



Forest Service

Region 6 Wentachee

Land and Resource Management Plan for the Wenatchee NF

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Department of
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Region

1990



Final Environmental Impact Statement

Land and Resource Management Plan

Wenatchee National Forest



FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE
LAND AND RESOURCE MANAGEMENT PLAN

WENATCHEE NATIONAL FOREST

Chelan, Kittitas and Yakima Counties in Washington

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LEAD AGENCY: USDA, Forest Service

RESPONSIBLE OFFICIAL: John F. Butruille, Regional Forester
Pacific Northwest Region

FOR FURTHER INFORMATION CONTACT: Glenn Hoffman, Forest Planner
Wenatchee National Forest
P. O. Box 811
Wenatchee, WA 98807
Telephone: (509)-662-4311

ABSTRACT

This Final Environmental Impact Statement documents public comments received on the Draft Environmental Impact Statement and Proposed Forest Plan, the changes made in response to those comments, and economic and environmental analysis of the Alternatives. Eleven Alternatives are presented for managing the 2,164,180 acre Wenatchee National Forest. These are: (NC) No Change, a representation of management direction included in the Forest's 1963 and 1968 Timber Management plans, (A/NFMA) Current Direction (No-Action), which continues the management of the Forest according to current plans and policies with levels of outputs and activities updated to reflect the current data base; (B) RPA, which responds to the 1980 Resources Planning Act (RPA) Program, (C) a modification of Alternative A/NFMA to maximize net public benefits and provide a balanced program in response to issues and concerns, (D) emphasizes the production of commodity resources such as timber, livestock forage, and developed recreation, (E) maximizes the protection of amenity values such as unroaded recreation opportunities, scenery, fish and wildlife habitat, (F) emphasizes the protection of unroaded recreation opportunities, scenery, fish and wildlife habitat, (G) offers a combination of commodity and amenity benefits, (H) provides the maximum timber production under the current land allocations, (I) a departure from the base timber sale schedule established under Alternative C; and (J) an alternative developed by timber industry, which emphasizes levels of timber harvest and commodity outputs while providing as much amenity values as possible.

Alternative C is the Forest Service preferred alternative. The selected alternative will become the Forest Plan and will guide management of the Wenatchee National Forest for the next 10 to 15 years.

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SUMMARY **OF THE FEIS**

INTRODUCTION

The Final Environmental Impact Statement (FEIS) discusses the eleven alternatives developed in preparation of the Land and Resource Management Plan (Forest Plan) for the Wenatchee National Forest. The environment to be affected and the environmental consequences of implementing each alternative are also discussed. The FEIS and Forest Plan responds to public comments received from review of the 1986 Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Plan and the 1988 Supplement to the DEIS. The Forest Plan would be in effect for 10 to 15 years, unless revised sooner.

This document is a general summary of the entire FEIS. It emphasizes the issues and concerns raised by the public and other local, State, and Federal agencies, regarding the management of the Wenatchee National Forest. The summary will briefly describe the purpose and need for the FEIS, and give a brief description of the alternatives, the affected environment, and the environmental consequences of implementation of any of the alternatives.

PLANNING AREA

The Wenatchee National Forest lies on the east side of the Cascade Mountain Range in Central Washington. It extends about 140 miles from north to south, and an average of 35 miles east to west. The Forest has a net area of 2,164,180 acres (larger than Delaware and Rhode Island combined).

Steep, rugged mountains and heavy snowpacks characterize the western portions of the Forest. In contrast, near desert conditions prevail in the eastern grass and shrub covered foothills and valleys. Between the two extremes are diverse forest and plant communities resulting from the variations in soils, elevation, aspect, temperature, precipitation, and fire influences. The major drainage systems include the Chelan, Entiat, Wenatchee, Upper Yakima, and Naches-Tieton River systems. All flow eastward toward the Columbia River. Principal Forest resources include timber, forage (for wildlife and livestock), recreation, water, and wilderness. Almost two out of every five acres on the Forest (39 percent) are Congressionally-designated wilderness.

PURPOSE AND NEED

The purpose of the Forest Plan is to direct all natural resource management activities on the Forest. Preparation of the Forest Plan is required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), plus the associated National Forest System Land and Resource Planning Regulations (36 CFR 219 - Refers to Part 219 of Title 36 of the Code of Federal Regulations dated 9/30/82).

The preparation of an environmental impact statement disclosing a preferred alternative and a broad range of additional alternatives is required by the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ), NEPA Regulations (40 CFR 1500), and the implementing regulations of NFMA (36 CFR 219). A FEIS is required because the Forest Plan is a major Federal action with a significant effect on the quality of the human environment. For the purpose of disclosure under NEPA, this FEIS and the accompanying Forest Plan are treated as combined documents.

PLANNING PROCESS

The National Forest Management Act implementing regulations require several planning steps to be used in developing the FEIS and the accompanying Forest Plan. These planning steps are described in Chapter I.

PLANNING ISSUES

An analysis of the issues determined that ten of the 18 issues identified were most important in formulating the various alternatives for the Wenatchee National Forest Plan. However, all 18 of the major issues influence the alternatives to some degree. The ten most important issues (which are stated as Planning Problems in Chapter I and Appendix A of the FEIS) are described as follows.

1. Recreation Use

An issue is the type of recreation use provided by the Forest. Some people want increased opportunities for unroaded, non-motorized recreation outside of designated wilderness while others want increased opportunities for motorized recreation and developed sites. Opinions also differ regarding the use and restrictions of off-road vehicles.

2. Unroaded Lands

The public is strongly divided on a related issue, that being the future management of the remaining roadless areas on the Forest. Some people would like to develop the timber and other commodity potentials of these areas. Others would like these areas to remain roadless and undeveloped. There are also conflicts about what types of recreation opportunities should be provided in roadless areas (motorized or non-motorized).

3. Wild and Scenic River Designation

There has been a strong response to Wild and Scenic River designation of waterways within the Forest. Some believe that all rivers on the Forest should be included in a preliminary administrative recommendation to Congress for consideration under the Wild and Scenic Rivers Act. Others are strongly opposed to the recommendation of rivers or river segments for designation, especially those rivers or river segments that include private lands within the corridors. Some are also concerned with the level of classification proposed for those river segments outside wilderness.

4. Water Quality and Quantity

Another issue is that of water quality and quantity. Topics include the reduction or elimination of water quality degradation, and the management direction needed to maintain or enhance water quality and quantity.

5. Wildlife Habitats

Wildlife habitat and diversity is believed by some people to have received inadequate attention on the Forest. Some are very concerned about the future management of anadromous fish habitat and old growth forest-dependent species, such as the northern spotted owl, pileated woodpecker, and marten. Other people are concerned that management for these wildlife species will seriously reduce the amount of timber available for harvest.

6. Old Growth

An issue of concern to the public is the treatment of old growth. Some believe that all existing old growth on the Forest should be preserved for biological diversity, dependent wildlife species, scenery or esthetic values. Others believe that both existing and potential old growth within designated wilderness is more than enough to meet all future needs.

7. Scenic Resources

The scenic quality of the environment is a concern of most recreation visitors to the Forest. Some would like to see maximum protection of the scenic values. Other people would like to see the Forest managed for wood fiber with few, if any, visual considerations. Still others favor the maintenance of scenic quality only in key travel corridors.

8. Production of Timber

Production of timber on the Forest is a major issue. Some people want increased emphasis on protection or preservation of non-timber resources, such as scenery, wildlife habitat, and water quality. Some want moderate development. Others favor intensive management of commercial timber species, with full development for consumptive uses.

9. Livestock Grazing

An issue is the level of livestock grazing the Forest should provide. Some feel that cattle and sheep cause damage to Forest resources and are not an appropriate use of the land. Others strongly favor grazing as a viable use of available forage and wish to see the use expanded.

10. Cultural Resource Sites

The locating and management of the cultural resource sites on the Forest is another issue. The American Indian community has strong concerns about the preservation of Indian cultural sites and traditional use areas. There are also local community concerns about the protection and interpretation of cultural resource sites.

CHANGES MADE BETWEEN THE DRAFT AND FINAL ENVIRONMENTAL IMPACT STATEMENTS

Several changes were made between the development of the draft and the completion of the FEIS as a response to public comments and internal concerns. These changes are summarized below. A more complete discussion may be found in the introductory pages of each chapter in the FEIS.

1. A new alternative, Alternative J, was added in response to public comment. This alternative was developed by timber industry representatives.
2. In all alternatives, the Mature/Old Growth MR network was revised. The number of Spotted Owl Habitat Areas was increased in response to the Supplement to the Regional Guide EIS. Management of the Spotted Owl Habitat Areas changed from a "managed" to a "dedicated" prescription which does not have a scheduled timber harvest.
3. Alternatives A/NFMA, C, E, F, G, H, and I all have different recommendations for Wild and Scenic River designation, and river segment classifications than were presented in the

draft. Alternatives C, E and F also have the new MP-1 prescription for the Mather Memorial Parkway along Highway 410, on the Naches Ranger District.

4. Alternative C, the preferred alternative, has numerous changes in allocation boundaries as well as the addition of two additional prescriptions: RE-4 Roadless Harvest and EW-3 Roadless Wildlife.

5. A number of changes were also made in the modeling used for the analysis of the alternatives.

AFFECTED ENVIRONMENT

The Wenatchee National Forest is currently managed under several different plans. Examples of these include the Wenatchee Timber Management Plan, the Chelan Unit Management Plan, the Kittitas Land Management Plan, District Multiple Use Plans, and the Alpine Lakes Area Land Management Plan. These plans do not meet the intent of the National Forest Management Act of 1976 nor do they provide sufficient direction to meet current issues and concerns.

The Forest Plan supercedes all previous land management plans prepared for the Forest except the Congressionally mandated Alpine Lakes Area Land Management Plan. However, management direction in the Alpine Lakes Plan is incorporated in the Forest Plan. Upon implementation, all subsequent administrative activities affecting the Forest, including budget proposals, will be consistent with the Forest Plan.

A description of the current condition of each resource and the environment to be affected by implementation of any of the alternatives is as follows:

Recreation Setting

The tremendous diversity of elevation, vegetation, and precipitation on the Wenatchee National Forest results in an equal variety of recreation uses and opportunities. The Forest has been the sixth most heavily visited National Forest in the country for the past several years, with almost five million recreation visitor days (RVD's) of use in 1986.

There are 244 developed recreation sites on the Forest including campgrounds, boating sites, recreation residence tracts, and ski areas. Campgrounds alone account for over a million RVD's of use per year. Theoretically, the present inventory of developed sites is more than adequate to meet the projected demand. However, developed sites in specific areas are overcrowded now and nearly all sites are used to near capacity on summer weekends.

Dispersed recreation refers to those recreation activities that occur outside of developed sites. It includes such activities as camping in undeveloped areas, hiking, off-road vehicle use, fishing, boating, hunting, river floating, horseback riding, mountain climbing, snowmobiling, cross-country skiing, firewood gathering, berry collecting, and driving for pleasure. Dispersed use (outside of wilderness) totaled over 2.2 million RVD's in 1986.

There are currently 2,463 miles of trail on the Forest with approximately 48 percent of them in wilderness. The Forest Service is presently working with users to develop four-wheel-drive trails, trail bike routes, and cross-country ski and snowmobile trails.

Roadless Areas

Inventoried roadless areas consisted of 556,272 acres as of April, 1985. With the passage of the Washington State Wilderness Act of 1984, these areas are not required to be managed for the purpose of protecting their suitability for wilderness classification. A full range of multiple use activities is currently taking place and will continue throughout the time that the Forest Plan is

being developed to the time of implementation. This will result in some change in the roadless status during that period of time.

Wild, Scenic, and Recreational Rivers

The Wild and Scenic Rivers Act of 1968, as amended, established a means of providing Federal protection for certain of the free-flowing rivers that remain in the United States. To be eligible for inclusion in the National Wild and Scenic River System, rivers were required to meet certain criteria set forth in Section 2(b) of the Act. In order to identify potential rivers meeting these criteria, the National Park Service completed a Nationwide Rivers Inventory (NRI) in 1982. Among the rivers listed in the NRI were the Chiwawa, White, Wenatchee and Yakima Rivers.

Present management of these river corridors is guided by the Forest Service Handbook. This direction specifies that management and development of the identified river and its corridor should provide for the protection of its free-flowing characteristics, to the extent authorized under law, as well as those outstandingly remarkable values which contribute to its eligibility.

Subsequent to publication of the NRI, some 30 additional rivers and creeks on the Wenatchee National Forest were identified for potential designation through in-Service study and public input. As a result, these rivers are being assessed for eligibility, and suitability where appropriate, for inclusion in the Wild and Scenic River System.

Cultural Resources

The cultural resource base of the Wenatchee National Forest includes a diverse and unusually rich range of historic and prehistoric artifacts and sites. These include: 1) historic cabins, trails, mines, ditches, railroad grades, emigrant trails, original highway grades, mulls, and homesteads; 2) historic Forest Service structures including guard stations, lookout towers, corrals, camps, administrative centers, and Depression-era campgrounds and buildings; and 3) prehistoric campsites, villages, graves, quarries, pictographs, workshops, trails, rock shelters, and religious sites.

In accordance with the National Historic Preservation Act of 1966, the National Environmental Policy Act of 1969, Executive Order 11593, the National Historic Preservation Act Amendment of 1980, as well as a series of implementing regulations and policy direction, the Forest has undertaken a program to identify, evaluate, preserve, and protect the cultural resources. A cultural resource overview, pulling together most of the recorded information relating to the prehistoric and ethnographic uses of the Forest has been completed and will be available for review at the Forest Supervisor's Office.

The relationship and interaction between American Indian rights and uses of the Forest and other Forest management activities is complex. Rights reserved to the Indians by the Yakima Treaty will affect Forest management activities, particularly those actions that could impact water quality and anadromous fish habitat. Other Indian-related issues that may influence Forest programs are protection of wildlife resource values and ancestral sites; recognition of social/cultural/religious values with respect to the landscape and resources of the Forest; and assurance of access to traditional resource collection areas. Litigation with respect to Indian rights is ongoing in many areas of the United States and may result in future changes in management practices on the Forest.

Scenery

The Wenatchee National Forest is well known for its outstanding mountain, valley, and lakeshore scenery. The Cascade Mountain landscapes are distinctive in beauty and nature, with sweeping vistas covering a variety of topography, ecotypes, and lifeforms. Natural-appearing environments exist on much of the Forest, even where intensive commodity management is occurring. Approximately 63 percent of the Forest, including wilderness, is in a natural-appearing condition.

Public demand for scenic quality is increasing and is expected to continue to increase over the next decade. The concerns for visual quality are highest along the major state highways that cross the Forest, along roads accessing wilderness, and in areas near recreation sites and communities.

Wilderness

Wildernesses occupy 39 percent of the area on the Wenatchee National Forest. They span a multitude of environments and elevations ranging from low, open, grassy slopes to timber stands of all ages and varied species; from subalpine and alpine areas to the rugged, rocky peaks of the Cascade Range.

Glacier Peak, Alpine Lakes, Henry M. Jackson, and Norse Peak Wildernesses extend across the Cascade Crest into the Mt. Baker-Snoqualmie National Forest while the William O. Douglas and Goat Rocks Wildernesses extend into the Gifford Pinchot National Forest. In the north, the Wenatchee and Okanogan National Forests share the Lake Chelan-Sawtooth Wilderness. Managers of neighboring Forests work together to develop uniform direction to be used by each Forest for the management of these shared wildernesses.

Wildlife

The Wenatchee National Forest provides year-round or seasonal habitat for an estimated 394 species of fish and wildlife. Of the 394 species, there are 13 amphibian, 18 reptile, 273 bird, and 90 mammal species. About 250 of these species reside year-round on the Forest.

The diversity of vegetation types and plant successional stages on the Forest provide a variety of wildlife habitats; some of these habitats are referred to as unique or special habitats. These include habitats such as old growth forests, riparian zones, snags, down, woody material, cliff and rim environments, caves and burrows, and talus slopes.

One Federally-listed endangered species, the peregrine falcon, is a known resident of the Forest, but no active nests have been located. The bald eagle is listed as threatened and several other species are considered sensitive.

Fisheries

Fish and the aquatic resources on the Wenatchee National Forest provide major recreational and aesthetic assets. Commercial and sport fisheries depend upon the Forest ecosystem to provide spawning and rearing habitat as well as a quality source of fresh water for downstream fisheries. Maintenance of this fish habitat and water quality is a strong concern of the public, State and Federal natural resource agencies, and representatives of the Colville and Yakima Indian Nations.

The aquatic habitats support 15 species of coldwater game fish and 3 species of warmwater game fish. Five species of coldwater anadromous and resident salmonoid species account for 95 percent of the angling. Four percent of the fishing is distributed among the other cold water species, while less than one percent is spent in warm water fishing.

Vegetation: Trees

Conifer forest ecotypes occupy approximately 69 percent of the Forest. Elevation, soil types, precipitation, and aspect combine to create a wide variety of ecological vegetative types. For simplicity, these can be combined into the three habitats of dry forest, wet forest, and sub-alpine parkland and mountain meadows.

Of the 2,164,180 acres on the Forest, 791,899 (37 percent) are tentatively suitable for timber production. These lands are capable of growing industrial wood and are suitable for timber management activities. During the period of 1977 to 1986, the average annual volume offered for sale was 192 million (MM) board feet, the average actually sold was 172 MM board feet, and the average actually cut each year was 162 MM board feet. The best estimate for the future is that demand will continue to be close to the average harvest level of the last few years.

Vegetation: Old Growth

It is estimated that there are 319,000 acres of old growth on the Forest, of which 148,000 acres are in wilderness. These latter acres occur in scattered parcels ranging in size from five acres to

several thousand acres. Low elevation areas that have been readily accessible to timber harvest have few old growth stands. Consequently, the amount of old growth has been in decline for many years.

Old growth is preserved for biological diversity, wildlife and plant habitat, and for aesthetic reasons. For the next decade, the majority of old growth will occur in wilderness, unroaded areas and in the areas protected for the old growth-dependent management indicator species (pileated woodpecker, pine marten and especially northern spotted owl).

Vegetation: Forage

The vegetative types within the Forest environment have evolved through the natural interactions of grazing animals and wildfire occurrence. Fire has removed or thinned the tree vegetation, while large grazing animals have used and modified the resulting forage resource. This interaction has provided a wide diversity of vegetation and wildlife. Grazing of vegetation by large wildlife species, such as elk, modifies the forage and retains some types in successional stages beneficial to use by deer, mountain sheep, and many small game and non-game species.

Forage for grazing animals is present throughout the Wenatchee National Forest as a component of all vegetative types. Supply is expected to exceed permitted use through all five decades, which will allow resolution of resource conflicts and also offer an opportunity to utilize livestock to enhance other resource objectives.

Vegetation: Unique Ecosystems

Unique ecosystems are areas that support or contain unique vegetative, ecologic or geologic attributes worthy of protection. The one existing area on the Forest is the Tumwater Botanical Area, which is to be managed in a near natural condition to protect the Lewisia tweedyi plant that grows there. Because the objective of the botanical area is to maintain a natural ecosystem, activities such as timber harvest, heavy recreation use, prescribed fire and grazing are prohibited.

Vegetation: Sensitive Plants

The Forest has a large variety of unique plant species. These species represent habitats and plant communities which have developed as a result of various geological processes. There are no known Federally-listed threatened or endangered plant species on the Forest, but there are 34 plant species that are on the Region 6 sensitive plant list. Of the 34, four are candidates for Federal listing and the remaining 30 are listed by the State of Washington. The extent of the populations of these species in the Forest is unknown.

Vegetation: Research Natural Areas

Research Natural Areas (RNA's) are part of a Federal system of such tracts established for nonmanipulative research and educational purposes. Each RNA is a site where some features are preserved for scientific purposes and natural processes are allowed to dominate. There are two established RNA's on the Forest: Meeks Table RNA in the Wilham O. Douglas Wilderness, and the Thompson Clover RNA located in Swakane Canyon.

The Research Natural Area Committee for the Pacific Northwest has formally proposed two other RNA's: Eldorado Creek in the Teanaway drainage and Fish Lake Bog at the west end of Fish Lake. There are also four additional areas that are currently recommended as candidate RNA's on the Forest.

Water

The Wenatchee National Forest manages mountain watersheds to produce clean water for individual and community water sources; for maintaining a viable fishery; to provide agricultural irrigation, and to provide for timber production, scenery, recreation, grazing, and wildlife. Annual runoff on the Forest is approximately 4 5 million acre-feet from 25 subwatersheds. Nearly 95 percent of the water used for irrigation and domestic water systems in Chelan, Kittitas, and Yakima Counties is provided from Forest lands.

Soil

Within the boundaries of the Forest are more than 200 different kinds of soils. Part of the reason for this high number are the more than 30 major geologic formations; elevations that range from 750 to over 9,000 feet; precipitation that ranges from 10 to over 120 inches per year; and the great variation in topography. Its variety is further complicated by the effects of transported materials such as glacial till, glacial outwash, alluvium, and volcanic ash and pumice.

A soil inventory for Forest lands within Kittitas County was completed in 1981. The Chelan County survey was completed in 1989 with Yakima County to be started in 1989. The Forest has also made an inventory of areas that have been significantly damaged and are presently eroded or causing management problems. Since 1980, the Forest has identified 143 inventoried sites.

Air

Since the passage of the Clean Air Act in 1970, the Wenatchee National Forest has been involved with the management of the air resource. Rapid development of the program has occurred during the last five years and this trend towards more intensive air resource management is expected to continue.

Within the Forest, prescribed fire and wildfire are the largest contributors to the temporary degradation of air quality (primarily causing reduced visibility from smoke or haze), but the management of all vegetation is known to be important to the maintenance of the chemical components of the atmosphere. The quality of the air resource on the Wenatchee National Forest can normally be described as "good" in comparison with the more populated areas which surround the Forest.

Minerals

The Forest has a long history of mining, with numerous claims having been located in the 1870's and maintained since then. Excluding the Holden Mine, the Forest has a modest past production record. More recently, following the Cannon gold mine discovery in 1983, more than 7,000 mining claims were located in the surrounding area. However, present mineral activity on Forest lands is relatively minor in scope.

In approximate decreasing order of importance, the Forest contains potentially significant occurrences of copper, gold, molybdenum, silver, lead, zinc, tungsten, iron, chromium, nickel, mercury, and manganese. Based upon available data, oil and gas resources are not presently known to exist on the Forest in commercial quantities but only limited geophysical surveys have been completed. Nevertheless, there are a total of 22 oil and gas leases issued covering 64,113 acres.

Roads

Since the 1940's, the majority of Forest road construction has been in support of timber management activities. Currently 33 percent of the total Forest and 53 percent of the non-wilderness acres are considered roaded. In the roaded areas, there are approximately 3.75 miles of road for each square mile of land.

In 1988, there were an estimated 5,110 miles of Forest Service roads on the Forest. About 18 percent of this total are classified as arterial and collector roads. Forest arterials and collectors access large or popular land areas and usually connect with State and County roads to form an integrated network of primary and secondary travel routes. The system is 98 percent complete.

Fire

Fire has played an important role in the ecology of the Wenatchee National Forest and is responsible for much of the diversity of vegetation that exists today. Wildfires ranging from 100 to several thousand acres in size have occurred in the northeast portion of the Forest every 10-20 years. The numbers of fires in the southerly portions of the Forest are similar but acreages are much smaller. New policies call for fighting fire in the most cost-efficient manner.

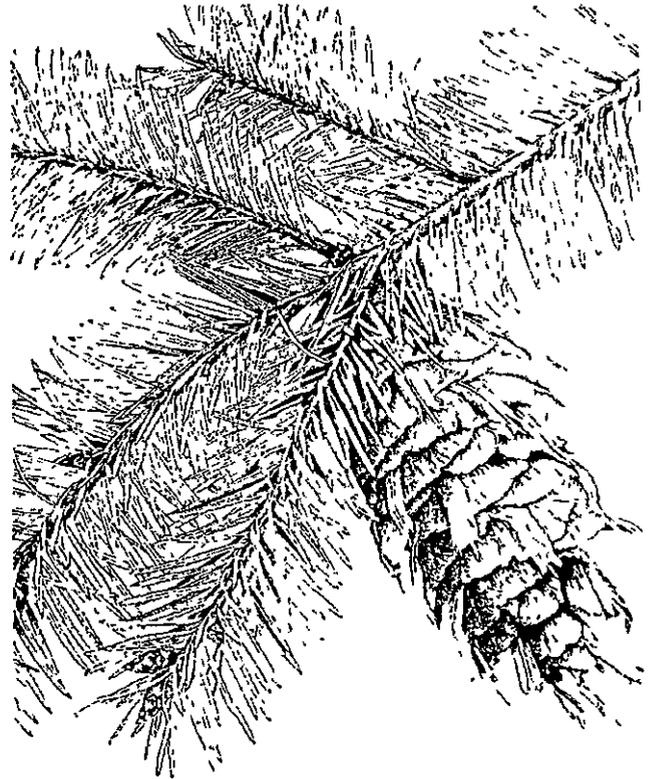
Currently, the Forest is using prescribed fire to treat an average of 6,354 acres annually for the enhancement of resources such as wildlife habitat, scenic diversity, recreation area management, site preparation for reforestation, and the reduction of fire hazards.

Social/Economic

Many of the residents of the communities adjacent to the Forest derive their livelihood from Forest-related activities, and many participate in a wide variety of Forest-oriented recreation. The balance of commodity and amenity resource uses are important components in their lives. In addition, Forest management affects out-of-area recreationists who live in metropolitan areas of Washington State. These people are most concerned with the quality of the recreation setting and scenery, wilderness, road access and hunting opportunities.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

Eleven alternatives were developed encompassing a full range of resource outputs and environmental effects. Each alternative presents a combination of management areas where sets of management practices and activity scheduling occur. Some management areas emphasize protection of wildlife habitat and naturally-occurring ecosystems, while others emphasize sustained timber yields or various types of recreation opportunities. Each alternative distributes Forest lands to management areas in different ways. These are listed by acreage in Table S-1.



**TABLE S-1
ACREAGES IN MANAGEMENT AREAS BY ALTERNATIVE 1/**

MANAGEMENT AREAS 5/	ALTERNATIVES									
	A/NFMA	B	C	D	E	F	G	H	I	J
Water	7,780	7,780	7,780	7,780	7,780	7,780	7,780	7,780	7,780	7,780
EF-1	4,770	4,770	4,770	4,770	4,770	4,770	4,770	4,770	4,770	4,770
EW-1	17,151	77,784	118,742	77,784	148,189	148,189	146,493	17,151	118,742	123,025
EW-2	53,849	58,046	47,361	58,046	38,012	40,832	47,573	52,301	47,361	52,470
EW-3	0	0	19,059	0	0	0	0	0	19,059	0
GF	393,306	613,344	389,089	613,344	153,955	202,949	224,743	393,243	389,089	615,887
OG-1	66,823	71,063	79,840	71,063	62,901	69,028	66,039	66,823	79,840	71,297
OG-2	56,074	55,671	49,015	55,671	14,862	15,688	45,071	56,075	49,015	57,813
RE-1	4,494	8,544	6,021	8,544	4,388	7,526	7,929	4,494	6,021	8,544
RE-2a	64,597	69,706	79,607	69,706	94,002	91,373	197,204	64,597	79,607	61,332
RE-2b	2/	7,865	16,748	7,865	38,754	38,754	26,437	2/	16,748	1,081
RE-3	59,551	84,462	116,092	84,462	320,038	259,088	100,362	59,551	116,092	79,480
RE-4	0	0	6,614	0	0	0	0	0	6,614	0
RM-1	33,708	81,663	17,702	81,663	6,106	7,166	7,632	33,708	17,702	62,244
RN-1	1,717	2,247	2,247	2,247	2,247	2,247	2,247	1,717	2,247	2,247
SI-1	136,911	72,950	70,512	72,950	74,010	74,010	70,491	136,911	70,512	70,893
SI-2	382	2,056	2,798	2,056	6,402	6,233	742	382	2,798	2,056
ST-1	125,484	55,163	83,635	55,163	178,230	163,368	147,469	120,968	83,635	36,655
ST-2	286,733	50,032	174,880	50,032	133,858	147,193	210,476	286,733	174,880	65,572
UC-1	3/	3/	3/	3/	3/	3/	3/	3/	3/	3/
WI-1 4/	841,034	841,034	841,034	841,034	841,034	841,034	841,034	841,034	841,034	841,034
WS-1	6,742	0	5,554	0	15,519	18,041	6,614	12,423	5,554	0
WS-2	3,074	0	11,363	0	3,816	3,752	3,074	3,519	11,363	0
WS-3 4/	6,636	0	23,426	0	26,924	26,776	6,632	23,426	23,426	0
MP-1	0	0	13,717	0	13,717	13,717	0	0	13,717	0

1/ Acres not shown for Alternative NC as it does not have management areas. Roughly equivalent acres would be 841,034 for WI-1, 7,780 acres for Water, 1,081,049 acres for GF, 8,200 acres for RE-1, 36,337 acres for RE-2a, 276 for RN-1, 1,104 acres for SI-2, and 164,000 acres for ST-1.

2/ Included in RE-2a

3/ Acres distributed among other management areas

4/ WI-1 acreage totals include WS-3 acres (except 1,590 acres in Alt E, 1,442 acres in Alt F, and 170 acres in Alt C and I)

5/

MANAGEMENT AREA LEGEND

- | | |
|--|--|
| EF-1 Experimental Forest | RE-4 Dispersed Recreation, Unroaded, Timber Harvest |
| EW-1 Key Big Game Habitat | RM-1 Range Management |
| EW-2 Riparian-Aquatic Habitat Protection Zone | RN-1 Research Natural Areas |
| EW-3 Key Big Game Habitat, Unroaded | SI-1 Classified Special Areas - Scenic and/or Recreation |
| GF General Forest | SI-2 Classified Special Areas - Other |
| MP-1 Mathers Memorial Parkway | ST-1 Scenic Travel - Retention |
| OG-1 Old Growth Management (dedicated) | ST-2 Scenic Travel - Partial Retention |
| OG-2 Mature Habitat (managed) | UC-1 Utility Corridors |
| RE-1 Developed Recreation | WI-1 Wilderness |
| RE-2a Dispersed Recreation, Unroaded Motorized
(w/out 4x4 routes) | WS-1 Scenic River (Proposed) |
| RE-2b Dispersed Recreation, Unroaded Motorized
(w/ 4x4 routes) | WS-2 Recreational River (Proposed) |
| RE-3 Dispersed Recreation, Unroaded Nonmotorized | WS-3 Wild River (Proposed) |

Each alternative is comprised of land uses, management practices, and activity schedules which result in a unique combination of resource outputs, land uses and environmental conditions. The Preferred Alternative is that alternative which is selected from all those formulated as the one which best maximizes the net public benefits. The actual selection of the Preferred Alternative is done by the Regional Forester.

For the Wenatchee Final Environmental Impact Statement, the Preferred Alternative is Alternative C.

The major reason that alternatives differ is that each responds to issues, concerns, and resource opportunities identified for this Forest in different ways. The following narrative and subsequent Table S-2 summarize these differences between alternatives.

The No Change Alternative (Alternative NC)

The No Change Alternative was developed in response to decisions made regarding appeal number 1588 brought by the Northwest Forest Resource Council on May 19, 1986. The appeal centered on a decision by Regional Forester James F. Torrence to "require inclusion of minimum management requirements (MR's) in the Current Direction Alternative for each Forest Plan." In response to this, a No Change Alternative was developed to represent the existing Timber Management plans. Consequently, it does not comply with all provisions of the National Forest Management Act of 1976 (NFMA) and regulations (36 CFR 219) promulgated by the Secretary of Agriculture to implement NFMA.

Alternative NC displays the objectives, outputs, and effects of the Wenatchee National Forest's Timber Management (TM) Plans so that they can be compared with the other alternatives. However, since the development of the TM plans, new inventories, assumptions about resource interrelationships, and new methods for predicting timber growth and yields have been developed. Therefore, a reviewer should be aware that information provided for Alternative NC is frequently based on outdated inventories and yield tables and is not always comparable to information provided for the other alternatives.

Alternative A/NFMA

This is the No Action Alternative. It was formulated to maintain the current management direction for the Forest. Sources of that direction were the Alpine Lakes Area Management Plan, the Chelan and Kittitas Unit Plans, and the Ranger District multiple use plans. Alternative A/NFMA portrays how these plans would influence the flow of goods and services over the life of this plan (10-15 years) based upon the use of current National Forest Management Act of 1976 (NFMA) planning data. It also approximates the current budget. This alternative meets all the management requirements of NFMA, including protection of habitat for wildlife dependent upon old growth and mature habitat types.

One of the features of this alternative is that it contains significantly fewer acres of EW-1 (Key Big Game Habitat) than any other alternative except the No Change Alternative. The reason for this is that most of the existing plans did not contain specific allocations for key big game habitat.

Alternative B

This alternative is an attempt to meet the 1980 Resources Planning Act (RPA) program which has been assigned to the Forest through the Regional Guide.

The 1980 RPA timber target strongly influenced the approach. This alternative uses the Alternative D land allocations. It portrays the Forest's maximum timber producing capability while considering other resource needs. This alternative would result in the greatest amount of development of the Forest.

A feature of this alternative and Alternative D is the higher allocation to General Forest (GF) and a corresponding decrease in the unroaded and scenic travel allocations. The major difference between this alternative and Alternative D is that in Alternative B more intensive timber management will be practiced on the GF land allocation, with higher yields and higher annual sale quantities resulting.

Alternative C

This alternative was developed by adjusting the current direction (Alternative A/NFMA) to a land allocation which would maximize net public benefits and which would provide a balanced program in response to the issues and concerns. The purpose of Alternative C is to respond to concerns for protecting wildlife and other amenity resources, and provide a variety of recreation opportunities while managing the Forest for commodity outputs. This was accomplished by modifying existing plans and practices to respond to public concerns received during issue identification early in the planning process. Further modification of this alternative has been done to respond to comments received through the public response to the Draft EIS.

Another way Alternative C differs from Alternative A/NFMA is that it allocates many more acres to key big game range, and increases the acreage allocated to roadless management.

Alternative D

This alternative emphasizes the production of resources such as timber, range, forage, developed recreation, minerals, and other resources which have the potential to return revenue to the Federal Treasury and local counties. Management of other resources is at economically and environmentally feasible levels consistent with the emphasis on market-oriented outputs.

A feature of this alternative and Alternative B is the higher allocation to General Forest (GF) and a corresponding decrease in the unroaded and scenic travel allocations. The major difference between this alternative and Alternative B is the economic emphasis. This results in less intensive timber management on the GF land allocation, and a lower annual sale quantity with an increased present net value compared to Alternative B.

Alternative E

This alternative allocates all currently roadless areas outside of the existing wilderness and the Alpine Lakes Management Area to a management prescription which will maintain their roadless status. It also emphasizes the protection of natural scenery, fish and wildlife habitat, and other amenity values. Management of other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

Alternative F

This alternative emphasizes unroaded recreation, protection of natural scenery, protection of fish and wildlife habitat, and other amenity values. It allocates approximately 80 percent of the currently roadless area outside of the existing wilderness and Alpine Lakes Management Area to roadless management prescriptions with heavy emphasis on non-motorized recreation. Management of other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

The Forest was assisted in the development of this alternative by a coalition of environmental groups from throughout the state.

Alternative G

This alternative is an attempt to balance the land allocations between amenity values and commodity production emphasis. The goal is to intensify commodity production on the lands not allocated to roadless management. Of the current roadless areas outside of existing wilderness and the Alpine Lakes Management Area which are suitable for timber production, approximately half was allocated to roadless management with a heavy emphasis toward motorized recreation, and the remainder was allocated to commodity production. On the lands allocated to timber production, a trade-off was reached between maximizing present net value and maximizing timber production.

The Forest was assisted in the development of portions of this alternative by representatives of off-road vehicle users groups from throughout the State.

Alternative H

This alternative portrays the maximum timber producing capability of the Forest under the present land allocations of existing management direction. It has the same land allocations as Alternative A/NFMA. The major difference between this alternative and Alternative A/NFMA is that more intensive timber management will be practiced on the General Forest land allocation, which will result in higher yields and higher annual sale quantities with a corresponding decrease in present net value.

Alternative I

Alternative I is a departure from the base sale schedule established under Alternative C, the preferred alternative. It has the same land allocations as Alternative C. The timber harvest schedule for Alternative C is based upon nondeclining flow, never exceeding long-term sustained yield. Alternative I has the same long-term sustained yield capacity as Alternative C but deviates from nondeclining flow. The level of timber harvest in the first decade approximates the average annual sell volume for fiscal years 1975 through 1984 under the current Timber Management Plan. The level of timber harvest gradually declines in the second and third decades, equaling that of Alternative C in the fourth decade. This would allow local industry to phase into a lower level of timber harvest more gradually than in Alternative C. The effects on other resources could be greater in the early decades due to the accelerated rate of timber harvest under the departure.

Alternative J

This alternative was developed by representatives of timber industry after release of the Wenatchee DEIS. They referred to it during the public input process as the "Essential Alternative". The goal of this alternative is to maintain timber harvest and other commodity outputs at their highest levels, while providing as much of the amenity outputs as possible without dropping ASQ below the level of the existing timber management plans.

Alternative J has the highest acreage of GF land allocation of any of the alternatives with correspondingly lower roadless and scenic travel allocations. There are no scenic travel retention allocations outside of the Alpine Lakes Management Area, and there is only a limited partial retention allocation along the Mather Memorial Parkway, the Entiat River, Lake Wenatchee and a part of the Chiwawa River road.

SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS

The following table summarizes the outputs of the alternatives as they relate to the planning problems. On this one table, the reader can quickly compare the major quantifiable results of each alternative. The qualitative results can be found in Chapter II of the FEIS, Table II-3b.



TABLE S-2

**INDICATORS OF RESPONSIVENESS OF ALTERNATIVES
TO MAJOR ISSUES AND NATIONAL CONCERNS**

INDICATORS OF RESPONSIVENESS	ALTERNATIVES 1/										
	A/NFMA	D	C	F	G	H	I	E	J	B	NC
Present Net Value (million \$)	1976	1937	1910	1897	1889	1864	1837	1834	1825	1756	1/
Average Annual Net Receipts.											
Decade 1 (MM \$)	-10.5	-12.6	-15.0	-13.8	-15.3	-16.0	-16.3	-16.8	-25.1	-26.1	-2.4
Decade 5 (MM \$)	-6.2	-7.9	-8.5	-9.1	-9.7	-9.8	-14.2	-13.4	-1.6	-1.4	1/
Average Annual Non-cash Benefits											
Decade 1 (MM \$)	81.3	81.2	81.3	80.3	81.4	81.3	81.2	81.3	81.2	81.2	1/
Decade 5 (MM \$)	115.4	114.1	115.3	114.9	115.8	115.4	115.0	115.9	114.9	114.2	1/
First Decade Payment to Counties (MM \$)	+3.0	+3.4	+3.3	+2.0	+2.5	+3.1	+3.7	+1.9	+2.1	+2.0	+3.8
First Decade Changes in Jobs Compared to 1982 Base Period	+39	+279	+203	-473	-225	+324	+413	-520	+630	+577	+378
First Decade Change in Income (MM \$)	+65	+7.2	+5.14	-13.3	-6.54	+8.43	+10.86	-14.56	+16.76	+15.31	+12.1
Second Decade Area by ROS Class											
Wilderness	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%
Primitive	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	1/
Semi-Primitive											
Non-Motorized	6	7	8	14	6	5	8	15	7	7	1/
Semi-Primitive											
Motorized	12	12	11	11	16	13	11	10	10	11	1/
Roaded Modified, or Natural or Rural	43	42	39	43	36	42	36	44	43	1/	
Allocation of Inventoried Roadless Areas											
Roaded Mgmt.	55.2%	58.8%	46.4%	22.0%	31.0%	55.2%	46.4%	10.2%	62.4%	58.8%	93.3%
Unroaded Mgmt	44.8	41.2	53.6	78.0	69.0	44.8	53.6	89.8	37.6	41.2	6.7
First Decade Increased Water Yield (M Acre Ft)	13.8	15.7	15.5	8.7	11.2	19.1	17.3	8.2	29.1	28.5	24.4
Average Annual Activity Sediment (M Tons)	69.2	65.5	72.4	51.5	60.9	89.4	71.4	50.3	96.6	94.4	94.9
Key Wildlife Habitat (Acres)	17151	77784	118742	148189	146493	17151	118742	148189	123025	77784	0
Old-Growth Retained Decade 5 (M Acres)	261.6	254.5	261.2	275.7	254.3	258.4	261.2	277.7	250.1	250.4	1/

TABLE S-2 (continued)

**INDICATORS OF RESPONSIVENESS OF ALTERNATIVES
TO MAJOR ISSUES AND NATIONAL CONCERNS**

INDICATORS OF RESPONSIVENESS	ALTERNATIVES 1/										
	A/NFMA	D	C	F	G	H	I	E	J	B	NC
Anadromous Commercial Fish Harvest (M Lbs)	328	328	328	328	328	328	328	328	328	328	1/
Visual Quality Objectives											
Preservation	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Retention	22.4	18.0	24.2	35.2	29.7	22.5	24.2	38.3	16.1	18.0	11.2%
Partial Retention	21.2	10.5	15.4	12.3	16.9	21.1	15.4	11.4	11.0	10.5	0
Modification	2.6	7.6	6.8	7.4	7.4	2.6	6.8	7.4	8.8	7.6	0
Maximum Mod	14.9	25.0	14.7	6.2	7.1	14.9	14.7	4.0	25.2	25.0	49.9%
									2/		
First Decade Average Annual Harvest - Programmed Timber Sales(MMCF)	23.4	27.4	26.1	14.6	18.7	28.9	29.6	13.8	36.5	36.0	32.4
Long-Term Sustained Yield (MMCF)	27.7	30.8	27.2	19.2	23.4	29.0	27.1	18.7	34.8	34.2	29.9
Suitable Timber Lands (Acres)	591794	643639	576074	421265	503326	603620	576074	410935	686918	681186	787751
Mineral Resource Accessibility											
Withdrawn as Wilderness (%)	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9
Withdrawn by Prescription(%)	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Open, but highly Sensitive (%)	19.0%	17.8%	22.3%	28.1%	24.8%	19.3%	22.3%	30.3%	16.9%	17.8%	19.0%
Open with Only Moderate to Few Constraints (%)	42.1%	43.3%	38.8%	33.0%	36.3%	41.8%	38.8%	30.8%	44.2%	43.3%	42.1%

1/ Alternatives are ranked in order of decreasing present net value (except for NC which does not have a PNv computed) All resource outputs cannot be reasonably estimated for Alternative NC because the TM plans were based on different yield tables and resource relationships.

2/ Alternative J has different standards and guidelines for key wildlife habitat areas and Retention/Partial Retention areas than the other alternatives Refer to Appendix D for more information

ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

Implementation of any alternative, including the preferred alternative, would affect the environment and resources of the Forest and its surroundings. Both short-term effects, meaning effects which could occur over the first few decades, and long term effects, which could be anticipated in decades beyond, were considered. Direct and indirect effects were analyzed. Quantitative and qualitative outputs and effects are summarized in Tables II-3a and II-3b in Chapter II of the FEIS.

The following section summarizes the consequences the different alternatives would have on the Forest and its surroundings. The discussion is organized by environmental component.

Recreation Setting

The ability of the Forest to supply a spectrum of recreation opportunities varies significantly among alternatives. Some, such as Alternatives E and F place more emphasis on primitive and semi-primitive (undeveloped) recreation opportunities. Other alternatives place more emphasis on developed, or roaded, dispersed recreation in natural-appearing or modified environmental settings.

Alternatives NC, A/NFMA, E, F and H emphasize developed recreation at current levels. Selected sites would be brought up to fee standards, with the remainder maintained with very few improvements. In all five of these alternatives, some overcrowding and conflicts could occur at the more popular sites. In contrast, Alternatives B, C, D, G, I and J would provide a high level of developed site capacity, with few impacts resulting to the recreation setting as a result of visitor use.

Dispersed recreation opportunities and the quality of the recreation setting in dispersed recreation areas is of utmost importance to visitors to the Forest. It is in dispersed areas that most of the recreation visitor use occurs and where a wide range of activities are conducted. The capacity for roaded, dispersed recreation greatly exceeds the demand in all alternatives. Impacts to the social setting (congestion, noise, dust, law enforcement problems) will only occur in highly popular areas during peak use times.

Unroaded Areas

Roadless areas would be managed differently under each alternative, according to the objectives of the alternative. Roadless areas allocated to development of timber and forage resources would change in character. Over time, they would no longer offer opportunities for semiprimitive, nonmotorized recreation, nor would they qualify for wilderness designation. The quality and quantity of old growth habitat and scenic quality in these areas would also decline. On the other hand, timber management opportunities and potential volumes would be foregone in roadless areas allocated to provide unroaded recreation opportunities (RE-2a, RE-2b and RE-3). Table S-3 displays the number of acres being retained in the unroaded setting by alternative.

TABLE S-3
PERCENTAGE OF INVENTORIED ROADLESS AREAS REMAINING ROADLESS

ROADLESS AREA	ACRES 1/	ALTERNATIVE									
		A/NFMA	B	C	D	E	F	G	H	I	J
Myrtle Lake	10,918	100	82	100	82	100	100	100	100	100	82
Rock Creek	32,924	54	52	69	52	100	96	92	54	69	32
Twin Lakes	22,048	62	61	65	61	100	97	66	62	65	61
Canyon Creek	9,158	0	46	46	46	100	97	49	0	46	46
Heather Lake	11,067	14	13	25	13	100	81	23	14	25	13
Chelan	71,063	84	59	90	59	100	85	82	84	90	52
Entiat	71,254	27	36	50	36	100	91	94	27	50	36
Stormy	32,500	0	17	30	17	95 ^{2/}	89	89	0	30	16
Slide Ridge	10,091	0	11	25	11	100	92	0	0	25	10
Devil's Gulch	25,186	37	0	34	0	100	87	78	37	34	0
Taneum	25,122	25	10	28	10	100	95	34	25	28	0
Manastash	8,798	46	40	69	40	100	70	54	46	69	0
Norse Peak Adj.	11,300	23	0	12	0	100	12	35	23	12	0
Quartz	8,756	1	1	13	1	100	71	96	1	13	0
Naneum	6,911	100	0	19	0	100	86	0	100	19	0
Lion Rock	4,834	0	80	74	80	100	94	94	0	74	80
Wm. O. Douglas Adj.	22,938	3	0	1	0	100	11	6	3	1	0
Blue Slide	18,571	0	13	16	13	100	80	80	0	16	3
Goat Rocks Adj.	7,357	76	0	18	0	100	50	31	76	18	0
Nason Ridge 3/	19,123	63	63	63	63	63	63	63	63	63	63
Alpine Lakes Adj. 3/	44,393	64	64	64	64	64	64	64	64	64	64
Thorp Mountain 3/	15,667	28	28	28	28	28	28	28	28	28	28
Teanaway 3/	66,293	79	79	79	79	79	79	79	79	79	79

1/ Net National Forest area as of April 1985

2/ There are 1,632 acres of an Experimental Forest which fall within the boundaries of this roadless area. They will be managed for research purposes and therefore are subject to access by road

3/ These areas lie within the Alpine Lakes Management Plan Area. The management of these areas has been directed by that plan which is currently being implemented. The management will not be changed by the Forest Plan and therefore the current management allocations for these areas will remain unchanged through all alternatives. These allocations include both roaded and unroaded management activities

The explanations given under footnotes 2/ and 3/ are given to indicate why 100 percent of the combined inventoried roadless area is not allocated to unroaded management under Alternative E. Because of the presence of bare rock, talus slopes, ice, unproductive grounds, and isolated pockets of productive lands, 100 percent of the roadless areas also cannot be allocated to full timber production and roaded development.

Wild, Scenic, and Recreational Rivers

Of the 33 rivers and river segments on the Forest considered for potential inclusion in the Wild and Scenic River System, ten were determined to meet the eligibility criteria. Recommendations for these ten vary by alternative.

In Alternatives E and F, all ten rivers are recommended for designation at their highest potential classification. The values and characteristics which contribute to the eligibility of these waterways would be fully protected under these two alternatives. Alternatives C and I recommend nine of the ten eligible rivers (only the Little Wenatchee is excluded), but with some segments proposed at less than their highest potential classification. Areas with substantial private holdings are generally recommended as Recreational in these latter alternatives, so as to accommodate local governmental land use objectives.

Alternative H is similar to Alternative C in that portions of nine of the ten eligible rivers are recommended for designation. However, those segments with substantial private holdings are not proposed for inclusion in the Wild and Scenic River System (the lowest segments of the Icicle, White, Napeequa, and Chiwawa Rivers, the lower two segments of the Cle Elum River, and the upper segment of the Wenatchee River). These corridor segments would be managed instead for Scenic Travel, with a visual quality objective of Retention. Most of the river values would be protected in Alternative H, but there could be a modification or loss of the free-flowing character of those segments that are not included in the National System.

The White, Chiwawa and Wenatchee Rivers, which were identified in the Nationwide Rivers Inventory, are the only rivers recommended for inclusion in Alternatives A/NFMA and G. Designation of some segments of these rivers is proposed at less than their highest potential classification, but in each case, the outstandingly remarkable values would be protected.

In contrast, none of the eligible rivers are proposed for inclusion in the National System in Alternatives NC, B, D and J. In these alternatives, the river corridors would be subject to a full range of management activities, with the potential for substantial modification of the visual landscape.

Cultural Resources

In addition to the Forest-wide Standards and Guidelines, the SI-2 management prescription will offer protection of significant cultural resources. However, the management area allocations surrounding the cultural resources do change by alternative. It is assumed that these allocations will affect the overall environmental setting surrounding the cultural resources and may impact currently unidentified subsurface materials. The greater the number of known or potential cultural sites that fall within management areas that may create a high level of modification, the greater is the risk of adverse impacts. In general, those alternatives with higher timber harvest and other developmental activities have a higher potential of adverse impacts.

Alternatives E, F and G overall involve moderate levels of modification to the landscape. The average proportion of known cultural sites and potential or reported cultural use areas that occur within the high impact management allocation areas is relatively low (about 30%). Under Alternatives A/NFMA, C, H and I, approximately 40% of the known and potential cultural resources occur within management area allocations that may have a high level of impact. Visual settings around some significant sites might experience modification apparent to the viewer. Alternatives NC, B, D and J have considerable potential for affecting cultural resources. Generally, 60% of all known cultural sites and potential or reported use areas occur within possible high impact management area allocations. These latter alternatives would require a substantial number of mitigation and protection measures.

Scenery

Scenic quality is affected by the nature of the land allocations proposed in each of the alternatives. The amenity-oriented alternatives will have a greater number of acres allocated to prescriptions that would provide for higher scenic quality and a more natural-appearing landscape. Alternatives E, F and G would emphasize visual quality. Most of the viewsheds would be managed in a natural to slightly altered condition.

Conversely, the commodity-oriented alternatives have higher levels of timber harvest and allocate more acres to prescriptions that will result in a more pronounced modification of the landscape. In Alternatives NC, B, D and J, the major viewsheds and most of the commercial forest lands would be heavily altered. In Alternative J, no viewsheds would be allocated to scenic management.

In the mid-range are Alternatives A/NFMA, C, H and I, which would protect or enhance many of the scenic areas on the Forest, although some viewsheds would not retain their natural-appearing character. In addition, Alternative I would produce greater alteration of the landscape in the first decade due to the increased harvest of timber during that period.

Wilderness

The management of wilderness does not vary by alternative. However, the type and intensity of resource management adjacent to the wilderness, and the type and degree of access afforded would affect the character of the wilderness. This, in turn, could affect both solitude and the overall quality of the recreation experience.

Timber harvest and associated road building activities adjacent to wilderness would affect the scenic quality of views from within the wilderness. The noise and visible evidence of human activity could also disturb the quality of the wilderness experience for visitors. Decreases in other recreation settings on the Forest could displace use to the wilderness, requiring an increase in managerial controls to minimize the impacts of the increased use.

Table S-4 indicates the relationship of unroaded and roaded recreation setting allocations adjacent to each wilderness boundary for each alternative. It also indicates the approximate amount of the unroaded setting that is motorized and non-motorized.

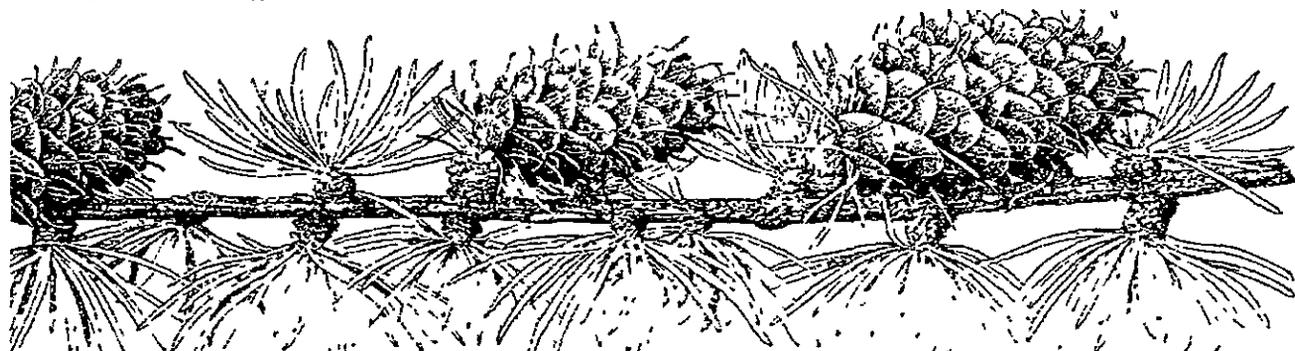


DAN O'CONNOR

Table S-4
ESTIMATED PERCENT OF EACH RECREATION SETTING ALLOCATED
ADJACENT TO EACH WILDERNESS BOUNDARY

	ALTERNATIVE									
	A/NFMA	B	C	D	E	F	G	H	I	J
<u>Lake Chelan-Sawtooth 1/</u>										
Unroaded Motorized	100	90	90	90	100	0	90	100	90	90
Unroaded Nonmotorized	0	0	0	0	0	87	0	0	0	0
Roaded	0	10	10	10	0	13	10	0	10	10
<u>Glacier Peak</u>										
Unroaded Motorized	45	5	11	5	6	0	15	45	11	5
Unroaded Nonmotorized	36	62	64	62	73	78	58	36	64	62
Roaded	19	33	25	33	21	22	27	19	25	33
<u>Henry M. Jackson</u>										
Unroaded Motorized	0	0	0	0	0	0	0	0	0	0
Unroaded Nonmotorized	10	11	30	11	92	92	27	10	30	11
Roaded	90	89	70	89	8	8	73	90	70	89
<u>Alpine Lakes</u>										
Unroaded Motorized	25	25	25	25	25	25	25	25	25	25
Unroaded Nonmotorized	47	47	47	47	47	47	47	47	47	47
Roaded	28	28	28	28	28	28	28	28	28	28
<u>Norse Peak</u>										
Unroaded Motorized	0	0	0	0	0	0	25	0	0	0
Unroaded Nonmotorized	0	0	0	0	53	25	0	0	0	0
Roaded	100	100	100	100	47	75	75	100	100	100
<u>William O. Douglas</u>										
Unroaded Motorized	0	0	0	0	3	0	1	0	0	0
Unroaded Nonmotorized	0	0	0	0	38	3	1	0	0	0
Roaded	100	100	100	100	59	97	98	100	100	100
<u>Goat Rocks</u>										
Unroaded Motorized	0	0	0	0	0	0	0	0	0	0
Unroaded Nonmotorized	21	0	0	0	49	13	13	21	0	0
Roaded	79	100	100	100	51	87	87	79	100	100

1/ As water is not "allocated," the boundaries adjacent to Lake Chelan are not included. Lake Chelan does have motorized boat traffic.



Wildlife

Each alternative would have effects on environmental components that influence habitat, such as trees, forage, riparian areas, fire, and roads. Changes in wildlife habitat produce changes in the diversity, abundance and distribution of wildlife species. The nature of the effect will depend upon the habitat requirements of the particular species. Habitat for threatened, endangered, and sensitive species would be protected in all alternatives. Habitat for management indicator species (MIS) would also be provided under every alternative except NC through the management requirements (MR's).

Mule deer, Rocky Mountain elk and mountain goats are the MIS for big game habitat. These are affected by alterations in the distribution, arrangement and amount of cover and forage, by road use and by range improvements and forage utilization by livestock. Alternatives E and F would have the least impact on big game due to the high level of unroaded, non-motorized land allocations, the smaller allocations to General Forest, and the high allocation to prescriptions that maintain or improve key big game habitats on both summer and winter ranges. Alternatives NC, B, D and J, on the other hand, would have a greater impact due to the emphasis on roaded recreation, the high allocations to General Forest and intensive range management, and in all but J, the very small or lack of allocation to the key big game prescriptions. Alternatives A/NFMA, C, G, H and I would vary in their effects with respect to recreation, timber, range management and key big game prescriptions, but the overall impact would be a moderate one.

All alternatives have standards for snag management that would meet or exceed that needed to maintain minimum viability levels of the primary cavity excavators. However, Alternatives E, F and G would have the least impact on primary cavity excavator habitat due to the lower timber harvest levels. Alternatives A/NFMA, C, D, H and I would have a moderate impact, and NC, B and J, with their heavy emphasis on timber production, would have the highest risk of impact.

The MIS for mature and old growth habitats are the northern spotted owl, pileated woodpecker, pine marten, and northern three-toed woodpecker. Two habitat factors can limit the populations of these species: the amount of suitable habitat in a given area, and the distribution between suitable habitat areas. Alternatives E, F and G would provide the greatest amount of mature and old growth habitat and have the least number of acres allocated to General Forest. The effects of these alternatives would be small. Alternatives A/NFMA, B, C, D, H, I and J would have a moderate effect on the distribution and abundance of mature and old growth habitats. Alternative NC would have the greatest effect, and in fact could threaten the viability of some species due to a decrease in the distribution and abundance of suitable habitats.

The MIS for riparian habitats are beaver and ruffed grouse, which represent some 260 species that utilize riparian habitats. Although these habitats make up less than one percent of the Forest, wildlife use of riparian ecosystems is much greater than that of adjacent areas. The Riparian-Aquatic Habitat Protection Zone (EW-2) prescription was developed by the Forest to ensure that riparian-dependent resources would be adequately protected in each alternative except NC. Alternative NC would follow current direction to give preferential consideration to riparian-dependent resources where resource management conflicts arise, but this direction is not as protective of the riparian dependent resources as the direction provided in the EW-2 prescription. Alternatives A/NFMA, B, C, D, E, F, G, H, I and J would either protect the riparian habitats under the EW-2 allocation or through other, even more restrictive allocations. However, Alternative C specifies more road closures and therefore, would have less of an impact on the riparian habitats.

On the Forest, the proposed, threatened, endangered and sensitive species include the bald eagle, peregrine falcon, grizzly bear, gray wolf, northern spotted owl, bighorn sheep, Townsend's big-eared bat, Canadian lynx, California wolverine, ferruginous hawk, Swainson's Hawk, and the long-billed curlew. The objectives for the management of these animals are the recovery of Federally-listed species and the assurance that sensitive species

will not become listed. Although these have varying management requirements, overall the highest impacts to these species occur in alternatives with the greatest number of acres allocated to General Forest and roaded, recreation allocations. Alternatives E, F and G would have the least effect due to the allocation of a large number of acres to unroaded, non-motorized prescriptions, and the fact that these alternatives have the fewest acres in General Forest. Alternatives A/NFMA, C, H and I would have a moderate impact, and Alternatives NC, B, D and J, with their emphasis on General Forest and developed recreation, would have the highest potential of affecting the habitats.

Fisheries

The fish habitat management objective for the Wenatchee National Forest is to at least maintain current habitat conditions, and show improving trends in habitat capability over time for both anadromous and resident trout species. Fish habitat capability and production are expected to increase under all alternatives except NC, due to habitat improvement projects, implementation of Best Management Practices, and the Forest Standards and Guidelines. Long term fish habitat capability may decrease under Alternative NC.

In terms of risk of impacts to fish habitat, however, those alternatives with greater timber harvest and resource development carry relatively more potential for effects. Alternatives B, D and J have the highest level of timber harvest and other resource development. Although these alternatives have a high level of funding directed to habitat improvement, there is a greater likelihood that these funds will be needed to mitigate resource management activities. On the other hand, Alternatives E and F provide the greatest potential benefit to fish habitat since they allocate the most dollars to habitat improvement, and have the least resource development. Alternatives A/NFMA, C, G, H and I have a relatively moderate risk, with C and I providing a substantial level of funding to habitat improvement.

Vegetation: Trees

All alternatives will continue to manipulate trees and other vegetation through timber sales, stand improvement, domestic livestock use, and prescribed fire. The difference between alternatives is in the amount of area allocated to timber harvest activities and in the levels of intensity of management.

Under Alternative A/NFMA, timber harvest activities would occur on 75 percent of the lands on the Forest suitable for timber management. Approximately two percent of the suitable lands would be managed at the highest intensity (GF-1) level (see Chapter IV of the FEIS for a definition of the intensity levels), with 29 percent managed at the low intensity (GF-4) level. Among the Special Prescription (SP) variations, Alternative A/NFMA has the largest amount of any of the alternatives managed under SP-3 for partial retention of scenery along travel corridors. Precommercial thinning is planned on overstocked acres within scenic travel corridors under all alternatives. This will increase tree vigor and reduce potential damage from insects such as mountain pine beetles.

In Alternative B, timber harvest would occur on 86 percent of the lands on the Forest suitable for timber management. Approximately 32 percent will be managed at the highest intensity (GF-1) level, with 19 percent of the suitable lands managed at the moderate intensity (GF-3) level. Alternative B will manage about half as many acres under SP-3 for partial retention of scenery along travel corridors, as in Alternative A/NFMA.

Alternative C would have harvest activities occurring on 73 percent of the lands suitable for timber management. Less than 3 percent of the suitable lands would be managed at the highest intensity (GF-1) level, with 14 percent of suitable land under this alternative managed at the GF-4 intensity and almost an equal amount managed under GF-3. This latter prescription is the most silviculturally and economically sound prescription for many stand types.

Alternative D has the same General Forest allocations as Alternative B. However, within the "General Forest" area a reduction in investment level would result in entirely different stands.

Under this alternative, only three percent of the suitable lands are managed at the highest intensity (GF-1) level. In contrast, 44 percent of the suitable lands would be managed at the low intensity (GF-4) level.

For Alternative E, 52 percent of the suitable lands on the Forest will have timber harvest activities occurring on them. This is the only alternative that proposes no acres for the highest intensity General Forest allocation, GF-1. Most of the timber management under this alternative would be aimed at other resource objectives, with the largest allocation being in scenic travel.

Under Alternative F, timber harvest would occur on 53 percent of the lands on the Forest suitable for timber management. Less than 1% of the suitable lands would be managed under GF-1. As in Alternative E, scenic travel prescriptions occupy the most area proposed for timber management.

Alternative G would have harvest activities occurring on 64 percent of the lands on the Forest suitable for timber management. Approximately one percent of this area would be managed at the highest intensity level (GF-1), with the largest percentage, as in Alternatives E and F, being allocated to the ST-1, scenic travel prescription.

In Alternative H, timber harvest would occur on 76 percent of the suitable timber land. Approximately 11 percent will be managed at the highest intensity, with most of the remaining acres of General Forest managed under the GF-3 or moderate intensity level.

Alternative I has the same General Forest allocations as Alternative C, with harvest occurring on 73 percent of the suitable timber lands. However, Alternative I would provide a higher level of timber harvest in the first decade. Approximately 19 percent will be managed at the highest intensity, but the greatest percentage would be allocated to low intensity (GF-4) management.

Under Alternative J, timber harvest would occur on 87 percent of the tentatively suitable acres, with more area managed at the highest intensity level than in any other alternative. This would also result in the most acres of planting and thinning of all alternatives.

Vegetation: Old Growth

The variation in the effects of the alternatives on old growth relates directly to the number of activities that manipulate the old growth ecosystem. Alternatives with the least acres in intensive management prescriptions and the most acreage in non-motorized, unroaded allocations would result in the least potential for impacts to old growth. Table S-5 summarizes the relationship between alternatives in terms of acres of old growth remaining at the end of the first, second and fifth decades.

**TABLE S-5
ACRES OF OLD GROWTH REMAINING
(INCLUDING WILDERNESS)
AT THE END OF DECADES 1, 2 AND 5**

Alternatives	Decades		
	1	2	5
NC	305,100	291,400	250,400
A/NFMA	307,300	295,800	261,600
B	305,200	291,500	250,700
C	307,300	295,700	261,200
D	305,900	293,100	254,500
E	310,600	302,400	277,700
F	309,300	300,900	275,700
G	299,600	289,500	259,300
H	306,700	294,600	258,400
I	307,300	295,300	261,200
J	305,100	291,300	250,100

Vegetation: Forage

The forage base occurring on the Forest will be utilized to some degree by either wildlife or livestock, and in some cases both classes of animals will use the same forage at different times of the year. Forest-wide there is forage in excess of current and projected needs. However, where some key winter range areas are utilized by livestock in the summer, there may be reductions in forage below the needs of wildlife.

The numbers of permitted livestock are the same in all alternatives through the first decade. The differences will occur in the number of acres available for livestock grazing and in the amount of suitable forage that will not be used outside the existing allotments. Alternatives B, D, H, I and J have the highest number of acres available for livestock grazing, nearly double all other alternatives except E and G. This is due to the creation of transitory range as a result of the timber harvest activities in these alternatives. Existing and potential forage is high, with a moderate to high number of livestock to be used in the management of the forage. Alternatives NC, A/NFMA, C and F will use about half the available acreage as the preceding alternatives for livestock grazing, with all use confined to existing allotments. Suitable forage areas outside these allotments would not be grazed. Alternatives E and G have about 10 percent fewer acres available for livestock grazing than Alternatives B, D, H, I and J, but will serve approximately the same number of livestock. The amount of existing and potential forage that is available is high.

Vegetation: Unique Ecosystems

The number of unique ecosystems proposed for protection varies by alternative, as does the specific localities selected. In some cases, these would be protected by a Special Interest area management allocation (SI-2) and in others, by inclusion in an unroaded, non-vegetative manipulation prescription. Each area is proposed for protection in at least one of the alternatives. In addition, all alternatives include the existing Tumwater Botanical Area under the Special Interest area allocation. Table S-6 summarizes the effects on the unique ecosystems by alternative. Areas showing an "X" have a Special Interest area allocation, while areas showing an "A" are protected by an unroaded, non-vegetation manipulation prescription.

**TABLE S-6
PROPOSED SPECIAL INTEREST AREAS BY ALTERNATIVE**

AREA	ALTERNATIVES										
	N/C	A	B	C	D	E	F	G	H	I	J
Camas							X				
Gene Creek							X				
Hornet Ridge						A	X	A			
Lake Creek			X	X	X	X	X	A		X	
Kloochman Rock							X				
Goose Egg Mt			X		X		X				
Rimrock			X		X		X				
Blue Slide			X		X	A	A	A			
Upper Naneum Mdw				X		A					
Boulder Cave				X							
Squaw Lake Area				X							
Fish Lake Run				X							
Ponderosa Estates				X							

Vegetation: Sensitive Plants

Sensitive plants are protected by Forest Service policy under all alternatives. However, the higher the level of development proposed in an alternative, the greater is the risk of unintentional impacts to sensitive plants through management activities. In this sense, Alternatives J, NC, B and D would present the greatest risk of impacts, with Alternatives E, F and G presenting the least overall. Alternatives A/NFMA, C, I and H would fall about mid-range in their potential for impact to sensitive plants.

Vegetation: Research Natural Areas (RNA's)

The two existing RNA's, Meeks Table and Thompson Clover, would remain unchanged in all alternatives, as would the two formally proposed areas, Fish Lake Bog and El Dorado Creek. Four additional areas are proposed as RNA's in Alternatives B, C, D, E, F and G, but are not recommended in Alternatives NC, A or H. In these latter alternatives, vegetative manipulation (for any management purpose) or site destruction by roading may irreversibly preclude the selection of some of these areas for RNA's in the future.

Water

Both on-Forest and off-Forest users are concerned about the water quality and quantity. It is a key ingredient in maintaining fish and wildlife habitat, and scenery, as well as being of critical importance for downstream irrigation and drinking water. The intent of all alternatives is to manage watersheds to minimize the loss of soil productivity and to provide riparian area, stream channel and water quality conditions that would protect beneficial uses of water.

When the annual water yield increase by alternative is compared to the Forest's annual background runoff, the increase appears insignificant because it is "masked" by the large annual runoff figure. However, on a site specific basis such as a small watershed heavily impacted by timber harvest, stream channel erosion and degradation could occur.

The location, intensity and timing of harvest, the specific methods of treatment, and the number of roads constructed directly affect water yield and quality. The higher the timber harvest level, the greater the increase in water yield, and the more roads constructed, the greater the potential to cause a degradation in water quality. By the end of the first decade, Alternative J would have the greatest water yield increase and highest potential for damage to water resources, followed in decreasing order by Alternatives NC, B, H, I, D, C, A/NFMA, G, F and E.

Soil

Timber harvesting and road construction can result in soil productivity reduction due to compaction, displacement, puddling, erosion and loss of nutrients, and increased sedimentation that will eventually end up as delivered sediment in the streams and rivers. Each of the alternatives generates different amounts of delivered sediment. Soil compaction and nutrient loss are proportional to the amount of delivered sediment loss created by management activities. Thus, if the amount of delivered sediment increases, the amount of compacted soil and the amount of nutrient loss will also increase.

The amount of delivered sediment is directly related to the intensity of timber harvest and the level of road construction and reconstruction. Those alternatives that harvest more timber and build more roads produce more delivered sediment. Alternative J would produce the highest sediment yield, followed in decreasing order by NC, B, H, C, I, A/NFMA, D, G, F and E.

Air

The effects of smoke and haze from off-Forest sources has caused more of an impact to air quality than activities originating on the Forest. Prescribed burning and wildfires are the largest contributors to the temporary degradation of the air resource, but these are short term and the effects do not vary significantly between alternatives.

Minerals

Mineral commodities, deposit locations, and deposit characteristics will not vary by alternative, but the demand for mineral commodities is expected to increase regardless of the alternative selected. The manner in which the lands are to be managed under each alternative will have an effect on the availability of these lands for exploration. It will also have an effect on the cost of conducting exploration, development, and reclamation activities.

The consequences of the alternatives are best shown by analyzing the relative degree to which management prescriptions may limit the availability of lands for mineral exploration and development, or constrain proposed mineral activities. Thus, Alternative E has the most constraints followed by Alternatives F, G, C, I, A/NFMA, H, D, B, J and NC.

Roads

The proposed construction and reconstruction of the arterial and collector road systems reflect only minor variation between alternatives. In contrast, local roads are much more sensitive to the alternatives, varying with the amount and rate of timber harvest. All alternatives will involve new road construction, including entry into currently unroaded areas. The majority of the road construction would occur in the next 20 years. Alternative J would construct the most miles of new roads (including unroaded areas), followed in descending order by Alternatives B, D, H, I, C, A/NFMA, G, F and E.

Fire

Fire has played a significant role in the past history and management of the Wenatchee National Forest, and is expected to continue to play this role in the future regardless of the alternative chosen. Wildfire and prescribed fire are interrelated aspects of fire management. The management of fuels reduces the accumulation of residue and hence limits the number of ignitions and intensity of wildfire. Alternatives B or J would result in the most acres of fuel treatment, Alternatives E, F and G would have the least. Alternatives NC, A/NFMA, C, D, H and I would result in a mid-range of acres treated. However, the variation between alternatives in terms of fire management is not a straightforward one, since post harvest fuel treatment can also increase the potential for wildfire ignition through industrial and slash disposal activities.

Social/Economic

Changes in the levels of Forest outputs have the potential to impact employment and income levels in local communities. Timber harvest levels, which vary appreciably between alternatives, account for almost all of the variation in jobs and income.

The following table displays changes in employment and income by alternative in the first decade.

TABLE S-7
CHANGES IN FIRST DECADE EMPLOYMENT AND INCOME

ALTERNATIVES	A/NFMA	B	C	D	E	F	G	H	I	J
Change in Employment (Jobs)	+39	+577	+203	+279	-520	-473	-225	+324	+413	+630
Change in Income (Million \$)	+ 65	+15.31	+5 14	+7 20	-14 56	-13 30	-6 54	+8 43	+10 86	+16 76

Returns to the Treasury and payments to Counties also are strongly related to the amount of timber harvest. Although the increase in harvest levels has positive effects on local jobs and income, it can have negative social effects with the loss of the unroaded recreation opportunities and loss of a natural-appearing landscape. An increase in harvest levels can also have adverse impacts on the American Indian communities. These impacts would be an increased risk to cultural sites and anadromous fish, and the alteration of the environmental setting around traditional Indian use areas.

SUMMARY OF MITIGATION MEASURES

A wide-range of mitigation measures are available to avoid, reduce, remedy or eliminate adverse environmental effects that occur as a result of management activities. The Forest-wide standards and guidelines would specifically assure mitigation of potential adverse impacts. For example, the Appendix J Best Management Practices are an example of mitigation measures developed to protect water quality.

Other examples of mitigation measures available in all alternatives include: the use of Forest Service manuals and handbook guides; the use of visual management practices in harvest activities to maintain a natural-appearing setting; the use of aerial or full suspension logging systems to protect cultural resources; the establishment and monitoring of limits of acceptable change for reducing impacts in Wilderness areas; the replanting of harvest units with mixed tree species to minimize tendencies towards monoculture; the use of fertilizer to mitigate management practices which reduce productivity; the adjustment of utilization standards for grazing to provide for plant needs, and soil and water protection; more complete use of wood residue to mitigate effects of prescribed fire; and the use of road closures for reducing impacts on wildlife and some types of recreation.

The effectiveness of these measures would vary according to the nature, intensity and location of the activities that are producing the impact, and hence would not work equally well in all alternatives. A detailed discussion of mitigation measures by environmental component appears in Chapter IV of the FEIS.

SHORT-TERM USES VS. LONG-TERM PRODUCTIVITY

The relationship between the short-term uses of man's environment and the maintenance and/or enhancement of long-term productivity is complex. For the purposes of this assessment, short-term uses are those that generally occur on a yearly basis on some area of the Wenatchee National Forest, such as timber harvest as a use of the wood resource, livestock grazing as a use of the forage resource, and recreation and irrigation uses of the water resource.

"Long-term" refers to longer than a 10 year period. Productivity refers to the capability of the land to provide market and amenity outputs and values for future generations. For example, maintenance of long-term soil productivity requires that activities which cause excessive erosion, compaction, and other adverse impacts to soil be mitigated. Occasionally short-term uses will cause substantial damage to isolated areas. Direction in Chapter IV of the Forest Plan contains management requirements designed to protect soil and water resources so that long-term productivity is not significantly impaired.

ENVIRONMENTAL CONDITIONS UNCHANGED BY THE ALTERNATIVES

Some resources on the Forest are not affected by any of the alternatives. The land area designated as wilderness is the same in each alternative. Within wilderness, the physical and biological environmental conditions would remain unchanged between alternatives.

In all alternatives, the land allocations designed by the Alpine Lakes Area Land Management Plan do not change.

Thompson Clover and Meeks Table Research Natural Areas, and the Entiat Experimental Forest have all been designated by the Chief of the Forest Service and will remain unchanged across all alternatives.

Existing and proposed utility corridors do not vary by alternative. It is estimated that a maximum of four small hydroelectric projects would proceed to the stage of applying for a license to build and operate a project. Thus, there is little difference in these effects between alternatives.

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Implementation of any of the alternatives will inevitably result in some adverse environmental effects that cannot be avoided. The degree of severity of the adverse effects can be minimized by adhering to the direction in the management prescriptions and Forest-wide Standards and Guidelines in Chapter IV of the Forest Plan, but some impacts generally cannot be avoided if any management activities occur.

Soil disturbance occurs as a result of timber harvest slash treatment, wildfires, and construction of utility corridors, roads, trails, and recreation sites. Both the technique and the scheduling of management activities can affect the kind and amount of impact that can occur on soil resources. This is also true for water resources. Short-term effects on water are a result of management activities such as timber harvest, wildfire, livestock use, and recreation use.

Effects on visual quality are generally of a short-term nature from activities such as timber harvest. Long-term effects on scenery would be from wildfire, roads, and utility corridors.

Air quality may be temporarily degraded in localized areas by both prescribed fire and wildfire. Wildlife can be adversely affected by fire, small hydro development, and timber harvest activities. And finally, it is likely that some significant cultural resource sites will inadvertently or unavoidably be disturbed.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Acres committed to roads and facilities constitute an irretrievable loss of vegetative production and an irreversible loss of soil productivity. When roadless areas are developed they represent an irreversible effect on the roadless values associated with them.

Timber resources can be irretrievably lost by being dedicated as old growth or by being located within designated wilderness. Insects, disease and fire can also cause irretrievable losses. Use of mineral and energy resources can have both irreversible and irretrievable effects.



CHAPTER I

PURPOSE AND NEED

A. INTRODUCTION

This Final Environmental Impact Statement (FEIS) discloses eleven alternatives, including an alternative identified as the Preferred Alternative (which is the "proposed action"). These eleven alternatives are alternate ways of managing the land and resources of the Wenatchee National Forest (See Chapter II). This FEIS also describes the environment which would be affected (Chapter III), and the environmental consequences of implementing each of the alternatives (Chapter IV).

Each alternative represents a different way to address local, regional, and national public issues and management concerns, provide for use and protection of resources, and fulfill legislative requirements. Every alternative generates a different mix of goods and services from the Forest.

For this plan, multiple use and sustained yield become the guiding principles. Each alternative was evaluated to determine its potential to provide a sustained yield of goods and services in a way that maximizes long-term net public benefits in an environmentally sound manner.

The Preferred Alternative is the alternative which the Forest Service believes would maximize long-term net public benefits while responding effectively to the resources issues and concerns. Net public benefits represents the cumulative net value of all Forest outputs and activities, whether assigned a dollar value or not. The key indicator for this principle is the comparison by alternative of Present Net Value changes or tradeoffs with quantitative indicators of response to the issues, concerns, and opportunities.

The Preferred Alternative, as modified by the Record of Decision, is the basis for the accompanying "Wenatchee National Forest Land and Resource Management Plan" which is a separate document. The purpose of the Forest Plan is to direct all natural resource management activities on the Forest. While the Forest Plan will guide the management of the Forest for the next 10 to 15 years, the analysis for the FEIS covers a planning horizon of 50 years to evaluate and display the long-term effects of current actions.

Preparation of the Forest Plan is required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), plus the associated National Forest System Land and Resource Planning Regulations (36 CFR 219 - Refers to Part 219 of Title 36 of the Code of Federal Regulations dated 9/30/82).

The preparation of an Environmental Impact Statement disclosing a preferred alternative and a broad range of additional alternatives is required by the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ), NEPA Regulations (40 CFR 1500), and the implementing regulations of NFMA (36 CFR 219). For purpose of disclosure under NEPA, this FEIS and the accompanying Forest Plan are treated as combined documents.

The Environmental Impact Statement is required because the Forest Plan is a major Federal action with a significant effect on the quality of the human environment. Its purpose is to provide decision-makers with an environmental disclosure sufficiently detailed to aid in the selection of management direction for the Forest. Equally important, its purpose is to make information of the alternatives' environmental impacts available to the public, and to encourage public participation in the development and refinement of that information.

A Glossary defining terms, units, and abbreviations is located just in front of the Index. A list of references and a list of preparers are also provided. The reader will find it useful to consult the land management allocation maps for each alternative when reviewing this FEIS. Since each alternative depicts different combinations of management areas, the reader should also become familiar with the direction and emphasis for each management area (See Chapter II).



B. CHANGES BETWEEN DRAFT AND FINAL

The Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan were released to the public in June 1986. A Supplement to the DEIS was released in October 1988. Changes that have occurred since the DEIS are incorporated in this Final EIS. These changes include numerous updates of information as well as responses to public involvement in the planning process. The discussion under Planning Problems gives more information on issues which were ratified and some which were given fresh emphasis such as roadless areas, timber harvest levels, Wild and Scenic River recommendations, and the old growth/spotted owl issue.

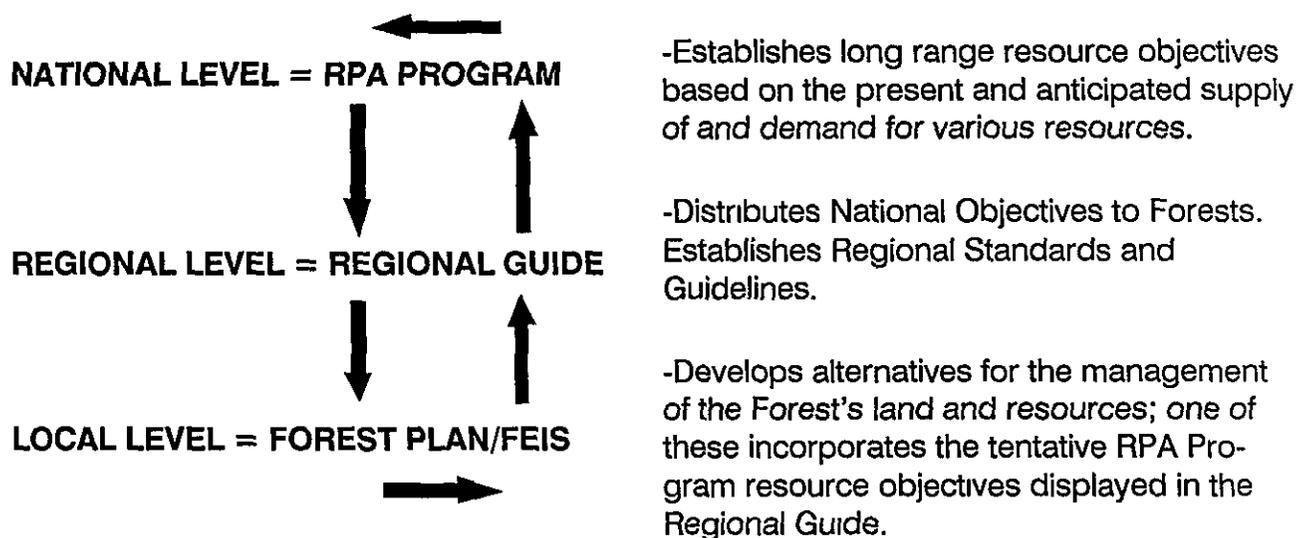
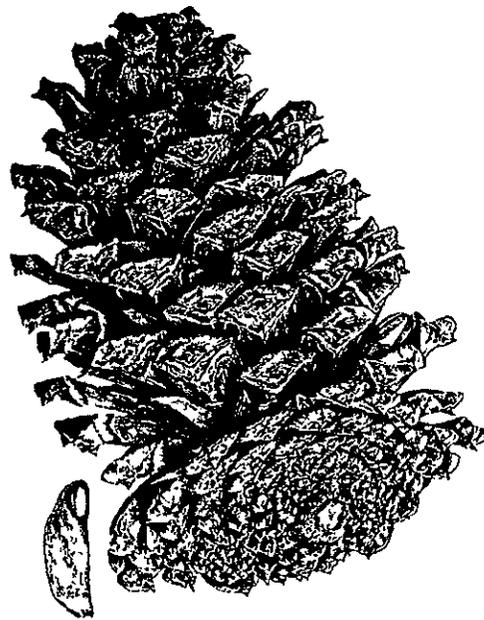
In response to public input, a comprehensive review was made of motorized trail use on the Forest. The review resulted in a change in trail management philosophy which allows for no net increase in mileage of motorized trails. Another major review was also made of future management of the current roadless areas. As a result, numerous boundary changes were made as well as two new prescriptions in the preferred alternative, for roadless timber harvest and for roadless wildlife emphasis. The EW-2 riparian area management prescription was extensively revised in response to comments asking for better protection of the water/fish resource. Wildlife direction for species dependent on the mature/old growth habitat was changed substantially with one prescription developed for dedicated (no timber harvest) and one for managed old growth. Timber harvest levels for all alternatives changed primarily from new direction for Management Requirements with other effects resulting from changes in the FORPLAN computer model.

The Final Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide (USDA, 1988) that addresses spotted owl guidelines has been completed since the Wenatchee DEIS. The changes in direction from the new guidelines have been incorporated in this FEIS resulting in changes to alternative outputs, the spotted owl habitat area network, and the Forest Plan Standards and Guidelines. The EIS for

Managing Competing and Unwanted Vegetation (USDA, 1988) was also released since the DEIS. The analysis in the FEIS and Forest Plan for the Wenatchee National Forest assumes that all methods of managing competing vegetation are available.

C. PLANNING PROCESS

To put Forest Planning in perspective, it is important to have a general understanding of the overall Forest Service planning process. As required by the RPA, NFMA, and related implementing regulations cited above, the Forest Service has a three-level integrated planning process:



Information on resources available and public demand for the resources of each National Forest is incorporated in the RPA Assessment and Program. The RPA Program is submitted to Congress as an aid to determine appropriation of the annual Forest Service budget. Since allocations in the annual budget have a major effect on forest management activities, many of the Forest's actual outputs and resulting environmental effects are ultimately determined in large part by the annual budget. Through the overall planning process the annual budget can be responsive to public needs and Forest capabilities.

The planning process is a continuously repeating process in that the information from the Forest level flows up to the National level, is incorporated in the RPA Program, and then flows back to the Forest level.

The RPA Program and Regional Guide are updated every five years. The Forest Plan is reviewed every 5 years and is ordinarily revised on a 10 year cycle or when changes in the RPA Program significantly affect Forest Programs. It must be revised at least every 15 years. It will also be revised whenever conditions or demands in the area covered by the Forest Plan change significantly. This process ensures that the Forest Plan is responsive to changing conditions.

The planning process specified in the NFMA implementing regulations, the environmental analysis process specified in the NFMA implementing regulations, and the environmental analysis process specified in the CEQ regulations were used in developing this FEIS and the accompanying Forest Plan. The planning steps employed are:

1. Identification of purpose and need (including public issues and management concerns)
2. Development of planning criteria
3. Inventory of data and information collection
4. Analysis of the management situation
5. Formulation of alternatives
6. Determination of estimated effects of the alternatives
7. Evaluation of alternatives
8. Selection of the Preferred Alternative and documentation of its proposed implementation in the Forest Plan
9. Plan approval
10. Plan Implementation
11. Monitoring and Evaluation

The results of the environmental analysis are documented in this FEIS. It ensures that environmental information is available to public officials and citizens before decisions are made and before actions are taken.

Upon implementation, the FEIS will be used for "tiering" in accordance with the CEQ regulations. Tiering means that environmental analysis prepared for projects arising from the Forest Plan will refer to the FEIS for coverage of the broader issues rather than repeat information. Environmental documents for specific projects will concentrate on issues unique to those projects (50 CFR 1508.28).

The Forest Plan supercedes all previous land management plans prepared for the Wenatchee National Forest except the Alpine Lakes Area Land Management Plan. All resource plans will be consistent with the Forest Plan. The Forest Plan incorporates the management direction in the Alpine Lakes Area Land Management Plan and Environmental Impact Statement (1981) that was Congressionally mandated through the Alpine Lakes Management Act (36 CFR Part 219.2(b)).

Upon implementation, all subsequent administrative activities affecting the Forest, including budget proposals, will be consistent with the Forest Plan. Actual budgets appropriated by Congress may alter the schedule of proposed activities. In addition, all permits, contracts, and other instruments for the use and occupancy of National Forest System lands must be revised to conform with the Forest Plan subject to valid existing rights (36 CFR 219.10(e)). Within the Alpine Lakes Area the Alpine Lakes Area Land Management Plan is the guiding document when there is a conflict in management direction between it and the Forest Plan.

Table I-1 shows how existing land and resource plans would be affected by the final Forest Plan

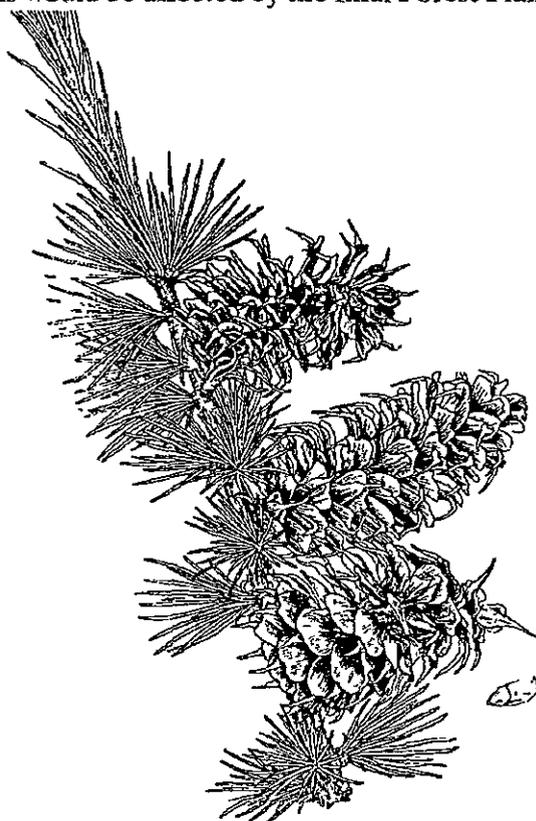


TABLE I-1
FUTURE STATUS OF EXISTING PLANS

Document Title	Continue	Terminate	Revise
Chelan Unit Management Plan, 1976		x	
Kittitas Land Management Plan, 1979		x	
District Multiple Use Plans		x	
Alpine Lakes Area Land Management Plan, 1981	x		
Timber Management Plans (Wenatchee N.F. and Naches-Tieton Districts)		x	
Fire Plan			x
Range Allotment Plans			x
Land Ownership Adjustment Plan			x
Research Natural Area Establishment Reports (Meeks Table, Thompson Clover)	x		
Off-Road Vehicle Plan			x
Tree Improvement Plan	x		
Tumwater Botanical Area			x
Existing Special Use Permits and Leases			x
Wilderness Management Plans			x

D. OVERVIEW OF THE FOREST'S LOCATION

The Wenatchee National Forest lies on the east side of the Cascade Mountain Range in Central Washington (Figure I-1). It extends about 140 miles from north to south and an average of 35 miles east to west. The Forest has a net area of 2,164,180 acres (larger than Delaware and Rhode Island combined).

Steep, rugged mountains and heavy snowpacks characterize the western portions of the Forest. In contrast, near desert conditions prevail in the eastern grass and shrub covered foothills and valleys. Between the two extremes are diverse forest and plant communities resulting from the variations in soils, elevation, aspect, temperature, precipitation, and fire influences. The major drainage systems include the Chelan, Entiat, Wenatchee, Upper Yakima and Naches-Tieton River systems. All flow eastward toward the Columbia River. Principal forest resources include timber, forage (for wildlife and livestock), recreation, water, and wilderness. Almost two out of every five acres on the Forest (39 percent) are Congressionally designated wilderness.

The Forest is primarily located in Chelan, Kittitas, and Yakima Counties, with two acres in Douglas County. The area administered by the Wenatchee National Forest and considered in this planning includes a 515,843 acre parcel of the Mt Baker-Snoqualmie National Forest. These lands are the Naches Ranger District in the southern portion of the Forest. In addition, an isolated 9,032 acre parcel of the Wenatchee National Forest in the Liberty Bell portion of Chelan County is being administered by the Okanogan National Forest and will be included in the Okanogan Forest Plan.

Major cities and towns in or near the planning area are Chelan, Entiat, Cashmere, Leavenworth, Wenatchee, and East Wenatchee in the north, Cle Elum, Roslyn, and Ellensburg in the center, and Yakima, Selah and Naches in the south. More than 270,000 people live in the four county area. The Forest is also easily accessible from the metropolitan Puget Sound Area (Figure I-1).

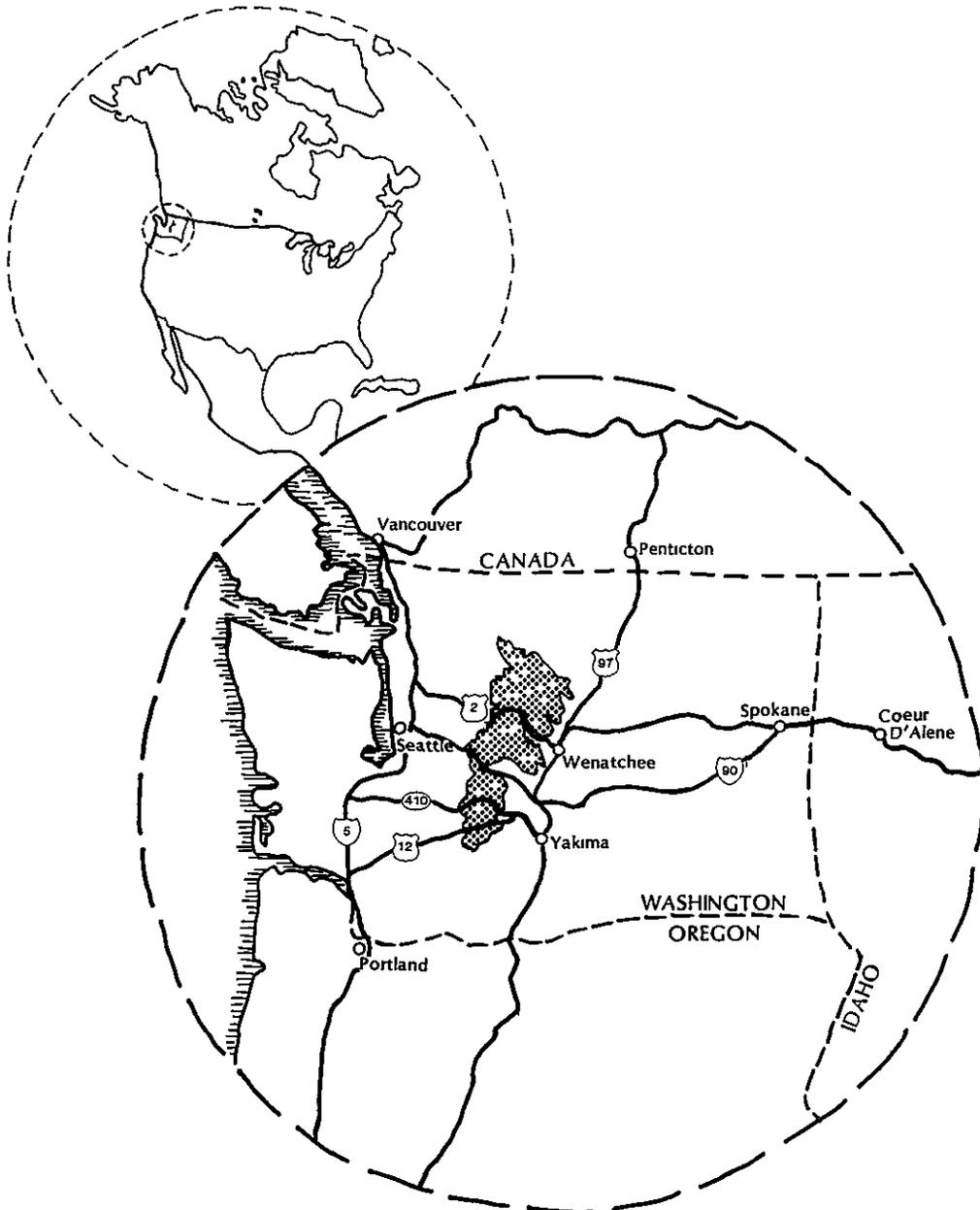
The Forest occupies a portion of the lands ceded to the U.S. Government by the Yakima Indians in 1855. The Yakimas retained certain rights on these lands through the Treaty of 1855.

The Forest headquarters is in Wenatchee, Washington. There are six Ranger Districts:

- Chelan Ranger District**
- Entiat Ranger District**
- Leavenworth Ranger District**
- Lake Wenatchee Ranger District**
- Cle Elum Ranger District**
- Naches Ranger District**

Further details on the Forest's environment and setting are in Chapter III of this FEIS.

**FIGURE I-1
VICINITY MAP
WENATCHEE NATIONAL FOREST**



E. ISSUES, CONCERNS, AND OPPORTUNITIES

The Wenatchee National Forest consists of complex natural systems that can be managed for different mixes of resource outputs, land uses, and environmental conditions. Different people and groups prefer to see the Forest managed to emphasize different outputs, uses, and conditions. Because all the resources, uses, and conditions of a forest are interconnected, managing to emphasize some resources results in changes in others. Trade-offs are necessary when management emphasis adversely affects resources or other uses. There are practical and natural limits to a Forest's productivity.

A central Forest Planning task is analyzing the alternative ways of managing the National Forest. The analysis must also determine the effects of these alternatives on the environment and on existing and human uses. The public desires for goods, services, uses, and environmental protection help to determine the alternative management practices that will be formulated and analyzed.

These different preferences of individuals and groups, and the physical, biological, and legal limits of Forest management are represented in the issues and concerns which guide the planning process. A public issue is a subject or question of widespread public interest relating to management of the National Forest System.

A management concern is an issue, problem, or a condition which limits the range of potential management practices identified by the Forest Service in the planning process.

A third component influencing alternatives comes from the various opportunities for resource use and development suggested by both the public and the Forest Service. The opportunity to preserve or develop and use the resources of the National Forest is the focus of many of the agency's programs, and the principal focus of the management alternatives developed here. Because there are both public issues and management concerns related to these opportunities, most of them are incorporated within the discussion of issues and concerns. Resource use and

development opportunities, along with the issues and concerns, are identified and discussed in Appendix A.

An important step in the planning process is the identification of major public issues and management concerns. This was accomplished through an extensive process involving individual members of the public, adjacent private landowners, other Federal agencies, State and local governments and agencies, local industry, conservation groups, user groups, and Native Americans. In early 1979, all existing Wenatchee National Forest land and resource management plans were reviewed and a list of 85 tentative issues was developed for public review and comment. That list had been put together by employees of the Wenatchee National Forest based on their dealings with the public and their knowledge of Forest concerns.

To help identify any remaining issues which should be addressed in the Wenatchee Forest Plan, planners went to the public for help in 1979. The original list of 85 issues was mailed to about 1,900 people in the search for additional issues. There were public workshop sessions in Wenatchee, Yakima, Tacoma, and Seattle, and there were meetings between the planners and more than 25 other federal agencies, State and local governments, Indian tribes, and owners of private land within and adjacent to the Forest.

Comments from 230 response forms and letters plus the results of the public workshop sessions and meetings were reviewed and analyzed to arrive at a final set of issues to be addressed in the Wenatchee Forest Plan. Since this list was developed, several issues were resolved, and several other issues increased in importance and were added to the list of issues.

With the passage of the Washington State Wilderness Act of 1984, former Issue #13, "Allocation of Areas Designated for Further Planning by RARE II," is no longer applicable. Much of the Goat Rocks Further Planning Area was added to the Goat Rocks Wilderness. The future management of the balance of this unroaded area and others on the Forest will be decided in the Forest Plan. In addition, four new issues and concerns were added to the original list: #13, Minerals; #14, Cultural Resource Management; #15,

Cumulative Effects, and #16, Social-Economic. In December of 1984 the public had another opportunity to respond to the revised list of issues, concerns, and opportunities through a Forest Plan Report #10 mailing and public meeting. There were 2,300 Forest Plan Reports mailed and 100 responses were received.

The issues list is dynamic and can be added to or changed as new or different issues surface. Due to the public input to the DEIS and Supplement, two new issues were added. These are #17, Wild and Scenic Rivers; and #18, Old Growth. Further information on the development of the ICO's is available in Appendix A in the FEIS or the Planning records of the Wenatchee National Forest.

Public involvement occurred throughout the planning process. Forest Plan Reports were sent to the public, agencies, State and local governments, Indian tribes and major private landowners at key points in the planning process. Public comment was encouraged. Information meetings were also held with interest groups, Indian tribes, and Federal and State agencies. The public, agencies, and Indian tribes had another opportunity to respond to the planning effort by commenting on the DEIS and accompanying Proposed Forest Plan.

The listed issues (Appendix A) were used to help formulate the various alternatives discussed in the following chapter. Table II-1 in Chapter II shows how the issues are linked with the alternatives and how they are resolved.

The ICO's for planning were ratified again through extensive public involvement received after publication of the DEIS, Proposed Forest Plan, and the Supplement to the DEIS. The Forest received a total of over 4,700 responses to the DEIS, and the Supplement received 2,650 responses. Numerous meetings with interested agency officials, groups, and individuals have continued to clarify ICO's. As a result of the public review process, two new issues (Wild and Scenic Rivers, and Old Growth) were added to the original list. Appendix K describes the public involvement process from the DEIS, through the Supplement, to the FEIS. It also displays public comments received and the Forest response to the comments.

An analysis of the issues (Appendix A) determined that 10 of the 18 issues were most important in formulating the various alternatives for the Wenatchee National Forest Plan. However, all 18 of the major issues influence the alternatives to some degree. In Chapter II, the alternatives are compared to determine how well they respond to all the issues and how these ICO responses relate to changes in Present Net Value. The ten most important issues are stated below as planning problems:

PLANNING PROBLEM #1

Are Forest lands capable and suitable of meeting public demand for particular types of recreation use? Where are these lands located?

Opinions are divided on the quantity and type of recreational facilities and opportunities the Forest should be providing. Some people want increased opportunities for unroaded non-motorized recreation outside of designated wilderness while others want increased opportunities for motorized recreation and developed sites. Opinions also differ regarding the use and restrictions of off-road vehicles (ORV's).

Some people are strongly opposed to ORV use in any way because of perceived impacts on soils, vegetation, and wildlife. There is also an expectation of incompatibility with their recreation experience from noise pollution in narrow canyons. Other people believe impacts are really insignificant or overstated and feel that relatively unlimited use of ORV's is acceptable.

There is a demand to expand existing developed recreation sites such as Mission Ridge and White Pass Ski Areas and developed campgrounds, or to construct new developed sites. On the other hand, there are those who prefer minimum development sites and the expansion of cross-country skiing opportunities.

Conflicts between recreation and other Forest values are frequently mentioned. For example, the visual effects of clearcutting are generally considered to be incompatible with recreational

values. The need and potential for special classification areas such as Research Natural Areas, Scenic areas, and Botanical areas are also mentioned.

PLANNING PROBLEM #2

What kinds of recreational opportunities should the Forest provide in non-wilderness roadless areas, and how much of the roadless areas should be allocated to commodity production?

The public is strongly divided on the future management of the remaining 556,272 acres of roadless areas. Some people would like to develop the timber and other commodity potentials of these areas. Others would like these areas to remain roadless and undeveloped. Some prefer a balance between commodity use and roadless recreation based on land suitability and multiple use. Wilderness proponents support the management of some roadless areas to maintain their potential for future additions to the Wilderness Preservation System.

PLANNING PROBLEM #3

What rivers and streams should be recommended to Congress for inclusion into the Wild and Scenic Rivers system, and at what level of classification?

This planning problem was considered a part of planning problem #1 (suitability of lands for recreation use) in the DEIS, but due to public response to the Draft, the Wild and Scenic Rivers section was greatly expanded in the 1988 Supplement to the DEIS.

Some people believe that all of the rivers and many streams on the Forest should be included in a preliminary administrative recommendation to Congress for consideration under the Wild and Scenic Rivers Act. Other people are strongly opposed to the recommendation of some or all rivers and streams (or certain segments), particularly rivers or segments of rivers with private lands within the river corridor. Some are also concerned with the level of classification proposed for those river segments outside wilderness.

PLANNING PROBLEM #4

How should water quality and quantity be maintained or enhanced?

The public is sensitive to the need to protect soil and water resources. Many people realize that improperly conducted management activities can cause damage to these resources.

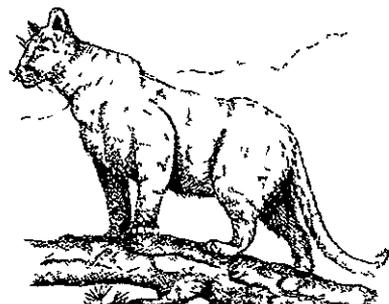
People living downstream of the Forest are concerned with the quantity of water for irrigation, as is the case in the Wenatchee and Yakima valleys. Other people, including the Yakima Indians, are concerned about fish habitat and instream needs for fish migration.

PLANNING PROBLEM #5

Where are the essential wildlife habitats, how should they be managed and what direction should be taken to maintain or enhance wildlife diversity?

Some people believe that wildlife and fish management has not received appropriate attention within the Forest. Others believe there should be more emphasis on wildlife needs through coordinated timber or range management activities. The future management of anadromous fish habitat and old-growth forest dependent species such as the northern spotted owl, pileated woodpecker, and marten is a major concern of another segment of the public. Other people are concerned that management for these wildlife species will seriously deplete the amount of timber available for harvest.

Wildlife management requires close coordination with the Washington Department of Wildlife. Many comments expressed the need to better coordinate other Forest management activities with wildlife concerns.



PLANNING PROBLEM #6

How should Old Growth be treated? How much should be preserved and how much should be made available for timber harvest?

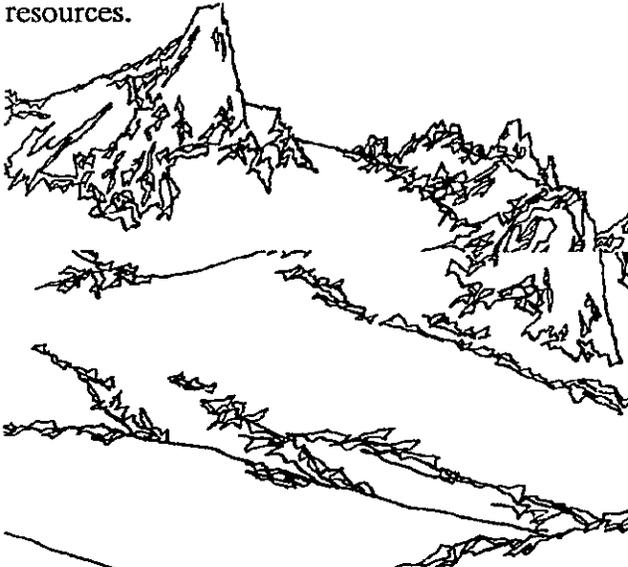
This planning problem was originally considered a part of planning problem #5 (essential wildlife habitats) in the DEIS, but due to public response to the Draft and Supplement, it was decided to make this a separate planning problem.

Some people believe that all existing old growth on the Forest should be preserved for biological diversity, dependent wildlife species, scenery or esthetic values, and/or because they feel that no more old-growth forest will remain in a few years. Others believe that both existing and potential old growth within designated wilderness is more than enough to meet all future needs.

PLANNING PROBLEM #7

Where are the key or unique scenic resources on the Forest and how should they be managed?

Most recreation visitors to the Forest are concerned about maintaining or enhancing the scenic quality of the environment. Others would like to see the Forest managed for wood fiber with few, if any, visual considerations. Some favor the maintenance of scenic quality only in key travel corridors. Others stress the multiple use benefits of maintaining scenery in combination with other resources.



PLANNING PROBLEM #8

How much timber should be produced, and where should it be produced?

Most people support timber management and harvesting on the Wenatchee National Forest. However, there is concern about harvest location, logging practices used, and their effects on other resources. Some people want increased emphasis on protection or preservation of scenery with little or no development. Others want increased wildlife habitat emphasis while allowing moderate development opportunities. Others favor intensive management of commercial timber species, with full development of consumptive uses.

PLANNING PROBLEM #9

What level of livestock grazing should the Forest provide?

Opinions differ on the use of public land for livestock grazing. Some feel that cattle and sheep cause damage to Forest resources and that commercial grazing is not a cost-effective use of the Forest's resources. Others strongly favor grazing as a viable use of available forage and would expand this use as a tool to enhance other resource values. Timber harvest practices to increase available forage are favored by some.

PLANNING PROBLEM #10

Where are the cultural resource sites on the Forest, and how should they be managed?

The American Indian community has strong concerns about the preservation of Indian cultural resource sites and traditional use areas. There are also local community concerns about the protection and interpretation of cultural resource sites. A central concern is to provide a balance between other resource uses and the protection of individual cultural resource sites.

F. SUMMARY OF PUBLIC PARTICIPATION

The ICO's which had been developed for the Draft EIS were ratified again through extensive public comment received after publication of the DEIS, Proposed Forest Plan, and the Supplement to the DEIS. For the DEIS and proposed Plan, the Forest had a 120 day review period during which it received over 4,700 responses. The Supplement to the DEIS had a 90 day review period and received about 2,650 responses.

Several issues or aspects of ICO's received fresh emphasis after the issuance of the Draft in 1986 and the Supplement in 1988. As mentioned previously, two new issues were added because of public input. Numerous meetings with interested agency officials, groups, and individuals since then have continued to clarify the ICO's. Appendix K describes the public involvement between the DEIS and FEIS. It also displays the public comments received and responses to the comments.

G. PLANNING RECORDS

All of the documents and files that chronicle the Wenatchee National Forest planning process, including the environmental analysis, are available for review at the Supervisor's Office, 301 Yakima Street, P.O. Box 811, Wenatchee, Washington 98807. These documents and files, known as planning records, contain the detailed information and decisions used in developing the FEIS and the Forest Plan. The planning records are referenced at appropriate points in the text and appendices of this FEIS and Forest Plan.



CHAPTER II

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

A. INTRODUCTION

This chapter is the heart of the Environmental Impact Statement. In this chapter, alternate ways of managing the National Forest (the Alternatives) are presented and their resource outputs and environmental effects displayed. There are also discussions of how these Alternatives were developed and how they compare to each other and to current Forest management. This chapter draws on material from later chapters. Chapter III describes the affected environment. Chapter IV presents the environmental consequences.

1. Overview of Chapter II

There are three main parts to this chapter. First there is a summary of the analysis that was conducted in the process of developing the alternatives. (A much more detailed presentation of this analysis is presented in Appendix B, Description of the Analysis Process.) Next, the purpose and management emphasis of each alternative is described. Finally, the alternatives are compared directly to each other. This comparison shows the response to issues, the emphasized land uses, the resource outputs, the environmental effects, and the economic costs and benefits which will occur with each alternative.

2. Changes Made Between Draft and Final

A new Alternative, Alternative J, was added in response to public comment. This Alternative was developed by timber industry representatives who referred to it in the public input as the "Essential Alternative."

In all Alternatives the Mature/Old Growth Management Requirement network was revised. The number and size of Spotted Owl Habitat Areas (SOHA's) was increased in response to the Supplement to the Regional Guide EIS. Management of the SOHA's changed from a "managed" to a "dedicated" prescription which does not allow scheduled timber harvest.

Due to public comments, Alternatives A/NFMA, C, E, F, G, H, and I all have different proposals for Wild and Scenic Rivers classification than shown in the DEIS. Alternatives C, E, F and I have the new prescription MP-1 for the Mather Memorial Parkway on the Naches Ranger District.

Road and trail management direction have changed from the Draft. More roads will be closed and off-road vehicle trail mileage will not increase.

Alternative C, the preferred, has numerous changes in allocation boundaries as well as the addition of two additional prescriptions: RE-4 Dispersed Recreation, Unroaded, Timber Harvest; and EW-3 Key Big Game Habitat, Unroaded.

Best Management Practices (BMP's) were added as mitigation common to all alternatives in response to public comment (also see Appendix J).

A number of changes were also made in the modeling used for analysis of the alternative (also see Description of the Analysis Process).

a. Growth was updated on existing timber yield tables to reflect new growth since the original yield tables were constructed. Acres that were cut-over since the original model was built were changed to reflect this in the FORPLAN runs for the final.

b. The original FORPLAN model had a commercial thinning constraint that limited commercial thinning volume to 29 percent of the total volume for the first decade. After the first decade, commercial thinning volume could not vary by more than +50 percent from the previous decade. It was discovered that this constraint also applied to shelterwood entries. After examination of this constraint, it was discovered that there was no need to limit shelterwood entries, and that commercial thinning entries were a very small portion of first decade harvest. This constraint was, therefore, dropped from the model for the FEIS.

c. The 1978 version of IMPLAN was used to predict changes in jobs and income in the DEIS. For the FEIS, the updated 1982 version of IMPLAN was used.

d. Deer and elk winter range (EW-1) was originally managed under Special Prescription Yield Tables 2 and 3. These yield tables included managing the timber on a fairly long rotation. Since cover and early forage production were considered more important, Yield Table RM-1 was considered to be more appropriate for winter range in the FEIS.

e. In the DEIS, the spotted owl, pine marten, three-toed woodpecker, and pileated woodpecker were managed using the same prescription and modeled with the same yield table. The DEIS also had only one spotted owl network while the FEIS uses three different networks that meet or exceed direction contained in the Final Supplement to the EIS for an amendment to the Regional Guide for Spotted Owl Guidelines. For example, the minimum owl network is used in the maximum commodity alternatives. Another difference in the FEIS is that a separate prescription was written for the spotted owl. The Spotted Owl Yield Table changed from managed old growth to dedicated old growth (no scheduled timber harvest). The prescription for the pine marten and three-toed and pileated woodpeckers was also changed to

one that produces the mature timber requirements for these species. As a result, the analysis of management requirements has also changed (see Appendix I and Management Requirements Section in this chapter).

f. Management direction for primary cavity excavators was changed resulting in a two percent reduction in the harvest volume.

g. Changes in the alternative formulations and modeling parameters resulted in the benchmark data displayed in the DEIS being no longer comparable to the alternatives displayed in the FEIS. This update was completed outside the FORPLAN model. See Appendix B for further information.

3. Alternatives

The eleven alternatives considered in this Final Environmental Impact Statement display different ways of managing the lands and resources of the Wenatchee National Forest. They may differ from each other in the land uses and management practices which would occur on different parts of the Forest. They may also differ in their scheduling of management activities.

Each alternative is a unique combination of land allocations, management prescriptions, and activity schedules. As a result, each alternative would generate a different mix of goods and services for the public, and a different combination of resource outputs, land uses, and environmental effects.

a. Constants Throughout All Alternatives

Management of some areas on the Forest will not vary by alternative. These include all Congressionally designated Wilderness areas and the Alpine Lakes Management Unit. The direction for the Alpine Lakes Management Unit is included in the recently completed (1981) Alpine Lakes Area Land Management Plan that was Congressionally mandated through the Alpine Lakes Area Management Act of 1976. This is in accord with 36 CFR Part 219.2(b) of the National

Forest Management Act of 1976 (NFMA) planning regulations. Two established Research Natural Areas, and the Entiat Experimental Forest are also constant across the alternatives. Alternative NC differs from the others as it make no allowance for the Alpine Lakes Management Unit or Entiat Experimental Forest, and does not include management requirements (MR's) per 36 CFR 219.27.

The management of some resources on the Forest will not vary by alternative. Watersheds will be managed at levels which minimize the loss of on-site soil productivity as well as provide riparian, fishery stream channel, and water quality conditions which would protect beneficial uses of water. Management of the air resource by compliance with federal, state, and local statutes will be the same in all alternatives. Appropriate wildfire responses will be implemented under all alternatives.

The final determination of timber harvest method will be made on a site-specific level for each project. All alternatives would employ combinations of the silvicultural systems applicable on this Forest. Options of designing alternatives using a single system (either even-aged or uneven-aged) were not built into the alternatives due to the tremendous physical and biological variation found within the Forest and the multiple objectives associated with each alternative. Clearcut, shelterwood, seed tree, single-tree selection, and group selection harvest methods are all available tools under each alternative. The Standards and Guidelines (Chapter IV of the Plan) indicate the system generally appropriate for given combinations of site and stand conditions, and management goals and objectives. Appendix H of the FEIS presents a discussion of the various systems, comparisons of their effects, and rationale for uses under different conditions. The systems indicated as most appropriate for the broad categories presented should be those most often used; however, it is not intended that other systems should not be used when site-specific conditions warrant. The final selection of a silvicultural system for a specific site is left for the silvicultural prescription. This is consistent with Criterion 6 of Section I-1 of the Standards and Guidelines in the Regional Guide for the Pacific Northwest Region (USDA Forest Service, 1984).

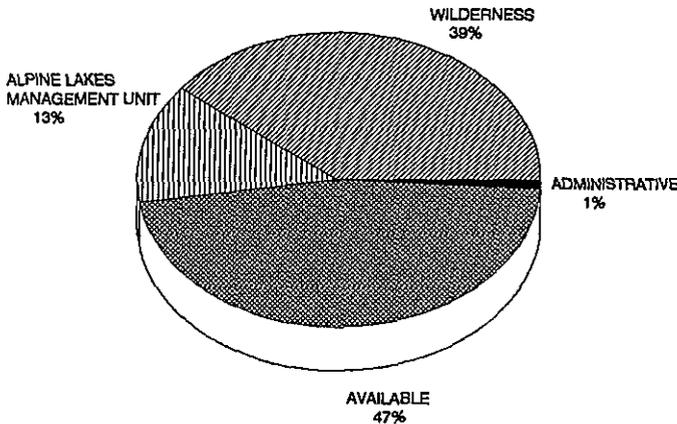
Logging systems will also be matched to the site specific conditions, and systems will be selected to meet the resource objectives at the least cost. Specific areas suitable for only some systems have not been identified by alternative. All systems will be available, including helicopter, and will be used where appropriate. The cost data used in the analysis includes allowances for this mix of logging systems in the timber program.

The Forest Service is not proposing the construction of the Naches Pass Road and there is no current proposal to construct a road by any of the intermingled landowners. Any future proposal would be subject to a site specific Environmental Analysis and the public would have the opportunity to participate in that process.

Currently 39 percent of the Forest is wilderness, 13 percent is within the Alpine Lakes Management Unit, and 2 percent is within other fixed land allocations. Thus, the land allocation on more than half of the Forest is already set and will not vary between alternatives.

FIGURE II-1

HOW MUCH OF THE WENATCHEE NATIONAL FOREST IS ACTUALLY AVAILABLE FOR CHANGING LAND ALLOCATIONS?



An even distribution of reasonable alternatives covering a broad range of possible actions were formulated by the Interdisciplinary Team. In formulating these alternatives, they were guided by several considerations. For example, the planning regulations 36 CFR 219.12(e) and (f) require a specific analytic process which includes an inspection of various minimum and maximum production levels and economic factors. In addition, the collection of alternatives must respond to public issues and include alternatives which reflect current and National programs such as the Resources Planning Act (RPA) program.

Some alternatives would manage the National Forest to maximize the production of priced commodities such as timber and range, while other alternatives would maximize the provision of unpriced amenities, such as dispersed recreation, wildlife, and scenery. One alternative (Alternative A/NFMA, "No Action") reflects current production levels, while another (Alternative B, RPA program) reflects the objectives of the Forest Service National program. One alternative, Alternative I, has an accelerated timber harvesting program ("departure"). From this broad range of alternatives, the Regional Forester has a basis for selecting the alternative (the Preferred Alternative) which comes nearest to maximizing the net benefits to the public while responding effectively to the Issues, Concerns, and Opportunities identified in Chapter I.

"Benchmarks" are presented and discussed in this chapter. Benchmarks are analytic bases from which the alternatives were developed. They were used to analyze certain relationships under special economic and resource production assumptions. Their character and use will be discussed in the next section.

B. OVERVIEW OF ALTERNATIVE DEVELOPMENT

The primary purpose of alternative development is to formulate a broad range of options as a basis for identifying the alternative that comes nearest to maximizing Net Public Benefits (NPB) (36 CFR 219.11(f)). An analytic process is used to develop alternatives that reflect a range of resource output and expenditure levels, distributed between the minimum and maximum resource potentials identified in the analysis process (36 CFR 219.12 (e) and (f)). Alternatives are formulated in a manner that facilitates the evaluation of a number of economic parameters, including effects on costs and benefits, present net value, employment and income, and analyses of trade-offs among alternatives. The collection of alternatives demonstrates different ways of responding to Issues, Concerns, and Opportunities.

By managing the forest resources in different ways, various objectives can be achieved which respond to the Issues, Concerns, and Opportunities. This differing management can vary by what, where, and when it is done. The result is a combination of management activities, management areas, and schedules which define a unique combination of resource outputs and environmental conditions for each alternative. The merits of an alternative are evaluated based upon the Net Public Benefit that the alternative achieves and how it responds to the public issues.

Present Net Value (PNV) is the quantitative component of Net Public Benefit. It is the discounted value of all priced benefits less all priced costs. Timber benefits and costs, quantitatively valued aspects of recreation, human use of wildlife and fisheries and range are included in the PNV calculations. Some values such as the preservation of old growth and roadless areas, the protection of spotted owls and rare plants, employment and local income, Retention and Partial Retention Visual Quality Objectives, returns to the federal and county governments, and the fostering of local social stability are not represented in the PNV figures. These and other values need to be taken into account in the development of alternatives that best respond to Issues, Concerns, and Opportunities.

Net Public Benefit reflects both quantified and non-quantified net benefits of the alternatives and represents the overall value to the nation of all outputs and positive effects (benefits) less all of the associated inputs and negative effects (costs) of producing priced and non-priced goods and services from National Forest lands (36 CFR 219.3). Net Public Benefit represents the sum of net priced outputs and the net value of non-priced outputs. Forest planning alternatives are formulated to examine different combinations of goods and services, both quantitatively and qualitatively valued, to find the mix that best maximizes Net Public Benefits while responding effectively to public issues.

The "No Action" Management Alternative A/NFMA is a key alternative in the planning process. This alternative projects the management direction found in existing land and resource plans. It serves as a basis (a yardstick) for measuring the environmental effects of implementing any alternatives compared to the existing situation. It also provides a means of comparing the ability of the alternatives to resolve the Issues, Concerns, and Opportunities in relationship to current management. The Alternative A/NFMA map depicts current land uses.

Forest unit plans, multiple use plans, and other current resource plans are the basis for the current management direction of the Alternative A/NFMA. The Forest's "No Action" Alternative is based upon the land uses designated in the Chelan Planning Unit FEIS dated April 28, 1976, the Kittitas Land Management Plan FEIS dated May 27, 1979, the Alpine Lakes Area Land Management Plan FEIS dated November 2, 1981, and the May 17, 1973, updates of the Tieton and Naches Ranger District Multiple Use plans plus other applicable multiple use resource plans and land use directives. Congressionally designated wildernesses such as those recently established by the Washington State Wilderness Act of June 29, 1984, supercede other land uses.

The "No Change" Alternative (Alternative NC) was developed differently than the other alternatives. It is based on the existing Timber Management (TM) Plans for the Wenatchee National Forest which are essentially single resource plans. The TM Plans emphasize production of the

timber resource. The land base that was used had different criteria for identifying lands suitable for timber harvest. Yield tables in the TM Plans are based on information that has since been updated.

By managing the Forest lands and resources in different ways, different objectives can be achieved which respond to different issues and produce various combinations of public benefits. Forest management can vary by what is done, where it is done, and when it is done. These different management activities, varying management areas, and differing schedules will result in varying resource outputs and environmental conditions in meeting the objectives of the alternatives.

An alternative is formulated by considering all of these factors:

- the capability of different areas on the Forest to produce various goods and services.
- the public's need or demand for different combinations of commodities and amenities.
- the management actions which are planned for different areas ("management prescriptions").
- the interrelationship of capabilities, management prescriptions, and schedules which result in resource outputs and environmental conditions which are consistent with the objectives of that alternative.

Management activities in all alternatives will be governed by Standards and Guidelines (Forest Plan, Chapter IV) as well as Best Management Practices, or "BMP's". Best Management Practices are specifically designed to protect water quality, as required by the Clean Water Act, and are a mitigation measure common to all alternatives. Appendix J, BMP's, describes the process and practices to protect water quality which were developed in response to public input.

1. DEMAND/SUPPLY ANALYSIS

The demand estimates in Table II-A reflect the future output/effect levels anticipated by several public agencies, including the Forest Service. These projections are discussed in several places in the FEIS, including Chapters III and IV. There is a further discussion of demand in Chapter II of the Forest Plan.



TABLE II-A
CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES

	UNITS	DECADE				
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
DEVELOPED RECREATION USE CAPACITY						
	Thousand RVD's					
Current Program		4,883	4,900	4,900	4,900	4,900
Production Potential		6,853	6,870	6,870	6,870	6,870
Forest Plan		6,683	6,700	6,700	6,700	6,700
Demand		3,141	3,449	3,848	4,647	4,647
DISPERSED RECREATION USE CAPACITY						
-Roaded						
	Thousand RVD's					
Current Program		22,576	23,576	23,829	24,082	24,334
Production Potential		<-----26,007----->				
Forest Plan		21,884	22,467	22,873	23,279	23,685
Demand		1,998	2,126	2,294	2,462	2,630
-Unroaded, Motorized						
	Thousand RVD's					
Current Program		873	833	803	773	742
Production Potential		<-----1,024----->				
Forest Plan		796	752	722	692	663
Demand		279	301	336	371	405
-Unroaded Non-Motorized						
	Thousand RVD's					
Current Program		147	142	135	128	121
Production Potential		<-----341----->				
Forest Plan		188	179	174	169	163
Demand		99	106	118	130	143
-Wild and Scenic Rivers						
	Miles					
Current Program		<-----45----->				
Production Potential		<-----240.5----->				
Forest Plan		<-----230----->				
Demand		<-----Mixed----->				
VISUAL QUALITY OBJECTIVES						
-Preservation						
	Acres					
Current Program		<-----842,751----->				
Potential		<-----843,281----->				
Forest Plan		<-----843,281----->				
Demand		<-----Very High----->				
-Retention						
	Acres					
Current Program		<-----485,081----->				
Potential		<-----828,058----->				
Forest Plan		<-----521,800----->				
Demand		<-----Very High----->				

TABLE II-A (continued)

**CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES**

		UNITS	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
-Partial Retention	Acres						
Current Program		<-----459,112----->					
Potential		<-----246,835----->					
Forest Plan		<-----332,927----->					
Demand		<-----High----->					
-Modification	Acres						
Current Program		<-----55,629----->					
Potential		<-----55,629----->					
Forest Plan		<-----147,828----->					
Demand		<-----Low----->					
-Maximum Modification	Acres						
Current Program		<-----321,607----->					
Potential		<-----86,941----->					
Forest Plan		<-----318,344----->					
Demand		<-----Very Low----->					
WILDERNESS USE CAPACITY	Thousand RVD's						
Current Program		<-----1,060,000----->					
Production Potential		<-----1,060,000----->					
Forest Plan		<-----1,060,000----->					
Demand		423 5	444 7	475.8	507 2	540 2	
WILDLIFE HABITAT							
-Big-Game	Acres						
Current Program		<-----17,151----->					
Production Potential		<-----148,189----->					
Forest Plan		<-----118,742----->					
Demand		<-----148,189----->					
-Old-Growth	Acres						
Current Program		307,300	295,800	284,400	272,900	261,600	
Production Potential		<-----310,600----->					
Forest Plan		307,300	295,700	284,200	272,700	261,200	
Demand		<-----Very High----->					
BIG GAME ESTIMATES							
-Deer (summer)	Numbers						
Current Program		25,200	25,100	25,000	24,900	24,700	
Production Potential		<-----28,100----->					
Forest Plan		25,100	24,900	24,800	24,600	24,400	
Demand		<-----High----->					

TABLE II-A (continued)

CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES

	UNITS	DECADE				
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
-Elk (summer)	Numbers					
Current Program		12,500	12,500	12,400	12,400	12,300
Production Potential		<-----14,000----->				
Forest Plan		12,500	12,400	12,300	12,200	12,100
Demand		<-----High----->				

FISHERIES

-Cutthroat Trout	Numbers					
Current Program		201,000	202,000	203,000	204,000	205,000
Production Potential		206,000	218,000	230,000	242,000	254,000
Forest Plan		204,000	212,000	220,000	229,000	238,000
Demand		<-----Very High----->				
-Anadromous Commerical Harvest	Lbs. (with increasing escapements)					
Current Program		328,000	941,000	946,000	950,000	955,000
Production Potential		328,000	1,002,000	1,028,000	1,054,000	1,080,000
Forest Plan		328,000	970,000	1,012,000	1,012,000	1,033,000
Demand		<-----Exceeds Supply----->				

VEGETATION: TREES

-Timber Offered	Thousand Cubic Feet					
Current Program		<-----32,400----->				
Production Potential		<-----36,500----->				
Forest Plan		<-----26,100----->				
Demand		30,940	<-----Exceeds Supply----->			

-Timber Offered	Thousand Board Feet					
Current Program		<-----176,800----->				
Production Potential		<-----186,600----->				
Forest Plan		<-----146,000----->				
Demand		168,600	<-----Exceeds Supply----->			

-Allowable Timber Sale Quantity--	Thousand Cubic Feet					
Current Program		<-----31,300----->				
Production Potential		<-----34,100----->				
Forest Plan		<-----24,300----->				
Demand		30,940	<-----Exceeds Supply----->			

-Allowable Timber Sale Quantity--	Thousand Board Feet					
Current Program		<-----170,800----->				
Production Potential		<-----173,800----->				
Forest Plan		<-----136,800----->				
Demand		168,600	<-----Exceeds Supply----->			

TABLE II-A (continued)

CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES

	UNITS	DECADE				
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
-Fuelwood Availability	Thousand Cubic Feet					
Current Program		<-----	4,396	----->		
Production Potential		<-----	4,396	----->		
Forest Plan		<-----	3,400	----->		
Demand		<-----	Not Estimated	----->		
VEGETATION: FORAGE						
-Grazing Capacity (Livestock)	AUM's					
Current Program		36,400	37,700	37,600	37,800	38,300
Production Potential		<-----	42,900	----->		
Forest Plan		38,700	39,900	40,000	40,400	41,100
Demand		23,000	25,500	29,000	32,000	36,000
-Expected Permitted Use	AUM's					
Current Program		23,000	23,000	22,000	21,000	20,000
Production Potential		<-----	42,900	----->		
Forest Plan		23,000	24,000	24,000	24,000	24,000
Demand		23,000	25,500	29,000	32,000	36,000
WATER YIELD INCREASE	Acre Feet					
Current Program		13,800	18,900	19,500	19,200	21,600
Production Potential		<-----	40,600	----->		
Forest Plan		15,500	21,000	21,500	22,700	23,800
Demand		<-----	Very High	----->		
ACTIVITY SEDIMENT YIELD	Tons					
Current Program		94,900	69,200	69,200	38,800	38,800
Maximum Program		96,600	96,600	96,600	54,100	54,100
Forest Plan		72,400	72,400	72,400	40,500	40,500
MINERALS						
-Locatable Minerals						
Current Program	Plans of Operation	100-170	130-200	130-200	130-200	130-200
	Notices of Intent					
Potential Program	Acres Available for Mineral Development					
	High Potential	<-----	14,204	----->		
	Moderate Potential	<-----	46,538	----->		
	Low or Unknown	<-----	1,253,377	----->		
-Leaseable Minerals						
Current Program	Leases/Permits	35	35	40	50	60
	Plans of Operation					
Potential Program	Acres Available					
	Oil and Gas	<-----	205,854	----->		
	Coal	<-----	425,657	----->		
	Geothermal	<-----	182,385	----->		

TABLE II-A (continued)

**CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES**

		UNITS	Decade 1	Decade 2	DECADE Decade 3	Decade 4	Decade 5
-Salable Minerals	Tons						
Current Program		90,000	90,000	80,000	70,000	60,000	
Potential Program		142,000	129,000	100,000	80,000	60,000	
ROADS							
-Arterial and Collector	Miles						
Construction & Reconstruction							
Current Program		17	2	2	2	2	2
Maximum Program		19	2	2	2	2	2
Forest Plan		18	2	2	2	2	2
-Timber Purchase Roads	Miles						
Construction & Reconstruction							
Current Program		74	74	4	4	4	4
Maximum Program		111	92	8	8	8	8
Forest Plan		83	68	5	5	5	5
FUEL TREATMENT	Acres						
Current Program		3,400	4,800	4,800	4,800	4,800	4,800
Maximum Program		11,300	11,500	6,200	7,000	6,600	6,600
Forest Plan		6,700	5,800	3,200	6,800	7,800	7,800
TOTAL BUDGET	Thousand Dollars						
Current Program		23,000	22,000	21,500	20,900	20,600	
Maximum Program		34,200	31,800	30,000	29,000	27,500	
Forest Plan		29,000	25,400	24,000	23,500	22,800	
RETURNS TO TREASURY	Thousand Dollars						
Current Program		12,500	13,700	13,100	16,000	14,500	
Maximum Program		15,300	16,300	15,900	24,200	25,700	
Forest Plan		14,000	15,100	10,400	17,500	14,300	
PAYMENTS TO COUNTIES	Thousand Dollars						
Current Program		3,000	3,000	2,600	2,900	2,400	
Maximum Program		3,700	3,300	3,200	4,400	4,200	
Forest Plan		3,300	3,300	2,100	3,200	2,400	
CHANGES IN JOBS	Number						
Current Program		39	-	-	-	-	
Maximum Program		629	-	-	-	-	
Forest Plan		203	-	-	-	-	

2. FORPLAN

A large, computerized, mathematical simulation model of the Forest is used to keep track of all the factors in building an alternative and their interactions. This Forest Planning model, called FORPLAN, also assists in selecting that particular combination of lands, management prescriptions, and activity schedules that will best meet the objectives of an alternative.

FORPLAN, which is a "linear programming" model, is designed to simulate and to depict the effect of management on resources and environmental conditions on the Forest. It is also designed to find the "optimum" solution to a planning problem given the limited potential of the Forest to produce resources while maintaining desired environmental conditions. The model considers the effects of costs, budgets, and resource values.

The FORPLAN model is structured to achieve the targets and goals of each alternative with the greatest economic efficiency. This is done by selecting land units and prescriptions whose accumulative benefits will exceed the investment cost by the largest amount; i.e. maximize present net value. Present Net Value (PNV) is the current value of present and future monetary benefits after subtracting present and future monetary costs. The investment level or costs and benefits are an output of the FORPLAN solution rather than an input like the targets, goals, and prescription and land unit options. FORPLAN is thus able to predict some Forest-wide, cumulative, quantitative effects, including monetary costs and benefits under the conditions specified to achieve the objectives of a particular alternative.

The Forest Plan Interdisciplinary (ID) Team is directly involved with the design, operation and interpretation of the FORPLAN model. The land and resource base is stratified into land units or classes ("analysis areas"). Alternative management activities ("management prescriptions") are developed for each of these units according to the Team's instructions. The FORPLAN model examines this data and then assigns prescriptions to analysis areas and schedules activities. The ID Team must then assure that the model has correctly represented the objectives and constraints

assigned to the model, and that the results are feasible and implementable.

Many assumptions and generalizations are necessary to depict as large and complex an entity as the Wenatchee National Forest in a reasonably manageable and economical computer model. For example, timber stands found on the Forest consist of an almost infinite mix of plant species, tree sizes and stocking densities. They must be lumped into a fairly small group of "average" stands which can be modeled feasibly using current inventory data and modeling techniques.

Results of FORPLAN tend to suffice for the average situation but may not be applicable to every situation which can be found on the ground. These modeling limitations must be taken into account when interpreting FORPLAN results. FORPLAN is very useful in predicting relative differences between alternatives and in simulating broad impacts of alternative management strategies over time. The outputs and effects predicted by FORPLAN need to be tested on the ground over time through use of the Monitoring Plan (Forest Plan, Chapter V).

The process for formulating alternatives is one which involves considerable analysis of all resources and environmental conditions. It involves the examination of the National Forest under various management approaches designed to meet different goals and objectives. It is conducted by the Forest Plan Interdisciplinary Team, the Forest Management Team, Ranger District personnel, and interested members of the public.

Other analytic techniques were used to specify the parameters and the constraints required to use or supplement the FORPLAN model. After FORPLAN analysis, other analysis is conducted to aid in interpreting the results.

In some cases, the FORPLAN model will report that the Forest cannot be managed to meet a certain combination of objectives. In this case, the limitations of land and resources, impact on environmental quality, or the practical limits of budgets make the objectives infeasible. Then the Interdisciplinary Team must modify the objectives and make other "runs" of the computer model to find the particular combination of lands, activities,

and schedules which will best meet the goals of that alternative. Other analytic techniques are employed to validate a FORPLAN solution and to develop economic and other information about its implementation.

C. DESCRIPTION OF THE ANALYSIS PROCESS

Appendix B of this FEIS describes the entire analysis process in detail. Readers are encouraged to refer to that Appendix for technical information not presented in this chapter.

The analysis used in formulating the alternatives is guided by the planning regulations (36 CFR 219.12(e) and (f)).

The first steps in the analysis process begin with the inventory of the character, potentials, and limitations of different land areas of the Forest which have fairly uniform characteristics. These are identified as "analysis areas." The Interdisciplinary Team identified 130 analysis areas on the Wenatchee National Forest, ranging in size from 21 to 67,798 acres. These are the basic geographic units of alternatives. They are subdivisions of the Forest having similar characteristics of management cost and predicted response to Forest management activities.

Analysis areas on the Wenatchee National Forest typically were areas which were not contiguous. Analysis areas with a common management prescription are combined to form larger "management areas" in all implementable alternatives. In conjunction with the creation of analysis areas, the ID Team generated "management prescriptions" which apply to specific analysis areas and management areas. To direct on-the-ground management, standards and guidelines for management were written and/or incorporated from the Regional Guide. Mathematical estimates of their direct economic costs and resource yields were generated for use in the FORPLAN model.

The process of identifying and subsequently developing management prescriptions began with an Interdisciplinary Team review of the issues, concerns, and opportunities (ICO's). Prescriptions were then identified which would help

address those ICO's which were related to decisions regarding standards and guidelines, scheduling, or land allocations. There were other ICO's which were to be addressed through policy statements for which it was not appropriate to develop prescriptions.

Once the need and purpose for certain types of prescriptions was identified, goal statements for each management prescription were designed to respond to the questions raised by the ICO's. The Interdisciplinary Team then used professional judgment, evaluated existing policy, legislative direction, and research for guidance in developing multiple use management prescriptions. Regional Office and Ranger District personnel, representatives from other agencies, and interested members of the public participated in this process. The resulting management prescriptions then received thorough review, with some modification, by the Forest Management Team.

The resulting set of prescriptions represents a broad range of resource management emphases, practices, and capital investment levels. Forest-wide standards and guidelines were also developed by the Interdisciplinary Team and Management Team to cover practices common to all prescriptions and resource management situations that are Forest-wide in scope. For a complete description of the management prescription process, see Appendix B.

Prior to prescriptions being loaded into FORPLAN, an economic analysis of timber prescription feasibility and efficiencies, (Stage II Economic Analysis) was completed by Joan Krzak, the Forest economist at that time. This analysis disclosed that it was uneconomical to reforest non-stocked lands. It also concluded that all analysis areas that were to be used for FORPLAN modeling, which contained merchantable volume, were economic to harvest and reforest.

After making the first trial FORPLAN runs, it became apparent that the yield table that did not have a precommercial thin, but attempted to commercial thin, was not economical. At this point, that yield table (GF-2) was dropped from future consideration. See Appendix B for a complete discussion of the land allocation prescription process.

Management areas are portions of the Forest to which a set of management practices, standards, and guidelines apply. There is a range of 20 to 26 management areas used in developing the different alternatives. Management areas are identified on the maps for each alternative which accompanies this FEIS. The management areas are described immediately following Table II-1 and their acreages are shown in Table II-2.

The unit costs and values were not updated between the Draft and the Final in the FORPLAN model. In preparation of the Forest budget, some costs for wildlife and other resource areas were updated.

Having identified areas for analysis and management, and having prescribed the appropriate management practices and their mathematical expressions for use in the FORPLAN model, the Interdisciplinary Team proceeded with the following process of analysis in the formulation of alternatives.

The Timber Management Plans upon which the No Change Alternative is based were originally developed in 1963 and 1969. As stated previously, the TM Plans were not integrated resource plans. The Forest planning computer models were not used to model Alternative NC because of the differences in available information between it and the other alternatives. Because of this, there are outputs and effects from FORPLAN for the other alternatives that can't be derived with the same accuracy and reliability for the No Change Alternative.

The Chelan Unit Management Plan in 1976, the Kittitas Land Management Plan in 1979, and the District Multiple Use Plans, as modified by policies in the Forest Service Manual, provide new standards and management objectives which were used for on-the-ground management. These unit plan standards and management objectives are best represented in Alternative A/NFMA - No Action (Current Direction). However, the unit plan direction was not reconciled with the TM Plans pending completion of the Forest Plan. As a result, the timber potential yield estimated used in the TM Plans and in the No Change Alternative may not be feasible under the unit and multiple use plan allocations.

D. DEVELOPMENT AND IMPLICATION OF MANAGEMENT REQUIREMENTS

Management requirements (MR's) were developed in accordance with 36 CFR 219.27 to assure that the basic productivity of the land and water resources remains unimpaired. Selected MR's were tested to determine their effect on present net value, the first decade timber harvest level, and other selected outputs. The MR's tested were water quality/riparian areas, dispersion of openings created by harvesting, primary cavity excavators, and requirements for the marten, northern three-toed woodpecker, pileated woodpecker, and spotted owl.

The analysis of opportunity costs for meeting MR's was based on the Maximum Present Net Value (PNV) benchmark. Details on how the analysis was performed are provided in Appendix I. The effect that alternative means of meeting MR's had on key resource outputs is shown in the following table.



TABLE II-B

**OPPORTUNITY COSTS OF MEETING THE MANAGEMENT REQUIREMENTS
WITH SELECTED IMPLEMENTATION METHODS (MEANS)**

	FIRST DECADE ALLOWABLE SALE QUANTITY MMCF/YR (MMBF/YR)	CHANGE IN ALLOWABLE SALE QUANTITY 1/	PRESENT NET VALUE MM\$	CHANGE IN PRESENT NET VALUE
Maximum PNV Benchmark Displayed in the DEIS	29.9 (163 0)		2132	
Opportunity Cost--Approximate Change				
Opportunity Cost of Selected Timber Harvest Dispersion Implementation Methods	4.3 (23.4)	13.4%	25	1 2%
Opportunity Cost of Selected Mature Conifer Implementation Methods	0.9 (4.9)	3 0%	5	0 2%
Opportunity Cost of Selected Spotted Owl Implementation Methods	1.8 (9.8)	6.0%	9	0.4%
Opportunity Cost of Selected Water Quality/ Riparian Implementation Methods	1.8 (9.8)	6.0%	9	0 4%

MMCF/YR = Millions of cubic feet per year
MMBF/YR = Millions of board feet per year
MM\$ = Millions of dollars
1/ Percent change calculated on cubic foot basis

The results of the analysis show that the timber harvest dispersion MR has the highest opportunity costs. Costs for mature conifer and water quality/riparian MR's are the same, with the costs for spotted owls the least.

The opportunity costs of MR's when compared against one of the Forest Plan alternatives would be significantly less than the costs shown in the table. This is because the management practices necessary to meet other objectives of the plan alternatives may partially or fully meet the MR.

The timber harvest dispersion method was selected because it was the maximum rate at which regeneration cutting could occur without cutover openings being contiguous, assuming a checker-board harvesting model. A cutover area is no longer considered an "opening" when the trees reach a height of four and one-half feet. For the mature conifer habitat, the selected implementation method was that which was felt would maintain the viability of the selected wildlife species while having the least impact on timber harvest.

The results of the analysis of opportunity costs for the FEIS is substantially different from the analysis shown in the Wenatchee Supplement to the DEIS. This is because of the changes in requirements for mature conifer habitat and spotted owls. Direction for spotted owls was provided in the Forest Service Final Supplement to the EIS (SEIS) for an Amendment to the Pacific Northwest Regional Guide. The Record of Decision for the SEIS was not published until after the Wenatchee Supplement was released. Refer to Appendix I for further information.

Water quality/riparian implementation methods were selected to provide the most protection to the water resource with the least impact on timber harvest.

E. BENCHMARK ANALYSIS

Many of the first steps involved the creation of "benchmarks," and the inspection of their outputs, costs, and assumptions. Benchmarks are an assessment of the Forest's capability to produce goods and services, but lack consideration for likely budgets or the need to protect a full range of resource values. Benchmarks are similar to alternatives in that they are a combination of land capability, management practices, and schedules to achieve certain objectives. But unlike alternatives, they are usually not capable of actually being implemented, because of their narrow consideration of budget realities and management objectives. Benchmarks do provide significant information about the maximum biological and economic production opportunities. They also assist in evaluating the compatibilities or conflicts between market and nonmarket objectives, and define the range within which Forest management alternatives will be developed.

Changes in the alternative formulations and modeling parameters resulted in the benchmark data displayed in the DEIS being no longer comparable to the alternatives displayed in the FEIS. The benchmarks displayed have been updated to be comparable with the alternatives displayed in the FEIS. This update was done outside the FORPLAN model. (See Appendix B for further details).

Benchmark analyses were not conducted using the Alternative NC resource assumptions. These resource assumptions are not based upon the most recent scientific information.

Some benchmarks are economically based, while others indicate the maximum physical productivity of land for various resources. In these benchmark analyses, each option must include meeting management requirements of 36 CFR 219.27, such as protecting the productivity of the land, meeting minimum air and water quality standards, and maintaining wildlife viability. Benchmarks are also described further in Appendix B of the FEIS.

There are several benchmarks that are required by the planning regulations (36 CFR 219.12(e)) and National direction. They include:

1. MINIMUM LEVEL

This benchmark specifies the minimum level of management which would be needed to maintain the Wenatchee National Forest as part of the National Forest System.

2. MAXIMUM PRESENT NET VALUE BASED ON ESTABLISHED MARKET PRICE

This benchmark specifies the management of the Forest which will maximize the present net value of those outputs that have an established market price.

3. MAXIMUM PRESENT NET VALUE INCLUDING ASSIGNED VALUES

This benchmark specifies the management which will maximize the present net value of those outputs that have either an established market price or assigned monetary value.

4. CURRENT LEVEL

This benchmark specifies the management of the National Forest most likely to be implemented in the future if current direction is followed. This benchmark forms the basis for the "no action" alternative.

5. MAXIMUM RESOURCE LEVEL

Each of these benchmarks estimate the maximum capabilities of the Forest to provide a single resource output. There are maximum resource level benchmarks for Timber, Range, Wildlife, Fish, and Unroaded Recreation.

Other benchmark analysis is conducted to determine the effect of various management requirements and discretionary constraints. Analysis also assesses the effect of restricting timber harvest rotations to the culmination of mean annual increment (CMAI) and the impact of a nondeclining yield of timber harvest.

When a benchmark appears to offer a viable opportunity to respond to issues, concerns, and opportunities, further analysis is conducted to examine it as an alternative. Some benchmarks are the basis for alternatives, while others display too many environmental, fiscal, and practical problems in the analysis and are eliminated from *further study in detail*.

F. RANGE OF ALTERNATIVES

By inspecting the information generated by the benchmark analysis, and the parameters identified by the various benchmarks, the Interdisciplinary Team proceeded with constructing alternatives which could be implemented on the Forest.

The benchmarks presented in the previous section were one of the factors used to develop alternatives that represent a range of resource outputs for responding to the planning problems identified in Chapter I. Benchmarks can provide sideboards for the maximum the Forest can produce of various resource outputs. They help define for the decision-maker the amount of flexibility he has in making the decision; in other

words, the "decision space." A complete discussion of the decision space can be found in Appendix B. Forest Plan alternatives were not developed solely from benchmarks because the benchmarks were responsive to only one of several resource issues.

Alternatives were designed to span the benchmark range while meeting policy constraints such as the use of herbicides, different harvest systems (see Appendix H), and the SEIS Management Requirement Standards and Guidelines for the Spotted Owl (except Alternative NC). The standards and guidelines for riparian areas are also a constraint and were substantially modified from the Draft EIS in response to public comment.

Other constraints and prescriptions were also common or constant in all alternatives. These were necessary to meet planning requirements, existing laws or policies, or the objectives of prescriptions. Some areas on the Forest will not vary by alternative. These include Congressionally designated Wilderness, the two established Research Natural Areas, the Entiat Experimental Forest, and the Alpine Lakes Management Unit. Other constraints included the timber flow constraints, such as nondeclining flow (except for Alternative I); the harvest level of the last harvest period will be less than or equal to long-term sustained yield; and an ending inventory constraint. Additional constraints were included to meet management requirements such as the dispersion constraint and to provide for minimum viable wildlife populations. A complete discussion of the constraints common to all alternatives can be found in Appendix B.

Among the alternatives the ID team formulated are several that are required by regulations and National direction. The required alternatives are listed and briefly described here.

1. "NO CHANGE" ALTERNATIVE

This alternative was developed in response to decisions made regarding an appeal brought by the Northwest Forest Resources Council on May 19, 1986. The substance of the appeal was that a "true no action alternative representing current

management plans" was not included in Forest Plan EIS's. Although the appeal was denied, relief was granted in that Alternative NC was developed which is based on the existing Timber Management plans. As a result, it does not comply with all provisions of the National Forest Management Act of 1976 (NFMA) and the regulations promulgated by the Secretary of Agriculture to implement NFMA. The outputs of Alternative NC are similar to other alternatives and can therefore be used for comparison purposes.

2. CURRENT DIRECTION (NO ACTION)

This is the alternative of "No-Action" required by the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14) and the NFMA Planning Regulations (36 CFR 219.12(f)). This alternative would continue the management of the Forest as defined by existing direction in approved management plans. It assumes continuation of existing policies, standards, and guidelines, current budget levels updated for changing costs over time; and, to the extent possible, production of current levels and mixes of resource outputs.

Alternative A/NFMA is the Current Direction Alternative (or the "No-Action" Alternative) in this FEIS.

3. EMPHASIS ON THE CURRENT RPA PROGRAM

This alternative determines how the Current (1980) RPA program distributed to the Forests through the Regional Guide could best be implemented.

Alternative B is the current RPA program alternative in this FEIS.

4. EMPHASIS ON MARKET OPPORTUNITIES

This alternative has an emphasis on outputs that have an established market price (timber, live-stock range, forage, commercial fish, developed recreation opportunities, and minerals). Management for other resources will be at economically and environmentally feasible levels consistent with the emphasis on market-oriented outputs.

Alternative D is the alternative in this FEIS which emphasizes market opportunities.

5. EMPHASIS ON NON-MARKET OPPORTUNITIES

This alternative has an emphasis on water, fish, scenery, wildlife, recreation and other amenity values (the maximum amount of the roadless inventory would be allocated to a roadless management emphasis). Management for other resources will be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

Alternative E is the alternative in the FEIS which emphasizes amenity values.

6. EMPHASIS ON DISPERSED UNROADED RECREATION AND INTENSIFIED MANAGEMENT

This alternative allocates a large portion of the roadless areas on the Forest to dispersed unroaded recreation while increasing commodity production on those areas already roaded. Its purpose is to offset the economic effects of not beginning commodity production in roadless areas. It also attempts to reduce potential cumulative effects of management activities on National Forest and adjacent forest lands.

Alternative G is the alternative in this FEIS which best emphasizes dispersed unroaded recreation and intensified management

7. DEPARTURE ALTERNATIVE

One alternative is a "departure" alternative. It has the same land allocation and resource management prescriptions as Alternative C. However, the timber harvest schedule has been modified from the base sale schedule which would result in a non-declining flow of timber that never exceeds the long-term sustained yield capacity of the Forest. In most cases, management under a departure alternative results in higher volumes of timber harvested in the near future and lower volumes of timber available in the intermediate future. The ability of the Forest to produce timber in the long run is no less than that of the alternative upon which the departure was based.

Alternative I is the departure alternative in this FEIS.

8. OTHER ALTERNATIVES

Additional alternatives were necessary to respond to the full range of public issues, management concerns, and resource use and development opportunities. These were formulated to reflect a broad range of resource outputs and expenditure levels. Additional alternatives were also formulated to respond to 36 CFR 219.12a(f)(1) which requires alternatives to "be distributed between the minimum resources potential and the maximum resource potential" to display the "full range" of outputs that a Forest could produce.

A new alternative, Alternative J, was added between the Draft and Final EIS in response to public comment. It was developed by representatives of timber industry, and was referred to during the public comment period as the "Essential Alternative."

9. THE PREFERRED ALTERNATIVE

The Forest Service Preferred Alternative has been identified. The selection of the Preferred Alternative was made only after careful comparison of all the alternatives on the basis of their resource outputs, environmental effects, implementation costs, and the trade-offs between them. The Preferred Alternative is that alternative

which is selected from all those formulated as the one which best maximizes the net public benefits while responding effectively to the issues, concerns and opportunities. After the Forest Supervisor reviewed the Interdisciplinary Team's evaluation, and after the Regional Forester and his staff had reviewed the alternatives, this alternative was selected as the preferred alternative in this Final EIS.

Alternative C is the Preferred Alternative.

G. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Many alternatives were considered to address all of the issues, concerns, and opportunities which have been expressed and to meet directions from various management levels within the Agency. Eleven alternatives were selected to be studied in detail. An alternative was received from Earth First! but was not considered further because it was not a legal alternative. The remainder of those alternatives considered are described below with the rationale for eliminating them from further study.

1. VARIATIONS TO THE LAND ALLOCATIONS AND MANAGEMENT OF THE ALPINE LAKES MANAGEMENT AREAS

The Alpine Lakes Area Land Management Plan (11/2/81) was congressionally mandated through the Alpine Lakes Area Management Act of 1976. This Plan was implemented early in 1982 following a tremendous amount of public involvement. This plan was also developed under an interdisciplinary process similar to the NFMA regulations being used in the Forest Plan. The area has been managed under the above plan for approximately seven years. To date, neither the Forest Service nor the public has identified any major problems with the allocation or management of that plan. In good faith to those members of the public who helped develop that plan, the Forest Plan proposes that the land allocations and management as presented in the Alpine Lakes Area Land Management Plan be held constant in all alterna-

tives. Both the Wenatchee and the Mount Baker-Snoqualmie Forests are in agreement with this proposal which will allow that plan to stand the test of time. Problems which surface could be handled administratively or when the Forest Plan is revised.

It is felt that this proposal is in accord with 36 CFR Part 219.2(b) of the NFMA planning regulations which states:

“219.2(b) If, in a particular case, special area authorities require the preparation of a separate special area plan, the direction in any such plan may be incorporated without modification in plans prepared under this subpart.”

2. A VERSION OF THE CURRENT DIRECTION ALTERNATIVE WHICH DEPICTED AN EARLIER VISUAL QUALITY OBJECTIVE CLASSIFICATION

Several years ago, when the Visual Quality Objective (VQO) concept was initiated, the Forest was mapped to the various VQO classifications. There was a sincere effort to meet these objectives whenever possible, but experience revealed that the initial mapping was not always the most appropriate for the specific site. As this alternative was being developed, it became evident that the management of the Forest did not always meet the original visual quality objectives. Therefore, no further analysis was conducted on this alternative.

The VQO's, as presented in Alternative A/ NFMA are the result of a completely new VQO inventory which depicts the present visual management of the Forest.

3. WATER CONSERVATION ALTERNATIVE

Representatives of the Friends of the Earth submitted a narrative description of an alternative which would emphasize the management of the portion of the Yakima River Drainage Watershed on the Wenatchee National Forest to maximize

water conservation for fisheries and irrigation benefits. Management for other resources would be at economically and environmentally feasible levels consistent with the emphasis on water conservation values. This alternative also strives to eliminate or mitigate potential adverse cumulative effects on soil, water, recreation and visual resources.

Alternative E, as discussed later in this chapter, has a goal which is very similar to the above alternative. It is applicable to the entire Forest.

4. DEPARTURE ON ALTERNATIVE C TO REACH RPA '80

Alternative B, the RPA Alternative, was originally formulated as a departure alternative based on Alternative C. The departure met the RPA timber target in the first decade but not in subsequent decades. For this reason, the above mentioned departure version was not considered in greater detail.

5. ALTERNATIVE G WITH VARIOUS HARVEST LEVELS

Four variations of Alternative G were considered but eliminated from detailed study. The basic land allocations for these variations were identical to that of Alternative G. The timber harvest schedule varied from the level which maximized present net value to the level which maximized timber volume, including three intermediate levels. The FEIS displays Alternative G under a maximize present net value objective function.

6. ALTERNATIVE I - VARIOUS DEPARTURES

Six variations of Alternative I were examined. All variations used Alternative C as a base, but had different timber harvest schedules. One variation was selected as best meeting the intention of the alternative to start at the current level of timber and gradually phase into the level of Alternative C. The other variations were not considered further.

H. ALTERNATIVES CONSIDERED IN DETAIL

The alternatives considered in detail are alternate ways of managing the land and resources of the Wenatchee National Forest. They are a combination of land uses, management practices, and activity schedules, which result in a unique combination of resource outputs, land uses, and environmental conditions.

Formulated through an analysis process that explored a wide array of possibilities shown in the benchmarks and here in the required alternatives, these alternatives together present a broad range of reasonable management options.

Each alternative has goals and output objectives. These are designed, with the exception of Alternative NC, to respond to public issues and management concerns. Table II-1 presents the response of each alternative to all the issues and concerns. The planning problems listed in Chapter I were used to develop the goals for each alternative.

Each alternative, except Alternative NC, distributes the lands of the Forest to different management areas. The acreages in the different management areas vary from one alternative to another. These acreages are presented in Table II-2. A description of the management areas and the goals of land and resource management in them is presented later in this chapter in the discussion preceding Table II-2. The location of the management areas for each alternative, except Alternative NC, are shown on the maps which accompany this FEIS.

The management areas would be managed according to management standards and guidelines. One of the principal functions of these standards and guidelines is to assure that potentially adverse environmental effects are mitigated and/or avoided. For example, Appendix J Best Management Practices is an example of mitigation measures for water quality. Other examples of mitigation measures common to all alternatives include: the use of Forest Service manuals and handbook guides; the use of visual management practices in harvest activities to maintain a natural appearing setting; the use of aerial or full suspen-

sion logging systems to protect cultural resources, the establishment and monitoring of limits of acceptable change for reducing impacts in Wilderness areas; the replanting of harvest units with mixed tree species to minimize tendencies towards monoculture; the use of fertilizer to mitigate for management practices which reduce productivity; the adjustment of utilization standards for grazing to provide for plant needs, and soil and water protection; more complete use of wood residue to mitigate effects of prescribed fire; and the use of road closures for reducing impacts on wildlife and some types of recreation. (See FEIS Chapter IV for additional mitigation measures by environmental component).

Some of these standards and guidelines were developed by the Planning Interdisciplinary Team specifically to respond to environmental conditions on the Wenatchee National Forest, and others are adopted from the standards and guidelines in the Regional Guide. The standards and guidelines which apply to all alternatives are found in Chapter IV of the Forest Plan.

The management of the Forest according to the different alternatives will result in various land uses, resource outputs, and environmental effects. Some differences represent the specific objectives of the alternative. All of the significant land uses, environmental effects, and resource outputs are presented by alternative and by time period in Tables II-3a and Table II-3b. Table II-3a presents those uses, effects, and outputs which are quantified; Table II-3b, those which are qualitative.

The relationships of resource outputs and environmental effects are discussed in Chapter IV, Environmental Consequences. There are also summaries of the outputs and effects there. However, the most detailed reporting of each alternative's land uses, resource outputs, time frames, costs, benefits, availability of acres for management and environmental conditions are here in Chapter II. This placement of the effects of the alternatives is all designed to facilitate the comparison of the alternatives. It allows comparison of several types of outputs and effects at one time.

1. DESCRIPTION OF THE ALTERNATIVES CONSIDERED IN DETAIL

The following alternatives were selected for detailed study. They represent a broad range within the decision space identified by the benchmarks. For a complete discussion of the decision space, see Appendix B.



THE NO CHANGE ALTERNATIVE (ALTERNATIVE NC)

The No Change Alternative was developed in response to decisions made regarding appeal number 1588 brought by the Northwest Forest Resource Council on May 19, 1986. The appeal centered on a decision by then Regional Forester James F. Torrence to "require inclusion of minimum management requirements (MR's) in the Current Direction Alternative for each Forest Plan." Although the appeal was denied, an alternative named "No Change" was developed to represent the existing Timber Management plans and consequently does not comply with all provisions of the National Forest Management Act of 1976 (NFMA) and regulations (36 CFR 219) promulgated by the Secretary of Agriculture to implement NFMA.

Alternative NC displays the objectives, outputs, and effects of the Wenatchee National Forest's Timber Management (TM) Plans so that they can be compared with the other alternatives. However, since the development of the TM plans, new inventories, assumptions about resource interrelationships, and new methods for predicting timber growth and yields have been developed. Therefore, a reviewer should be aware that information

THE NO CHANGE ALTERNATIVE (ALTERNATIVE NC)

provided for Alternative NC is frequently based on outdated inventories and yield tables and is not always comparable to information provided for the other alternatives.

RECREATION SETTING

--Developed Recreation

Alternative NC provides the same allocation and opportunities for developed recreation as Alternative A/NFMA. The emphasis would be on bringing selected sites up to full service standards. Only those sites which have a history of heavy use, or where it is possible to convert all sites in a single drainage to full service sites, would be considered. Other popular sites would be maintained with very little improvement to existing facilities. Some expansion of existing full service sites would occur.

There would be some opportunity to improve and/or establish overlooks and scenic vistas in new roaded areas.

Ski areas that have current master plans and are considering expansion are: Mission Ridge, White Pass, and Stevens Pass.

--Dispersed Recreation

Based on allocations contained in the timber management plans, 8.0 percent of the Forest would provide unroaded recreation opportunities outside of established Wilderness, with 1.7 percent of the Forest in an unroaded allocation. The additional 6.3 percent are unsuitable lands not scheduled for timber harvest. The timber management plans do not contain Recreation Opportunity Spectrum (ROS) classifications, however, there would be approximately 175,015 unroaded acres in a Semi-Primitive setting. In addition, there will be 1,148,131 acres (53 percent of the Forest) providing roaded recreation.

Two of the inventoried roadless areas outside of the Alpine Lakes Management Area would have a substantial portion of their area in a roadless management character. These are shown below:

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS	ACRES TO BE ROADED
Myrtle Lake	10,918	8,967	1,951
Entiat	71,254	27,430	43,824

An additional 138,678 acres would remain unroaded in scattered high country blocks classified as unsuitable for timber harvest. These scattered blocks could not be specifically identified by geographic area from the data contained in the timber management plans.

There would be a reduction of approximately 525 miles of trail resulting from timber harvest and road construction. Trailhead locations would also be moved as a result. The miles of trail available to motorized use by land allocation or due to administrative closures are:

ALLOCATION	MILES OPEN TO MOTORIZED USE	MILES CLOSED TO MOTORIZED USE
Wilderness	---	1,188.0
Unroaded ^{1/}	268.0	94.4
Roaded	481.8	---
Administratively closed	---	367.4

^{1/} The timber management plans did not distinguish between unroaded motorized and unroaded non-motorized.

Administratively closed trails are those trails in open allocations but closed for other environmental considerations.

--Special Interest Areas

The Tumwater Botanical Area is provided for in the timber management plans and would be protected.

WILD, SCENIC, AND RECREATIONAL RIVERS

There are no rivers recommended for designation under the Wild and Scenic Rivers Act. Corridors of potentially eligible rivers would be open to a range of management activities, some of which could noticeably alter the values that contribute to their eligibility.

SCENERY

The timber management plans contained Landscape Management Units (LMU's) where harvest levels were expected to approximate gross growth. For example, if a unit grew at a rate of 3 million board feet (MMBF) per year, the harvest level in that same unit would also be 3 MMBF.

The acreage in these LMU's allowed for protection of the foreground and partial protection of the middleground viewing area along all major travel viewsheds. Background areas within the viewsheds would have no reduction in harvest level for scenery protection. This would result in a reduction in scenic qualities throughout much of the Forest including portals to wilderness.

Visual quality objectives would remain at a high level along the immediate foreground of all major interstate scenic highway travel routes, and most major wilderness portals that are in contiguous Forest Service lands.

Some wilderness and main transportation corridors will not maintain scenic qualities. Unnatural landscape patterns would occur in almost all major viewsheds.

Roaded areas, including all of the Forest's 34 inventoried viewsheds, will be heavily altered.

In this alternative, a buffer strip of trees 200 feet along both sides of the travel route would be left natural appearing. However, the viewshed beyond the 200 foot strip will be heavily altered.

The general visual impression of the majority of the Forest would be one of a heavily altered landscape with contrasting openings, visible logging roads, and block-cut patterns.

Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

CULTURAL RESOURCE

Cultural resource inventory and evaluation, according to established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

Over 80 percent of the known cultural resources would be within management area designations that may create a potentially moderate to high level of impact (about 60 percent would be within management areas that could be considered to have a high level of impact). These would require mitigation measures or frequent project modification. There might be substantial modification of the visual settings around several significant sites. Loss of non-significant sites might be high.

A high number of acres would be inventoried for cultural resources (approximately 788,000 acres over the planning period in support of the timber program alone), but the ways in which identified sites could be managed and interpreted in place might be constrained.

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious uses of Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest. Increased emphasis will be placed on management, public information, and education on wilderness ethics and minimum impact camping techniques.

Approximately 85 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

Habitat for sensitive species will not increase.

Under this alternative, big game numbers would achieve a high level now and will decrease to the lowest levels of all alternatives. This results from many acres of timber harvest in a short time creating an abundance of forage and near optimum conditions. As the timber harvest continues over time, thermal cover becomes the limiting factor. After all stands have been harvested that create significant increases in forage, forage again becomes the limiting factor. This trend is predicted for both summer and winter habitat.

The implementation of the existing primary cavity excavators direction did not consider the State safety requirements for working in the vicinity of dead trees. This problem has reduced habitat for a number of years and the accumulation of the loss of habitat may result in population levels below 40 percent at some time in the future. As direction problems are resolved, the population will return to the 40 percent level or higher.

This is the only alternative that decreases riparian habitat in the future.

Alternative NC provides the lowest level for recreation use of wildlife of all alternatives due to reduced wildlife population.

There is no spotted owl or mature habitat (marten, three-toed, and pileated woodpecker) network in this alternative. Therefore, the habitat for these species is decreasing faster and to lower levels than other alternatives.

FISHERIES

Riparian habitat protection under this alternative would consist of actions to meet the minimum requirement of the Washington State Forest Practice Rules. Riparian standards applicable to other alternatives to maintain current and long-term fish habitat would not be implemented. Fish outputs would be expected to be maintained at current levels, changing as downstream problems such as passage at mainstream Columbia River Dams are corrected. There is greater risk that fish habitat capability would decrease over time due to the lack of riparian habitat protection and management standards.

RANGE

Permitted livestock grazing would increase slightly in the second decade and then decrease in the third through fifth decades due to constrained budgets. Permitted use in the first decade would be expected to average 23,000 animal unit months (AUM's), 23,000 AUM's in the second decade, and 20,000 AUM's by the fifth decade. Demand for sheep grazing would be met in all decades but demand for cattle grazing would exceed permitted use at the end of the first decade. Actual permitted use will never approach the production potential of 38,000 AUM's

OLD GROWTH

This alternative would have approximately 148,500 acres of old growth in wilderness and 11,200 acres in areas excluded from harvest by law and policy (but outside wilderness). There are an estimated 159,100 acres of old growth outside wilderness for a current estimate of 318,800 acres of old growth on the Wenatchee National Forest. By the 5th decade, there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce 32.4 million (MM) cubic feet (176.8 MM board feet) per year for the first five decades. This would also be the long-term sustained yield provided no land use constraints were imposed that were not in the original TM plans.

The timber yields in Alternative NC were computed differently than in the other alternatives. For example, the Wenatchee Working Circle plan (Chelan, Entiat, Lake Wenatchee, Leavenworth, and Cle Elum Ranger Districts) had no specific guidance on acres of thinning to be accomplished.

The Naches-Tieton Working Circle TM plan (Naches Ranger District) has a temporary inflation of 14.0 MMBF which is included in the Forest total of 176.8 MMBF. This is based on 15 year cutting entries into the stand and harvesting of extensive mortality salvage volume. The actual potential yield would then become 162.8 MMBF for the entire Forest. Yield projections for this Working Circle included a successful overwood removal to release existing pole stands in most two-storied stands.

An average of 3,944 acres per year would be clearcut, 3,928 acres would be shelterwood cut, and 1,896 acres would be partial cut.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. Timber harvest activity in this alternative would result in annual water yield increase for the first decade of 24,400 acre-feet, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The overall trend is for the amount of delivered sediment from management activity areas to increase over time. Delivered sediment levels from these lands for the first decade would be about 94,900 tons per year above the background level of 930,500 tons per year. The No Change Alternative would increase the amount of water flowing off of the forest and will also increase the amount of delivered sediment. This is due to the increased amount of clearcutting and increased mileage of roads, as well as the lack of land use constraints in Alternative NC.

MINERALS

The area withdrawn as wilderness (841,034 acres) would not change in any of the alternatives including the No Change Alternative, but the additional area to be withdrawn and the area to be managed as highly sensitive, does vary some. In addition to wilderness withdrawals, this alternative would result in the withdrawal of 276 additional acres as research natural areas. This is a very small percentage of the total Forest acres. A total of 77,721 acres would be in allocations which are considered to be "highly" sensitive toward mineral related activities. This is less than four percent of the total Forest acres. Since the timber management plans do not provide sufficient detail, the effect Alternative NC would have relative to the locatable and leasable mineral potential areas cannot be accurately presented.

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

About 25 small hydroelectric proposals are pending. Three of these are applications to the Federal Energy Regulatory Commission for licenses to construct and operate hydroelectric power facilities. The remaining proposals are still pending.

ROADS

Proposed new road construction for the first decade is 670 miles of new local road and 300 miles reconstruction. Road densities beyond the first 10 years are a FORPLAN output and cannot be estimated. The more important proposed road construction and reconstruction is listed on the Road Construction/Reconstruction Table IV-26 in Chapter IV of the FEIS.

FIRE MANAGEMENT

An appropriate suppression response would be made on all wildfires. Lightning fires in wilderness would be carefully monitored and allowed to play their natural role unless there is a threat to life, property, or important natural resources. If such a threat exists, the fire will be extinguished. Human caused fires occurring in wilderness would be put out. Prescribed fire would be used as a management tool for reduction of activity generated fuels (slash) and for maintenance and improvement of other resources.

SOCIAL/ECONOMIC

An annual budget of 17.6 million dollars would be required for implementation of the No Change Alternative. Revenues from Forest products would return 15.2 million dollars to the U.S. Treasury; 3.8 million dollars would be returned to local governments. Employment would increase by 378 jobs over base year levels with income increasing by 12.1 million dollars.

Present Net Value cannot be computed for this alternative.

NO CHANGE ALTERNATIVE
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual recreation capacity	Rec. Visitor Days	1/
<u>Roadless Management</u> (RE-2a, RN-1, SI-2)		
	Acres	37,717
<u>Wild and Scenic Rivers</u>		
	Miles	0
<u>Water Quality and Quantity</u>		
Water yield increase	Acre feet	24,400
Sediment increase index	Tons/year	94,900
<u>Old-growth</u>		
	Acres	1/
<u>Wildlife and Fish</u>		
Wildlife habitat management	Acres	0
Anadromous fish commercial harvest	Pounds	1/
<u>Landscape Management Units</u>		
	Acres	164,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	841,310
- Retention	Acres	241,721
- Partial Retention	Acres	-----
- Modification	Acres	-----
- Maximum Modification	Acres	1,081,149
<u>Timber</u>		
Potential Yield 2/	Million Cubic Feet	32.4
Potential Yield 2/	Million Board Feet	176.8
Long-term sustained yield	Million Cubic Feet	32.4
Area of suitable timber land	Acres	787,751
Marginal Land	Acres	102,200
<u>Range</u>		
Grazing capacity	Animal Unit Months	38,000
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	1/
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1/
Annual cost to the Federal Government	Million Dollars	17.6
Annual revenues to the Federal Government	Million Dollars	15.2
Annual returns to Local Governments 3/	Million Dollars	3.8
Change in employment 3/	Number of Jobs	+378
Change in income 3/	Million Dollars	+12.1

1/ The Timber Management (TM) Plans, upon which the No Change Alternative is based, are not integrated resource plans. As a result, all the resource uses and outputs are not addressed. The missing information in this table cannot be reasonably estimated because the original plan was based on yield tables and resource relationships which do not reflect the latest scientific techniques and information.

2/ The potential yield includes a 2.6 MMCF (14.0 MMBF) temporary inflation of the cut on the Naches Ranger District. Potential yield figures are not directly comparable to the ASQ of other alternatives.

3/ Employment and income figures are based on volumes harvested, not potential yield or volumes sold.



ALTERNATIVE A/NFMA

This is the No Action Alternative. It was formulated to maintain the current management direction for the Forest. Sources of that direction were the Alpine Lakes Management Plan, the Chelan and Kittitas Unit Plans, and the Ranger District multiple use plans. Alternative A/NFMA portrays how these plans would influence the flow of goods and services over the life of this plan (10-15 years) based upon the use of current National Forest Management Act of 1976 (NFMA) planning data. It also approximates the current budget.

This alternative has been corrected from the DEIS version (Alternative A) and meets all NFMA requirements as explained in the "Correction and Supplemental Information" which was included with the Reviewer's Guide when the DEIS was mailed to the public. The Supplement to the DEIS also contained corrected information and displayed this alternative as Alternative A/NFMA. Essentially the difference between Alternative A in the original DEIS and Alternative A/NFMA, is that this alternative now meets all of the management requirements including protection of habitat for wildlife dependent upon old-growth and mature habitat types.

One of the features of this alternative is that it contains significantly fewer acres of EW-1 (Key Deer and Elk Habitat) than any of the other alternatives except the No Change Alternative. The reason for this is that most of the existing plans did not contain specific allocations for key big game habitat.

The major changes in this alternative from the DEIS, and the Supplement to the DEIS, include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS, and "dedicating" old growth spotted owl habitat areas rather than "managing".
- Revision of the mature habitat network for marten, and three-toed and pileated woodpeckers, by changing sizes, locations, and management direction.

RECREATION SETTING

--Developed Recreation

The emphasis will be on bringing selected sites up to full service standards. Only those sites which have a history of heavy use, or where it is possible to convert all sites in a single drainage to full service sites, will be considered. Other popular sites will be maintained with very little improvement to existing facilities. Some expansion of existing full service sites will occur.

There will be some opportunity to improve and/or establish overlooks and scenic vistas in new roaded areas.

Ski areas that have current master plans and are considering expansion are: Mission Ridge, White Pass, and Stevens Pass.

--Dispersed Recreation

By the second decade, 12 percent of the Forest will provide unroaded recreation opportunities outside wilderness. This includes 8,371 acres primitive, 57,158 acres Semi-Primitive, Non-Motorized, and 183,825 acres Semi-Primitive, Motorized Recreation Opportunity Spectrums (ROS).

In addition, there will be 49 percent of the Forest providing roaded recreation or 1,066,012 acres of the Roaded Natural and Roaded Modified Recreation Opportunity Spectrums combined.

Fifteen of the 23 inventoried roadless areas will have a substantial portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS 1/	ACRES TO BE ROADED
Myrtle Lake	10,918	10,918	0
Rock Creek	32,924	17,935	14,989
Twin Lakes	22,048	13,717	8,331
Canyon Creek	9,158	0	9,158
Heather Lake	11,067	1,526	9,541
Chelan	71,063	59,806	11,257
Entiat	71,254	19,144	52,110
Stormy	32,500	0	32,500
Slide Ridge	10,091	0	10,091
Devil's Gulch	25,186	9,222	15,964
Taneum	25,122	6,296	18,826
Manastash	8,798	4,070	4,728
Norse Peak Adj	11,300	2,650	8,650
Quartz	8,756	64	8,692
Naneum	6,911	21	6,890
Lion Rock	4,834	0	4,834
William O. Douglas Adj.	22,938	784	22,154
Blue Slide	18,571	0	18,571
Goat Rocks Adj	7,357	5,597	1,760
Nason Ridge	19,123	12,063	7,060
Alpine Lakes Adj.	44,393	28,513	15,880
Thorp Mountain	15,667	4,388	11,279
Teanaway	66,293	52,640	13,653

1/ The acres shown remaining roadless do not include 4,388 acres of dedicated old growth that fall within roadless allocations.

The miles of trail available to motorized use by land allocation or due to administrative closures are:

Allocation	Miles Open to Motorized Use	Miles Closed to Motorized Use
Wilderness	--	1,188
Unroaded Non-motorized	--	94.4
Unroaded Motorized	235.1	---
Roaded Motorized	944.7	---
Administratively Closed	--	367.4

Administratively closed trails are those trails in open allocations but closed for other environmental considerations.

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

<u>Scenic</u>	<u>Dispersed Recreation</u>
Tumwater	Teanaway Nason Ridge Annette Lake

WILD, SCENIC, AND RECREATIONAL RIVERS

The White, Chiwawa and Wenatchee Rivers are recommended for designation under the Wild and Scenic Rivers Act. The proposed classifications are as follows:

River	Recommended Classification	Miles	Segment
White	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
	Scenic	7.0	Glacier Peak Wilderness boundary to above Tall Timbers Ranch.
	Recreational	12.0	Above Tall Timbers Ranch to Lake Wenatchee
Chiwawa	Wild	5.0	Headwaters to Glacier Peak Wilderness boundary.
	Recreational	24.0	Glacier Peak Wilderness boundary to Goose Creek.
	Recreational	6.0	Goose Creek to confluence with Wenatchee River.
Wenatchee	Recreational	21.0	Lake Wenatchee to Tumwater Campground
	Recreational	7.0	Tumwater Campground to Forest boundary.

The characteristics contributing to their eligibility will be protected until Congress formally determines the status of these rivers. Other eligible rivers on the Forest will not be recommended for inclusion in the Wild and Scenic Rivers System, but the corridors will be managed for Scenic Travel, with a visual quality objective of Retention. See Appendix E for a complete description of the Wild and Scenic Rivers analysis process.

SCENERY

All major interstate scenic highway viewsheds and the Alpine Lakes Management Unit would retain natural or slightly altered conditions.

All major portals to wilderness would retain a near natural appearance. The natural appearance of the Forest as viewed from Forest roads would be reduced but a natural appearance would dominate the majority of the landscape.

Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

CULTURAL RESOURCE

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-Wide Standards and Guidelines would direct future management decisions regarding significant cultural resources.

A majority of the known cultural resources (roughly 76 percent) would be within management area designations that may create a potentially moderate to high level of impact. These would require mitigation. Visual settings around some significant sites might experience modification apparent to the viewer. Opportunities would be good to enhance several significant historic sites through treatment of the adjacent vegetation in conjunction with the Forest timber management program.

There would be a high number of acres inventoried for cultural resources (approximately 592,000 acres over the planning period). Accessibility to cultural sites managed for interpretation would be very good.

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious uses of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information, and education on wilderness ethics and minimum impact camping techniques.

Approximately 58 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

Alternative A/NFMA maintains lower levels of habitat for mature and old growth species than some other alternatives.

Deer and elk summer habitat is reduced a small amount with a moderate reduction in their wintering habitat.

Primary cavity excavator habitat is reduced to about the average of most alternatives.

Riparian habitat increases moderately.

This alternative is in the middle of the range of providing for recreation use of wildlife.

State wildlife objectives would be met for mountain goats, grouse, and spotted owls.

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and Research Natural Areas, and 151,000 acres of suitable spotted owl habitat in lands that are unsuitable for timber management, or in allocations that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area (SOHA) network, there were 16,430 acres originally allocated to full timber yield prescriptions, and 41,955 acres originally allocated to reduced timber yields.

FISHERIES

This alternative should result in a small increase in both anadromous and resident fish habitat capability through the life of the Plan. In the second decade, the numbers of catchable cut-throat trout are estimated to increase from a current level of 200,000 fish to approximately 202,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase slightly from 1.348 million to 1.354 million smolts and 172,000 smolts to 173,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is expected to remain constant at current levels through the life of the Plan.

It is anticipated that increases in habitat capability will result from Riparian Habitat Management Standards, the Fish Habitat Management Program and implementation of Best Management Practices which will maintain current habitat capability and should allow fairly natural stream processes to operate, resulting in improving trends in habitat capability. Further small increases are expected due to implementation of habitat improvement program. It is estimated that approximately \$37,000 of the annual habitat improvement program will be funded through appropriated monies and \$25,000 through KV. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage off the Forest. This alternative, however, will provide habitat at current levels with an improving trend and thus is consistent with the objective to improve anadromous fish runs in the drainage.

Resident trout habitat will also be maintained so opportunities for sport fishing will be provided at current levels with a relatively small increase in the availability of catchable resident trout.

RANGE

Permitted livestock grazing would increase slightly in the second decade and then decrease in the third through fifth decades due to constrained budgets. Permitted use in the first decade is expected to average 23,000 animal unit months (AUM's), 23,000 AUM's in the second decade, and 20,000 AUM's by the fifth decade. Demand for sheep grazing would be met in all decades but demand for cattle grazing would exceed permitted use at the end of the first decade. Actual permitted use will not exceed the total production potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 55,863 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 22,854 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 91,567 acres of old growth. By the 5th decade, there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce on Allowable Sale Quantity of 21.8 million (MM) cubic feet (121.4 MM board feet) per year and a Timber Sale Programmed Quantity of 23.4 MM cubic feet (130.3 MMBF) for the first five decades. The long-term sustained yield for this alternative is

27.7 MM cubic feet based on 591,794 acres of suitable timber lands. This compares to the past decade average annual volume sold of 187.5 MMBF and an average annual volume harvested of 166.0 MMBF.

A wide range of timber intensities were selected for this alternative ranging from GF-1 (high level of timber investment) to GF-6 in General Forest (GF) Management Areas. Intensive management with control of tree spacing is planned on 23% of GF acres.

An average of 2,590 acres per year will be clearcut, 2,539 acres will be shelterwood cut, and 2,564 acres will be selective cut.

Clearcutting is optimal and proposed where mistletoe and root rot are common. Mistletoe and/or root rot are estimated to affect 50-55 percent of the Forest acres. (Hadfield, 1982) Clearcutting is also optimal where shallow rooted species such as western hemlock and grand fir are subject to extensive blowdown. Partial cutting, or shelterwoods, in previously dense stands often result in windthrow during wet soil periods or heavy wet snowfalls.

Pesticide use will be allowed if necessary to control insects, rodents, and unwanted weed vegetation under all alternatives. The amount of use has been very inconsistent in the past. Insecticides are not used to any extent except for minor campground fly control in most years. However, in 1976, 1977, and 1978 aerial spraying of Fenituthion, Malathion, and Sevin-4-oil covered 210,300 acres of the Wenatchee Forest to control the spruce budworm. *Bacillus Thuringiensis* (BT) was sprayed on approximately 50,000 acres in 1987. Since treatment, no reoccurrence of epidemic populations have been recorded.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. Timber

harvest activity in this alternative would result in annual water yield increases for the first, second and fifth decades of 13,800, 18,900 and 21,600 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades the activity related delivered sediment will be approximately 69,200 tons per year. By the end of the third decade, most of the roads will have been built so that the forest should have a good transportation network in place. Because of this, it is anticipated that the amount of delivered sediment will be reduced by about forty-four percent, therefore soil losses produced by management activities in the fifth decade will be approximately 38,800 tons per year.

MINERALS

The area withdrawn as Wilderness (841,034 acres) will not change in any of the alternatives, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 1,717 additional acres from mineral entry, which is less than 1 percent of the total Forest acres. In addition to the withdrawals, highly sensitive management prescriptions which could discourage mineral related activities would be used to manage 411,199 acres, or 19 percent of the total Forest acres. The following figure shows how this management strategy would affect areas identified as having potential for the occurrence of locatable and leasable mineral resources.

	WITHDRAWAL	OPEN BUT WITH HIGHLY SENSITIVE MANAGEMENT STRATEGIES	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 acres or less than 1%	22,960 acres or 19%	36,782 acres or 31%
Area classified prospectively valuable for oil and gas	0 acres or 0%	32,246 acres or 15%	173,608 acres or 82%
Area classified prospectively valuable for geothermal resources	0 acres or 0%	55,269 acres or 9.2%	42,315 acres or 11%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	140,070 acres or 26%	284,718 acres or 54%

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

About 25 small hydroelectric proposals are pending. Three of these are applications to the Federal Energy Regulatory Commission for licenses to construct and operate hydroelectric power facilities.

ROADS

The implementation of Alternative A/NFMA would require the construction of approximately 1,480 miles of additional road. Some 748 miles of this construction is expected to take place in areas that are currently unroaded. It is assumed that the majority of this construction will occur in the next 20 years. In addition to the roads currently open, it is expected that 20% of the new roads would be opened to public use by high clearance vehicles.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

An appropriate suppression response would be made on all wildfires. Lightning fires in wilderness would be carefully monitored and allowed to play their natural role unless there is a threat to life, property, or important natural resources. If such a threat exists, the fire will be extinguished. Human caused fires occurring in wilderness would be put out. Prescribed fire would be used as a management tool for reduction of activity fuels (slash) and for maintenance and improvement of other resources.

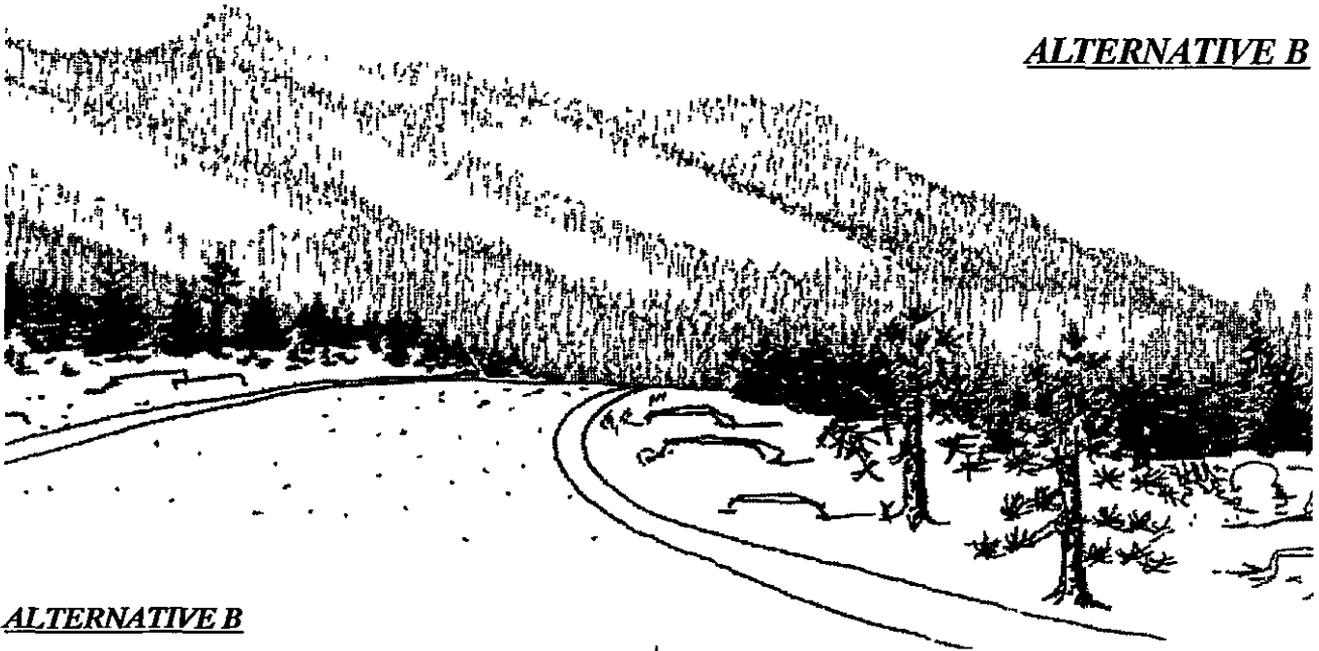
SOCIAL/ECONOMIC

Present net value of this alternative would be 1,976 million dollars. An annual budget of 23.0 million dollars would be required for implementation. Revenues from Forest products would return 12.5 million dollars to the U.S. Treasury; 3.0 million dollars would be returned to local governments. Employment would increase by 39 jobs and income would increase by 0.65 million dollars from existing levels.

ALTERNATIVE A/NFMA
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec Visitor Days	4,883,000
Annual dispersed recreation capacity		
- Roaded	Rec Visitor Days	22,576,000
- Unroaded	Rec Visitor Days	1,009,000
- Wilderness	Rec Visitor Days	1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1, WS-3)	Acres	263,158
<u>Wild and Scenic Rivers.</u>		
- Wild	Miles	20.0
- Scenic	Miles	7.0
- Recreational	Miles	70.0
<u>Water Quality and Quantity</u>		
Water yield increase	Acre feet	13,800
Sediment increase index	Tons/year	69,200
<u>Old-Growth</u>	Acres	307,300
<u>Wildlife and Fish</u>		
Wildlife habitat management (EW-1)	Acres	17,151
Anadromous fish commercial harvest	Pounds	328,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	842,751
- Retention	Acres	485,081
- Partial Retention	Acres	459,112
- Modification	Acres	55,629
- Maximum Modification	Acres	321,607
<u>Timber</u>		
Allowable sale quantity	Million Cubic Feet	21.8
Allowable sale quantity	Million Board Feet	121.4
Long-term sustained yield	Million Cubic Feet	27.7
Area of suitable timber land	Acres	591,794
<u>Range</u>		
Grazing capacity	Animal Unit Months	36,400
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	901,971
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,976
Annual cost to the Federal Government	Million Dollars	23.0
Annual revenues to the Federal Government	Million Dollars	12.5
Annual returns to Local Governments	Million Dollars	3.0
Change in employment	Number of Jobs	+39
Change in income	Million Dollars	+0.65

ALTERNATIVE B



ALTERNATIVE B

This alternative was developed in an attempt to meet the 1980 Resources Planning Act program which has been assigned to the Forest through the Regional Guide.

The 1980 RPA timber target strongly influenced our approach. This alternative uses the Alternative D land allocations. This alternative would result in the greatest amount of development of the Forest.

A feature of this alternative and Alternative D is the higher allocation to General Forest (GF) and a corresponding decrease in the unroaded and scenic travel allocations. The major difference between this alternative and Alternative D is that in Alternative B more intensive timber management will be practiced on the GF land allocation which will result in higher yields and higher annual sale quantities.

The major changes in this alternative from the DEIS and the Supplement to the DEIS, include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and "dedicating" old growth spotted owl habitat areas rather than "managing."

- Revision of the mature habitat network for marten, and three-toed and pileated woodpeckers, by changing sizes, locations, and management direction.

RECREATION SETTING

--Developed Recreation

The emphasis under this alternative is to convert the more popular reduced service sites to full service status. Other popular sites will be maintained with very little improvement to existing facilities. Some expansion of existing full service sites will occur. Added coordination with the dispersed recreation component of the recreation setting would be needed because of the increased timber harvest and roading activities.

More opportunity would be available for establishing overlooks and scenic vistas in new roaded areas.

Ski areas that have current master plans and are considering expansion are Mission Ridge, White Pass, and Stevens Pass.

--Dispersed Recreation

By the second decade, 11 percent of the Forest will provide unroaded recreation opportunities outside wilderness. This includes 7,169 acres Primitive, 82,699 acres Semi-Primitive, Non-Motorized and 139,177 acres Semi-Primitive Motorized Recreation Opportunity Spectrums (ROS).

ALTERNATIVE B

In addition, there will be 50 percent of the Forest providing roaded recreation, or 1,086,321 acres of the Roaded Natural and Roaded Modified Recreation Opportunity Spectrums combined.

Seventeen of the 23 inventoried roadless areas will have a substantial portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS 1/	ACRES TO BE ROADED
Myrtle Lake	10,918	8,968	1,950
Rock Creek	32,924	17,128	15,796
Twin Lakes	22,048	13,420	8,628
Canyon Creek	9,158	4,240	4,918
Heather Lake	11,067	1,442	9,625
Chelan	71,063	41,701	29,362
Entiat	71,254	25,801	45,453
Stormy	32,500	5,406	27,094
Slide Ridge	10,091	1,060	9,031
Devil's Gulch	25,186	0	25,186
Taneum	25,122	2,438	22,684
Manastash	8,798	3,498	5,300
Norse Peak Adj.	11,300	0	11,300
Quartz	8,756	106	8,650
Naneum	6,911	0	6,911
Lion Rock	4,834	3,859	975
William O. Douglas Adj.	22,938	0	22,938
Blue Slide	18,571	2,374	16,197
Goat Rocks Adj.	7,357	0	7,357
Nason Ridge	19,123	12,063	7,060
Alpine Lakes Adj	44,393	28,513	15,880
Thorp Mountain	15,667	4,388	11,279
Teanaway	66,293	52,640	13,653

1/ The acres shown remaining roadless do not include 4,388 acres of dedicated old growth that fall within roadless allocations.

The miles of trail available to motorized use by land allocation or due to administrative closures are:

Allocation	Miles Open to Motorized Use	Miles Closed to Motorized Use
Wilderness	--	1,188
Unroaded Non-motorized	--	66.7
Unroaded Motorized	162.5	---
Roaded Motorized	1,045.6	---
Administratively Closed	--	390 0

Administratively closed trails are those trails in open allocations but closed for other environmental considerations.

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

<u>Scenic</u>	<u>Dispersed Recreation</u>
Tumwater	Teanaway Nason Ridge Annette Lake

WILD, SCENIC, AND RECREATIONAL RIVERS

There are no rivers recommended for designation under the Wild and Scenic Rivers Act. River corridors would be subject to a full range of management activities, with five of the ten eligible rivers outside wilderness being allocated to timber harvest prescriptions that could noticeably alter the scenic qualities of the landscape.

SCENERY

Visual quality objectives would remain at a high level only in the Alpine Lakes Management Unit, and the Lake Chelan and the Mather Memorial (Hwy 410) viewsheds. Slightly altered to altered scenery would be evident in the White Pass (Hwy 12) and the Entiat Valley viewsheds.

Unnatural patterns will dominate most portals to wilderness. The natural character will not be maintained.

The natural appearance of the Forest in other areas would be greatly reduced. The general impression would be of a heavily altered landscape with contrasting openings, visible logging roads, and large cut patterns.

Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

CULTURAL RESOURCE

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-Wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

Approximately 80 percent of the known cultural resources would be within management area designations that may create a potentially moderate to high level of impact (59 percent would be within management areas that could be considered to have a high level of impact). These would require mitigation measures or frequent project modification. There might be substantial modification of the visual settings around several significant sites. Loss of non-significant sites might be high.

ALTERNATIVE B

A high number of acres would be inventoried for cultural resources (approximately 682,000 acres over the planning period in support of the timber program alone), but the ways in which identified sites could be managed and interpreted in place might be constrained.

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious uses of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information and education on wilderness ethics and minimum impact camping techniques.

Approximately 62 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

This alternative maintains lower levels of habitat for mature and old growth species than some other alternatives.

Deer and elk populations are reduced a small amount in summer habitat and have a moderate reduction in their wintering habitat.

Primary cavity excavator habitat is reduced to the next lowest level of the alternatives.

Riparian habitat is maintained.

This alternative is on the lower end of the range of providing for recreation use of wildlife.

State wildlife objectives would be met for deer, mountain goats, grouse, and spotted owls.

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and Research Natural Areas, and 138,000 acres of suitable spotted owl habitat in lands that are unsuitable for timber management, or in allocations that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area (SOHA) network, there were 45,305 acres originally allocated to full timber yield prescriptions, and 19,356 acres originally allocated to reduced timber yields.

FISHERIES

This alternative should result in an increase in both anadromous and resident fish habitat capability through the life of the plan. By the second decade the numbers of catchable cutthroat trout are estimated to increase from a current level of 200,000 fish to 218,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase from 1.348 million to 1.381 million and 172,000 to 176,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is expected to remain constant at current levels through the life of the plan.

It is anticipated that increases in habitat capability will result from Riparian Habitat Management Standards, the fish Habitat Management Program and implementation of Best Management Practices which will maintain current habitat capability and should allow fairly natural stream processes to function, resulting in improving trends in habitat capability. Further increases are expected due to implementation of a habitat improvement program. It is estimated that approximately \$17,000 of the annual habitat improvement program will be funded through appropriated monies and \$418,000 through KV. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage off the Forest. This alternative, however, is anticipated to improve habitat from current levels and thus is consistent with objectives to improve anadromous fish runs in the drainage. Resident

trout habitat capability will also improve, providing opportunities for expected increased demand for sport fishing.

RANGE

Permitted livestock grazing would increase in all decades through the fifth decade. Permitted use in the first decade is expected to average 23,000 AUM's, 25,500 AUM's in the second decade, and 36,000 AUM's in the fifth decade.

Demand for cattle grazing would exceed supplies by the third decade, but demand for sheep grazing will be met in all decades. Actual permitted use would not exceed the total production potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 48,421 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 23,808 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 98,054 acres of old growth. By the fifth decade, there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce an Allowable Sale Quantity of 33.5 million (MM) cubic feet (169.1 MM board feet) per year and a Timber Sale Programmed Quantity of 36.0 MMCF (181.5 MMBF) for the first five decades. The long-term sustained yield for this alternative is 34.2 MM cubic feet based on 681,186 acres of suitable timber lands. This compares to the past decade

average annual volume sold of 187.5 MMBF and an average annual volume harvested of 166.0 MMBF.

This alternative uses only GF-1 (high level of timber investment) and GF-3 in General Forest Management Areas. All acres would be managed using thinning to increase yields of sawlog size trees.

An average of 7,976 acres per year will be clearcut, 2,143 acres will be shelterwood cut, and 5,060 acres will be selective cut.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. The timber harvest activity in this alternative would result in annual water yield increases for the first, second and fifth decades of 28,500, 40,200 and 39,300 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades, the activity related delivered sediment will be approximately 94,900 tons per year. By the end of the third decade, most of the roads will have been built so that the Forest should have a good transportation network in place. Because of this, it is anticipated that the amount of delivered sediment will be reduced by roughly 44 percent. Therefore, soil losses produced by management activities in the fifth decade will be approximately 53,100 tons per year.

ALTERNATIVE B

MINERALS

The area withdrawn as Wilderness (841,034 acres) will not change in any of the alternatives, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 2,247 additional acres from mineral entry which is less than 1 percent of the total Forest acres. In addition to the withdrawals, highly sensitive management prescriptions which could discourage mineral related activities would be used to manage 384,868 acres or 18 percent of the total Forest areas. The following figures shows how this management strategy would affect areas identified as having potential for the occurrence of locatable and leasable mineral resources.

	WITHDRAWAL	OPEN BUT WITH A HIGHLY SENSITIVE MANAGEMENT STRATEGIES	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 acres or less than 1%	23,236 acres or 19%	36,507 acres or 31%
Area classified prospectively valuable for oil and gas	530 acres or less than 1%	29,108 acres or 14%	176,216 acres or 83%
Area classified prospectively valuable for geothermal resources	0 acres or 0%	43,503 acres or 7 3%	132,840 acres or 23%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	126,396 acres or 24%	298,392 acres or 56%

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

In this alternative it is estimated that the number of small hydroelectric proposals could increase to about 40. At least four of these could be expected to advance to the application for license stage.

ROADS

The implementation of Alternative B would require the construction of approximately 1901 miles of additional road. Some 979 miles of this construction is expected to take place in areas that are currently unroaded. It is assumed that the majority of this construction will occur in the next 18 years. In addition to the roads currently open, it is expected that 100% of the new roads would be opened to public use by high clearance vehicles.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

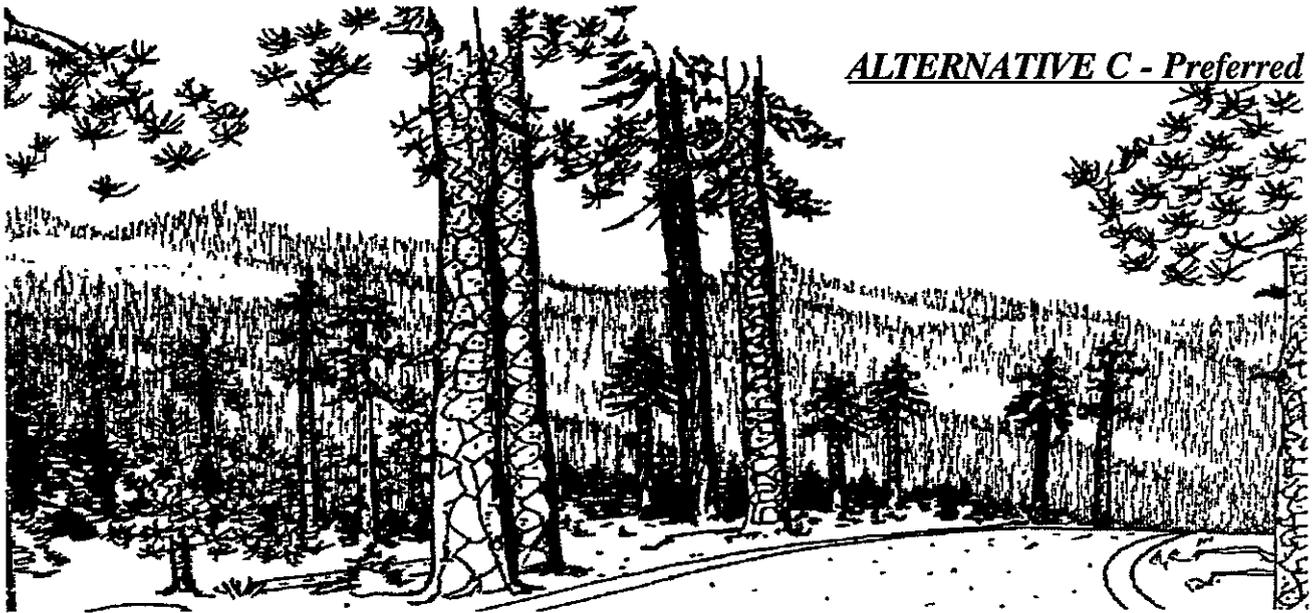
Fire hazard would decrease because of increased timber harvest and hazard reduction activities including prescribed burning. All human caused fires occurring in wilderness areas would be put out. Lightning fires in wilderness would be carefully monitored and allowed to play their natural role unless there is a threat to life, property, or important natural resources. If a threat exists, the fire will be attacked. Fire prevention efforts will be concentrated on logging-related industrial activities.

SOCIAL/ECONOMIC

Present net value of this alternative would be 1,756 million dollars. An annual budget of 34.2 million dollars would be required for implementation. Revenues from Forest products would return 8.1 million dollars to the U.S. Treasury; 2.0 million dollars would be returned to local governments. Employment would increase by 577 jobs and income would increase by 15.31 million dollars from existing levels.

ALTERNATIVE B
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec Visitor Days	6,853,000
Annual dispersed recreation capacity		
- Roaded	Rec Visitor Days	22,495,000
- Unroaded		944,000
- Wilderness		1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1, WS-3)	Acres	239,286
<u>Wild and Scenic Rivers</u>		
	Miles	0
<u>Water Quality and Quantity</u>		
Water yield increase	Acre feet	28,500
Sediment increase index	Tons/year	94,900
<u>Old-growth</u>		
	Acres	305,200
<u>Wildlife and Fish</u>		
Wildlife habitat management (EW-1)	Acres	77,784
Anadromous fish commercial harvest	Pounds	328,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	843,281
- Retention	Acres	388,853
- Partial Retention	Acres	226,268
- Modification	Acres	164,217
- Maximum Modification	Acres	541,561
<u>Timber</u>		
Allowable sale quantity	Million Cubic Feet	33.5
Allowable sale quantity	Million Board Feet	169 1
Long-term sustained yield	Million Cubic Feet	34.2
Area of suitable timber land	Acres	681,186
<u>Range</u>		
Grazing capacity	Animal Unit Months	40,600
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	907,900
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,756
Annual cost to the Federal Government	Million Dollars	34 2
Annual revenues to the Federal Government	Million Dollars	8.1
Annual returns to Local Governments	Million Dollars	2 0
Change in employment	Number of Jobs	+577
Change in income	Million Dollars	+15 31



ALTERNATIVE C - Preferred

ALTERNATIVE C - Preferred

This alternative was developed by adjusting the current direction (Alternative A/NFMA) to a land allocation which would maximize net public benefits and would provide a balanced program in response to the issues and concerns. The purpose of Alternative C is to respond to concerns for protecting wildlife and other amenity resources, and provide a variety of recreation opportunities while managing appropriate areas of the Forest for commodity outputs. This was accomplished by modifying existing plans and practices to respond to public concerns received during issue identification early in the planning process. Further modification of this alternative has been done to respond to comments received through the public response on the Draft EIS.

Alternative C differs from Alternative A/NFMA in that it allocates many more acres to key big game range and increases the acreage allocated to roadless management.

The major changes in this alternative from the DEIS, and the Supplement to the DEIS, include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and “dedicating” old growth spotted owl habitat areas rather than “managing.”
- Revision of the mature habitat network for marten, and three-toed and pileated woodpeckers, by changing sizes, locations, and management direction.

-Increase inventoried roadless area acreage from 267,610 acres to 298,115 acres.

-Reduction in acres allocated to unroaded motorized use.

-Development and application of the Mather Memorial Parkway prescription (MP-1) which has no scheduled timber harvest within the Parkway corridor.

-An addition of two new allocations: EW-3 (Key Big Game Habitat, Unroaded) and RE-4 (Dispersed Recreation, Unroaded, Timber Harvest).

-Changes in the classification on some of the recommended Wild and Scenic Rivers, and the addition of the Waptus River to those recommended for designation.

-An increase in acreage of Special Interest Areas.

RECREATION SETTING

--Developed Recreation

This alternative places emphasis on upgrading and expanding heavily used popular campgrounds and renovating or rehabilitating facilities in other developed recreation sites. Highly popular reduced service campgrounds in developed high use areas will be upgraded to full service sites.

ALTERNATIVE C

Campgrounds in more semi-primitive areas will remain as lesser developed sites. Facility repair in more remote semi-primitive settings will focus on sanitation, public safety and unserviceable facilities.

There will be some opportunity during timber sale activities to improve or establish overlooks and scenic vistas.

Ski areas that have current Master Plans and are considering expansion are Mission Ridge, White Pass, and Stevens Pass.

--Dispersed Recreation

By the second decade, 14% of the Forest will provide unroaded recreation opportunities

outside wilderness. This includes 7,265 acres Primitive, 115,314 acres Semi-Primitive Non-Motorized, and 175,536 acres Semi-Primitive Motorized Recreation Opportunity Spectrums (ROS).

In addition, there will be 47 percent of the Forest providing roaded recreation or 1,017,251 acres of the Roaded Natural and Roaded Modified Recreation Opportunity Spectrums combined.

Twenty-two of the 23 inventoried roadless areas will have all or a portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS 1/	ACRES TO BE ROADED
Myrtle Lake	10,918	10,918	0
Rock Creek	32,924	22,812	10,112
Twin Lakes	22,048	14,331	7,717
Canyon Creek	9,158	4,197	4,961
Heather Lake	11,067	2,714	8,353
Chelan	71,063	63,664	7,399
Entiat	71,254	35,998	35,256
Stormy	32,500	9,710	22,790
Slide Ridge	10,091	2,502	7,589
Devil's Gulch	25,186	8,586	16,600
Taneum	25,122	7,038	18,084
Manastash	8,798	6,106	2,692
Norse Peak Adj.	11,300	1,357	9,943
Quartz	8,756	1,145	7,611
Naneum	6,911	1,335	5,576
Lion Rock	4,834	3,582	1,252
William O. Douglas Adj.	22,938	191	22,747
Blue Slide	18,571	3,032	15,539
Goat Rocks Adj.	7,357	1,293	6,064
Nason Ridge	19,123	12,063	7,060
Alpine Lakes Adj.	44,393	28,513	15,880
Thorp Mountain	15,667	4,388	11,279
Teanaway	66,293	52,640	13,653

1/ The acres shown remaining roadless do not include 6,232 acres of dedicated old growth that fall within roadless allocations

The miles of trail available to motorized use by land allocation or due to administrative closures are:

Allocation	Miles Open to Motorized Use	Miles Closed to Motorized Use
Wilderness	--	1188.0
Unroaded Non-motorized	--	139.7
Unroaded Motorized	190.4	---
Roaded Motorized	944.7	---
Administratively Closed	--	379.4

Administratively closed trails are those trails in open allocations but closed for other environmental considerations.

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

Scenic	Dispersed Recreation	Old Growth
Turnwater	Teanaway Nason Ridge Annette Lake	Hornet Ridge Rattlesnake Springs Heather Lake Trailhead Fish Creek (Lake Wenatchee) The Sanctuary
Ecological	Botanical	Geological
Squaw Lake area Fish Lake Run Twin Lake Ponds Upper Naneum Meadow	Turnwater Ponderosa Estates Goose Egg Blue Slide	Boulder Cave Kloochman Rock Goose Egg Blue Slide

WILD, SCENIC, AND RECREATIONAL RIVERS

The American, Cle Elum, Waptus, Icicle, Napeequa, White, Chiwawa, Wenatchee, and Entiat Rivers have all been given a preliminary administrative recommendation for Wild and Scenic River designation. The proposed classifications are shown in the table below. The only eligible river not recommended for inclusion in the National System is the Little Wenatchee. However, the corridor here will be managed for a visual quality objective of retention, and fisheries habitat will be protected through special riparian prescriptions. For a more complete discussion of this topic, refer to Appendix E of the FEIS.

River	Recommended Classification	Miles	Segment
American	Wild	6.0	Headwaters to confluence with Rainier Fork.
	Scenic	16.0	Confluence with Rainier Fork to confluence with Bumping River (in Mather Memorial Parkway corridor).
Chiwawa	Wild	5.0	Headwaters to Glacier Peak Wilderness boundary
	Recreational	24.0	Glacier Peak Wilderness boundary to Goose Creek.
	Recreational	6.0	Goose Creek to confluence with Wenatchee River.
Cle Elum	Wild	4.0	Headwaters to Alpine Lakes Wilderness boundary.
	Scenic	2.0	Alpine Lakes Wilderness boundary to above Lake Tucquala.
	Recreational	14.0	Above Lake Tucquala to Salmon La Sac bridge.
	Recreational	4.5	Salmon La Sac bridge to Lake Cle Elum
Entiat	Wild	12.5	Headwaters to Glacier Peak Wilderness boundary.
	Scenic	4.0	Glacier Peak Wilderness boundary to Cottonwood Trailhead
	Recreational	15.0	Cottonwood Trailhead to above Burns Creek.
Icicle	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary
	Recreational	14.0	Alpine Lakes Wilderness boundary to above Leavenworth city water intake.
Napeequa	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
	Recreational	1.0	Glacier Peak Wilderness boundary to confluence with White River.
Waptus	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary.
	Wild	1.0	Alpine Lakes Wilderness boundary to confluence with Cle Elum River.
Wenatchee	Recreational	21.0	Lake Wenatchee to Tumwater Campground.
	Recreational	7.0	Tumwater Campground to Forest boundary.
White	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary
	Scenic	7.0	Glacier Peak Wilderness boundary to above Tall Timbers Ranch.
	Recreational	12.0	Above Tall Timbers Ranch to Lake Wenatchee.

The characteristics that contribute to the eligibility of these rivers will be protected until Congress formally determines their status.

SCENERY

Visual quality is maintained at a high level for all major interstate scenic highway viewsheds, the Alpine Lakes Management Unit, and most major wilderness portals.

Unnatural landscape patterns would occur in a few major viewsheds such as Cooper Mountain to South Navarre, Little Naches, Cash Prairie, Little Rattlesnake, North and South Fork Tieton.

The natural appearance of the remainder of the Forest as viewed from Forest roads would be altered.

Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

Old growth preservation for aesthetic reasons are in Old Growth (OG-1) and Special Interest (SI-2) management prescriptions.

CULTURAL RESOURCE

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

A majority of the known cultural resources (77 percent) would be within management area designations that may create a potentially moderate to high level of impact. These would require mitigation. Visual settings around some significant sites might experience modification apparent to the viewer. Opportunities would be good to enhance several significant historic sites through treatment of the adjacent vegetation in conjunction with the Forest timber management program.

There would be a moderate number of acres inventoried for cultural resources (approximately 577,000 acres over the planning period). Accessibility to cultural sites managed for interpretation would be very good.

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious use of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information and education on wilderness ethics and minimum impact camping techniques.

Approximately 58 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

This alternative maintains moderate levels of habitat for mature and old growth species compared to other alternatives.

Deer and elk populations will decrease a small amount in summer habitat and will increase in their winter habitat.

Primary cavity excavator habitat is maintained near the middle of the range of the alternatives.

Riparian habitat is maintained.

This alternative is in the middle of the range of alternatives in providing for recreation use of wildlife.

State wildlife objectives would be met for deer, mountain goats, grouse, and spotted owls.

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and Research Natural Areas, and 165,000 acres of suitable spotted owl habitat in lands that are unsuitable for timber management or in alloca-

tions that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area (SOHA) network, there were 29,511 acres originally allocated to full timber yield prescriptions and 37,991 acres originally allocated to reduced timber yields.

FISHERIES

This alternative should result in an increase in both anadromous and resident fish habitat capability through the life of the Plan. Numbers of catchable trout by the second decade are estimated to increase from a current level of 200,000 fish to 212,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase from 1.348 million to 1 395 million and 172,000 to 178,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is expected to remain constant at current levels through the life of the Plan.

It is anticipated that increase in habitat capability will result from Riparian Habitat Management Standards and the Fish Habitat Management Program. Beyond this, implementation of Best Management Practices will maintain current habitat capability and should allow fairly natural stream processes to function, resulting in improving trends in habitat capability. Further increases are expected due to implementation of a habitat improvement program. It is estimated that approximately \$189,000 of the annual habitat improvement program will be funded through appropriated monies and \$246,000 through Knutson-Vandenburg (KV) monies. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage around dams off the Forest. This alternative, however, is anticipated to improve habitat from current levels and thus is consistent with objectives to improve anadromous fish runs in the drainage. Resident trout habitat capability will also improve providing opportunities for expected increased demand for sport fishing.

RANGE

Permitted livestock grazing would increase slightly above the current level through the fifth decade. Permitted use in the first decade is expected to average 23,000 AUM's, 24,000 AUM's in the second decade, and 24,000 AUM's in the fifth decade. Demand for cattle grazing would exceed available supply by the third decade, but demand for sheep grazing would be met in all decades. Actual permitted use would not exceed the total production potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 64,343 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 20,161 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 85,779 acres of old growth. By the fifth decade, there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce an Allowable Sale Quantity of 24.3 million (MM) cubic feet (136 MM board feet) per year and a Timber Sale Programmed Quantity of 26.1 MMCF (146.0 MMBF) for the first five decades. The long-term sustained yield for this alternative is 27.2 MM cubic feet based on 576,074 acres of suitable timber lands. This compares to the past decade average annual volume sold of 187.5 MMBF and an average annual volume harvested of 166.0 MMBF.

A wide range of timber intensities were selected ranging from GF-1 (high level of timber investment) to GF-6 in General Forest Management Areas. Approximately 50% of the general forest acres will receive intensive management including tree spacing (thinning). The other 50% will not be thinned due to economics, growth potential after thinning, or other physical and biological reasons.

An average of 3,433 acres per year will be clearcut, 2,360 acres will be shelterwood cut, and 2,896 acres will be selective cut.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) Standard in all decades of the plan. Timber harvest activity in this alternative would result in annual water yield increases for the first, second and fifth decades of 15,500, 21,000 and 23,800 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades the activity related delivered sediment will be approximately 72,400 tons per year. By the end of the third decade, most of the roads will have been built so the Forest should have a good transportation network in place. Because of this, it is anticipated that the amount of delivered sediment will be reduced by roughly 44 percent; therefore, soil losses produced by management activities in the fifth decade will be approximately 40,500 tons per year.

MINERALS

The area withdrawn as Wilderness (841,034 acres) will not change in any of the alternatives, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 2,247 additional acres from mineral entry, which is less than 1 percent of the total Forest acres. In addition to the withdrawals, management prescriptions which could discourage mineral related activities, would be used to manage 482,876 acres or 22 percent of the total Forest acres.

The following table shows how this management strategy would affect areas identified as having potential for the occurrence of locatable and leasable mineral resources.

	WITHDRAWAL	OPEN BUT WITH HIGHLY SENSITIVE MANAGEMENT STRATEGIES	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 acres or less than 1%	28,599 acres or 24%	31,143 acres or 26%
Area classified prospectively valuable for oil and gas	530 acres or less than 1%	44,330 acres or 21%	160,994 acres or 76%
Area classified prospectively valuable for geothermal resources	0 acres or 0%	58,767 acres or 9.8%	117,576 acres or 20%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	155,758 acres or 29%	269,030 acres or 50%

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

In this alternative it is estimated that the number of small hydroelectric proposals would be about 25. Three or four of these could be expected to reach the application for license stage.

ROADS

The implementation of Alternative C would require the construction of approximately 1,486 miles of additional road. Some 706 miles of this construction is expected to take place in areas that are currently unroaded. It is assumed that the majority of this construction will occur in the next 18 years. It is expected that none of the new roads would be opened to public use by high clearance vehicles. Roads that are currently open would be expected to remain open.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

An appropriate suppression response would be made on all wildfires. An unplanned natural fire occurring in wilderness would be treated as a prescribed fire until declared a wildfire. Human-caused fires occurring in wilderness would require an appropriate suppression response. Prescribed fire would be used for the reduction of activity fuels (logging and road building slash) and for maintenance and improvement of other resources as a management tool.

SOCIAL/ECONOMIC

Present net value of this alternative would be 1,910 million dollars. An annual budget of 29.0 million dollars would be required for implementation. Revenues from Forest products would return 14.0 million dollars to the U.S. Treasury; 3.3 million dollars would be returned to local governments. Employment would increase by 203 jobs and income would increase by 5.14 million dollars from existing levels.

ALTERNATIVE C**SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)**

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec Visitor Days	6,683,000
Annual dispersed recreation capacity		
- Roaded	Rec Visitor Days	21,884,000
- Unroaded		984,000
- Wilderness		1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1, EW-3, RE-4)	Acres	313,677
<u>Wild and Scenic Rivers</u>		
- Wild	Miles	82.5
- Scenic	Miles	29.0
- Recreational	Miles	118.5
<u>Water Quality and Quantity</u>		
Water yield increase	Acre Feet	15,500
Sediment increase index	Tons/Year	72,400
<u>Old-growth</u>	Acres	307,300
<u>Wildlife and Fish</u>		
Wildlife habitat management (EW-1 & EW-3)	Acres	137,801
Anadromous fish commercial harvest	Pounds	328,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	843,281
- Retention	Acres	521,800
- Partial Retention	Acres	332,927
- Modification	Acres	147,828
- Maximum Modification	Acres	318,344
<u>Timber</u>		
Allowable sale quantity	Million Cubic Feet	24.3
Allowable sale quantity	Million Board Feet	136.0
Long-term sustained yield	Million Cubic Feet	27.2
Area of suitable timber land	Acres	576,074
<u>Range</u>		
Grazing capacity	Animal Unit Months	38,700
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	898,184
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,910
Annual cost to the Federal Government	Million Dollars	29.0
Annual revenues to the Federal Government	Million Dollars	14.0
Annual returns to Local Governments	Million Dollars	3.3
Change in employment	Number of Jobs	+203
Change in income	Million Dollars	+5.14



ALTERNATIVE D

This alternative emphasizes the production of resources such as timber, range forage, developed recreation, minerals, and other resources which have the potential to return revenue to the Federal Treasury and local Counties. Management of other resources is at economically and environmentally feasible levels consistent with the emphasis on market oriented outputs.

A feature of this alternative and Alternative B is the higher allocation to General Forest (GF) and a corresponding decrease in the unroaded and scenic travel allocations. The major difference between this alternative and Alternative B is the economic emphasis. This results in less intensive timber management on the GF land allocation, and a lower annual sale quantity with an increased present net value compared to Alternative B.

The major changes in this alternative from the DEIS, and the Supplement to the DEIS, include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS, and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.

- Revision of the mature habitat network for marten, and three-toed and pileated woodpeckers, by changing sizes, locations, and management direction.

RECREATION SETTING

--Developed Recreation

The emphasis of this alternative is to upgrade and expand heavily used popular campsites and develop new sites where capacity is being fully utilized. Highly popular reduced service campgrounds in high use areas will be upgraded to full service sites. Campgrounds in remote semi-primitive areas will remain as lesser developed sites. All deteriorating facilities at campgrounds will be renovated.

Increased timber roading would provide more opportunity for commercial resorts in choice locations. These opportunities would be captured by entrepreneurs as the demand for such facilities develops.

Ski areas would be encouraged to look at their master plans for inclusion of more area for expansion. These are the Mission Ridge, White Pass, Stevens Pass, and Crystal Mountain areas.

--Dispersed Recreation

By the second decade, 11% of the Forest will provide unroaded recreation opportunities. This includes 9,464 acres Primitive, 80,404 acres Semi-Primitive Non-Motorized, and 139,177 acres Semi-Primitive Motorized Recreation Opportunity Spectrums (ROS).

In addition, there will be 50 percent of the Forest providing roaded recreation or 1,086,321 acres of the Roaded Natural and Roaded Modified Recreation Opportunity Spectrums combined.

Seventeen of the 23 inventoried roadless areas will have a substantial portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS 1/	ACRES TO BE ROADED
Myrtle Lake	10,918	8,968	1,950
Rock Creek	32,924	17,128	15,796
Twin Lakes	22,048	13,420	8,628
Canyon Creek	9,158	4,240	4,918
Heather Lake	11,067	1,442	9,625
Chelan	71,063	41,701	29,362
Entiat	71,254	25,801	45,453
Stormy	32,500	5,406	27,094
Slide Ridge	10,091	1,060	9,031
Devil's Gulch	25,186	0	25,186
Taneum	25,122	2,438	22,684
Manastash	8,798	3,498	5,300
Norse Peak Adj.	11,300	0	11,300
Quartz	8,756	106	8,650
Naneum	6,911	0	6,911
Lion Rock	4,834	3,859	975
William O. Douglas Adj.	22,938	0	22,938
Blue Slide	18,571	2,374	16,197
Goat Rocks Adj.	7,357	0	7,357
Nason Ridge	19,123	12,063	7,060
Alpine Lakes Adj.	44,393	28,513	15,880
Thorp Mountain	15,667	4,388	11,279
Teanaway	66,293	52,640	13,653

1/ The acres shown remaining roadless do not include 4,388 acres of dedicated old growth that fall within roadless allocations.

ALTERNATIVE D

The miles of trail available to motorized use by land allocation or due to administrative closures are:

<u>Allocation</u>	<u>Miles Open to Motorized Use</u>	<u>Miles Closed to Motorized Use</u>
Wilderness	--	1188.0
Unroaded Non-motorized	--	66.7
Unroaded Motorized	162.5	---
Roaded Motorized	1045.6	---
Administratively Closed	--	390.0

Administratively closed trails are those trails in open allocations but closed for other environmental considerations.

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

Scenic

Dispersed Recreation

Tumwater

Teanaway
Nason Ridge
Annette Lake

WILD, SCENIC, AND RECREATIONAL RIVERS

There are no rivers recommended for designation under the Wild and Scenic Rivers Act. River corridors would be subject to a full range of management activities, with five of the ten eligible rivers outside wilderness being allocated to timber harvest prescriptions that could noticeably alter the scenic qualities of the landscape.

SCENERY

Visual quality objectives would remain at a high level only in the Alpine Lakes Management Unit and the Lake Chelan and Mather Memorial (Hwy-410) viewsheds. Visual quality on the White Pass (Hwy 12) and the Entiat Valley viewsheds would be slightly altered to altered.

Unnatural patterns will dominate most portals to wildernesses. The natural character will not be maintained.

The natural appearance of the Forest in other areas would be greatly reduced. The general viewing impression would be one of a heavily altered landscape with contrasting openings, visible logging roads, and large cut patterns.

Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

CULTURAL RESOURCE

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

Approximately 80 percent of the known cultural resources would be within management area designations that may create a potentially moderate to high level of impact (59 percent would be within management areas that could be considered to have a high level of impact). These would require mitigation measures or frequent project modification. There might be noticeable modification of the visual settings around several significant sites. There might be an increase in the loss of non-significant sites.

A high number of acres would be inventoried for cultural resources (approximately 644,000 acres over the planning period in support of the timber program alone), but the ways in which identified sites could be managed and interpreted in place might be constrained.

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious uses of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information, and education on wilderness ethics and minimum impact camping techniques.

Approximately 62 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

This alternative maintains lower levels of habitat for mature and old growth species compared to other alternatives.

Deer and elk populations are reduced a small amount in summer habitat and have a moderate reduction in winter habitat.

Primary cavity excavator habitat is reduced to the second lowest level of the alternatives.

Riparian habitat is maintained.

This alternative is on the lower end of the range of providing for recreation use of wildlife.

State wildlife objectives would be met for deer, mountain goats, grouse and spotted owls.

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and Research Natural Areas, and 138,000 acres of suitable spotted owl habitat in lands that are unsuitable for timber management or in allocation that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area (SOHA) network, there were 45,305 acres originally allocated to full timber yield prescriptions and 19,356 acres originally allocated to reduced timber yields.

FISHERIES

This alternative should result in an increase in both anadromous and resident fish habitat capability through the life of the plan. Numbers of catchable trout by the second decade are estimated to increase from a current level of 200,000 to 212,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase from 1.348 million to 1.368 million and 172,000 to 174,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is expected to remain constant at current levels through the life of the plan.

It is anticipated that increases in habitat capability will result from Riparian Habitat Management Standards, the Fish Habitat Management Program and implementation of Best Management Practices, which will maintain current habitat capability and should allow fairly natural stream processes to function, resulting in improving trends in habitat capability. Further increases are expected due to implementation of a habitat improvement program. It is estimated that, under this alternative, the \$295,000 annual habitat improvement program will be funded through Knutson-Vandenburg monies. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage off Forest. This alternative, however, is anticipated to improve habitat from current levels and thus is consistent with objectives to improve anadromous fish runs in the drainage. Resident trout habitat

ALTERNATIVE D

capability will also improve, providing opportunities for expected increased demand for sport fishing.

RANGE

Permitted livestock grazing would increase in all decades through the fifth decade. Permitted use in the first decade is expected to average 23,000 AUM's, 25,500/AUM's in the second decade, and 36,000 AUM's in the fifth decade. Demand for cattle grazing would exceed supplies by the third decade, but demand for sheep grazing would be met in all decades. Actual permitted use would not exceed the total production potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 48,421 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 23,808 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 98,054 acres of old growth. By the fifth decade, there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce an Allowable Sale Quantity of 25.6 million (MM) cubic feet (142.7 MM board feet) and a Timber Sale Programmed Quantity of 27.4 MMCF (153.2 MMBF) per year for the first five decades. The long-term sustained yield for this alternative is 30.8 MM cubic feet based on 643,639 acres of suitable timber lands. This compares to the past decade average annual volume sold of 187.5 MMBF and average annual volume harvested of 166.0 MMBF.

A wide range of timber intensities were selected ranging from GF-1 (high level of timber investment) to GF-6 in General Forest Management Areas. Approximately 31% of the general forest acres will receive intensive management including tree spacing (thinning). The other 69% will not be thinned.

An average of 5,136 acres per year will be clearcut, 24 acres will be shelterwood cut, and 2,569 acres will be selective cut.

WATER

Water quality and yield parameters are affected by degree of commodity production. Refer to Chapter IV for a discussion of the variation in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. Timber harvest activity in this alternative would result in annual water yield increases for the first, second and fifth decades of 15,700, 22,200 and 24,900 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades, the activity related delivered sediment will be approximately 65,500 tons per year. By the end of the third decade, most of the roads will have been built, so the Forest should have a good transportation network in place. Because of this, it is anticipated that the amount of delivered sediment will be reduced by roughly 44 percent; therefore, soil losses produced by management activities in the fifth decade will be approximately 36,700 tons per year.

MINERALS

The area withdrawn as Wilderness (841,034 acres) will not change in any of the alternatives, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 2,247 additional acres from mineral entry, which is less than 1 percent of the total Forest acres. In addition to the withdrawals, highly sensitive management prescriptions which could discourage mineral related activities would be used to manage 384,868 acres or 18 percent of the total Forest acres. The following figure shows how this management strategy would affect areas identified as having potential for the occurrence of locatable and leasable mineral resources.

	WITHDRAWAL	OPEN BUT WITH HIGHLY SENSITIVE MANAGEMENT STRATEGIES	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 Acres or less than 1%	23,236 acres or 19.5%	36,507 acres or 30.5%
Area classified prospectively valuable for oil and gas	530 acres or less than 1%	29,108 acres or 14%	176,216 acres or 83%
Area classified prospectively valuable for geothermal resources	0 acres or 0%	43,503 acres or 7%	132,840 acres or 22%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	126,396 acres or 24%	298,392 acres or 56%

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

In this alternative, it is estimated that the number of small hydroelectric proposals would be 40 or more. At least four of these could be expected to advance to the application for license state.

ROADS

The implementation of Alternative D would require the construction of approximately 1,630 miles of additional road. Some 853 miles of this construction is expected to take place in areas that are currently unroaded. It is assumed that the majority of this construction will occur in the next 20 years. It is expected that none of the new roads would be opened to public use by high clearance vehicles. Roads that are currently open would be expected to remain open.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

An appropriate suppression response would be made on all wildfires. Lightning fires occurring in wilderness would be treated as prescribed fire until declared a wildfire. Human caused fires occurring in wilderness would require an appropriate suppression response. The fire hazard would decrease because increased timber harvest and fuel reduction activities would reduce forest fuels. Fire prevention efforts would be directed toward timber harvest activities.

SOCIAL/ECONOMIC

Present net value of this alternative would be 1,937 million dollars. An annual budget of 26.9 million dollars would be required for implementation. Revenues from Forest products would return 14.3 million dollars to the U.S. Treasury; 3.4 million dollars would be returned to local governments. Employment would increase 279 jobs, and income would increase by 7.2 million dollars from existing levels.

ALTERNATIVE D
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec Visitor Days	6,853,000
Annual dispersed recreation capacity		
- Roaded	Rec Visitor Days	22,410,000
- Unroaded		950,000
- Wilderness		1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1, WS-3)	Acres	239,286
<u>Wild and Scenic Rivers</u>	Miles	0
<u>Water Quality and Quantity</u>		
Water yield increase	Acre Feet	15,700
Sediment increase index	Tons/Year	65,500
<u>Old-growth</u>	Acres	305,900
<u>Wildlife and Fish</u>		
Wildlife habitat management (EW-1)	Acres	77,784
Anadromous fish commercial harvest	Pounds	328,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	843,281
- Retention	Acres	388,853
- Partial Retention	Acres	226,268
- Modification	Acres	164,217
- Maximum Modification	Acres	541,561
<u>Timber</u>		
Allowable sale quantity	Million Cubic Feet	25.6
Allowable sale quantity	Million Board Feet	142.7
Long-term sustained yield	Million Cubic Feet	30.8
Area of suitable timber land	Acres	643,639
<u>Range</u>		
Grazing capacity	Animal Unit Months	39,700
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	902,753
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,937
Annual cost to the Federal Government	Million Dollars	26.9
Annual revenues to the Federal Government	Million Dollars	14.3
Annual returns to Local Governments	Million Dollars	3.4
Change in employment	Number of Jobs	+279
Change in income	Million Dollars	+7.2



ALTERNATIVE E

This alternative allocates all inventoried currently roadless areas outside of the existing wilderness and the Alpine Lakes Management Area to a management prescription which will maintain their roadless status. It also emphasizes the protection of natural scenery, fish and wildlife habitat, and other amenity values. Management of other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

The major changes in this alternative from the DEIS, and the Supplement to the DEIS, include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS, and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.
- Revision of the mature habitat network for marten, and three-toed and pileated woodpeckers, by changing sizes, locations, and management direction.
- Development and application of the Mather Memorial Parkway prescription (MP-1) which has no scheduled timber harvest within the Parkway corridor.

RECREATION SETTING

--Developed Recreation

The emphasis for this alternative is to bring selected sites up to full service status and convert these sites to full service campgrounds. Some minor expansion of these sites as well as the present full service sites will take place in popular areas.

As the roadless areas will not be accessed for timber harvest, the opportunities for additional areas for developed site activities will be limited to the existing roaded drainages.

The Mission Ridge, White Pass, and Stevens Pass ski areas have master plans and development of these areas would continue on an orderly basis depending on public demand and economic conditions.

--Dispersed Recreation

By the second decade, 23% of the Forest will provide unroaded recreation opportunities outside wilderness. This includes 3,114 acres Primitive, 342,639 acres Semi-Primitive Non-Motorized, and 153,572 acres Semi-Primitive Motorized Recreation Opportunity Spectrums (ROS).

In addition, there will be 41 percent of the Forest providing roaded recreation or 886,041 acres of the Roaded Natural and Roaded Modified Recreation Opportunity Spectrums combined.

All of the 23 inventoried roadless areas will have all or a portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS	ACRES TO BE ROADDED
Myrtle Lake	10,918	10,918	0
Rock Creek	32,924	32,924	0
Twin Lakes	22,048	22,048	0
Canyon Creek	9,158	9,158	0
Heather Lake	11,067	11,067	0
Chelan	71,063	71,063	0
Entiat	71,254	71,254	0
Stormy	32,500	30,868	1,632 ^{1/}
Slide Ridge	10,091	10,091	0
Devil's Gulch	25,186	25,186	0
Taneum	25,122	25,122	0
Manastash	8,798	8,798	0
Norse Peak Adj.	11,300	11,300	0
Quartz	8,756	8,756	0
Naneum	6,911	6,911	0
Lion Rock	4,834	4,834	0
William O. Douglas Adj.	22,938	22,938	0
Blue Slide	18,571	18,571	0
Goat Rocks Adj	7,357	7,357	0
Nason Ridge	19,123	12,063	7,060 ^{2/}
Alpine Lakes Adj.	44,393	28,513	15,880 ^{2/}
Thorp Mountain	15,667	4,388	11,279 ^{2/}
Teanaway	66,293	52,640	13,653 ^{2/}

^{1/} Experimental Forest area within the boundaries of this inventoried roadless area

^{2/} Located within the Alpine Lakes Management Area

Four of the 23 inventoried roadless areas lie within the Alpine Lakes Management Area. Management of these areas is directed by the Alpine Lakes Area Land Management Plan and Environmental Impact Statement (1981) that was mandated through the Alpine Lakes Management Act (36 CFR, Part 219.2 {b}). Within these four areas, the Alpine Lakes Management Plan is the guiding document when there is a conflict in management direction between it and the proposed Forest Plan. Therefore, these four areas will have some areas roaded.

ALTERNATIVE E

The miles of trail available to motorized use by land allocation or due to administrative closures are:

Allocation	Miles Open to Motorized Use	Miles Closed to Motorized Use
Wilderness	--	1188.0
Unroaded Non-motorized	--	112.7
Unroaded Motorized	463.6	--
Roaded Motorized	697.8	--
Administratively Closed	--	621.2

Administratively closed trails are those trails in open allocations but closed for other environmental considerations.

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

<u>Scenic</u>	<u>Dispersed Recreation</u>
Tumwater	Teanaway Nason Ridge Annette Lake

WILD, SCENIC, AND RECREATIONAL RIVERS

The American, Cle Elum, Waptus, Entiat, Icicle, Little Wenatchee, White, Napeequa, Chiwawa and Wenatchee Rivers are recommended for designation under the Wild and Scenic Rivers Act. The classification by segment is described in the following table:

River	Recommended Classification	Miles	Segment
American	Wild	6.0	Headwaters to confluence with Rainier Fork.
	Scenic	16.0	Confluence with Rainier Fork to confluence with Bumping River (in Mather Memorial Parkway corridor).
Chiwawa	Wild	5.0	Headwaters to Glacier Peak Wilderness boundary
	Scenic	24.0	Glacier Peak Wilderness boundary to Goose Creek
	Recreational	6.0	Goose Creek to confluence with Wenatchee River.
Cle Elum	Wild	4.0	Headwaters to Alpine Lakes Wilderness boundary.
	Scenic	2.0	Alpine Lakes Wilderness boundary to above Lake Tucquala
	Scenic	14.0	Above Lake Tucquala to Salmon La Sac bridge
	Recreational	4.5	Salmon La Sac bridge to Lake Cle Elum
Entiat	Wild	12.5	Headwaters to Glacier Peak Wilderness boundary
	Wild	4.0	Glacier Peak Wilderness boundary to Cottonwood Trailhead.
	Scenic	15.0	Cottonwood Trailhead to above Burns Creek
Iceicle	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary.
	Scenic	14.0	Alpine Lakes Wilderness boundary to above Leavenworth city water intake.
Little Wenatchee	Scenic	8.0	Little Wenatchee Falls to Lake Wenatchee
Napeequa	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary
	Recreational	1.0	Glacier Peak Wilderness boundary to confluence with White River.
Waptus	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary
	Wild	1.0	Alpine Lakes Wilderness boundary to confluence with Cle Elum River
Wenatchee	Recreational	21.0	Lake Wenatchee to Tumwater Campground.
	Recreational	7.0	Tumwater Campground to Forest boundary.
White	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
	Scenic	7.0	Glacier Peak Wilderness boundary to above Tall Timbers Ranch.
	Recreational	12.0	Above Tall Timbers Ranch to Lake Wenatchee.

Characteristics which contribute to the eligibility of these rivers will be protected until Congress formally determines their status

ALTERNATIVE E

SCENERY

Visual quality would be maintained at the highest level. All major interstate scenic highway viewsheds would retain a natural appearing landscape.

All identified viewsheds in wilderness portals and the Alpine Lakes Management Unit would retain a natural appearance.

Chumstick - Plain, Sugarloaf-Maverick Saddle, Mission Creek, Rattlesnake Creek, and Table Mountain-Reecer Creek viewsheds would retain high visual quality.

The majority of the landscape would be characterized by a natural appearance. The balance of the landscape viewed from Forest roads would have an altered appearance.

Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

CULTURAL RESOURCES

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

A majority of the cultural resources would be within management area designations having potential for a low to moderate level of impact. Protection (through avoidance) of non-significant sites would be likely. The necessity of mitigation measures or project modifications would be infrequent, with greater latitude for preservation and protection of cultural resources in place. Visual settings around significant sites would likely be unaltered. However, there might also be fewer opportunities to economically manage the vegetation adjacent to such sites. The accessibility of some sites managed for interpretive purposes would be limited to non-motorized means only.

A somewhat smaller number of acres would be inventoried for cultural resources (approximately 411,000 acres over the planning period would be surveyed in support of the Forest timber program).

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious uses of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information, and education on wilderness ethics and minimum impact camping techniques.

Approximately 36 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

This alternative maintains the highest levels of habitat for mature and old growth species compared to other alternatives.

Deer and elk populations are increased in both summer and winter habitat.

This alternative is the only one that increases primary cavity excavator habitat.

Riparian habitat is increased.

This alternative provides the highest level of recreation use of wildlife.

State wildlife objectives will be met for elk, deer, mountain goats, grouse, and spotted owls.

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and

Research Natural Areas, and 235,000 acres of suitable spotted owl habitat in lands that are unsuitable for timber management or in allocations that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area (SOHA) network, there were 8,756 acres originally allocated to full timber yield prescriptions and 46,344 acres originally allocated to reduced timber yields.

FISHERIES

This alternative should result in a increase in both anadromous and resident fish habitat capability through the life of the plan. Numbers of catchable trout, by the second decade, are estimated to increase from a current level of 200,000 to 217,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase from 1.3 to 1.5 million and 172,000 to 185,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is estimated to remain constant at current levels through the life of the Plan.

It is anticipated that increases in habitat capability will result from Riparian Habitat Management Standards, the Fish Habitat Management Program and implementation of Best Management Practices, which will maintain current habitat capability and should allow fairly natural stream processes to function, resulting in improving trends in habitat capability. Further increases are expected due to implementation of a habitat improvement program. It is estimated that approximately \$680,000 of the annual habitat improvement program will be funded through appropriated monies and \$167,000 through Knutson-Vandenburg funds. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage off Forest. This alternative, however, is anticipated to improve habitat from current levels and thus is consistent with objectives to improve anadromous fish runs in the drainage. Resident trout habitat capability will also improve, providing opportunities for expected increased demand for sport fishing.

RANGE

Permitted livestock grazing would increase in all decades through the third decade and would only have a slight increase in the fourth through fifth decades. Permitted use in the first decade is expected to average 23,000 AUM's, 25,500 AUM's in the second decade, and 31,500 AUM's in the fifth decade. Demand for cattle grazing would exceed supply by the middle of the second decade but demand for sheep grazing could be met in all decades. Actual permitted use would not exceed total potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 105,556 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 15,095 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 57,562 acres of old growth. By the fifth decade there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce an Allowable Sale Quantity of 12.9 million (MM) cubic feet (71.9 MM board feet) and a Timber Sale Programmed Quantity of 13.8 MMCF (75.7 MMBF) per year for the first five decades. The long-term sustained yield for this alternative is 18.7 MM cubic feet based on 410,935 acres of suitable timber lands. This compares to the past decade average annual volume sold of 187.5 MMBF and average volume harvested of 166.0 MMBF.

ALTERNATIVE E

This alternative would manage general forest land at a low to moderate intensity. No acres are programmed for the most intensive management that includes both precommercial and commercial thinning.

An average of 611 acres per year will be clearcut, 2,600 acres will be shelterwood cut, and 1,605 acres will be selective cut.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. Timber harvest activity in the alternative would result in annual water yield increases for the first, second and fifth decades of 8,200, 11,500 and 14,700 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades, the activity related delivered sediment will be approximately 50,300 tons per year. By the end of the third decade, most of the roads will be in place, and the Forest should have a good transportation network in place. Because of that, it is anticipated that the amount of delivered sediment will be reduced by roughly 44 percent; therefore, the amount of soil loss produced in the fifth decade should be approximately 28,200 tons per year.

MINERALS

The area withdrawn as Wilderness (841,034 acres or 39 percent of the Forest) will not change in any of the alternatives, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 3,837 additional acres from mineral entry, which is less than 1 percent of the total Forest acres. In addition to the withdrawals, highly sensitive management prescriptions, which could discourage mineral related activities, would be used to manage 654,598 acres or 30 percent of the total Forest acres. The following figure shows how this management strategy would affect areas identified as having potential for the occurrence of locatable and leasable mineral resources.

	WITHDRAWAL	OPEN BUT WITH HIGHLY SENSITIVE MANAGEMENT STRATEGIES	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 acres or less than 1%	36,379 acres or 30%	23,363 acres or 19.6%
Area classified prospectively valuable for oil and gas	530 acres or less than 1%	63,792 acres or 30%	141,532 acres or 67%
Area classified prospectively valuable for geothermal resources	0 acres or 0%	95,189 acres or 16%	81,154 acres or 14%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	199,091 acres or 37%	225,697 acres or 42%

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

Land use designations in this alternative would appear to limit small hydroelectric projects to about 10 proposals. Perhaps one or two would proceed to the application for license stage. However, the current level of activity must be considered. Even in this alternative, about 25 proposals would be the minimum with 3 of them reaching the application for license stage.

ROADS

The implementation of Alternative E would require the construction of approximately 830 miles of additional road. Some 180 miles of this construction is expected to take place in areas that are currently unroaded within the Alpine Lakes Management Unit. It is assumed that the majority of this construction will occur in the next 20 years. It is expected that none of the new roads would be opened to public use by high clearance vehicles. Roads currently open, would be expected to remain open.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

An appropriate suppression response would be made on all wildfires. Unplanned natural ignitions occurring in wilderness areas would be treated as prescribed fire until declared a wildfire. Human caused fires occurring in wilderness areas would require an appropriate suppression response. Fire protection would be concentrated on high production market output areas. Prescribed burning from unplanned ignitions would be used extensively to create diversified forest conditions.

SOCIAL/ECONOMIC

Present net value of this alternative would be 1,834 million dollars. An annual budget of 24.8 million dollars would be required for implementation. Revenues from Forest products would return 8.0 million dollars to the U.S. Treasury; 1.9 million dollars would be returned to local governments. Employment would decrease by 520 jobs and income would decrease by 14.56 million dollars from existing levels.

ALTERNATIVE E
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec Visitor Days	5,033,000
Annual dispersed recreation capacity		
- Roaded	Rec Visitor Days	19,439,000
- Unroaded		982,000
- Wilderness		1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1, WS-3)	Acres	537,043
<u>Wild and Scenic Rivers</u>		
-Wild	Miles	86 5
-Scenic	Miles	100 5
-Recreational	Miles	51 5
<u>Water Quality and Quantity</u>		
Water yield increase	Acre Feet	8,200
Sediment increase index	Tons/Year	50,300
<u>Old-growth</u>	Acres	310,600
<u>Wildlife and Fish</u>		
Wildlife habitat management (EW-1)	Acres	148,189
Anadromous fish commercial harvest	Pounds	328,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	843,281
- Retention	Acres	828,058
- Partial Retention	Acres	246,835
- Modification	Acres	159,065
- Maximum Modification	Acres	86,941
<u>Timber</u>		
Allowable sale quantity	Million Cubic Feet	12 9
Allowable sale quantity	Million Board Feet	71 9
Long-term sustained yield	Million Cubic Feet	18 7
Area of suitable timber land	Acres	410,935
<u>Range</u>		
Grazing capacity	Animal Unit Months	38,400
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	789,085
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,834
Annual cost to the Federal Government	Million Dollars	24 8
Annual revenues to the Federal Government	Million Dollars	8 0
Annual returns to Local Governments	Million Dollars	1 9
Change in employment	Number of Jobs	-520
Change in income	Million Dollars	-14 56



ALTERNATIVE F

ALTERNATIVE F

This alternative emphasizes unroaded recreation, protection of natural scenery, fish and wildlife habitat and other amenity values. It allocates approximately 80 percent of the currently roadless area outside of the existing wilderness and Alpine Lakes Management Area to roadless management prescriptions with heavy emphasis to non-motorized recreation. Management of other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

The Forest was assisted in the development of this alternative by a coalition of environmental groups from throughout the state.

The major changes in this alternative from the DEIS, and the Supplement to the DEIS, include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS, and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.
- Revision of the mature habitat network for marten, and three-toed and pileated woodpeckers, by changing sizes, locations, and management direction.
- Development and application of the Mather Memorial Parkway prescription (MP-1) which has no scheduled timber harvest within the Parkway corridor.

RECREATION SETTING

--Developed Recreation

The emphasis for this alternative is to bring selected sites up to full service status. Some minor expansion of these sites as well as the present full service sites will take place in popular areas.

As the roadless areas will not be accessed for timber harvest, the opportunities for additional areas for developed site activities will be limited to the existing roaded drainages.

The Mission Ridge, White Pass, and Stevens Pass Ski Areas have master plans and development of these areas would continue on an orderly basis depending on public demand and economic conditions.

--Dispersed Recreation

By the second decade, 20% of the Forest will provide unroaded recreation opportunities which include 3,606 acres primitive, 280,180 acres semi-primitive non-motorized, and 150,572 acres semi-primitive motorized Recreation Opportunity Spectrums (ROS).

ALTERNATIVE F

In addition, there will be 41 percent of the Forest providing roaded recreation or 881,357 acres of the roaded natural and roaded modified Recreation Opportunity Spectrums combined.

All of the 23 inventoried roadless areas will have all or a portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS 1/	ACRES TO BE ROADED
Myrtle Lake	10,918	10,897	21
Rock Creek	32,924	31,652	1,272
Twin Lakes	22,048	21,306	742
Canyon Creek	9,158	8,904	254
Heather Lake	11,067	8,989	2,078
Chelan	71,063	60,548	10,515
Entiat	71,254	64,873	6,381
Stormy	32,500	29,087	3,413
Slide Ridge	10,091	9,243	848
Devil's Gulch	25,186	21,794	3,392
Taneum	25,122	23,808	1,314
Manastash	8,798	6,063	2,735
Norse Peak Adj.	11,300	1,336	9,964
Quartz	8,756	6,254	2,502
Naneum	6,911	5,957	954
Lion Rock	4,834	4,558	276
William O. Douglas Adj.	22,938	2,586	20,352
Blue Slide	18,571	14,861	3,710
Goat Rocks Adj.	7,357	3,689	3,668
Nason Ridge	19,123	12,063	7,060
Alpine Lakes Adj.	44,393	28,513	15,880
Thorp Mountain	15,667	4,388	11,279
Teanaway	66,293	52,640	13,653

1/ The acres shown remaining roadless do not include 4,388 acres of dedicated old growth that fall within roadless allocation.

The miles of trail available to motorized use by land allocation or due to administrative closures are:

Allocation	Miles Open to Motorized Use	Miles Closed to Motorized Use
Wilderness	--	1,188.0
Unroaded Non-motorized	--	337.4
Unroaded Motorized	197.0	---
Roaded Motorized	740.4	---
Administratively Closed	--	364.6

Administratively closed trails are those trails in open allocations but closed for other environmental considerations.

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

<u>Scenic</u>	<u>Dispersed Recreation</u>
Tumwater	Teanaway Nason Ridge Annette Lake

WILD, SCENIC, AND RECREATIONAL RIVERS

The American, Cle Elum, Wapatus, Entiat, Icicle, Little Wenatchee, White, Napeequa, Chiwawa and Wenatchee Rivers are recommended for designation under the Wild and Scenic Rivers Act. The classification by segment is described in the following table:

River	Recommended Classification	Miles	Segment
American	Wild	6.0	Headwaters to confluence with Rainier Fork
	Scenic	16.0	Confluence with Rainier Fork to confluence with Bumping River (in Mather Memorial Parkway corridor).
Chiwawa	Wild	5.0	Headwaters to Glacier Peak Wilderness boundary
	Scenic	24.0	Glacier Peak Wilderness boundary to Goose Creek.
	Recreational	6.0	Goose Creek to confluence with Wenatchee River.
Cle Elum	Wild	4.0	Headwaters to Alpine Lakes Wilderness boundary
	Scenic	2.0	Alpine Lakes Wilderness boundary to above Lake Tucquala.
	Scenic	14.0	Above Lake Tucquala to Salmon La Sac bridge
	Recreational	4.5	Salmon La Sac bridge to Lake Cle Elum
Entiat	Wild	12.5	Headwaters to Glacier Peak Wilderness boundary.
	Wild	4.0	Glacier Peak Wilderness boundary to Cottonwood Trailhead
	Scenic	15.0	Cottonwood Trailhead to above Burns Creek
Iceicle	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary
	Scenic	14.0	Alpine Lakes Wilderness boundary to above Leavenworth city water intake.
Little Wenatchee	Scenic	8.0	Little Wenatchee Falls to Lake Wenatchee
Napeequa	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
	Recreational	1.0	Glacier Peak Wilderness boundary to confluence with White River.
Wapatus	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary
	Wild	1.0	Alpine Lakes Wilderness boundary to confluence with Cle Elum River.
Wenatchee	Recreational	21.0	Lake Wenatchee to Tumwater Campground
	Recreational	7.0	Tumwater Campground to Forest boundary
White	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
	Scenic	7.0	Glacier Peak Wilderness boundary to above Tall Timbers Ranch.
	Recreational	12.0	Above Tall Timbers Ranch to Lake Wenatchee.

Characteristics which contribute to the eligibility of these rivers will be protected until Congress formally determines their status.

SCENERY

Visual quality would be maintained at a high level. All major interstate scenic highway viewsheds would retain a natural or slightly altered appearance.

Visual quality in the Alpine Lakes Management Unit would be high and all identified viewsheds and wilderness portals would retain their natural appearance.

Mad River, Sugarloaf to Maverick Saddle, Chumstick-Plain, Mission Creek, Table Mountain-Reecer Creek, Taneum/Manastash Quartz Mountain, Bumping Lake, and Rattlesnake Creek viewsheds would all retain high visual quality.

The general impression of the majority of the landscape would focus on its natural appearance. The remaining landscape viewed from Forest roads would have an altered appearance.

Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

CULTURAL RESOURCE

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

A majority of the cultural resources would be within management area designations having potential for a low to moderate level of impact. Protection (through avoidance) of non-significant sites would be likely. The necessity of mitigation measures or project modifications would be infrequent, with greater latitude for preservation and protection of cultural resources in place. Visual settings around significant sites would likely be unaltered. However, there might also be fewer opportunities to economically manage the vegetation adjacent to such sites. The accessibility of some sites managed for interpretive purposes would be limited to non-motorized means only.

A somewhat smaller number of acres than other alternatives would be inventoried for cultural resources. Approximately 422,000 acres over the planning period would be surveyed in support of the Forest timber program.

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious uses of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information, and education on wilderness ethics and minimum impact camping techniques.

Approximately 40 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

This alternative maintains the second highest level of habitat for mature and old growth species

Deer and elk populations are increased in both summer and winter habitat.

This alternative has only a slight decrease in primary cavity excavator habitat.

Riparian habitat is increased.

This alternative provides the second highest level of recreation use of wildlife.

State wildlife objectives will be met for elk winter habitat, deer, mountain goats, grouse, and spotted owls.

ALTERNATIVE F

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and Research Natural Areas, and 224,000 acres of suitable spotted owl habitat in lands that are unsuitable for timber management or in allocations that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area (SOHA) network, there were 13,526 acres originally allocated to full timber yield prescriptions and 47,806 acres originally allocated to reduced timber yields.

FISHERIES

This alternative should result in an increase in both anadromous and resident fish habitat capability through the life of the plan. Numbers of catchable trout, by the second decade, are estimated to increase from a current level of 200,000 to 212,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase from 1.348 million to 1.401 million and 172,000 to 179,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is estimated to remain constant at current levels throughout the life of the plan.

It is anticipated that increases in habitat capability will result from Riparian Habitat Management Standards, the Fish Habitat Management Program and implementation of Best Management Practices, which will maintain current habitat capability and should allow fairly natural stream processes to function resulting in improving trends in habitat capability. Further increases are expected due to implementation of a habitat improvement program. It is estimated that approximately \$340,000 of the annual habitat improvement program will be funded through appropriated monies and \$197,000 through Knutson-Vandenburg funds. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage off Forest. This alternative, however, is anticipated to improve habitat from current levels and thus is consistent with objectives to improve anadromous

fish runs in the drainage. Resident trout habitat capability will also improve, providing opportunities for expected increased demand for sport fishing.

RANGE

Permitted livestock grazing would increase in all decades through the fourth decade and would only increase slightly in the fifth decade. Permitted grazing use in the first decade is expected to average 23,000 AUM's, 25,500 AUM's in the second decade, and 31,500 AUM's in the fifth decade. Demand for cattle grazing would exceed supply by the end of the second decade, but demand for sheep grazing could be met in all decades. Actual permitted use would not exceed total production potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 97,627 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 13,314 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 59,396 acres of old growth. By the fifth decade there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce an Allowable Sale Quantity of 13.6 million (MM) cubic feet (76.0 MM board feet) and a Timber Sale Programmed Quantity of 14.6 MMCF (81.6 MMBF) per year for the first five decades. The long-term sustained yield for this alternative is 19.2 MM cubic feet

based on 421,265 acres of suitable timber lands. This compares to the past decade average annual volume sold of 187.5 MMBF and average volume harvested of 166.0 MMBF.

This alternative proposes higher intensity timber management on only 2% of the general forest acres. An additional 39 percent would be treated at the GF-3, or moderate intensity. The remaining acres would receive no thinning or other cultural treatment to improve timber growth.

An average of 869 acres per year will be clearcut, 2,515 acres will be shelterwood cut, and 1,692 acres will be selective cut.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the *management activities proposed in each alternative*. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. Timber harvest activity in this alternative would result in annual water yield increases for the first, second and fifth decades of 8,700, 12,100 and 15,300 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades the activity related delivered sediment will be approximately 51,500 tons per year. By the end of the third decade, most of the roads will have been built so the Forest should have a good transportation network in place. Because of this, it is anticipated that the amount of delivered sediment will be reduced by 44 percent. Therefore, management activity created soil loss in the fifth decade will be approximately 28,800 tons per year.

MINERALS

The area withdrawn as Wilderness (841,034 acres or 39 percent of the Forest) will not change in any of the alternatives, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 3,689 additional acres from mineral entry, which is less than one percent of the total Forest acres. In addition to the withdrawals, highly sensitive management prescriptions which could discourage mineral related activities would be used to manage 606,495 acres, or 28 percent of the total Forest acres. The following figure shows how this management strategy would affect areas identified as having potential for the occurrence of locatable and leasable mineral resources.

	WITHDRAWALS	OPEN BUT WITH HIGHLY SENSITIVE RESTRICTIVE MANAGEMENT	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 acres or less than 1%	32,288 acres or 27%	27,455 acres or 23%
Area classified prospectively valuable for oil and gas	530 acres or less than 1%	53,234 acres or 25%	152,090 acres or 72%
Area classified prospectively valuable for geothermal resources	0 acres or 0%	76,787 acres or 36%	99,556 acres or 17%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	186,646 acres or 35%	238,142 acres or 45%

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

This situation is similar to Alternative E. The land use allocations would indicate a lower number of proposals. However, the effect of the existing proposals must be considered. The estimate is that there would be 25 proposals with 3 proceeding to the license application stage.

ROADS

The implementation of Alternative F would require the construction of approximately 872 miles of additional road. Some 222 miles of this construction is expected to take place in areas that are currently unroaded. It is assumed that the majority of this construction will occur in the next 20 years. In addition to the roads currently open, it is expected that 10% of the new roads would be opened to public use by high clearance vehicles.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

An appropriate suppression response would be made on all wildfires. Unplanned natural ignitions occurring in wilderness would be treated as prescribed fire until declared a wildfire. Human caused fires occurring in wilderness would require an appropriate suppression response. Prescribed fire from unplanned ignitions would be used extensively to maintain a natural environment.

SOCIAL/ECONOMIC

Present net value of this alternative would be 1,897 million dollars. An annual budget of 22.2 million dollars would be required for implementation. Revenues from Forest products would return 8.4 million dollars to the U.S. Treasury, 2.0 million dollars would be returned to local governments. Employment would decrease by 473 jobs and income would decrease by 13.3 million dollars from existing levels.

ALTERNATIVE F
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec Visitor Days	6,443,000
Annual dispersed recreation capacity		
- Roaded	Rec Visitor Days	19,588,000
- Unroaded		988,000
- Wilderness		1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1, WS-3)	Acres	473,147
<u>Wild and Scenic Rivers</u>		
Wild	Miles	86.5
Scenic	Miles	100.0
Recreational	Miles	51.5
<u>Water Quality and Quantity</u>		
Water yield increase	Acre Feet	8,700
Sediment increase index	Tons/Year	51,500
<u>Old-growth</u>	Acres	309,000
<u>Wildlife and Fish</u>		
Wildlife habitat management (EW-1)	Acres	148,189
Anadromous fish commercial harvest	Pounds	63,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	843,281
- Retention	Acres	761,850
- Partial Retention	Acres	265,872
- Modification	Acres	160,125
- Maximum Modification	Acres	133,052
<u>Timber</u>		
Allowable sale quantity	Million Cubic Feet	13.6
Allowable sale quantity	Million Board Feet	76.0
Long-term sustained yield	Million Cubic Feet	19.2
Area of suitable timber land	Acres	421,265
<u>Range</u>		
Grazing capacity	Animal Unit Months	38,500
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	812,668
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,897
Annual cost to the Federal Government	Million Dollars	22.2
Annual revenues to the Federal Government	Million Dollars	8.4
Annual returns to Local Governments	Million Dollars	2.0
Change in employment	Number of Jobs	-473
Change in income	Million Dollars	-13.3



ALTERNATIVE G

This alternative is an attempt to balance the land allocations between amenity values and commodity production emphasis. Of the currently roadless areas outside of existing wilderness and the Alpine Lakes Management Area which are suitable for timber production, approximately half was allocated to roadless management with a heavy emphasis toward motorized recreation and the remainder was allocated to commodity production.

The Forest was assisted in the development of portions of this alternative by representatives of off-road vehicle users groups from throughout the State.

The major changes in this alternative from the DEIS, and the Supplement to the DEIS, include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS, and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.
- Revision of the mature habitat network for marten, and three-toed and pileated woodpeckers, by changing sizes, locations, and management direction.

RECREATION SETTING

--Developed Recreation

The emphasis will be on bringing selected sites up to full service standards. Only those sites which have a history of heavy use, or where it is possible to convert all sites in a single drainage to full service sites, will be considered. Other popular sites will be maintained with very little improvement to existing facilities. Some expansion of existing full service sites will occur.

Because of the popularity of areas such as the Lake Creek-Devil's Backbone, North Fork of the Entiat, Devil's Gulch, Manastash Ridge, and Naches Basin for motorized trail use activity, some additional development of trailheads with camping facilities for motorized users will be needed to accommodate this use. These would be developed in cooperation with the State Inter-agency Committee but would be available for all users.

There will be some opportunity to improve and/or establish overlooks and scenic vistas in new roaded areas.

Ski areas that have current master plans and are considering expansion are: Mission Ridge, White Pass, and Stevens Pass.

--Dispersed Recreation

By the second decade, 18% of the Forest will provide unroaded recreation opportunities outside wilderness. This includes 5,724 acres Primitive, 100,128 acres Semi-Primitive Non-Motorized, and 277,762 acres Semi-Primitive Motorized Recreation Opportunity Spectrums (ROS).

In addition, there will be 43 percent of the Forest providing roaded recreation or 931,752 acres of the Roaded Natural and Roaded Modified Recreation Opportunity Spectrums combined.

Twenty-one of the 23 inventoried roadless areas will have all or a portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS 1/	ACRES TO BE ROADED
Myrtle Lake	10,918	10,918	0
Rock Creek	32,924	30,401	2,523
Twin Lakes	22,048	14,480	7,568
Canyon Creek	9,158	4,494	4,664
Heather Lake	11,067	2,502	8,565
Chelan	71,063	58,555	12,508
Entiat	71,254	67,098	4,156
Stormy	32,500	28,938	3,562
Slide Ridge	10,091	0	10,091
Devil's Gulch	25,186	19,737	5,449
Taneum	25,122	8,649	16,473
Manastash	8,798	4,748	4,050
Norse Peak Adj.	11,300	3,986	7,314
Quartz	8,756	8,438	318
Naneum	6,911	0	6,911
Lion Rock	4,834	4,558	276
William O. Douglas Adj.	22,938	1,378	21,560
Blue Slide	18,571	14,883	3,688
Goat Rocks Adj.	7,357	2,247	5,110
Nason Ridge	19,123	12,063	7,060
Alpine Lakes Adj.	44,393	28,513	15,880
Thorp Mountain	15,667	4,388	11,279
Teanaway	66,293	52,640	13,653

1/ The acres shown remaining do not include 4,388 acres of dedicated old growth that fall within roadless allocations

ALTERNATIVE G

The miles of trail available to motorized use by land allocation or due to administrative closures are:

Allocation	Miles Open to Motorized Use	Miles Closed to Motorized Use
Wilderness	--	1188.0
Unroaded Non-motorized	--	68.5
Unroaded Motorized	417.9	--
Roaded Motorized	788.4	--
Administratively Closed	--	352.8

Administratively closed trails are those trails in open allocations but closed for other environmental considerations

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

<u>Scenic</u>	<u>Dispersed Recreation</u>
Turnwater	Teanaway Nason Ridge Annette Lake

WILD, SCENIC, AND RECREATIONAL RIVERS

The White, Chiwawa and Wenatchee Rivers are recommended for designation under the Wild and Scenic Rivers Act. The proposed classifications are as follows:

River	Recommended Classification	Miles	Segment
White	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
	Scenic	7.0	Glacier Peak Wilderness boundary to above Tall Timbers Ranch
	Recreational	12.0	Above Tall Timbers Ranch to Lake Wenatchee.
Chiwawa	Wild	5.0	Headwaters to Glacier Peak Wilderness boundary.
	Recreational	24.0	Glacier Peak Wilderness boundary to Goose Creek.
	Recreational	6.0	Goose Creek to confluence with Wenatchee River
Wenatchee	Recreational	21.0	Lake Wenatchee to Tumwater Campground.
	Recreational	7.0	Tumwater Campground to Forest boundary.

The characteristics contributing to their eligibility will be protected until Congress formally determines the status of these rivers. Other eligible rivers on the Forest will not be recommended for inclusion in the Wild and Scenic Rivers System, but the corridors will be managed for Scenic Travel, with a visual quality objective of Retention. See Appendix E for a complete description of the Wild and Scenic Rivers analysis process

SCENERY

Visual quality would be maintained at a high level. All major interstate scenic highway viewsheds would retain a natural or slightly altered appearance. Visual quality in the Alpine Lakes Management Area would remain high.

All identified viewsheds and wilderness portals would retain a natural appearance.

Mad River, Table Mountain, Reecer Creek, and Chumstick Plain viewsheds would have high visual quality.

Cooper Mountain to South Navarre and the Little Rattlesnake viewsheds would have a reduced visual quality.

The majority of the landscape, including unroaded motorized areas, would be natural appearing. The remaining landscape viewed from Forest roads would have an altered appearance.

Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

CULTURAL RESOURCE

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

Approximately 63 percent of the known cultural resources would be within management area designations having potential for a moderate to low level of impact. The visual settings around significant sites would likely be unaltered. There might be occasional conflicts with motorized trail use, requiring some level of mitigation.

The number of acres inventoried for cultural resources would be moderate (approximately 584,000 acres over the planning period would be examined in support of the timber program). There would be reasonable access to sites managed for interpretive purposes.

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Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious uses of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information, and education on wilderness ethics and minimum impact camping techniques.

Approximately 56 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

This alternative maintains moderate levels of habitat for mature and old growth species.

Deer and elk populations are increased in both summer and winter habitat.

This alternative provides a moderate level of primary cavity excavator habitat.

Riparian habitat is increased.

This alternative provides a moderate level of recreation use of wildlife.

State wildlife objectives will be met for elk winter habitat, deer, mountain goats, grouse, and spotted owls.

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and Research Natural Areas, and 187,000 acres of suitable spotted owl habitat in lands that are unsuitable for timber management or in allocations that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area

(SOHA) network, there were 16,918 acres originally allocated to full timber yield prescriptions, 42,464 acres originally allocated to reduced timber yields, and 29,871 acres originally allocated to prescriptions with no timber yields.

FISHERIES

This alternative should result in an increase in both anadromous and resident fish habitat capability through the life of the plan. Numbers of catchable trout, by the second decade, are estimated to increase from a current level of 200,000 to 210,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase from 1.348 million to 1.368 million and from 172,000 to 174,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is estimated to remain constant at current levels through the life of the plan.

It is anticipated that increases in habitat capability will result from Riparian Habitat Management Standards, the Fish Habitat Management Program and implementation of Best Management Practices, which will maintain current habitat capability and should allow fairly natural stream processes to function, resulting in improving trends in habitat capability. Further increases are expected due to implementation of a habitat improvement program. It is estimated that approximately \$17,000 of the annual habitat improvement program will be funded through appropriated monies and \$245,000 through Knutson-Vandenburg funds. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage off Forest. This alternative, however, is anticipated to improve habitat from current levels and thus is consistent with objectives to improve anadromous fish runs in the drainage. Resident trout habitat capability will also improve, providing opportunities for expected increased demand for sport fishing.

RANGE

Permitted livestock grazing would increase in all decades through the fourth decade and would only increase slightly in the fifth decade. Permitted use is expected to average 23,000 AUM's in the first decade, 25,500 AUM's in the second decade, and 33,500 AUM's in the fifth. Demand for cattle grazing would exceed supply by the end of the second decade, but demand for sheep grazing could be met in all decades. Actual permitted use would not exceed total production potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 77,063 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 17,829 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 75,391 acres of old growth. By the fifth decade there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce an Allowable Sale Quantity of 17.5 million (MM) cubic feet (98.0 MM board feet) and a Timber Sale Programmed Quantity of 18.7 MMBF (105.1 MMBF) per year for the first five decades. The long-term sustained yield for this alternative is 23.4 MM cubic feet based on 503,326 acres of suitable timber lands. This compares to the past decade average annual volume sold of 187.5 MMBF and average volume harvested of 166.0 MMBF.

Approximately 32% of the general forest area will receive intensive management including tree spacing (thinning).

An average of 1,124 acres per year will be clearcut, 3,139 acres will be shelterwood cut, and 2,131 acres will be selective cut.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. Timber harvest activity in this alternative would result in annual water yield increases for the first, second and fifth decades of 11,200, 15,500 and 18,600 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-full service.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades, the activity-related delivered sediment will be approximately 60,900 tons per year. By the end of the third decade, most of the roads will have been built so the Forest should have a good transportation network in place. Because of this, it is anticipated that the amount of delivered sediment will be reduced by 44 percent. Therefore, management activity created soil loss in the fifth decade will be approximately 34,100 tons per year.

MINERALS

The area withdrawn as Wilderness (841,034 acres or 39 percent of the Forest) will not change in any of the alternatives, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 2,247 additional acres from mineral entry, which is less than 1 percent of the

ALTERNATIVE G

total Forest acres. In addition to the withdrawals, highly sensitive management prescriptions which could discourage mineral related activities would be used to manage 536,513 acres or 25 percent of the total Forest acres.

The following figure shows how this management strategy would affect areas identified as having potential for the occurrence of locatable and leasable mineral resources.

	WITHDRAWAL	OPEN BUT WITH HIGHLY SENSITIVE MANAGEMENT STRATEGIES	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 acres or less than 1%	26,903 acres or 22.5%	32,840 acres or 27.5%
Area classified prospectively valuable for oil and gas	530 acres or less than 1%	48,082 acres or 23%	157,242 acres or 74%
Area classified prospectively valuable for geothermal resources	0 acres or 0%	62,074 acres or 10%	114,269 acres or 19%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	172,294 acres or 32%	252,493 acres or 47%

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

The estimated activity level for small hydroelectric projects is 20 to 25 proposals with 3 proposals advancing to the application for license stage.

ROADS

The implementation of Alternative G would require the construction of approximately 1,160 miles of additional road. Some 458 miles of this construction is expected to take place in areas that are currently unroaded. It is assumed that the majority of this construction will occur in the next 20 years. In addition to the roads currently open, it is expected that 30 percent of the new roads would be opened to public use by high clearance vehicles.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

Fire hazard would increase due to a decrease of timber harvest in roadless areas. Prescribed burning would be used to maintain or enhance amenity values and to reduce the hazard in timber harvest areas. An appropriate suppression response would be made on all wildfires. Unplanned natural ignitions occurring in wilderness would be treated as prescribed fire until declared a wildfire. Human caused fires occurring in wilderness would require an appropriate suppression response.

SOCIAL/ECONOMIC

Present net value of this alternative would be 1,889 million dollars. An annual budget of 25.7 million dollars would be required for implementation. Revenues from Forest products would return 10.4 million dollars to the U.S. Treasury, 2.5 million dollars would be returned to local governments. Employment would decrease by 225 jobs and income would decrease by 6.54 million dollars from existing levels.

ALTERNATIVE G
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec. Visitor Days	6,623,000
Annual dispersed recreation capacity		
- Roaded	Rec. Visitor Days	20,999,000
- Unroaded		1,171,000
- Wilderness		1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1, WS-3)	Acres	397,483
<u>Wild and Scenic Rivers</u>		
Wild	Miles	20.0
Scenic	Miles	7 0
Recreational	Miles	70 0
<u>Water Quality and Quantity</u>		
Water yield increase	Acre feet	11,200
Sediment increase index	Tons/Year	60,900
<u>Old-growth</u>	Acres	299,600
<u>Wildlife and Fish</u>		
Wildlife habitat management (EW-1)	Acres	146,493
Anadromous fish commercial harvest	Pounds	328,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	843,281
- Retention	Acres	643,215
- Partial Retention	Acres	364,813
- Modification	Acres	158,895
- Maximum Modification	Acres	153,976
<u>Timber</u>		
Allowable sale quantity	Million Cubic feet	17 5
Allowable sale quantity	Million Board feet	98 0
Long-term sustained yield	Million Cubic feet	23.4
Area of suitable timber land	Acres	503,326
<u>Range</u>		
Grazing capacity	Animal Unit Months	38,800
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	850,286
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,889
Annual cost to the Federal Government	Million Dollars	25 7
Annual revenues to the Federal Government	Million Dollars	10.4
Annual returns to Local Governments	Million Dollars	2.5
Change in employment	Number of Jobs	-225
Change in income	Million Dollars	-6 54

ALTERNATIVE H



ALTERNATIVE H

This alternative was developed to portray the maximum timber producing capability of the Forest under the present land allocations of existing management direction. This alternative has the same land allocations as Alternative A/NFMA. The major difference between this alternative and Alternative A/NFMA is that more intensive timber management would be practiced on the General Forest land allocation which would result in higher yields and higher annual sale quantities with a corresponding decrease in present net value.

The major changes in this alternative from the DEIS, and the Supplement to the DEIS, include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS, and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.
- Revision of the mature habitat network for marten, and three-toed and pileated woodpeckers, by changing sizes, locations, and management direction.
- Changes in classification on some of the recommended Wild and Scenic Rivers and deletion of some eligible segments with private land issues.

RECREATION SETTING

--Developed Recreation

The emphasis will be on bringing selected sites up to full service standards. Only those sites which have a history of heavy use, or where it is possible to convert all sites in a single drainage to full service sites, will be considered. Other popular sites will be maintained with very little improvement to existing facilities. Some expansion of existing full service sites will occur.

There will be some opportunity to improve and/or establish overlooks and scenic vistas in new roaded areas.

Ski areas that have current master plans and are considering expansion are: Mission Ridge, White Pass, and Stevens Pass.

--Dispersed Recreation

By the second decade, 12% of the Forest will provide unroaded recreation opportunities which include 7,497 acres primitive, 58,032 acres Semi-Primitive Non-Motorized, and 183,825 acres Semi-Primitive Motorized Recreation Opportunity Spectrums (ROS).

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In addition, there will be 49 percent of the Forest providing roaded recreation, or 1,066,012 acres of the Roaded Natural and Roaded Modified Recreation Opportunity Spectrums combined.

Fifteen of the 23 inventoried roadless areas will have a portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS 1/	ACRES TO BE ROADED
Myrtle Lake	10,918	10,918	0
Rock Creek	32,924	17,935	14,989
Twin Lakes	22,048	13,717	8,331
Canyon Creek	9,158	0	9,158
Heather Lake	11,067	1,526	9,541
Chelan	71,063	59,806	11,257
Entiat	71,254	19,144	52,110
Stormy	32,500	0	32,500
Slide Ridge	10,091	0	10,091
Devil's Gulch	25,186	9,222	15,964
Taneum	25,122	6,296	18,826
Manastash	8,798	4,070	4,728
Norse Peak Adj.	11,300	2,650	8,650
Quartz	8,756	64	8,692
Naneum	6,911	21	6,890
Lion Rock	4,834	0	4,834
William O. Douglas Adj	22,938	784	22,154
Blue Slide	18,571	0	18,571
Goat Rocks Adj.	7,357	5,597	1,760
Nason Ridge	19,123	12,063	7,060
Alpine Lakes Adj.	44,393	28,513	15,880
Thorp Mountain	15,667	4,388	11,279
Teanaway	66,293	52,640	13,653

1/ The acres shown remaining roadless do not include 4,388 acres of dedicated old growth which fall within roadless allocations

The miles of trail available to motorized use by land allocation or due to administrative closures are:

Allocation	Miles Open to Motorized Use	Miles Closed to Motorized Use
Wilderness	--	1188.0
Unroaded Non-motorized	--	94.4
Unroaded Motorized	235.7	--
Roaded Motorized	944.7	--
Administratively Closed	--	367.4

Administratively closed trails are those trails in open allocations but closed for other environmental considerations.

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

<u>Scenic</u>	<u>Dispersed Recreation</u>
Tumwater	Teanaway Nason Ridge Annette Lake

WILD, SCENIC, AND RECREATIONAL RIVERS

The American, Entiat and Waptus Rivers, and certain segments of the Cle Elum, Icicle, White, Napeequa, Chiwawa and Wenatchee Rivers are recommended for designation under the Wild and Scenic Rivers Act. The only eligible river not recommended for inclusion in the National System is the Little Wenatchee. However, the corridor here will be managed for a visual quality objective of retention, and fisheries habitat will be protected through special riparian prescriptions. For a more complete discussion of this topic, refer to Appendix E of the FEIS. The classification by segment is described in the following table:

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River	Recommended Classification	Miles	Segment
American	Wild	6.0	Headwaters to confluence with Rainier Fork.
	Scenic	16.0	Confluence with Rainier Fork to confluence with Bumping River (in Mather Memorial Parkway corridor).
Chiwawa	Wild	5.0	Headwaters to Glacier Peak Wilderness boundary.
	Recreational	24.0	Glacier Peak Wilderness boundary to Goose Creek.
Cle Elum	Wild	4.0	Headwaters to Alpine Lakes Wilderness boundary
	Scenic	2.0	Alpine Lakes Wilderness boundary to above Lake Tucquala.
Entiat	Wild	12.5	Headwaters to Glacier Peak Wilderness boundary.
	Scenic	4.0	Glacier Peak Wilderness boundary to Cottonwood Trailhead
	Recreational	15.0	Cottonwood Trailhead to above Burns Creek.
Icicle	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary.
Napeequa	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
Waptus	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary
	Wild	1.0	Alpine Lakes Wilderness boundary to confluence with Cle Elum River.
Wenatchee	Recreational	7.0	Tumwater Campground to Forest boundary
White	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
	Scenic	7.0	Glacier Peak Wilderness boundary to above Tall Timbers Ranch.

The characteristics contributing to the eligibility will be protected until such time as action on these rivers is taken by Congress.

SCENERY

Visual quality would be maintained at a high level. All major interstate scenic highway viewsheds would retain a natural or slightly altered appearance. Visual quality in the Alpine Lakes Management Unit would remain high.

All major wilderness portals would retain a near natural appearance.

The landscape would have a natural to slightly altered appearance near major recreation areas and viewsheds. However, increased timber harvest and intensive management would result in an altered appearance in some areas. Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

CULTURAL RESOURCE

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

Under this alternative, a majority of the known cultural resources (76 percent) would be within management area designations that may create a potentially moderate to high level of impact. These would require mitigation. Visual settings around some significant sites might experience modification apparent to the viewer. At the same time, opportunities would be good to enhance several significant historic sites through treatment of the adjacent vegetation in conjunction with the Forest timber management program.

There would be a high number of acres inventoried for cultural resources (approximately 604,000 acres over the planning period). Accessibility to cultural sites managed for interpretation would be very good.

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the

freedom to continue traditional religious uses of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information, and education on wilderness ethics and minimum impact camping techniques.

Approximately 58 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

This alternative maintains a low level of habitat for mature and old growth species.

Deer and elk populations are decreased a small amount in both summer and winter habitat.

This alternative provides a moderate level of primary cavity excavator habitat.

Riparian habitat is increased.

This alternative provides for moderate levels of recreation use of wildlife.

State wildlife objectives will be met for mountain goats, grouse, and spotted owls.

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and Research Natural Areas, and 151,100 acres of suitable spotted owl habitat in lands that are unsuitable for timber management or in allocations that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area (SOHA) network, there were 16,430 acres originally allocated to full timber yield prescriptions and 41,955 acres originally allocated to reduced timber yields.

FISHERIES

This alternative should result in an increase in both anadromous and resident fish habitat capability through the life of the plan. Numbers of catchable trout, by the second decade, are estimated to increase from a current level of 200,000 to 210,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase from 1.348 million to 1.368 million and from 172,000 to 173,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is estimated to remain constant at current levels through the life of the plan.

It is anticipated that increase in habitat capability will result from Riparian Habitat Management Standards, the Fish Habitat Management Program and implementation of Best Management Practices, which will maintain current habitat capability and should allow fairly natural stream processes to function, resulting in improving trends in habitat capability. Further increases are expected due to implementation of a habitat improvement program. It is estimated approximately \$7,000 of the annual habitat improvement program will be funded through appropriated monies and \$245,000 through Knutson-Vandenburg funds. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage off Forest. This alternative, however, is anticipated to improve habitat from current levels and thus is consistent with objectives to improve anadromous fish runs in the drainage. Resident trout habitat capability will also improve, providing opportunities for expected increased demand for sport fishing.

RANGE

Permitted livestock grazing would increase in all decades through the fifth decade. Permitted use is expected to average 23,000 AUM's in the first decade, 25,500 AUM's in the second decade, and 36,000 AUM's in the fifth decade. Demand for cattle grazing would exceed supplies by the third

decade, but demand for sheep grazing would be met in all decades. Actual permitted use would not exceed the total production potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 55,863 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 22,854 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 91,567 acres of old growth. By the fifth decade there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce an Allowable Sale Quantity of 27.5 million (MM) cubic feet (146.7 MM board feet) and a Timber Sale Programmed Quantity of 28.9 MMCF (157.5 MMBF) per year for the first five decades. The long-term sustained yield for this alternative is 29.0 MM cubic feet based on 603,620 acres of suitable timber lands. This compares to the past decade average annual volume sold of 187.5 MMBF and average volume harvested of 166.0 MMBF.

Almost all general forest acres would be intensively managed including tree spacing (thinning) under this alternative. More shelterwood harvest is proposed under this alternative than under any other evaluated.

An average of 1,521 acres per year will be clearcut, 4,656 acres will be shelterwood cut, and 3,089 acres will be selective cut.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. Timber harvest activity in this alternative would result in annual water yield increases for the first, second and fifth decades of 19,100, 27,300 and 28,900 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades, the activity related delivered sediment will be approximately 89,400 tons per year. By the end of the third decade, most of the roads will have been built so the Forest should have a good transportation network in place. Because of this, it is anticipated that the amount of delivered sediment will be reduced by 44 percent. Therefore, management activity created soil loss in the fifth decade will be approximately 50,100 tons per year.

MINERALS

The area withdrawn as Wilderness (841,034 acres) will not change in any of the alternatives, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 1,717 additional acres from mineral entry, which is less than 1 percent of the total Forest acres. In addition to the withdrawals, highly sensitive management prescriptions which could discourage mineral related activities would be used to manage 417,325 acres or 19 percent of the total Forest acres. The following figure shows how this management strategy would affect areas, identified as having potential for the occurrence of locatable and leasable mineral resources.

	WITHDRAWAL	OPEN BUT WITH HIGHLY SENSITIVE MANAGEMENT STRATEGIES	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 acres or less than 1%	23,914 acres or 20%	35,827 acres or 30%
Area classified prospectively valuable for oil and gas	0 acres or 0%	32,246 acres or 15%	173,608 acres or 82%
Area classified prospectively valuable for geothermal resources	0 acres or 0%	56,774 acres or 9%	119,569 acres or 20%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	138,904 acres or 26%	285,884 acres or 53%

ALTERNATIVE H

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

Small hydroelectric proposal activity is estimated at 25 or more proposals, with 3 proceeding to the license application stage.

ROADS

The implementation of Alternative H would require the construction of approximately 1,550 miles of additional road. Some 652 miles of this construction is expected to take place in areas that are currently unroaded. It is assumed that the majority of this construction will occur in the next 16 years. In addition to the roads currently open, it is expected that 50% of the new roads would be opened to public use by high clearance vehicles.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

An appropriate suppression response would be made on all wildfires. Unplanned natural ignitions occurring in wilderness would be treated as prescribed fire until declared a wildfire. Human caused fires occurring in wilderness would require an appropriate suppression response. Fire hazard will decrease because of increased timber harvest and hazard reduction activities. Fire prevention efforts would be directed toward timber harvest activities.

SOCIAL/ECONOMIC

Present net value of this alternative would be 1,864 million dollars. An annual budget of 28.9 million dollars would be required for implementation. Revenues from Forest products would return 12.9 million dollars to the U.S. Treasury; 3.1 million dollars would be returned to local governments. Employment would increase by 324 jobs and income would increase by 8.43 million dollars from existing levels.

ALTERNATIVE H
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec. Visitor Days	4,883,000
Annual dispersed recreation capacity		
- Roaded	Rec. Visitor Days	22,688,000
- Unroaded		1,021,000
- Wilderness		1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1, WS-3)	Acres	263,158
<u>Wild, Scenic and Rivers</u>		
-Wild	Miles	82.5
-Scenic	Miles	29.0
-Recreational	Miles	46.0
<u>Water Quality and Quantity</u>		
Water yield increase	Acre feet	19,100
Sediment increase index	Tons/Year	89,400
<u>Old-growth</u>	Acres	306,700
<u>Wildlife and Fish</u>		
Wildlife habitat management (EW-1)	Acres	17,151
Anadromous fish commercial harvest	Pounds	328,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	842,751
- Retention	Acres	486,691
- Partial Retention	Acres	457,501
- Modification	Acres	55,629
- Maximum Modification	Acres	321,608
<u>Timber</u>		
Allowable sale quantity	Million Cubic feet	27.5
Allowable sale quantity	Million Board feet	146.7
Long-term sustained yield	Million Cubic feet	29.0
Area of suitable timber land	Acres	603,620
<u>Range</u>		
Grazing capacity	Animal Unit Months	36,800
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	893,642
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,864
Annual cost to the Federal Government	Million Dollars	28.9
Annual revenues to the Federal Government	Million Dollars	12.9
Annual returns to Local Governments	Million Dollars	3.1
Change in employment	Number of Jobs	+324
Change in income	Million Dollars	+8.43

ALTERNATIVE I



ALTERNATIVE I

Alternative I is a departure from the base sale schedule established under Alternative C, the preferred alternative. It has the same land allocation as Alternative C. The timber harvest schedule for Alternative C is based upon nondeclining flow, never exceeding long-term sustained yield. Alternative I has the same long-term sustained yield capacity as Alternative C but deviates from nondeclining flow. The level of timber harvest in the first decade approximates the average annual sell volume for fiscal years 1975 through 1984 under the current Timber Management Plan. The level of timber harvest gradually declines in the second and third decades, equaling that of Alternative C in the fourth decade. This would allow local industry to phase into a lower level of timber harvest more gradually than in Alternative C. The effects on other resources could be greater in the early decades due to the accelerated rate of timber harvest under the departure.

The major changes in this alternative from the DEIS, and the Supplement to the DEIS, include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS, and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.
- Revision of the mature habitat network for marten, and three-toed and pileated woodpeckers, by changing sizes, locations, and management direction.
- Increase inventoried roadless areage from 267,610 acres to 298,115 acres.
- Reduction in acres allocated to unroaded motorized use.
- Development and application of the Mather Memorial Parkway prescription (MP-1) which allows only unscheduled timber harvest within the Parkway corridor.
- An addition of two other allocations, EW-3 (Key Big Game Habitat, Unroaded) and RE-4 (Dispersed Recreation, Unroaded, Timber Harvest).
- Changes in the classification on some of the recommended Wild and Scenic Rivers.

RECREATION SETTING**--Developed Recreation**

This alternative places emphasis on upgrading and expanding heavily used popular campgrounds and renovating or rehabilitating facilities at other developed recreation sites. Highly popular reduced service campgrounds in developed high use areas, will be upgraded to full service sites. Campgrounds in more semi-primitive areas will remain as lesser developed sites. Facility repair in more remote semi-primitive settings will focus on sanitation, public safety and unserviceable facilities.

There will be some opportunity to improve and/or establish overlooks and scenic vistas.

Some small developed non-feet sites will still exist but as the facilities deteriorate beyond repair, the sites will be converted to dispersed occupancy spots.

Ski areas that have current master plans and are considering expansion are: Mission Ridge, White Pass, and Stevens Pass.

--Dispersed Recreation

By the second decade, 14% of the Forest will provide unroaded recreation opportunities outside wilderness. This includes 7,157 acres Primitive, 115,422 acres Semi-Primitive Non-Motorized, and 175,536 acres Semi-Primitive Motorized Recreation Opportunity Spectrums (ROS).

In addition, there will be 47 percent of the Forest providing roaded recreation or 1,017,251 acres of the roaded natural and roaded modified Recreation Opportunity Spectrums combined.

Twenty-two of the 23 inventoried roadless areas will have a substantial portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS 1/	ACRES TO BE ROADED
Myrtle Lake	10,918	10,918	0
Rock Creek	32,924	22,812	10,112
Twin Lakes	22,048	14,331	7,717
Canyon Creek	9,158	4,197	4,961
Heather Lake	11,067	2,714	8,353
Chelan	71,063	63,664	7,399
Entiat	71,254	35,998	35,256
Stormy	32,500	9,710	22,790
Slide Ridge	10,091	2,502	7,589
Devil's Gulch	25,186	8,586	16,600
Taneum	25,122	7,038	18,084
Manastash	8,798	6,106	2,692
Norse Peak Adj.	11,300	1,357	9,943
Quartz	8,756	1,145	7,611
Naneum	6,911	1,335	5,576
Lion Rock	4,834	3,582	1,252
William O. Douglas Adj.	22,938	191	22,747
Blue Slide	18,571	3,032	15,539
Goat Rocks Adj.	7,357	1,293	6,064
Nason Ridge	19,123	12,063	7,060
Alpine Lakes Adj.	44,393	28,513	15,880
Thorp Mountain	15,667	4,388	11,279
Teanaway	66,293	52,640	13,653

1/ The acres shown remaining roadless do not include 6,232 acres of dedicated old growth that fall within roadless allocations

ALTERNATIVE I

The miles of trail available to motorized use by land allocation or due to administrative closures are:

Allocation	Miles Open to Motorized Use	Miles Closed to Motorized Use
Wilderness	--	1188.0
Unroaded Non-motorized	--	139.7
Unroaded Motorized	245.1	--
Roaded Motorized	944.7	--
Administratively Closed	--	379.4

Administratively closed trails are those trails in open allocations but closed for other environmental considerations.

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

<u>Scenic</u>	<u>Dispersed Recreation</u>	<u>Old Growth</u>
Tumwater	Teaway Nason Ridge Annette Lake	Hornet Ridge Rattlesnake Springs Heather Lake Trailhead Fish Creek (Lake Wenatchee) The Sanctuary
<u>Ecological</u>	<u>Botanical</u>	<u>Geological</u>
Squaw Lake area Fish Lake Run Twin Lake Ponds Upper Naneum Meadow	Tumwater Ponderosa Estates Goose Egg Blue Slide	Boulder Cave Kloochman Rock Goose Egg Blue Slide

WILD, SCENIC, AND RECREATIONAL RIVERS

The American, Cle Elum, Waptus, Icicle, Napeequa, White, Chiwawa, Wenatchee, and Entiat Rivers are recommended for Wild and Scenic River designation. The proposed classifications are shown in the table below. The only eligible river not recommended for inclusion in the National System is the Little Wenatchee. However, the corridor here will be managed for a visual quality objective of retention, and fisheries habitat will be protected through special riparian prescriptions. For a more complete discussion of this topic, refer to Appendix E of the FEIS.

River	Recommended Classification	Miles	Segment
American	Wild	6.0	Headwaters to confluence with Rainier Fork.
	Scenic	16.0	Confluence with Rainier Fork to confluence with Bumping River (in Mather Memorial Parkway corridor).
Chiwawa	Wild	5.0	Headwaters to Glacier Peak Wilderness boundary.
	Recreational	24.0	Glacier Peak Wilderness boundary to Goose Creek.
	Recreational	6.0	Goose Creek to confluence with Wenatchee River.
Cle Elum	Wild	4.0	Headwaters to Alpine Lakes Wilderness boundary.
	Scenic	2.0	Alpine Lakes Wilderness boundary to above Lake Tucquala.
	Recreational	14.0	Above Lake Tucquala to Salmon La Sac bridge.
	Recreational	4.5	Salmon La Sac bridge to Lake Cle Elum.
Entiat	Wild	12.5	Headwaters to Glacier Peak Wilderness boundary
	Scenic	4.0	Glacier Peak Wilderness boundary to Cottonwood Trailhead
	Recreational	15.0	Cottonwood Trailhead to above Burns Creek
Icicle	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary
	Recreational	14.0	Alpine Lakes Wilderness boundary to above Leavenworth city water intake.
Napeequa	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
	Recreational	1.0	Glacier Peak Wilderness boundary to confluence with White River.
Waptus	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary.
	Wild	1.0	Alpine Lakes Wilderness boundary to confluence with Cle Elum River
Wenatchee	Recreational	21.0	Lake Wenatchee to Tumwater Campground.
	Recreational	7.0	Tumwater Campground to Forest boundary.
White	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary
	Scenic	7.0	Glacier Peak Wilderness boundary to above Tall Timbers Ranch.
	Recreational	12.0	Above Tall Timbers Ranch to Lake Wenatchee.

The characteristics that contribute to the eligibility of these rivers will be protected until Congress formally determines their status.

ALTERNATIVE I

SCENERY

Visual quality would be maintained at a high level. All major interstate scenic highway viewsheds and the Alpine Lakes Management Unit will retain their natural appearance.

Most wilderness portals would retain a natural appearance.

Unnatural landscape patterns would dominate the Cooper Mountain to South Navarre, Little Naches, Cash Prairie, Little Rattlesnake, and North and South Fork Tieton viewsheds.

The balance of the landscape viewed from Forest roads would have an altered appearance.

Refer to Tables IV-5 and IV-6 in Chapter IV for specifics about future visual conditions of identified viewsheds and lakes.

Old growth preservation for aesthetic reasons are included in Old Growth (OG-1) and Special Interest (SI-2) prescriptions.

CULTURAL RESOURCE

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

A majority of the known cultural resources (77 percent) would be within management area designations that may create a potentially moderate to high level of impact. These would require mitigation. Visual settings around some significant sites might be difficult to manage in a natural appearing condition, particularly over the first four decades of the planning period. Opportunities would be good to enhance several significant historic sites through treatment of the adjacent vegetation in conjunction with the Forest timber management program.

There would be a moderate number of acres inventoried for cultural resources (approximately 577,000 acres over the planning period). Accessibility to cultural sites managed for interpretation would be very good.

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious uses of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information, and education on wilderness ethics and minimum impact camping techniques.

Approximately 58 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

This alternative maintains moderate levels of habitat for mature and old growth species.

Deer and elk populations are decreased in summer habitat and increased in winter habitat.

Primary cavity excavator habitat is maintained near the middle level of the alternatives.

Riparian habitat is increased.

This alternative is on the lower end of the range of alternatives for providing recreation use of wildlife.

State wildlife objectives will be met for deer, mountain goats, grouse, and spotted owls.

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and Research Natural Areas, and 165,100 acres of

suitable spotted owl habitat in lands that are unsuitable for timber management or in allocations that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area (SOHA) network, there were 29,511 acres originally allocated to full timber yield prescriptions and 37,991 acres originally allocated to reduced timber yields.

FISHERIES

This alternative should result in an increase in both anadromous and resident fish habitat capability through the life of the plan. Numbers of catchable trout, by the second decade, are estimated to increase from a current level of 200,000 to 216,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase from 1.348 million to 1.388 million and 172,000 to 177,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is estimated to remain constant at current levels through the life of the plan.

It is anticipated that increases in habitat capability will result from Riparian Habitat Management Standards, the Fish Habitat Management Program and implementation of Best Management Practices, which will maintain current habitat capability and should allow fairly natural capability. Further increases are expected due to implementation of a habitat improvement program. It is estimated that approximately \$85,000 of the annual habitat improvement program will be funded through appropriated monies and \$367,000 through Knutson-Vandenburg funds. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage off Forest. This alternative, however, is anticipated to improve habitat from current levels and thus is consistent with objective to improve anadromous fish runs in the drainage. Resident trout habitat capability will also improve, providing opportunities for expected increased demand for sport fishing.

RANGE

Permitted livestock grazing would increase in all decades through the fifth decade. Permitted use is expected to average 23,000 AUM's in the first decade, 24,000 AUM's in the second decade, and 24,000 AUM's in the fifth decade. Demand for cattle grazing would exceed supplies by the third decade, but demand for sheep grazing would be met in all decades. Actual permitted use would not exceed the total production potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 64,343 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 20,161 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 85,779 acres of old growth. By the fifth decade there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative is a departure from the base sale schedule established under Alternative C, the preferred alternative.

Alternative I has approximately the same long-term sustained yield capacity as Alternative C. However, unlike Alternative C, the allowable sale quantity in the first decade for Alternative I approximates the amount programmed for fiscal year 1989 (27.7 MM cubic feet or 154.6 MM board feet). The second decade timber harvest drops to 23.2 MM cubic feet. The Timber Sale Programmed Quantity for the first decade is 29.6 MMCF (166.0 MMBF). This compares to the

ALTERNATIVE I

past decade average annual volume sold of 187.5 MMBF and average volume harvested of 166.0 MMBF. The advantage of this alternative is that timber industry would have a 10 year period to adjust to lower sell levels. The disadvantage is that the sell level for decades 2 through 14 is less than that for Alternative C.

The long-term sustained yield for this alternative is 27.1 MM cubic feet based on 576,074 acres of suitable timber lands.

A wide range of timber intensities was selected, ranging from GF-1 (high level of timber investment) to GF-6 in General Forest Management Areas. Approximately 35% of the general forest area will receive intensive management including tree spacing (thinning).

An average of 5,603 acres per year will be clearcut, 223 acres will be shelterwood cut, and 2,913 acres will be selective cut.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. Timber harvest activity in this alternative would result in annual water yield increases for the first, second and fifth decades of 17,300, 22,200 and 22,900 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades, the activity related delivered sediment will be approximately 71,400 tons per year. By the end of the third decade, most of the roads will have been built so the Forest should have a good transportation network in place. Because of this, it is anticipated that the amount of delivered sediment will be reduced by 44 percent. Therefore, management activity created soil loss in the fifth decade will be approximately 40,000 tons per year.

MINERALS

The area withdrawn as Wilderness (841,034 acres or 39 percent of the Forest) will not change in any of the alternatives, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 2,247 additional acres from mineral entry, which is less than one percent of the total Forest acres. In addition to the withdrawals, highly sensitive management prescriptions which could discourage mineral related activities would be used to manage 482,876 acres or 22 percent of the total Forest acres. The following figure show how this management strategy would affect areas identified as having potential for the occurrence of locatable and leasable mineral resources.

	WITHDRAWALS	OPEN BUT WITH HIGHLY SENSITIVE MANAGEMENT STRATEGIES	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 acres or less than 1%	28,599 acres or 24%	31,143 acres or 26%
Area classified prospectively valuable for oil and gas	530 acres or 1%	44,330 acres or 21%	160,994 acres or 76%
Area classified prospectively valuable for geothermal resources	0 acres or less than 0%	58,767 acres or 9.8%	117,576 acres or 20%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	155,758 acres or 29%	264,030 acres or 50%

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

Small hydroelectric proposal activity is estimated at 24 or more proposals, with 3 proposals moving to the application for license stage.

ROADS

The implementation of Alternative I would require the construction of approximately 1,493 miles of additional road. Some 713 miles of this construction is expected to take place in areas that are currently unroaded. It is assumed that the majority of this construction will occur in the next 16 years. In addition to the roads currently open, it is expected that 50% of the new roads would be opened to public use by high clearance vehicles.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

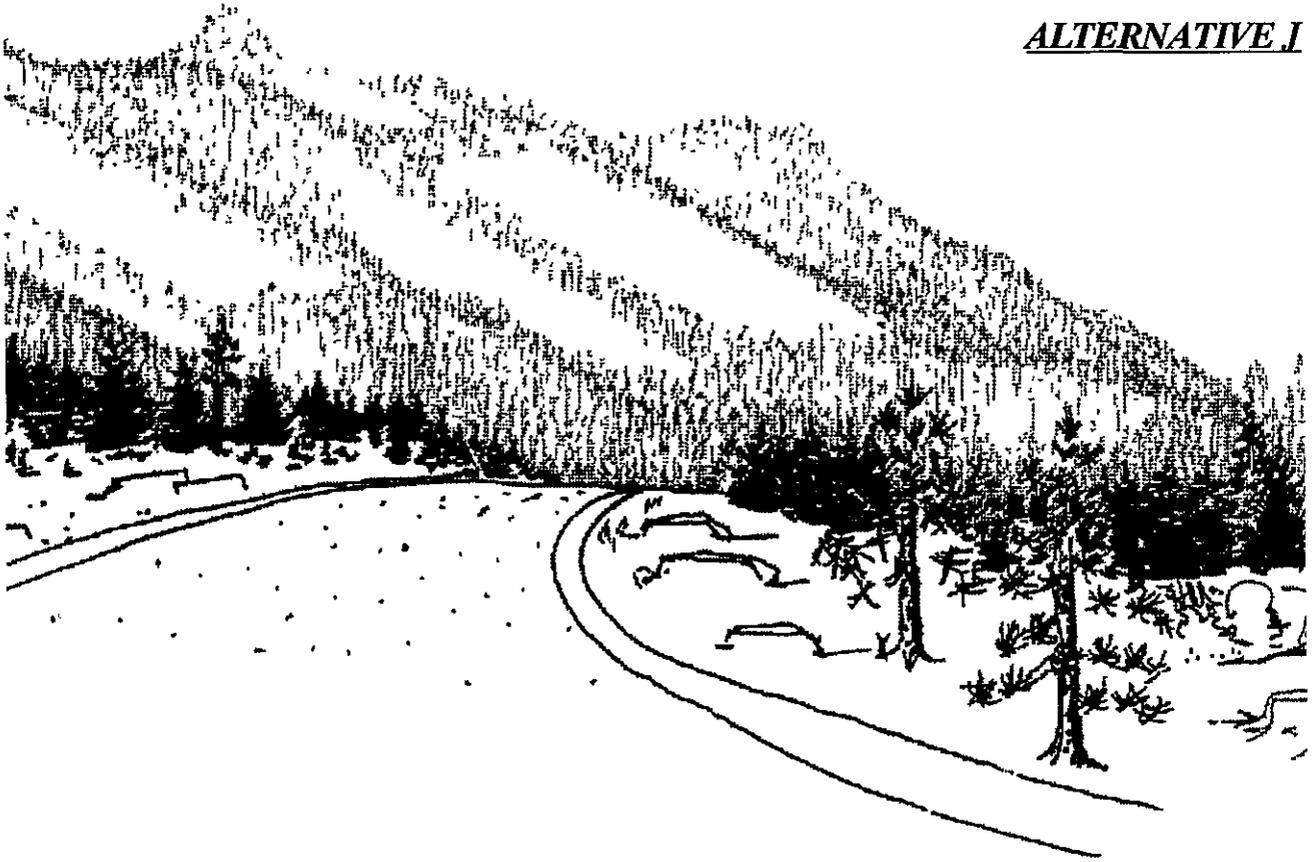
Prescribed fire would be used for reduction of activity fuels and for maintenance and improvement of other resources as a management tool. An appropriate suppression response would be made on all wildfires. Unplanned natural ignitions occurring in wilderness would be treated as prescribed fires until declared a wildfire. Human caused fires occurring in wilderness would require an appropriate suppression response.

SOCIAL/ECONOMIC

Present net value of this alternative would be 1,837 million dollars. An annual budget of 31.6 million dollars would be required for implementation. Revenues from Forest products would return 15.3 million dollars to the U.S. Treasury; 3.7 million dollars would be returned to local governments. Employment would increase by 413 jobs and income would increase by 10.86 million dollars from existing levels.

ALTERNATIVE I
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec Visitor Days	6,683,000
Annual dispersed recreation capacity		
- Roaded	Rec Visitor Days	21,889,000
- Unroaded		983,000
- Wilderness		1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1, EW-3, RE-4)	Acres	313,677
<u>Wild and Scenic Rivers</u>		
- Wild	Miles	82.5
- Scenic	Miles	29.0
- Recreational	Miles	118.5
<u>Water Quality and Quantity</u>		
Water yield increase -	Acre feet	17,300
Sediment increase index -	Tons/Year	71,400
<u>Old-growth</u>	Acres	307,300
<u>Wildlife and Fish</u>		
Wildlife habitat management (EW-1 & EW-3)	Acres	137,801
Anadromous fish commercial harvest	Pounds	328,000
<u>Visual Quality Objectives</u>		
Area managed for - Preservation	Acres	843,281
- Retention	Acres	521,800
- Partial Retention	Acres	332,927
- Modification	Acres	147,828
- Maximum Modification	Acres	318,344
<u>Timber</u>		
Allowable sale quantity	Million Cubic feet	27.7
Allowable sale quantity	Million Board feet	154.6
Long-term sustained yield	Million Cubic feet	27.1
Area of suitable timber land	Acres	576,074
<u>Range</u>		
Grazing capacity	Animal Unit Months	38,900
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	898,184
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,837
Annual cost to the Federal Government	Million Dollars	31.6
Annual revenues to the Federal Government	Million Dollars	15.3
Annual returns to Local Governments	Million Dollars	3.7
Change in employment	Number of Jobs	+413
Change in income	Million Dollars	+10.86



ALTERNATIVE J

This alternative was developed by representatives of the Timber Industry after release of the Wenatchee DEIS. They referred to it during the public input process as the "Essential Alternative." The goal of this alternative is to maintain timber harvest and other commodity outputs at their highest levels, while providing as much of the amenity outputs as possible without dropping ASQ below the level of the existing timber management plans.

Some features of this alternative include:

- The highest acreage of GF land allocation of any of the alternatives with correspondingly lower roadless and scenic travel allocations.

- No scenic travel retention allocation outside of the Alpine Lakes management area. I-90, Highway 2 (Stevens Pass) and Highway 97 (Swauk Pass) are in this management unit.

- Limited Partial Retention allocation on Mather, Entiat, Lake Wenatchee, and a part of the Chiwawa River road.

RECREATION SETTING

--Developed Recreation

The emphasis under this alternative is to convert the more popular reduced service recreation sites to full service status. Rehabilitation and renovation of high use sites will be accomplished to meet full service site standards. Other popular sites will be maintained with minor improvements to provide for sanitation and public safety. Some expansion of highly popular existing full service sites will occur.

Added coordination between the developed recreation component of the recreation setting is needed because of the increased timber harvest and road construction activities.

More opportunity will be available for establishing overlooks and opportunities to view scenic vistas in the new roaded areas.

Ski areas that are operating under existing master plan and are considering expansion are: Mission Ridge, White Pass, and Stevens Pass.

ALTERNATIVE J

--Dispersed Recreation

By the second decade, seventeen percent of the Forest will provide unroaded recreation opportunities outside wilderness. This includes 7,991 acres primitive, 150,664 acres semi-primitive non-motorized, and 222,196 acres semi-primitive motorized, Recreation Opportunity Spectrum (ROS) classes.

In addition, these will be 44% of the Forest providing roaded recreation or 951,524 acres of the Roaded Natural and Roaded Modified Recreation Opportunity Spectrum classes combined.

Fourteen of the twenty-three inventoried roadless areas will have a portion of their area maintained in a roadless management character. The area allocated to developed and roadless management is shown below.

AREA NAME	TOTAL ACRES PRESENTLY ROADLESS	ACRES REMAINING ROADLESS 1/	ACRES TO BE ROADDED
Myrtle Lake	10,918	8,968	1,950
Rock Creek	32,924	10,516	22,408
Twin Lakes	22,048	13,420	8,628
Canyon Creek	9,158	4,240	4,918
Heather Lake	11,067	1,442	9,625
Chelan	71,063	36,761	34,302
Entriat	71,254	25,355	45,899
Stormy	32,500	5,363	27,137
Slide Ridge	10,091	1,060	9,031
Devil's Gulch	25,186	0	25,186
Taneum	25,122	0	25,122
Manastash	8,798	0	8,798
Norse Peak Adj.	11,300	0	11,300
Quartz	8,756	0	8,756
Naneum	6,911	0	6,911
Lion Rock	4,834	3,859	975
William O. Douglas Adj.	22,938	0	22,938
Blue Slide	18,571	572	17,999
Goat Rocks Adj.	7,357	0	7,357
Nason Ridge	19,123	12,063	7,060
Alpine Lakes Adj.	44,393	28,513	15,880
Thorp Mountain	15,667	4,388	11,279
Teanaway	66,293	52,640	13,653

1/ The acres shown remaining roadless do not include 4,388 acres of dedicated old growth that fall within roadless allocations.

The miles of trail available to motorized use by land allocation or due to administrative closures are:

Allocation	Miles Open to Motorized Use	Miles Closed to Motorized Use
Wilderness	--	1188.0
Unroaded Non-motorized	--	66.7
Unroaded Motorized	162.5	---
Roaded Motorized	1045.6	---
Administratively Closed	--	390.0

Administratively closed trails are those trails in open allocations but closed for other resource management considerations.

--Special Interest Areas

The following proposed Special Interest areas would either remain classified or be recommended for classification for the purpose shown:

<u>Scenic</u>	<u>Dispersed Recreation</u>
Tumwater	Teanaway Nason Ridge Annette Lake

WILD, SCENIC, AND RECREATIONAL RIVERS

There are no rivers recommended for designation under the Wild and Scenic Rivers Act. River corridors would be subject to a full range of management activities, with five of the ten eligible rivers outside wilderness being allocated to timber harvest prescriptions that could noticeably alter the scenic qualities of the landscape.

SCENERY

Visual quality objectives would remain at a high level along the immediate foreground of all major interstate scenic highway travel routes, and most major wilderness portals. In this alternative a buffer strip of trees 200 feet along both sides of the travel route would be left slightly altered to altered. However, the viewshed beyond the 200 foot strip will be heavily altered.

Some wilderness and main transportation corridors will not maintain scenic qualities. Unnatural landscape patterns would occur in almost all major viewsheds.

The Alpine Lake Management unit will maintain high visual quality.

The general visual impression of the majority of the Forest would be a heavily altered landscape pattern. Block-cut patterns and contrasting openings will be dominant.

CULTURAL RESOURCES

Cultural resource inventory and evaluation, according to the established strategies and consultation procedures, would precede all ground disturbing projects. Appropriate historic preservation laws, regulations, and policies, plus the Forest-wide Standards and Guidelines, would direct future management decisions regarding significant cultural resources.

Approximately 80 percent of the known cultural resources would be within management area designations that may create a potentially moderate to high level of impact (59 percent would be within management areas that could be considered to have a high level of impact). These would require mitigation measures or frequent project modification. There might be noticeable modification of the visual settings around several significant sites. There might be an increase in the loss of non-significant sites.

ALTERNATIVE J

A high number of acres would be inventoried for cultural resources (approximately 644,000 acres over the planning period in support of the timber program alone), but the ways in which identified sites could be managed and interpreted in place might be constrained.

Coordination with the American Indian community would be ongoing to ensure that concerns regarding the protection of ancestral sites and the freedom to continue traditional religious uses of the Forest lands and resources are considered.

WILDERNESS

Wilderness would remain unchanged at 841,034 acres, or 39 percent of the Forest.

Increased emphasis will be placed on management, public information, and education on wilderness ethics and minimum impact camping techniques.

Approximately 62 percent of the land adjacent to the total length of wilderness boundary on the Forest is allocated to management activities associated with timber management and road access.

WILDLIFE

This alternative maintains low levels of habitat for mature and old growth species.

Deer and elk populations are decreased in summer habitat and increased a small amount in winter habitat. The wildlife habitat management prescriptions has different standards and guidelines in this alternative. See Appendix D for further information.

Primary cavity excavator habitat is maintained at low levels.

Riparian habitat is maintained.

This alternative is in the low range of providing for recreation use of wildlife.

State wildlife objectives will be met for deer, mountain goats, grouse, and spotted owls.

In this alternative, there are 149,000 acres of suitable spotted owl habitat in wilderness and Research Natural Areas, and 135,617 acres of suitable spotted owl habitat in lands that are unsuitable for timber management or in allocation that preclude timber management. Of the acres allocated to the Spotted Owl Habitat Area (SOHA) network, there were 41,510 acres originally allocated to full timber yield prescriptions and 23,384 acres originally allocated to reduced timber yields.

FISHERIES

This alternative should result in an increase in both anadromous and resident fish habitat capability through the life of the plan. Numbers of catchable trout, by the second decade, are estimated to increase from a current level of 200,000 to 217,000 fish. Spring chinook salmon and summer steelhead trout smolt habitat capability are estimated to increase from 1.348 million to 1.388 million and 172,000 to 177,000 smolts respectively. Summer chinook salmon and sockeye salmon smolt habitat capability is estimated to remain constant at current levels through the life of the plan.

It is anticipated that increases in habitat capability will result from Riparian Habitat Management Standards, the Fish Habitat Management Program and implementation of Best Management Practices, which will maintain current habitat capability and should allow fairly natural stream processes to function, resulting in improving trends in habitat capability. Further increases are expected due to implementation of a habitat improvement program. It is estimated that approximately \$45,000 of the annual habitat improvement program will be funded through appropriated monies and \$418,000 through Knutson-Vandenburg funds. This does not include potential funding through outside sources.

Actual anadromous fish outputs from the Forest will be dependent upon the success of other programs correcting problems such as passage off Forest. This alternative, however, is anticipated to improve habitat from current levels and thus is consistent with objectives to improve anadromous

fish runs in the drainage. Resident trout habitat capability will also improve, providing opportunities for expected increased demand for sport fishing.

RANGE

Permitted livestock grazing would increase in all decades through the fifth decade. Permitted use in the first decade is expected to average 23,000 AUM's, 25,500 AUM's in the second decade, and 36,000 AUM's in the fifth decade. Demand for cattle grazing would exceed supplies by the third decade, but demand for sheep grazing would be met in all decades. Actual permitted use would not exceed the total production potential by the fifth decade.

OLD GROWTH

This alternative would have approximately 148,507 acres of old growth in wilderness and 45,093 acres of old growth in prescriptions with no scheduled timber harvest. In areas within harvest prescriptions, but on lands unsuitable for timber harvest, there are approximately 25,970 acres of old growth. On suitable timberlands outside wilderness, in areas allocated for timber harvest, there are approximately 99,220 acres of old growth. By the fifth decade there will be a decline in total old growth acres mainly because old growth within harvest prescriptions will decrease, and ingrowth (when stands develop old growth characteristics over time) will not be rapid enough to replace the acres cut. The acres of old growth remaining will be of value for maintaining biological diversity, providing plant and wildlife diversity, and preserving aesthetic values.

TIMBER

This alternative would produce an Allowable Sale Quantity of 34.1 million (MM) cubic feet (173.8 MM board feet) and a Timber Sale Programmed Quantity of 36.5 MMCF (186.6 MMBF) per year for the first five decades. The long-term sustained yield for this alternative is 34.8 MM cubic feet based on 686,918 acres of suitable lands. This

compares to the past decade average annual volume sold of 187.5 MMBF and average volume harvested of 166.0 MMBF.

This alternative has the highest intensity of timber management. All suitable acres would be managed using thinning to increase yields of sawlog size trees.

An average of 8,050 acres per year would be clearcut, 2,215 acres would be shelterwood cut, and 5,133 acres would be selective cut.

WATER

Water quality and yield parameters are affected by the degree of commodity production. Refer to Chapter IV for a discussion of the variations in risks or benefits to water resources from the management activities proposed in each alternative. Water quality for this alternative should meet the Washington State Class AA (excellent) standard in all decades of the plan. Timber harvest activity in this alternative would result in annual water yield increases for the first, second and fifth decades of 29,100, 40,600 and 37,900 acre-feet, respectively, compared to a background annual runoff of 4,455,000 acre-feet.

SOIL

The background level (approximately 930,500 tons per year) of delivered sediment will remain constant throughout all decades. However, the amount of delivered sediment created by management activities related to timber manipulation will change over time. During the first and second decades, the activity-related delivered sediment will be approximately 96,600 tons per year. By the end of the third decade, most of the roads will have been built so the Forest should have a good transportation network in place. Because of this, it is anticipated that the amount of delivered sediment will be reduced by 44 percent. Therefore, management activity created soil loss in the fifth decade will be approximately 54,100 tons per year.

MINERALS

The area withdrawn as Wilderness (841,034 acres) will not change in any of the alternative, but the additional area to be withdrawn and the area to be managed under highly sensitive management prescriptions does vary by alternative. This alternative would result in the withdrawal of 2,247 additional acres from mineral entry, which is less than 1 percent of the total Forest acres. In addition to the withdrawals, highly sensitive management prescriptions which could discourage mineral related activities would be used to manage 365,046 acres or 17 percent of the total Forest acres. The following figure shows how this management strategy would affect areas identified as having potential for the occurrence of leasable.

	WITHDRAWALS	OPEN BUT WITH HIGHLY SENSITIVE MANAGEMENT STRATEGIES	OPEN WITH MODERATE TO LOW SENSITIVITY
"High" and "Moderate" locatable mineral potential areas	827 acres or less than 1%	23,236 acres or 19%	36,506 acres or 30%
Area classified prospectively valuable for oil and gas	530 acres or less than 1%	28,070 acres or 13%	177,254 acres or 84%
Area classified prospectively valuable for geothermal resources	0 acres or 0%	42,379 acres or 7%	133,964 acres or 22%
Area classified prospectively valuable for coal resources	869 acres or less than 1%	123,110 acres or 23%	301,678 acres or 56%

LANDS

Existing utility corridors would be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (e.g., 115 KV line might be increased to 230 KV). One potential new corridor is identified.

Small hydroelectric proposal activity is estimated at 25 or more proposals with 3 proceeding to the license application stage.

ROADS

The implementation of Alternative J would require the construction of approximately 1,964 miles of additional road. Some 1,006 miles of this construction is expected to take place in areas that are currently unroaded. It is assumed that the majority of this construction will occur in the next 18 years. All new construction and approximately 700 miles of existing road would be closed to public use by automobile.

The proposed construction and reconstruction of the Arterial and Collector roads are shown on Table IV-26 in Chapter IV.

FIRE MANAGEMENT

An appropriate suppression response would be made on all wildfires. Unplanned natural ignitions occurring in wilderness would be treated as prescribed fire until declared a wildfire. Human-caused fires occurring in wilderness would require an appropriate suppression response. Fire hazard will decrease because of increased timber harvest and hazard reduction activities. Fire prevention efforts would be directed toward timber harvest activities.

SOCIAL/ECONOMIC

Present net value of this alternative would be 1,825 million dollars. An annual budget of 33.8 million dollars would be required for implementation. Revenues from Forest products would return 8.7 million dollars to the U.S. Treasury; 2.1 million dollars would be returned to local governments. Employment would increase by 630 jobs and income would increase by 16.76 million dollars from existing levels.

ALTERNATIVE J
SUMMARY OF RESULTS RELATED TO PLANNING PROBLEMS (FIRST DECADE)

ISSUE	UNITS	RESULTS
<u>Recreation</u>		
Annual developed recreation capacity	Rec Visitor Days	6,683,000
Annual dispersed recreation capacity		
- Roaded	Rec Visitor Days	22,954,000
- Unroaded		897,000
- Wilderness		1,060,000
<u>Roadless Management</u>		
Lands allocated to roadless management other than wilderness (RE-2a & 2b, RE-3, SI-1, SI-2, RN-1)	Acres	217,089
<u>Wild and Scenic Rivers</u>		
	Miles	0
<u>Water Quality and Quantity</u>		
Water yield increase -	Acre feet	29,100
Sediment increase index -	Tons/Year	96,600
<u>Old-growth</u>		
	Acres	305,100
<u>Wildlife and Fish</u>		
Wildlife habitat management ^{1/}	Acres	123,025
Anadromous fish commercial harvest	Pounds	328,000
<u>Visual Quality Objectives ^{1/}</u>		
Area managed for - Preservation	Acres	843,281
- Retention	Acres	348,510
- Partial Retention	Acres	238,798
- Modification	Acres	190,039
- Maximum Modification	Acres	543,552
<u>Timber</u>		
Allowable sale quantity	Million Cubic feet	34 1
Allowable sale quantity	Million Board feet	173 8
Long term sustained-yield	Million Cubic feet	34 8
Area of suitable timber land	Acres	686,918
<u>Range</u>		
Grazing capacity	Animal Unit Months	40,700
Permitted grazing	Animal Unit Months	23,000
Area of suitable grazing land	Acres	898,184
<u>Social/Economic</u>		
Present Net Value	Million Dollars	1,825
Annual cost to the Federal Government	Million Dollars	33 8
Annual revenues to the Federal Government	Million Dollars	8 7
Annual returns to Local Governments	Million Dollars	2 1
Change in employment	Number of Jobs	+630
Change in income	Million Dollars	+16 76

^{1/} Alternative J has different standards and guidelines for EW-1 and Retention/Partial Retention acres than the other alternatives. Refer to Appendix D for more information.

2. COMPARISON OF ALTERNATIVES CONSIDERED IN DETAIL

a. OVERVIEW

This section will present the alternatives in a way that they can be easily compared. The aspects of the alternatives that will be presented for comparison include: responsiveness to issues and concerns, management areas, resource outputs, environmental effects, and costs and benefits. In addition to tables presenting information, there are narrative sections describing differences between alternatives.

The purpose of Forest planning is to identify and select for implementation that alternative that most nearly maximizes net public benefits. Net public benefits are defined as the

“... overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not . . . consistent with the principles of multiple use and sustained yield (36 CFR 219.3).

There is no mathematical formula available to define the preferred alternative. Indeed, there are differences of opinion about whether particular effects of alternatives are positive or negative. Therefore, it is necessary to separately identify all the major effects of each alternative as the basis for review, judgment, and an eventual selection. This selection may result in a completely different alternative or one that is a combination of those presented.

b. ISSUES AND CONCERNS

Alternatives are different ways of responding to issues and concerns. Table II-1 presents the ways that each alternative responds to each of the issues and concerns. Since benchmarks are analytic bases rather than attempts to respond to all issues, they do not appear in this table.

Each alternative has goals and output objectives. They are designed to respond to public issues and management concerns. Table II-1 presents the response of each alternative to the issues and concerns which are addressed differently in each alternative.

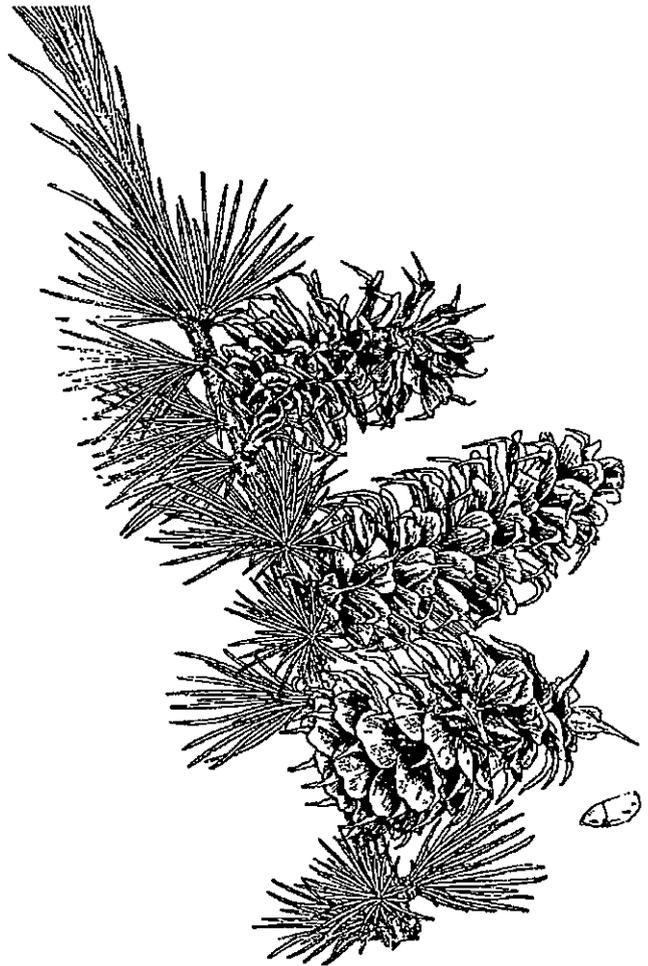


TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

<u>ISSUES AND CONCERNS</u> <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D					
<u>1 RECREATIONAL OPPORTUNITIES AND USE CONFLICTS</u> <i>Developed</i>	<p align="center">←—— The current potential supply of 2,900,000 Recreation Visitor Days (RVD's) at developed recreation sites is adequate to meet the projected demand on a Forest-wide basis regardless of alternative. However, as stated in Chapter III, there is demand and need to provide additional capacity in several specific areas such as the loicle drainage. To meet these needs, an additional 180,000 RVD capacity is planned for development through the year 2000. ———→</p>									
Ability to provide particular types of recreational use <u>Dispersed Allocations</u> <i>Roaded Acres</i> <i>Unroaded, Motorized Acres 1/</i> <i>Unroaded, Non-Motorized Acres</i>	1,148,131 175,015 0	1,066,012 183,825 65,529	1,086,321 139,177 89,868	1,017,251 175,536 122,579	1,086,321 139,177 89,868					
Recreation opportunities that can be developed or managed to meet demand, reduce conflicts and minimize resource damage <u>Recreation Emphasis Management Areas</u>	<p align="center">←—— The Forest area is allocated to the following amounts of Recreation Emphasis Management ———→</p> <table border="1"> <tr> <td data-bbox="269 1062 535 1388"> Developed <1% Dispersed Roaded 52% Unroaded Motorized 8% Unroaded Nonmotorized 0% Special Interest <1% Wilderness 39% </td> <td data-bbox="535 1062 783 1388"> Developed <1% Dispersed Roaded 49% Unroaded Motorized 8% Unroaded Nonmotorized 3% Special Interest <1% Wilderness 39% </td> <td data-bbox="783 1062 1040 1388"> Developed <1% Dispersed Roaded 50% Unroaded Motorized 6% Unroaded Nonmotorized 4% Special Interest <1% Wilderness 39% </td> <td data-bbox="1040 1062 1297 1388"> Developed <1% Dispersed Roaded 47% Unroaded Motorized 8% Unroaded Nonmotorized 6% Special Interest <1% Wilderness 39% </td> <td data-bbox="1297 1062 1468 1388"> Developed <1% Dispersed Roaded 51% Unroaded Motorized 6% Unroaded Nonmotorized 4% Special Interest <1% Wilderness 39% </td> </tr> </table>					Developed <1% Dispersed Roaded 52% Unroaded Motorized 8% Unroaded Nonmotorized 0% Special Interest <1% Wilderness 39%	Developed <1% Dispersed Roaded 49% Unroaded Motorized 8% Unroaded Nonmotorized 3% Special Interest <1% Wilderness 39%	Developed <1% Dispersed Roaded 50% Unroaded Motorized 6% Unroaded Nonmotorized 4% Special Interest <1% Wilderness 39%	Developed <1% Dispersed Roaded 47% Unroaded Motorized 8% Unroaded Nonmotorized 6% Special Interest <1% Wilderness 39%	Developed <1% Dispersed Roaded 51% Unroaded Motorized 6% Unroaded Nonmotorized 4% Special Interest <1% Wilderness 39%
Developed <1% Dispersed Roaded 52% Unroaded Motorized 8% Unroaded Nonmotorized 0% Special Interest <1% Wilderness 39%	Developed <1% Dispersed Roaded 49% Unroaded Motorized 8% Unroaded Nonmotorized 3% Special Interest <1% Wilderness 39%	Developed <1% Dispersed Roaded 50% Unroaded Motorized 6% Unroaded Nonmotorized 4% Special Interest <1% Wilderness 39%	Developed <1% Dispersed Roaded 47% Unroaded Motorized 8% Unroaded Nonmotorized 6% Special Interest <1% Wilderness 39%	Developed <1% Dispersed Roaded 51% Unroaded Motorized 6% Unroaded Nonmotorized 4% Special Interest <1% Wilderness 39%						
<p>1/ Acres allocated to prescriptions SI-1, SI-2 and EW-3 are included in the unroaded motorized category. Specific areas within the prescriptions may be managed as unroaded non-motorized to meet specific management objectives</p>										

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
---------------	---------------	---------------	---------------	---------------	---------------

←-----The current potential supply of 2,900,000 Recreation Visitor Days (RVD's) at developed recreation sites is adequate to meet the projected demand on a Forest-wide basis regardless of alternative. However, as stated in Chapter III, there is demand and need to provide additional capacity in some specific areas such as theircle drainage To meet these needs, an additional 180,000 RVD capacity is planned for development through the year 2000----->

866,041	881,357	931,752	1,066,012	1,017,251	1,106,206
153,572	150,223	277,762	183,825	175,536	124,317
345,753	283,786	105,852	65,529	122,579	84,843

←-----The Forest area is allocated to the following amounts of Recreation Emphasis Management----->

Developed <1%	Developed <1%	Developed <1%	Developed <1%	Developed <1%	Developed <1%
Dispersed Roaded 40%	Dispersed Roaded 41%	Dispersed Roaded 43%	Dispersed Roaded 49%	Dispersed Roaded 47%	Dispersed Roaded 51
Unroaded Motorized 7%	Unroaded Motorized 7%	Unroaded Motorized 13%	Unroaded Motorized 8%	Unroaded Motorized 8%	Unroaded Motorized 6%
Unroaded Nonmotorized 16%	Unroaded Nonmotorized 13%	Unroaded Nonmotorized 5%	Unroaded Nonmotorized 3%	Unroaded Nonmotorized 6%	Unroaded Nonmotorized 4%
Special Interest <1%	Special Interest <1%	Special Interest <1%	Special Interest <1%	Special Interest <1%	Special Interest <1%
Wilderness 39%	Wilderness 39%	Wilderness 39%	Wilderness 39%	Wilderness 39%	Wilderness 39%

1/ Acres allocated to prescriptions SI-1, SI-2 and EW-3 are included in the unroaded motorized category Specific areas within the prescriptions may be managed as unroaded non-motorized to meet specific management objectives

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TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUES AND CONCERNS <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
2 MANAGEMENT OF AREAS THAT ARE PRESENTLY UNDEVELOPED The most appropriate mix of resource management for inventoried roadless areas. <i>Percent of inventoried roadless areas remaining roadless</i>	30 percent	45 percent	41 percent	54 percent	41 percent
The rate that non-wilderness undeveloped areas should be entered for the management of various resources <i>1st decade</i> <i>2nd decade</i> <i>5th decade</i>	<-----The total unharvested acres remaining in non-wilderness undeveloped areas at the end of the first, second, and fifth decade are estimated at----->				
	462,009	417,254	364,410	387,763	410,841
	417,845	300,698	229,045	298,115	229,085
	338,250	249,354	229,045	298,115	229,045
3 DESIGNATION AND CLASSIFICATION OF WILD AND SCENIC RIVERS The number and location of rivers proposed for inclusion in the Wild and Scenic River System <i>Number of Rivers</i>	<-----Table IV-3 in Chapter 4 lists the recommended rivers for each Alternative----->				
	0	3	0	9	0
The level of classification assigned to the individual river segments <i>Miles of River by Class</i>	Wild 0 Scenic 0 Recreational 0	Wild 20 0 Scenic 7 0 Recreational 70 0	Wild 0 Scenic 0 Recreational 0	Wild 82 5 Scenic 29 0 Recreational 118 5	Wild 0 Scenic 0 Recreational 0

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
90 percent	78 percent	69 percent	45 percent	54 percent	38 percent

← The total unharvested acres remaining in non-wilderness undeveloped areas at the end of the first, second, and fifth decade are estimated at →

449,325	488,270	438,501	380,707	386,537	348,235
449,325	434,009	383,614	249,354	298,115	209,160
449,325	434,009	383,614	249,354	298,115	209,160

← Table IV-3 in Chapter 4 lists the recommended rivers for each Alternative →

10	10	3	9	9	0
Wild: 86.5 Scenic: 100 Recreational: 51.5	Wild: 86.5 Scenic: 100 Recreational: 51.5	Wild: 20.0 Scenic: 7.0 Recreational: 70.0	Wild: 82.5 Scenic: 29.0 Recreational: 46.0	Wild: 82.5 Scenic: 29.0 Recreational: 118.5	Wild: 0 Scenic: 0 Recreational: 0

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUES AND CONCERNS <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
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4 TRANSPORTATION SYSTEM DEVELOPMENT AND MANAGEMENT

The suitability of various areas on the forest for trail development

<i>Miles Wilderness</i>	←----- 1,188 -----→				
<i>Unroaded Nonmotorized</i>	1/	94.4	66.7	94.2	66.7
<i>Administratively Closed to Motorized*</i>	367.4	367.4	390.0	379.4	390.0
<i>Unroaded Motorized.</i>	268	235.1	162.5	190.4	162.5
<i>Roaded Motorized:</i>	331.8	944.7	1045.6	944.7	1045.6
<i>Reduction due to mgmt. activities .</i>	525	0	0	0	0
<i>Estimated available for motorized use*</i>	1/	813.0	818.1	755.7	818.1

1/ The timber management plans did not distinguish between unroaded motorized and unroaded non-motorized

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
---------------	---------------	---------------	---------------	---------------	---------------

←----- 1,188 ----->

112.7	337.4	68.5	94.4	139.7	66.7
621.2	364.6	352.8	367.4	379.4	390.0
463.6	197.0	417.9	235.7	245.1	162.5
697.8	740.4	788.4	944.7	944.7	1045.6
0	0	0	0	0	0
540.2	572.8	853.6	813.0	755.7	818.1

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUES AND CONCERNS <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
Road densities and standards needed to implement the different land allocations of the Forest Plan Alternatives	←—————The assumptions about local road densities and standards are the same for all alternatives—————→ The amount of local road varies in direct proportion with the amount of timber harvest				
<i>Miles local roads</i>	Not Estimated.	1,462	1,883	1,468	1,612
5. WATER QUALITY, QUANTITY, AND TIMING OF FLOWS					
Measures that should be taken to maintain or enhance water quality. <i>Water Quality</i>	←—————The intent of all alternatives is to manage watersheds to minimize—————→ the loss of on-site soil productivity potential (e.g., minimize erosion and sedimentation) and to provide riparian area, stream channel, water quality and yield conditions that would protect the beneficial uses of water (e.g., fish habitat, irrigation). Measures designed to maintain or enhance water quality are incorporated in all alternatives through implementation of Standards and Guidelines and Best Management Practices				
The influence of land use allocations and activities on water yield <i>Water Yield</i>	←—————The potential effects of alternatives on water yield (quantity,—————→ timing of flows) are based on the acres allocated to prescriptions subject to vegetative manipulation through timber harvest (e.g., see "Water Yield" in Table II-3a). Refer to the Soil and Water sections of Chapter IV, Environmental Consequences, for further discussion of these issues				
6. MIXED OWNERSHIP MANAGEMENT					
Management of National Forest lands adjacent to other ownerships <i>There are no management prescriptions which apply to the NC alternative. The Forest will cooperate with adjacent land-owners and reasonable access will be provided.</i>	←—————In all alternatives these lands will be managed according to the management—————→ prescriptions applied to them. To the extent consistent with the prescriptions, the Forest will cooperate with the adjacent landowner in planning, road construction, and property line survey. In all cases, reasonable access will be provided to the private land owner, though the Forest Service may not share in the cost of access (e.g., within roadless areas in checkerboard ownership). Also, in some areas, delay of scheduled harvest of National Forest timber may be necessary to mitigate the cumulative effects of harvesting on both parties' lands.				

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
<p><-----The assumptions about local road densities and standards are the same for all alternatives-----> The amount of local road varies in direct proportion with the amount of timber harvest</p>					
830	872	1,142	1,532	1,475	1,945

<-----The intent of all alternatives is to manage watersheds to minimize----->
 the loss of on-site soil productivity potential (e g , minimize erosion and sedimentation) and to provide riparian area, stream channel, water quality and yield conditions that would protect the beneficial uses of water (e g , fish habitat, irrigation). Measures designed to maintain or enhance water quality are incorporated in all alternatives through implementation of Standards and Guidelines and Best Management Practices

<-----The potential effects of alternatives on water yield (quantity,----->
 timing of flows) are based on the acres allocated to prescriptions subject to vegetative manipulation through timber harvest (e g , see "Water Yield" in Table II-3a) Refer to the Soil and Water sections of Chapter IV, Environmental Consequences, for further discussion of these issues.

<-----In all alternatives these lands will be managed according to the management----->
 prescriptions applied to them. To the extent consistent with the prescriptions, the Forest will cooperate with the adjacent landowner in planning, road construction, and property line survey In all cases, reasonable access will be provided to the private land owner, though the Forest Service may not share in the cost of access (e g , within roadless areas in checkerboard ownership) Also, in some areas, delay of scheduled harvest of National Forest timber may be necessary to mitigate the cumulative effects of harvesting on both parties lands

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUES AND CONCERNS <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
Land ownership adjustment needed to improve management.	<-----In the Alpine Lakes Management Area, the adjustments needed to improve management-----> do not vary by alternative				
	Alpine Lakes Management area will vary from other alternatives. Requires a small amount of ownership adjustment	Requires a small amount of ownership adjustment	Creates the least need for ownership adjustment (Same as Alternative D).	Requires a small amount of ownership adjustment	Creates the least need for ownership adjustment (Same as Alternative B)
7. WILDERNESS MANAGEMENT Management of the wilderness to maintain the wilderness environment and to minimize conflicts between competing users	Wilderness will be managed in accordance with Wilderness Management Plans 15 percent of the lands adjacent to wilderness will be retained for un-roaded recreation	<-----All wilderness will be managed in accordance with the management standards and-----> guidelines which are found in the Forest Plan These are designed to maintain the wilderness environment In addition, the following statements also apply to this issue as they relate to the lands bordering the wilderness			
		42 percent of the lands adjacent to wilderness will be retained for un-roaded recreation	38 percent of the lands adjacent to wilderness will be retained for un-roaded recreation	42 percent of the lands adjacent to wilderness will be retained for un-roaded recreation	38 percent of the lands adjacent to wilderness will be retained for un-roaded recreation
8 WILDLIFE AND FISH The location and management of essential wildlife habitats and management direction needed to maintain or enhance wildlife diversity	Increased threatened and endangered species habitat Maintained or decreased sensitive species habitat Decreased mature and old growth habitat. Decreased summer deer and elk habitat. Decreased winter deer and elk habitat. Decreased primary cavity excavator habitat Decreased riparian habitat. Increased recreational use of wildlife	Increased threatened and endangered species habitat Maintained or increased sensitive species habitat. Decreased mature and old growth habitat Decreased summer deer and elk habitat. Decreased winter deer and elk habitat. Decreased primary cavity excavator habitat. Increased riparian habitat. Increased recreational use of wildlife.	Increased threatened and endangered species habitat Maintained or increased sensitive species habitat. Decreased mature and old growth habitat Decreased summer deer and elk habitat Decreased winter deer and elk habitat Decreased primary cavity excavator habitat. Increased riparian habitat Increased recreational use of wildlife	Increased threatened and endangered species habitat Maintained or increased sensitive species habitat. Decreased mature and old growth habitat Decreased summer deer and elk habitat. Increased winter deer and elk habitat. Decreased primary cavity excavator habitat Maintained riparian habitat Increased recreational use of wildlife	Increased threatened and endangered species habitat Maintained or increased sensitive species habitat Decreased mature and old growth habitat Decreased summer deer and elk habitat Decreased winter deer and elk habitat Decreased primary cavity excavator habitat Maintained riparian habitat Increased recreational use of wildlife

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
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-----> In the Alpine Lakes Management Area, the adjustments needed to improve management do not vary by alternative <-----

Creates the greatest need for ownership adjustment (Same as Alternative F)	Creates the greatest need for ownership adjustment (Same as Alternative E).	Creates a moderately great need for ownership adjustment.	Requires a small amount of ownership adjustment	Requires a small amount of ownership adjustment (Same as Alternative B)	Creates the least need for ownership adjustment (Same as Alternative B & D)
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-----> All wilderness will be managed in accordance with the management standards and guidelines which are found in the Forest Plan. These are designed to maintain the wilderness environment. In addition, the following statements also apply to this issue as they relate to the lands bordering the wilderness <-----

64 percent of the lands adjacent to wilderness will be retained for un-roaded recreation	60 percent of the lands adjacent to wilderness will be retained for un-roaded recreation.	44 percent of the lands adjacent to wilderness will be retained for un-roaded recreation	40 percent of the lands adjacent to wilderness will be retained for un-roaded recreation	42 percent of the lands adjacent to wilderness will be retained for un-roaded recreation	36 percent of the lands adjacent to wilderness will be retained for un-roaded recreation
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Increased threatened/ endangered species habitat Maintained or increased sensitive species habitat Decreased mature and old growth habitat Increased summer deer and elk habitat Increased winter deer and elk habitat. Increased primary cavity excavator habitat Increased riparian habitat. Increased recreational use of wildlife	Increased threatened/ endangered species habitat Maintained or increased sensitive species habitat Decreased mature and old growth habitat. Increased summer deer and elk habitat Increased winter deer and elk habitat Decreased primary cavity excavator habitat Increased riparian habitat Increased recreational use of wildlife	Increased threatened/ endangered species habitat Maintained or increased sensitive species habitat Decreased mature and old growth habitat. Increased summer deer and elk habitat. Increased winter deer and elk habitat Decreased primary cavity excavator habitat. Increased riparian habitat Increased recreational use of wildlife.	Increased threatened/ endangered species habitat Maintained or increased sensitive species habitat. Decreased mature and old growth habitat Decreased summer deer and elk habitat Decreased winter deer and elk habitat Decreased primary cavity excavator habitat. Increased riparian habitat Increased recreational use of wildlife	Increased threatened/ endangered species habitat Maintained or increased sensitive species habitat Decreased mature and old growth habitat Decreased summer deer and elk habitat. Increased winter deer and elk habitat Decreased primary cavity excavator habitat Increased riparian habitat Increased recreational use of wildlife	Increased threatened/ endangered species habitat Maintained or increased sensitive species habitat Decreased mature and old growth habitat Decreased summer deer and elk habitat Increased winter deer and elk habitat Decreased primary cavity excavator habitat Maintain riparian habitat Increased recreational use of wildlife
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TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUES AND CONCERNS Outputs or Effects to be Measured	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
Ability to meet fish habitat needs	<p>Riparian habitat management standards do not apply to this alternative. Protection of riparian and fish habitat will include only those measures necessary to meet the minimum requirements of the Washington State Forest Practice Rules and Regulations. This alternative has the lowest planned investment in habitat improvement and is the most risky in terms of not meeting fish habitat objectives.</p>	<p><—All Alternatives, except NC, should result in the protection and maintenance of—> fish habitat. Implementation of Forest-wide Fish and Riparian Standards, the EW-2 Prescription, Best Management Practices and Monitoring Guidance, should assure that fish habitat capability is at least maintained with an improving trend.</p> <p>Increases in habitat capability are also projected due to habitat improvement projects. Differences displayed between alternatives are due to the amount of money invested and the mix between KV funded work and projects projected to be completed with appropriated funds. It is assumed that eighty-percent of the appropriated funds will be spent on anadromous fish, with KV funding being split 50/50 between anadromous and resident fish work.</p> <p>Demand for fish is expected to increase over the life of the plan. By maintaining and improving habitat, all alternatives are compatible with objectives to increase anadromous fish production throughout the Columbia Basin. All alternatives should also provide increased opportunity for resident trout sport fishing.</p> <p>Projects the lowest increase in anadromous fish outputs by the second decade and the lowest investment in habitat improvement. Compared to other alternatives, Alternative A has a relatively moderate risk of not achieving fish habitat objectives.</p>	<p>Projects the sixth highest potential for anadromous fish outputs in the second decade with the fifth highest investment in habitat improvement. Due to the amount of land allocated to resource development activities such as timber management and roading, Alternative B has a relatively high risk of not achieving fish habitat objectives compared to other Alternatives.</p>	<p>Projects the third highest increase in anadromous fish outputs by the second decade. Along with Alternative B, it has approximately the fifth highest investment in habitat improvement. Due to the amount of land allocated to resource development such as timber management and roading, Alternative C has a relatively moderate risk of not achieving fish habitat objectives compared to other Alternatives.</p>	<p>Along with Alternatives G and H, Alternative D projects next to lowest increase in anadromous fish outputs by the second decade. It has approximately the lowest investment in habitat improvement. Due to the amount of land allocated to resource development activities such as timber management and roading, this alternative has a relatively high risk of not achieving fish habitat objectives compared to other alternatives.</p>

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
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← All Alternatives, except NC, should result in the protection and maintenance of fish habitat. Implementation of Forest-wide Fish and Riparian Standards, the EW-2 Prescription, Best Management Practices and Monitoring guidance, should assure that fish habitat capability is at least maintained with an improving trend →

Increases in habitat capability are also projected due to habitat improvement projects. Differences displayed between alternatives are due to the amount of money invested and the mix between KV funded work and projects projected to be completed with appropriated funds. It is assumed that 80 percent of the appropriated funds will be spent on anadromous fish, with KV funding being split 50/50 between anadromous and resident fish work.

Demand for fish is expected to increase over the life of the plan. By maintaining and improving habitat, all alternatives are compatible with objectives to increase anadromous fish production throughout the Columbia Basin. All alternatives should also provide increased opportunity for resident trout sport fishing.

Projects the highest increase in anadromous fish outputs by the second decade with greatest investment in habitat improvement. Due to the amount of land allocated to resource development activities such as timber management and roading, this Alternative has a relatively low risk of not achieving fish habitat objectives compared to other Alternatives.

Projects the second highest increases in anadromous fish outputs by the second decade with the second highest investment in the habitat improvement. Due to the amount of land allocated to resource development activities such as timber management and roading, this Alternative has a relatively low risk of not achieving fish objectives compared to other Alternatives.

Along with Alternatives D and H, alternative G projects the fifth highest increase in anadromous fish outputs, with the seventh highest investment in habitat improvement. Due to the amount of land allocated to resource development activities such as timber management and roading, this Alternative has a relatively low risk of not achieving fish habitat objectives compared to other Alternatives.

Along with Alternatives D and G, alternative H projects fifth highest increase anadromous fish outputs with an investment in habitat improvement similar to alternative G. Due to amount of land allocated to resource development activities such as timber harvest and roading, this Alternative has a relatively moderate risk of not achieving fish habitat objectives.

Along with Alternatives B, alternative I projects the fourth highest increase in anadromous fish outputs with the fourth highest investment in habitat improvement. Due to the amount of land allocated to resource development activities such as timber management and roading, this alternative has a relatively moderate risk of not achieving fish habitat objectives. Because this is a departure alternative, alternative I is somewhat more risky than alternatives A, C, H.

Projects the fourth highest increase in anadromous fish outputs by the second decade with the third highest investment in habitat improvement. Due to the amount of land allocated to resource development activities such as timber management and roading, this alternative has a relatively high risk of not achieving fish habitat objectives compared to other Alternatives.

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUES AND CONCERNS <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
9 VISUAL RESOURCE MANAGEMENT Maintenance, enhancement, and restoration of the visual resource <i>Visual Quality</i>	High reduction in natural appearing landscapes	High in natural appearing landscapes	Substantial reduction in natural appearing landscapes	Moderate reduction in natural appearing landscapes	Greatly reduced in natural appearing landscapes
Management direction needed to maintain the key or unique visual resources of the Forest <i>Visual Quality</i>	High reduction in management direction that protects unique visual attributes	High in management direction that protects unique visual attributes	Substantial reduction in management direction that protects unique visual attributes	Moderate reduction in management direction that protects unique visual attributes	Greatly reduced in management direction that protects unique visual attributes.
10 TIMBER MANAGEMENT The Forest timber harvest level considering the local, regional, and national demand for timber products. <i>Allowable Sale Quantity (first decade)</i>	Allowable sale quantity is the same as the current Timber Management Plan	Allowable sale quantity decreases to 71% of current Timber Management Plan	Allowable sale quantity decreases to 99% of current Timber Management Plan	Allowable sale quantity decreases to 80% of current Timber Management Plan	Allowable sale quantity decreases to 84% of current Timber Management Plan.
The capability and suitability of the Forest to produce timber <i>Suitable Acres For Timber Management</i>	Suitable acres are the highest of any alternative. (787,751 acres plus 102,200 marginal)	Suitable acres are the sixth highest of any alternative. (591,794 acres)	Suitable acres are the third highest of any alternative. (681,186 acres)	Suitable acres are the seventh highest of any alternative (576,074 acres)	Suitable acres are the fourth highest of any alternative (643,639 acres)

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Substantial increase in natural appearing landscapes.	High increase in natural appearing landscapes.	High increase in natural appearing landscapes.	Little reduction in natural appearing landscapes	Moderate to higher reduction in natural appearing landscapes	Substantial reduction in natural appearing landscapes
Substantial increase in management direction that protects unique visual attributes	High increase in management direction that protects unique visual attributes	High increase in management direction that protects unique visual attributes	Little reduction in management direction that protects unique visual attributes	Moderate to higher reduction in management direction that protects unique visual attributes	Substantial reduction in management direction that protects unique visual attributes
Allowable sale quantity decreases to 42% of current Timber Management Plan	Allowable sale quantity decreases to 44% of current Timber Management Plan	Allowable sale quantity decreases to 57% of current Timber Management Plan.	Allowable sale quantity decreases to 86% of current Timber Management Plan	Allowable sale quantity decreases to 91% of current Timber Management Plan	Allowable sale quantity increases to 102% of current Timber Management Plan
Suitable acres are the lowest of any alternative (410,935 acres)	Suitable acres are the tenth highest of any alternative (421,265 acres)	Suitable acres are the ninth highest of any alternative (503,326 acres)	Suitable acres are the fifth highest of any alternative (603,620 acres)	Suitable acres are the eighth highest of any alternative (576,074 acres)	Suitable acres are the second highest of any alternative (686,918 acres)

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUES AND CONCERNS <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
The effect timber management has on other resources and on meeting other multiple use objectives <i>The ability to meet other resource objectives</i>	Other resource objectives are not fully integrated into this alternative	Less dispersed old-growth habitat protection would be included in this alternative	Increased funding would be required to mitigate other resource effects from increased harvest	All other resource objectives can be met or exceeded under this alternative	Other resource objectives would be similar to Alternative B except less money would be invested in tree management
11 ENERGY Management of existing and future utility corridor needs.	<----- All alternatives provide the same opportunities ----->				
Energy conservation in meeting other resource goals <i>Net Energy Balance</i>	Not estimated	Provides the fifth highest net energy balance	Provides the ninth highest net energy balance	Provides the sixth highest net energy balance	Provides the seventh highest net energy balance
12 THE ROLE OF FIRE The role of naturally occurring fires to improve Forest conditions.	<----- An appropriate wildfire suppression response will be implemented under all alternatives. All natural ignitions occurring in Wilderness will be considered prescribed fires unless declared a wildfire, at which time an appropriate suppression response will occur ----->				
Use of prescribed fire as a tool to improve Forest conditions <i>Prescribed Fire</i>	There will be a slight decrease in the amount of prescribed fire.	There will be no significant change in the number of acres treated by prescribed fire	There will be a significant increase in the number of acres treated by prescribed fire	There will be no significant change in the number of acres treated by prescribed fire	There will be no significant change in the number of acres treated by prescribed fire
Control of the public user to reduce fire risk to acceptable levels	<----- All alternatives will emphasize the reduction of public user control needed to bring fire risk to acceptable levels with little variation between alternatives ----->				

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Many other resource objectives and opportunities are foregone under this alternative. The effect on unroaded recreation is minimized under this alternative.	Protection of roadless recreation high, but other resource production including forage at low level.	Opportunities to achieve other resource objectives through timber sales at low level. Protection of resource values impacted by timber sales high.	Moderate level of other resource outputs and moderate mitigation from timber sale effects.	Little change from current resource outputs in the first decade. Decrease timber, and other resource opportunities associated with timber sales in future decades.	Increased funding would be required to mitigate other resource effects from increased harvest.

← All alternatives provide the same opportunities →

Provides the highest net energy balance	Provides the second highest net energy balance	Provides the fourth highest net energy balance	Provides the eighth highest net energy balance	Provides the third highest net energy balance	Provides the lowest net energy balance
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← An appropriate wildfire suppression response will be implemented under all alternatives. All natural ignitions occurring in Wilderness will be considered prescribed fires unless declared a wildfire, at which time an appropriate suppression response will occur →

There will be a significant decrease in the number of acres treated by prescribed fire.	There will be a significant decrease in the number of acres treated by prescribed fire.	There will be a moderate decrease in the number of acres treated by prescribed fire.	There will be a significant increase in the number of acres treated by prescribed fire.	There will be a slight increase in the number of acres treated by prescribed fire.	There will be a significant increase in the numbers of acres treated by prescribed fire.
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← All alternatives will emphasize the reduction of public user control needed to bring fire risk to acceptable levels with little variation between alternatives →

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUES AND CONCERNS <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
13 RANGE MANAGEMENT					
Management direction needed to improve vegetative conditions and reduce conflicts <i>Range Condition</i>	Provides the least amount of improved range condition and a moderate resolution of conflicts	Provides the least percentage of improved range condition and a moderate resolution of conflicts	Provides for a high amount of improved range condition and high resolution of conflicts	Provides for the highest percentage of improved range condition and very high resolution of conflicts	Provides for a high percentage of improved range condition and very high resolution of conflicts.
The level of livestock grazing that should be provided on the Forest <i>AUM's</i>	Provides grazing at current level with a slight increase in the second decade and then decreases through the fifth decade Does not meet RPA targets.	Provides grazing at current level with a slight increase in the second decade and then decreases through the fifth decade Does not meet RPA targets	Provides a 2-3M AUM increase per decade through the fifth decade Meets or exceeds RPA targets	Provides grazing at current level with a slight increase in the second decade and then is constant through the fifth decade Does not meet RPA targets	Same as Alternative B
14. MINERALS The designation of lands with mineral potential to management areas that are compatible with exploration and mining <i>Mineral Potential Areas Compared to Land Designations</i>	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry and less than 6% would have allocations which could highly restrict mineral related activities. That portion of the area having potential for occurrence of locatable or leasable minerals which is adversely affected cannot be portrayed from the information contained in the Timber Management Plans	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry, less than 17% of the lands classified prospectively valuable for energy minerals and less than 20% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry, less than 15% of the lands classified prospectively valuable for energy minerals and less than 20% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry, less than 19% of the lands classified prospectively valuable for energy minerals and less than 24% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry, less than 15% of the lands classified prospectively valuable for energy minerals and less than 20% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Provides for a moderate percentage of improved range condition and a high resolution of conflicts	Provides for a high amount of improved range condition and a very high resolution of conflicts.	Provides for a moderately high percentage of improved range condition and a very high resolution of conflicts.	Provides for a high percentage of improved range condition and high resolution of conflicts	Provides for the highest percentage of improved range condition and high resolution of conflicts.	Provides for a high amount of improved range condition and high resolution of conflicts.
Provides a 2-3M AUM increase per decade through the third decade and a 1-1.5M AUM increase in the fourth and fifth decades Will meet RPA targets through the third decade only.	Provides grazing at current level which will remain constant through the fifth decade Will meet RPA targets except for the fifth decade	Same as Alternative F	Same as Alternative B	Same as Alternative B	Provides a 2-3M AUM increase per decade through the fifth decade. Meets or exceeds RPA targets
Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry, less than 28% of the lands classified prospectively valuable for energy minerals and less than 30% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry, less than 24% of the lands classified prospectively valuable for energy minerals and less than 30% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry, less than 21% of the lands classified prospectively valuable for energy minerals and less than 23% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry, less than 17% of the lands classified prospectively valuable for energy minerals and less than 21% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions.	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry; less than 19% of the lands classified prospectively valuable for energy minerals and less than 24% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions.	Of the non-wilderness lands on the Forest, less than 1% would be withdrawn from mineral entry; less than 19% of the lands classified prospectively valuable for energy minerals and less than 24% of the lands identified as having a "high" to "moderate" locatable mineral potential would be affected by highly sensitive management prescriptions

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

<u>ISSUES AND CONCERNS</u> <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
The management of existing and potential energy resources on the Forest.	The potential for converting biomass to energy is the second best in this alternative.	The potential for converting biomass to energy is the eighth best in this alternative	The potential for converting biomass to energy is the third best in this alternative	The potential for converting biomass to energy is the seventh best in this alternative	The potential for converting biomass to energy is the fifth best in this alternative
<p>15. CULTURAL RESOURCE MANAGEMENT The compatibility of management prescriptions with cultural site management.</p>	<p>Considerable potential for adverse impact from other land uses Substantial modification of the visual setting is likely Mitigation measures or project modification may frequently be necessary Management options are constrained and opportunities for interpretation limited.</p>	<p>Moderate to high level of impact from other land uses are possible There may be some modification of the visual setting Mitigation measures may be necessary Provides for a variety of management options and opportunities for enhancement. Number of sites identified will be high Accessibility of managed sites to the public will be good</p>	<p>Considerable potential for adverse impact from other land uses Substantial modification of the visual setting is likely Mitigation measures or project modification may frequently be necessary. Management options are constrained and opportunities for interpretation limited</p>	<p>Moderate to high level of impact from other land uses are possible There may be some modification of the visual setting Mitigation measures may be necessary Provides for a variety of management options and opportunities for enhancement. Number of sites identified will be high Accessibility of managed sites to the public will be good</p>	<p>Considerable potential for adverse impact from other land uses Substantial modification of the visual setting is likely Mitigation measures or project modification may frequently be necessary Management options are constrained and opportunities for interpretation limited</p>

16 CUMULATIVE EFFECTS

The cumulative effects of management activities on soil, water, and fish habitat resources.

←-----Refer to the cumulative effects section for soil and water, Chapter IV,----->
for a discussion of this issue

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
The potential for converting biomass to energy is the eleventh best in this alternative .	The potential for converting biomass to energy is the tenth best in this alternative	The potential for converting biomass to energy is the ninth best in this alternative	The potential for converting biomass to energy is the sixth best in this alternative	The potential for converting biomass to energy is the fourth best in this alternative	The potential for converting biomass to energy is the best in this alternative
Overall potential for impact from other land uses is low. Visual quality objectives blend well with management of the cultural resources. Preservation and protection of cultural resources in place is likely Provides for a limited variety of management options and opportunities for interpretation	Overall potential for impact from other land uses is low. Visual quality objectives blend well with management of the cultural resources. Preservation and protection of cultural resources in place is likely Provides for a limited variety of management options and opportunities for interpretation	Overall potential for impact from other land uses is low to moderate. Visual quality objectives blend well with management of cultural resources Preservation and protection of cultural resources in place is likely, with some mitigation required Provides for a variety of management options and opportunities for interpretation	Moderate to high level of impact from other land uses are possible There may be some modification of the visual setting Mitigation measures may be necessary Provides for a variety of management options and opportunities for interpretation	Moderate to high level of impact from other land uses are possible There may be some modification of the visual setting Mitigation measures may be necessary Provides for a variety of management options and opportunities for interpretation	Considerable potential for adverse impact from other land uses Substantial modification of the visual setting is likely Mitigation measures or project modification may frequently be necessary Management options are constrained and opportunities for interpretation limited

←-----Refer to the cumulative effects section for soil and water, Chapter IV,----->
for a discussion of this issue

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUES AND CONCERNS <i>Outputs or Effects to be Measured</i>	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
The effect of "checkerboard" ownership and differing management philosophies on National Forest visual and recreation objectives	←-----Refer to Chapter IV, Scenery, for Cumulative Effects-----→				
17 SOCIAL AND ECONOMIC The socio-economic affects of National Forest activities and management on local communities <i>Employment, income, payments to counties.</i>	Employment, income, and payments to counties would be at the third highest level of any alternative	Employment, income, and payments to counties decline to the eighth highest level of any alternative	Employment, income, and payments to counties increase to the fourth highest level of any alternative	Employment and income would be at the seventh highest level of any alternative Payments to counties declines to the sixth highest level (same as Alternative A)	Employment, income, and payments to counties would be at the sixth highest level of any alternative
Economic efficiency in meeting overall multiple use objectives. Maintenance or enhancement of the stability and quality of life of significantly affected communities and population groups <i>Present Net Value (PNV)</i> <i>Employment and community stability</i>	Not Estimated ^{1/} Employment would stay at current levels. The altered appearance of the forest would adversely affect some local residents and visitors to the forest Increased polarization would occur due to the intensification of conflicts over scenery and roadless area management	Present net value is highest of any alternative Employment would increase, slightly over current conditions Slightly lowered visual conditions would adversely affect some local residents and visitors to the Forest Conflicts over roadless area management could intensify	Present net value is the lowest of any alternative Employment would increase The altered appearance of the Forest would adversely affect some local residents and visitors to the Forest. Increased polarization would occur due to the intensification of conflicts over scenery and roadless area management	Present net value is third highest of any alternative Employment would increase Slightly lowered visual conditions would adversely affect some local residents and visitors to the Forest Conflicts over roadless area management could intensify	Present net value is second highest of any alternative Employment would increase slightly The altered appearance of the Forest would adversely affect some local residents and visitors to the Forest Increased polarization would occur due to the intensification of conflicts over scenery and roadless area management

TABLE II-1

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
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← Refer to Chapter IV, Scenery, for Cumulative Effects →

<p>Employment, income, and payments to counties decline to the lowest of any alternative.</p>	<p>Employment, income, and payments to counties decline to the second lowest level of any alternative</p>	<p>Employment, income, and payments to counties decline to the third lowest level of any alternative.</p>	<p>Employment, income, and payments to counties would be at the fifth highest level of any alternative</p>	<p>Employment, income, and payments to counties would be at the second highest level of any alternative in the first decade but would decline in future decades.</p>	<p>Employment, income, and payments to counties increase to the highest level of any alternative</p>
<p>Present net value is eighth highest of any alternative</p>	<p>Present net value is fourth highest of any alternative</p>	<p>Present net value is fifth highest of any alternative.</p>	<p>Present net value is sixth highest of any alternative</p>	<p>Present net value is seventh highest of any alternative</p>	<p>Present net value is the ninth of any alternative</p>
<p>Employment would decrease the most of any alternative. Most of the jobs lost would be in the logging and wood processing sectors. The natural appearance of the Forest is maintained. Increased polarization would occur due to intensification of conflicts over scenery and roadless areas.</p>	<p>Employment would decrease, particularly in the logging and wood processing sectors. The natural appearance of the Forest is maintained. Conflicts over roadless area management could intensify.</p>	<p>Same as Alternative F</p>	<p>Employment would increase above current levels. Lowered visual conditions would adversely affect some local residents and Forest visitors. Conflict over roadless area management could intensify.</p>	<p>Employment would increase above current levels. Lowered visual conditions would adversely affect some local residents and Forest visitors. Conflicts over roadless area management would intensify.</p>	<p>Employment would increase. The altered appearance of the Forest would adversely affect some local residents and visitors to the Forest. Increased polarization would occur due to the intensification of conflicts over scenery and roadless area management.</p>



I. MANAGEMENT AREAS

Each alternative is a combination of management areas where sets of management practices and activity scheduling occur. Table II-2 presents acreages of the management areas for each alternative in a format for comparison. The enclosed maps accompanying this FEIS provide both a brief description of each management area and show its location on the Forest.

Benchmarks are analytic tests of the quantitative outputs under different assumptions. While approximating what could be managed on the ground, they are not mapped to assure their feasibility and manageability. Therefore, no management areas are presented here for the benchmarks.

1. Management Area EF-1: Experimental Forest

a. GOAL STATEMENT:

Provide opportunities to study the effects of forest management and fire on vegetative, soil and water resources occurring on the east side of the Cascade Mountains. Maintain the area in a form that will not compromise the opportunities for research.

b. DESCRIPTION:

The Entiat Experimental Forest was designated under the authority of the Chief of the Forest Service in 1970. Burned by wildfire in 1970, and rehabilitated and reforested in subsequent years, the area has been the subject of numerous scientific investigations. Currently, the Experimental Forest is being managed for a wide range of multiple uses in coordination with the Forestry Sciences Laboratory in Wenatchee. Periodic monitoring will occur until vegetation reaches such a size as to have a significant effect on water production. New studies will be initiated at that time.

New objectives following the Entiat Burn in August 1970 were to study the effects of fire on complete hydrologic units.

2. Management Area EW-1: Key Deer and Elk Habitat

a. GOAL STATEMENT:

Manage deer and elk winter range to meet habitat requirements for sustaining maximum carrying capacity.

b. DESCRIPTION:

Deer and elk winter ranges are generally on the edge of the Forest, adjacent to or intermingled with, other land ownerships, at low elevations, south and/or east facing slopes with reduced snow depth and early melt-off of snow. Because of these conditions these areas are highly desired for winter and/or early spring recreation activities and dry out early to become high fire danger areas. These habitats have openings covering 10 to 60 percent of the area (used by big game for foraging), containing shrubs, grasses, and forbs with scattered conifer trees, and 20 to 80 percent covered by conifer stands (used by big game for cover). The quality of the forage and the amount of thermal cover combined with the amount of human disturbance are the factors that determine the carrying capacity of these areas for big game in winter.

3. Management Area EW-2: Riparian-Aquatic Habitat Protection Zone

a. GOAL STATEMENT:

Maintain and enhance riparian management areas to perpetuate their distinctive resource values to (a) achieve and maintain habitat conditions necessary to maximize long-term natural production opportunities for desired fish species, (b) maintain water quality that meets or exceeds State Standards and (c) provide diverse wildlife habitat

b. DESCRIPTION:

This prescription applies to the land and vegetation adjacent to fish bearing streams, lakes and wetlands. The Riparian Management Area (RMA) shall correspond to at least the recognizable area dominated by riparian vegetation (true

Riparian Zone) and sufficient upland area (influence area) to assure adequate protection to achieve riparian management objectives and standards. The minimum area of consideration is 100 feet horizontal distance from the ordinary high water line associated with both banks of Class I, II, and fish bearing Class III streams and the perimeter of lakes and wetlands.

Riparian Management Area boundaries and specific riparian management objectives will be established for all projects within an RMA. Riparian management objectives will be established based upon analysis of RMA habitat conditions, objectives and standards both within the sub-drainage (generally 1,000-10,000 acres) and at the project site.

Within Riparian Management Areas, management decisions will be made in favor of riparian dependent resources (water quality, fish and wildlife habitat) when conflicts exist with man's use.

Refer to the Forest-wide Standards and Guidelines for Riparian Areas for overall direction on the planning and administration of management activities in RMA's. The interim quantitative standards applicable to EW-2 are also listed under the heading RIPARIAN in the following prescription, along with some of the operational considerations associated with the standards (under "MANAGEMENT PRACTICE"). Refer to the "Administration" section in the Forest-wide Standards and Guidelines for Riparian Areas for a discussion of the use and refinement of these interim standards.

**4. Management Area EW-3:
Key Big Game Habitat/Unroaded**

a. GOAL STATEMENT:

Manage deer, elk, and mountain goat winter range and key summer range to meet habitat requirements for sustaining optimum carrying capacity in an unroaded setting.

b. DESCRIPTION:

Deer and elk winter ranges are generally at low elevations, on south and/or east facing slopes with reduced snow depth and early melt-off of snow. Because of these conditions, these areas are highly desirable for winter and early spring recreation activities, and dry out early to become high fire danger areas. These habitats have 10-60 percent of the area in openings (used by big game for foraging) containing shrubs, grasses, and forbs with scattered conifer trees, and 20-80 percent of the area in conifer stands (used by big game for cover). The quality of the forage and the amount of thermal cover combined with the amount of human disturbance are the factors that determine the carrying capacity of these areas for big game in winter. Mountain goat summer and winter ranges are generally adjacent to each other at high elevations, well within the Forest, and just above and below the line separating suitable and unsuitable timber harvesting stands. Summer range consists of dense stands of old conifer trees intermingled with small meadows that provide food and shelter. Winter range consists of open, steep, rocky ridges with grasses, forbs, and shrubs dominating a landscape containing scattered conifer trees. Human activity, reductions in winter habitat, and lack of quality forage in summer range limit the populations of mountain goats.

**5. Management Area GF:
General Forest**

a. GOAL STATEMENT:

Provide for the greatest long-term growth and production of commercially valuable wood products at a level of investment in timber culture practices that maximizes net public benefits.

b. DESCRIPTION:

Future stands will vary from intensive timber management typified by regular spacing, relatively even age and height, to those that are similar to natural stands. Regenerated stands will have a high ratio of genetically superior stock and may receive cultural treatments throughout the rotation. The cultural practices will be deter-

mined on a site specific basis depending on the biological and economic conditions of the stand. Regeneration harvest will generally occur at culmination of mean annual increment. Logging will be by the most economical methods compatible with silvicultural requirements, soil and water standards and landform. Road densities and standards would also be dependent upon these conditions. In the General Forest area, the relative intensity of management is set by the Forest Plan. However, site specific details and locations of treatments will be determined in the prescription written or field reviewed by a certified silviculturist.

**6. Management Area MP-1:
Mather Memorial Parkway**

a. GOAL STATEMENT:

Manage area to maintain and enhance its outstanding scenic and recreation qualities.

b. DESCRIPTION:

This is an area classified by executive order, encompassing a zone extending 1/2 mile each side of U.S. Highway 410, to be managed primarily for scenic and recreational purposes. Developments and management activities within the allocation generally are not visually evident. The natural existing or established landscape will generally have vegetation on forested lands that is composed of large old growth trees in the overstory or in groves intermixed with a variety of age classes in the understory. The general perception of the landscape is a natural appearing environment. Motorized use is permitted within these areas to the extent it is compatible with the management intent.

**7. Management Area OG-1:
Old-Growth Management**

a. GOAL STATEMENT:

Manage for old growth habitat to achieve "ecosystem diversity, preservation of aesthetic qualities", and/or wildlife and plant habitat".

b. DESCRIPTION:

The Regional Guide for the Pacific Northwest Region directs all Forests to use a standard definition of old growth. Following are the descriptions of the characteristics needed to meet the requirements of this prescription.

1. ECOSYSTEM DIVERSITY: Ecosystem diversity is a representation of the variety that exists in biotic communities and is characterized by the number of species on a site and by the number of communities at all sites. The variety of management prescriptions will provide many and varied stand conditions and species, helping to maintain ecosystem diversity in managed, younger stands. However, enough of all types of old growth are required to maintain species dependent on old growth and preserve the various kinds of old growth communities found on the Forest

2. PRESERVATION OF AESTHETIC QUALITIES: People using the forest for recreation purposes enjoy old growth trees for their aesthetic and awe-inspiring qualities. Old trees represent a living link with the past and provide an important visual reference to the natural successional process of the forest environment.

Old growth stands are typically thought of as having an atmosphere that is peaceful, cathedral-like, and park-like or an atmosphere of being small, closed in, dominated and encompassed. The stand feels cool and refreshing, and smells musty from the decaying vegetation (rotting logs, snags, fruiting bodies of fungus and underbrush). The trees have deep furrowed bark, large diameters at the base of the tree (generally 21" in diameter or larger), tall and straight boles, (over 100 feet tall) rotten cracks, broken limbs, mosses, lichens, and rounded tops that create the illusion of being old.

3. WILDLIFE AND PLANT HABITAT: The indicator species for old growth and mature habitat is the spotted owl. Habitat for spotted owls includes mature and overmature trees dominant in the overstory, a multi-layered canopy, trees of several age classes, large amounts of standing dead trees and down material present, canopy crown closure of 45 percent or greater, and elevations between 1500 and 5000 feet.

The 2200 acres (more or less depending upon local circumstances) of suitable habitat may be contiguous, or scattered over a area of about 9000 acres. There is usually unsuitable habitat (either naturally occurring or from harvest) intermingled with the suitable habitat. It is common to find logging activities next to suitable spotted owl habitat. Road use and recreation activities will often be taking place within the habitat site.

Maintenance of reproduction of spotted owls is of high concern. Therefore, limit activities that may affect reproduction will be limited.

**8. Management Area OG-2:
Mature Habitat**

a. GOAL STATEMENT:

Manage for mature to old growth habitat for wildlife and plant species dependent upon this habitat.

b. DESCRIPTION:

The indicator species for this prescription are the marten/northern three-toed woodpecker and pileated woodpecker. These indicators plus the spotted owl are designed to provide a mature and old growth network. The network is to provide habitat for all species dependent upon mature or old growth habitat. The habitat for the marten/northern three-toed woodpecker and pileated woodpecker is described as mature or overmature trees in the overstory, a multi-layered canopy of trees in several age classes, large amounts of dead standing and down trees present, and a canopy closure of 40 percent or greater. Habitat for marten/northern three-toed woodpeckers is at elevations of about 2000 to 7000 feet, and for the pileated woodpecker, about 1500 to 5000 feet in elevation.

The marten/northern three-toed woodpecker habitat is a 160 acre contiguous habitat. One site will be found every 4000 to 5000 acres and it will be overlapped with spotted owl and pileated woodpecker sites when possible. An additional 160 acres of habitat is needed for developing future marten/northern three-toed woodpecker habitat. This additional acreage may be in any

successional stages. The location of the 160 acres of mature habitat will change through time in the 320 acre site.

The pileated woodpecker habitat is 300 acres, made of stands of no less than 50 acres within a 1000 acre area. One site will be found every 12,000 acres and these sites should be overlapped with spotted owls when possible. An additional 300 acres of habitat is needed for pileated woodpecker sites that may be in any successional stage but must have a high number of snags to provide food. The location of the 300 acres of mature habitat will change through time in the 600 acre site.

**9. Management Area RE-1:
Developed Recreation**

a. GOAL STATEMENT:

Provide developed recreation in an Urban to Primitive Recreation Opportunity Spectrum (ROS) setting.

b. DESCRIPTION:

This prescription is applicable to existing and potential developed recreation sites within the full spectrum of ROS settings. The areas allocated to this use include only the specific site on which development takes place. This prescription is also applicable to existing and potential Alpine (downhill) ski areas including runs, tows or lift facilities, shelters, lodges, services and parking lots. Associated developments such as skating rinks, toboggan runs, etc , may also be present. Potential sites allocated to this prescription will be managed to protect or enhance the future values and conditions desired.

**10. Management Area RE-2A and RE-2B:
Dispersed Recreation, Unroaded, Motorized**

a. GOAL STATEMENT:

Provide dispersed, unroaded recreation in a semi-primitive motorized recreation opportunity setting.

b. DESCRIPTION:

This prescription is for application to unroaded areas in which trails are evident and maintained for the following types of uses:

RE-2A - Areas having existing or potential trails for motorbikes, hikers, and horseback riders.

RE-2B - Areas having existing or potential four-by-four routes in addition to trails for motor bikes, hikers and horseback riders.

They are generally located in a natural appearing landscape setting. Winter motorized use is permitted where appropriate.

**11. Management Area RE-3:
Dispersed Recreation, Unroaded,
Non-motorized**

a. GOAL STATEMENT:

Provide dispersed recreation in an unroaded, semi-primitive non-motorized setting or a primitive setting.

b. DESCRIPTION:

This prescription is for application to unroaded areas in which trails are evident and maintained for non-motorized uses. Landscape changes are generally not evident to those walking through the area. The area is essentially a natural or natural appearing environment. There is little evidence on-site of other users.

**12. Management Area RE-4:
Dispersed Recreation, Unroaded,
Timber Harvest**

a. GOAL STATEMENT:

Provide for dispersed recreation, as well as long-term growth and production of commercially valuable wood products at a very low level of investment in timber cultural practices while maintaining the unroaded characteristics.

b. DESCRIPTION

Approximately 90 percent of future stands would come from natural regeneration. The remaining 10 percent would be regenerated by planting, after failure of natural regeneration to establish the stand. No stand improvements are planned between regeneration and harvest, future stands will closely resemble unmanaged conditions and will be typified by a tendency towards small irregularly spaced groups. Stands will generally have poor crown ratios and a wide range of age and height. Mortality due to tree competition, disease, and insects can be expected. Logging will generally be by aerial system to protect the unroaded characteristics of the area. Roads will not be constructed, except to protect adjacent resources.

**13. Management Area RM-1:
Intensive Range Management**

a. GOAL STATEMENT:

Provide for maximum forage production and utilization by commercial livestock with a high level of investment in range cultural practices.

b. DESCRIPTION:

Management seeks to optimize production and utilization of forage allocated for livestock use consistent with maintaining the environment and providing for multiple use of the range. Cultural practices such as brush control or seeding may be combined with fencing and water developments to implement complex grazing systems.

**14. Management Area RN-1:
Research Natural Area**

a. GOAL STATEMENT:

Provide for; (1) Preservation of examples of all significant natural Ecosystems for comparison with those influenced by man, (2) educational research areas for ecological and environmental studies, and (3) preservation of gene pools for typical and rare and endangered plants and animals.

b. DESCRIPTION:

Research Natural Areas (RNA) contain either examples of typical natural ecosystems or unique kinds of vegetation, animals, and land which are reserved for scientific and educational use. This use is restricted to non-manipulative and non-destructive research. On the Wenatchee National Forest there are two established RNA's: Meeks Table and Thompson Clover. Two additional areas have been studied and are candidates for addition to the system. They are: Fish Lake Bog, a marsh-bog community, and Eldorado Creek, a montane serpentine community. Several new areas on the Forest are candidates as Research Natural areas to meet regional cell (ecosystem) needs. A Research Natural Area establishment report will be prepared for each recommended area when the Forest Plan is implemented. These reports will describe the boundaries of the areas. Until the reports are signed by the Chief of the Forest Service, the areas designated in this Plan are recommendations. They will be managed to maintain their suitability as RNA's.

**15. Management Area SI-1:
Classified Special Areas -
Scenic and/or Recreation**

a. GOAL STATEMENT:

Manage Special Areas for recreation use, substantially in their natural condition.

b. DESCRIPTION:

These areas are classified under 36 CFR 294.1 and managed for recreation use substantially in their natural condition. The purpose of classifying these areas is to protect the natural beauty and, where appropriate, foster public use and enjoyment of the feature or environment (scenic areas possess outstanding or unique natural beauty). They occupy large areas of land where some multiple use activities may be compatible. Motorized use is permitted within these areas to the extent it is compatible with the management intent. Developments such as resorts, parking areas, campgrounds, etc., are located outside of the Special Area whenever possible.

**16. Management Area SI-2:
Classified Special Area - Other**

a. GOAL STATEMENT:

Manage areas of significant cultural, geological, botanical, zoological, paleontological, or other special characteristics so as to protect, preserve, and enhance their intrinsic values.

b. DESCRIPTION:

Special Interest Areas are classified under 36 CFR 294.1 and managed for recreation use substantially in their natural condition. The purpose of classifying these areas is to protect, and where appropriate, foster public use and enjoyment of the feature or environment. This prescription includes the following:

1) Cultural-Historic Area: Lands possessing prehistoric or historical sites, buildings or objects of National Register significance or having special cultural associations to the American Indian community.

2) Geologic Area: Lands having unique geologic features of the earth's development including caves and fossils.

3) Botanical Area: Lands containing specimens or group exhibits of plants, plant groups and plant communities which are significant because of form, color occurrence, habitat location, life history, arrangement ecology, environment, rarity and/or other features.

4) Zoological Area: Those lands having authentic, significant, and interesting evidence of our American National heritage as it pertains to fauna. The areas are meaningful because they embrace animals, animal groups, or animal communities which are natural and important because of occurrence, habitat, location, life history, ecology, environment, rarity or other features.

5) Paleontological Areas: Areas containing relic specimens of fauna and flora. These are the plant and animals (nonhuman) that span geologic time between periods when life first appeared on earth

and the age of man. Significant specimens may include Precambrian rocks; shellfish; early vertebrates; coal swamp forests; early reptiles; dinosaurs and Cenozoic mammals.

Management of these areas is aimed at preserving the features and environment of the area to be classified. Developments such as resorts, parking areas, campgrounds, etc., are located outside of the special interest area whenever possible.

There is one classified special interest area on the Wenatchee National Forest - Tumwater Botanical Area. There are also several potential geologic areas and a number of known significant and potentially significant cultural sites. There may also be other special interest areas which have not been identified to date.

**17. Management Area ST-1:
Scenic Travel - Retention**

a. GOAL STATEMENT:

To retain or enhance the viewing and recreation experiences along scenic travel routes.

b. DESCRIPTION:

Development and permitted uses will meet the "Retention" Visual Quality Objective in foreground and middleground areas viewed from recreation sites, and designated roads and trails. Developments and management activities within the allocation generally are not visually evident. The natural existing or established landscape will generally have vegetation on forested lands that is composed of large old growth trees in the overstory or in groves intermixed with a variety of age classes in the understory. The general perception of the landscape is that of a natural appearing environment.

**18. Management Area ST-2:
Scenic Travel - Partial Retention**

a. GOAL STATEMENT:

Provide a natural appearing foreground and middleground along scenic travel corridors.

b. DESCRIPTION:

Development and permitted uses will meet the "Partial Retention" Visual Quality Objective in the foreground and middleground viewed from developed recreation sites and designated roads and trails. The foreground of the main use routes will generally have vegetation that is composed of some large trees in the overstory or in groves intermixed with a variety of age classes in the understory. The middleground viewed areas from the main travel routes will generally have the perception of a natural appearing environment. The proposed uses and vegetation management within the allocation will be integrated with the natural landscape so that activities are visually subordinate to the characteristic landscape.

**19. Management Area UC-1:
Utility Corridors**

a. GOAL STATEMENT:

Provide and manage utility corridors to accommodate energy transmission needs.

b. DESCRIPTION:

This prescription is applicable to existing and potential utility and transmission corridors. It includes the land directly under and adjacent to the pipeline or powerline facility (clearing limits). Compatible facilities are combined in the same corridor whenever possible. Resource uses, such as grazing, and dispersed recreation activities, such as camping, mushroom and berry picking, Christmas tree cutting, etc., may be compatible in some areas.

**20. Management Area WI-1:
Wilderness**

a. GOAL STATEMENT:

Preserve and protect the natural character for future generations, and provide opportunities for solitude, challenge, inspiration, and scientific study.

b. DESCRIPTION:

This prescription is for application to the following Wildernesses: Alpine Lakes, Chelan-Sawtooth, Glacier Peak, Henry M. Jackson, Norse Peak, William O. Douglas, and Goat Rocks. Also, refer to the Alpine Lakes Area Management Plan for specific direction for the Alpine Lakes Wilderness. Each wilderness is delineated into four wilderness Recreation opportunity classes. These classes are Pristine, Primitive, semi-primitive and transition. Each class represents a specific physical, biological, social and managerial setting and degree of isolation and solitude that can be experienced. Experiences range from the maximum solitude and freedom found in the Pristine Class to the more human impacted acres near wilderness boundaries and trailheads that are classified transition.

**21. Management Area WS-1:
Scenic River (Proposed)**

a. GOAL STATEMENT:

Preserve the Scenic River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

b. DESCRIPTION:

This prescription is for application to those river segments on the Forest that are free of impoundments, and have largely primitive watersheds or shorelines but are accessible by road in places.

**22. Management Area WS-2:
Recreational River (Proposed)**

a. GOAL STATEMENT:

Preserve the Recreational River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

b. DESCRIPTION:

This prescription is for application to those river segments on the Forest that are readily accessible by road or railroad, may have some development along their shorelines, and may have undergone some impoundment or diversion in the past.

**23. Management Area WS-3:
Wild River (Proposed)**

a. GOAL STATEMENT:

Preserve the Wild River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

b. DESCRIPTION:

This prescription is applicable to those river segments on the Forest identified as being free of impoundments and generally inaccessible except by trail, with watersheds or shoreline essentially primitive and waters unpolluted. These represent vestiges of primitive America.

TABLE II-2
ACREAGES IN MANAGEMENT AREAS BY ALTERNATIVE 1/

MANAGEMENT AREAS	ALTERNATIVES									
	A/NFMA	B	C	D	E	F	G	H	I	J
Water	7,780	7,780	7,780	7,780	7,780	7,780	7,780	7,780	7,780	7,780
EF-1	4,770	4,770	4,770	4,770	4,770	4,770	4,770	4,770	4,770	4,770
EW-1	17,151	77,784	118,742	77,784	148,189	148,189	146,493	17,151	118,742	123,025
EW-2	53,849	58,046	47,361	58,046	38,012	40,832	47,573	52,301	47,361	52,470
EW-3	0	0	19,059	0	0	0	0	0	19,059	0
GF	393,306	613,344	389,089	613,344	153,955	202,949	224,743	393,243	389,089	615,887
OG-1	66,823	71,063	79,840	71,063	62,901	69,028	66,039	66,823	79,840	71,297
OG-2	56,074	55,671	49,015	55,671	14,862	15,688	45,071	56,075	49,015	57,813
RE-1	4,494	8,544	6,021	8,544	4,388	7,526	7,929	4,494	6,021	8,544
RE-2a	64,597	69,706	79,607	69,706	94,002	91,373	197,204	64,597	79,607	61,332
RE-2b	<u>2/</u>	7,865	16,748	7,865	38,754	38,754	26,437	<u>2/</u>	16,748	1,081
RE-3	59,551	84,462	116,092	84,462	320,038	259,088	100,362	59,551	116,092	79,480
RE-4	0	0	6,614	0	0	0	0	0	6,614	0
RM-1	33,708	81,663	17,702	81,663	6,106	7,166	7,632	33,708	17,702	62,244
RN-1	1,717	2,247	2,247	2,247	2,247	2,247	2,247	1,717	2,247	2,247
SI-1	136,911	72,950	70,512	72,950	74,010	74,010	70,491	136,911	70,512	70,893
SI-2	382	2,056	2,798	2,056	6,402	6,233	742	382	2,798	2,056
ST-1	125,484	55,163	83,635	55,163	178,230	163,368	147,469	120,968	83,635	36,655
ST-2	286,733	50,032	174,880	50,032	133,858	147,193	210,476	286,733	174,880	65,572
UC-1	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>	<u>3/</u>
WI-1 <u>4/</u>	841,034	841,034	841,034	841,034	841,034	841,034	841,034	841,034	841,034	841,034
WS-1	6,742	0	5,554	0	15,519	18,041	6,614	12,423	5,554	0
WS-2	3,074	0	11,363	0	3,816	3,752	3,074	3,519	11,363	0
WS-3 <u>4/</u>	6,636	0	23,426	0	26,924	26,776	6,632	23,426	23,426	0
MP-1	0	0	13,717	0	13,717	13,717	0	0	13,717	0

1/ Acres not shown for Alternative NC as it does not have management areas. Roughly equivalent acres would be 841,034 for WI-1, 7,780 acres for Water, 1,081,049 acres for GF, 8,200 acres for RE-1, 36,337 acres for RE-2a, 276 for RN-1, 1,104 acres for SI-2, and 164,000 acres for ST-1

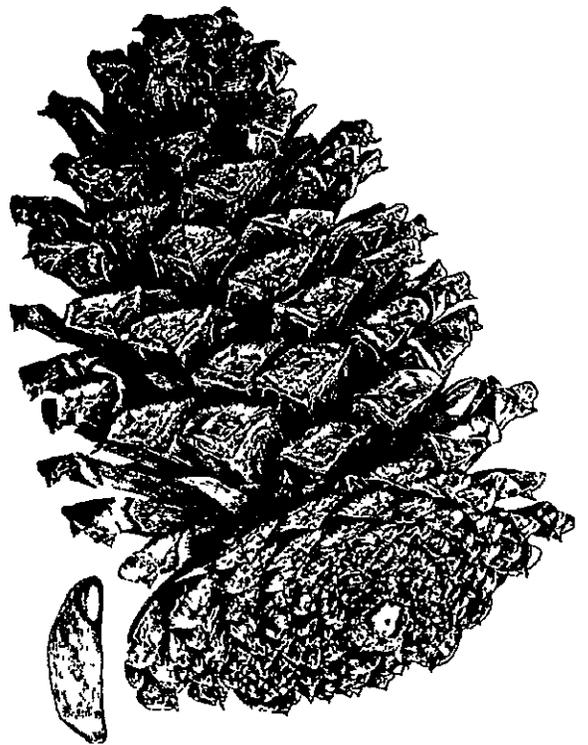
2/ Included in RE-2a.

3/ Acres distributed among other management areas

4/ WI-1 acreage totals include WS-3 acres (except 1,590 acres in Alt E, 1,442 acres in Alt F, and 170 acres in Alt. C and I)

J. RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Many of the outputs and effects are derived from the analysis which is fully described in Appendix B. Environmental effects are more fully discussed in Chapter IV. Consult Appendix B and Chapter IV for additional information. By comparing the alternative's response to issues and concerns (Table II-1) and the outputs and effects (Tables II-3a and II-3b) in this Chapter, the relationship between issues and environmental effects can be seen. It is important to note that the outputs shown are estimates and projections based on available inventory data and assumptions, subject to the annual budget. Refer to the glossary for definitions and explanations of abbreviations and units of measure.



**TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J
DEVELOPED RECREATION USE 1000 RVD's											
Decade 1	<					3,140	9				>
Decade 2	<					3,449	3				>
Decade 5	<					4,647	5				>
DEVELOPED RECREATION USE CAPACITY 1000 RVD's 1/											
Decade 1 2/		4,883	6,853	6,683	6,853	5,033	6,443	6,623	4,883	6,683	6,853
Decade 2	24/	4,900	6,890	6,700	6,870	5,050	6,460	6,640	4,900	6,700	6,890
Decade 5		4,900	6,870	6,700	6,870	5,050	6,640	6,640	4,900	6,700	6,870
NON-WILDERNESS DISPERSED RECREATION USE											
ROADED 1000 RVD's 3/											
Decade 1	<					1,977	8				>
Decade 2	<					2,125	9				>
Decade 5	<					2,630	2				>
UNROADED MOTORIZED 1000 RVD's 3/											
Decade 1	<					278	6				>
Decade 2	<					300	6				>
Decade 5	<					405	0				>
UNROADED NON-MOTORIZED 1000 RVD's 3/											
Decade 1	<					98	6				>
Decade 2	<					105	7				>
Decade 5	<					142	7				>
NON-WILDERNESS DISPERSED RECREATION USE CAPACITY											
ROADED 1000 RVD's											
Decade 1 2/	24/	22,576	22,495	21,884	22,410	19,439	19,588	20,999	22,688	21,889	22,954
Decade 2		23,106	23,379	22,467	23,083	19,547	19,725	21,277	23,327	22,522	23,788
Decade 5		24,334	25,466	23,685	24,633	19,691	19,993	21,955	25,336	23,539	26,007
		(Roaded = roaded natural, roaded modified, and rural)									
UNROADED MOTORIZED 1000 RVD's											
Decade 1 2/	24/	873	770	796	774	653	670	1,024	134	795	728
Decade 2		833	704	752	725	645	660	1,003	124	748	667
Decade 5		742	549	663	608	635	641	952	96	673	500

**TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J
UNROADED NON-MOTORIZED 1000 RVD's											
Decade 1 ^{2/}	24/	136	174	188	176	329	318	147	887	188	169
Decade 2		128	162	179	166	328	316	143	820	179	157
Decade 5		112	133	163	146	326	312	134	675	165	126
WILDERNESS USE 1000 RVD's ^{3/}											
Decade 1	<-----					423 5					----->
Decade 2	<-----					444 7					----->
Decade 5	<-----					540 2					----->
WILDERNESS USE CAPACITY 1000 RVD's											
Decade 1 ^{2/}	<-----					1060 0					----->
Decade 2	<-----					1060 0					----->
Decade 5	<-----					1060 0					----->
TRAIL CONSTRUCTION/ RECONSTRUCTION Miles											
Decade 1	52 7	28 6	52 7	81 6	81 6	81 6	81 6	81 6	28 6	81 6	81 6
Decade 2	52 7	28 6	52 7	81 6	81 6	81 6	81 6	81 6	28 6	81 6	81 6
Decade 5	26 8	14 3	26 1	44 0	44 0	44 0	44 0	44 0	14 3	44 0	44 0
DEVELOPED SITE CONSTRUCTION/ RECONSTRUCTION											
Decade 1 ^{3/}	425	670	721	1,248	721	1,248	1,248	1,248	721	1,248	721
Decade 2	42	100	100	200	100	200	200	200	100	200	100
Decade 5	80	100	300	500	300	500	500	500	300	500	300
VISUAL QUALITY OBJECTIVES Acres											
Preservation	841,310	842,751	843,281	843,281	843,281	843,281	843,281	843,281	842,751	843,281	843,281
Retention	241,721	485,081	388,853	521,800	388,853	828,058	761,850	643,215	486,691	521,800	348,510
Partial Retention	0	459,112	226,268	332,927	226,268	246,835	265,872	364,813	457,501	332,927	238,798
Modification	0	55,629	164,217	147,828	164,217	159,065	160,125	158,895	55,629	147,828	190,039
Maximum Modification	1,081,149	321,607	541,561	318,344	541,561	86,941	133,052	153,976	321,608	318,344	543,552
INVENTORIED ROADLESS AREAS ASSIGNED TO ROADED MANAGEMENT PRESCRIPTIONS. ^{4/}											
Acres	519,875	306,918	327,227	258,157	327,227	56,947	122,263	172,658	306,918	258,157	347,112

**TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J
INVENTORIED ROADLESS AREAS ASSIGNED TO UNROADED MANAGEMENT PRESCRIPTIONS Acres	36,397	249,354	229,045	298,115	229,045	499,325	434,009	383,614	249,354	298,115	209,160
OLD-GROWTH (Total Forest including Wilderness) 1000 Acres 5/											
Decade 1	305 1	307 3	305 2	307 3	305 9	310 6	309 3	299 6	306 7	307 3	305 1
Decade 2	291.4	295 8	291 5	295.7	293 1	302 4	300.9	289 5	294 6	295 3	291 3
Decade 5	250 4	261 6	250 7	261 2	254 5	277.7	275 7	259.3	258 4	261 2	250 1
WILDLIFE & FISH USE 1000 WFUDs											
FISH											
Decade 1	24/	550 4	550.4	550 4	550.4	550 4	550 4	550 4	550 4	550 4	550 4
Decade 2		731	731	732	731	732	732	731	731	731	731
Decade 5		1061	1062	1062	1062	1063	1063	1061	1061	1062	1062
ANADROMOUS FISH COMMERCIAL HARVEST 1000 Pounds											
Decade 1	24/	328	328	328	328	328	328	328	328	328	328
Decade 2		941	945	970	951	1002	974	951	951	965	965
Decade 5		955	1019	1033	986	1080	1039	981	981	1022	1019
ANADROMOUS FISH HABITAT IMPROVEMENT OVER PRESENT 1000 Pounds of Fish											
Decade 1	0	0	0	0	0	0	0	0	0	0	0
Decade 2	0	4.7	8.5	33	14	65	38	14	14	28	28
Decade 5	0	19	82.4	96.5	49 6	143.5	102 6	44.8	44 8	85 8	82 4
MANAGEMENT INDICATOR SPECIES											
SPRING CHINOOK SALMON 1000 Adults Escapement											
Decade 1	24/	60	60	6.0	60	60	60	60	60	60	60
Decade 2		11.85	12.09	12.21	11.97	12.62	12 27	11.97	11.97	12 15	12.15
Decade 5		12.03	12.80	12 80	12 38	13 56	13 27	12 33	12 33	12 86	12 80

**TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J
SUMMER CHINOOK SALMON 1000 Adults Escapement											
Decade 1		20	20	20	20	20	20	20	20	20	20
Decade 2	24/	467	467	467	467	467	467	467	467	467	467
Decade 3		467	467	467	467	467	467	467	467	467	467
SOCKEYE SALMON 1000 Adults Escapement											
Decade 1	24/	318	318	318	318	318	318	318	318	318	318
Decade 2		40	40	40	40	40	40	40	40	40	40
Decade 5		40	40	40	40	40	40	40	40	40	40
STEELHEAD TROUT 1000 Adults Escapement											
Decade 1	24/	17	17	17	17	17	17	17	17	17	17
Decade 2		35	35	36	35	37	36	35	35	35	35
Decade 5		35	37	38	36	40	39	36	37	37	37
BULL TROUT											
Decade 1	24/	←----- NOT ESTIMATED ----->									
Decade 2		←----- NOT ESTIMATED ----->									
Decade 5		←----- NOT ESTIMATED ----->									
RESIDENT CUTTHROAT TROUT 1000 Adults											
Decade 1	24/	201	206	204	204	206	204	203	203	205	206
Decade 2		202	218	212	212	217	212	210	210	216	217
Decade 5		205	254	238	234	252	238	230	228	246	252
SMOLT HABITAT PRODUCTION CAPABILITY (SHC)											
SPRING CHINOOK 1000 Smolts											
Decade 1	24/	1,351	1,358	1,363	1,356	1,381	1,367	1,355	1,355	1,360	1,360
Decade 2		1,355	1,382	1,395	1,370	1,449	1,402	1,368	1,368	1,388	1,388
Decade 5		1,375	1,463	1,483	1,415	1,550	1,517	1,409	1,409	1,469	1,463
SUMMER CHINOOK 1000 Smolts											
Decade 1	24/	←----- 646 ----->									
Decade 2		←----- 646 ----->									
Decade 5		←----- 646 ----->									
SOCKEYE 1000 Smolts											
Decade 1	24/	←----- 3,296 ----->									
Decade 2		←----- 3,296 ----->									
Decade 5		←----- 3,296 ----->									

TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J
STEELHEAD 1000 Smolts											
Decade 1		172	173	174	173	176	174	173	173	173	173
Decade 2	24/	173	176	178	174	185	179	175	175	177	177
Decade 5		175	186	189	180	198	193	180	180	187	186
WILDLIFE 1000 WFUD's											
Decade 1	754	754	748	753	748	756	757	757	754	749	719
Decade 2	817	837	826	836	826	844	843	843	837	828	794
Decade 5	1,037	1,087	1,059	1,084	1,059	1,101	1,100	1,100	1,087	1,063	1,012
MTN GOATS Number											
Decade 1	1,600	←-----1,600----->									
Decade 2	1,500	←-----1,600----->									
Decade 5	1,200	←-----1,600----->									
BEAVER Number											
Decade 1	<	-----320----->									
Decade 2	310	320	320	350	320	380	380	380	350	320	320
Decade 5	280	350	320	350	320	420	420	400	380	350	320
MULE DEER 1000 Animals Summer											
Decade 1	23.2	25.2	24.1	25.1	24.1	26.0	25.8	25.8	25.2	24.3	24.2
Decade 2	21.0	25.1	22.8	24.9	22.8	26.6	26.3	26.3	25.1	23.3	23.1
Decade 5	14.6	24.7	19.2	24.4	19.2	28.1	28.0	28.0	24.7	20.0	19.7
Winter											
Decade 1	9.6	9.7	9.9	10.1	9.9	10.2	10.2	10.2	9.7	10.1	10.0
Decade 2	9.2	9.4	9.9	10.2	9.9	10.4	10.4	10.4	9.4	10.2	10.1
Decade 5	8.0	8.3	9.8	10.4	9.8	11.0	11.0	11.0	8.3	10.4	10.2
ELK 1000 Animals Summer											
Decade 1	11.4	12.5	12.0	12.5	12.0	12.9	12.8	12.8	12.5	12.1	12.0
Decade 2	10.5	12.5	11.3	12.4	11.3	13.2	13.1	13.1	12.5	11.6	11.5
Decade 5	7.2	12.3	9.5	12.1	9.5	14.0	13.9	13.8	12.2	9.9	9.8
Winter											
Decade 1	5.4	5.4	5.6	5.6	5.6	5.7	5.7	5.7	5.4	5.6	5.6
Decade 2	5.1	5.2	5.5	5.7	5.5	5.8	5.8	5.8	5.2	5.7	5.6
Decade 5	4.5	4.7	5.5	5.8	5.5	6.1	6.1	6.1	4.7	5.8	5.7
RUFFED GROUSE 1000 Grouse											
Decade 1	31	←-----32----->									
Decade 2	30	34	32	34	32	36	36	36	36	32	32
Decade 5	2.8	36	32	38	32	45	45	40	38	36	33
BALD EAGLE Nests											
Decade 1	<	-----4----->									
Decade 2	<	-----5----->									
Decade 5	<	-----10----->									

**TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J
PEREGRINE FALCON Nests											
Decade 1	<					2					>
Decade 2	<					3					>
Decade 5	<					4-10					>
PRIMARY CAVITY EXCAVATORS (percent of potential population)											
Decade 1	67	73	72	73	72	75	75	74	73	73	72
Decade 2	59	70	69	70	69	75	75	73	70	70	69
Decade 5	34	61	51	62	51	77	74	70	62	62	56
SPOTTED OWL Pairs											
Decade 1	115 6/	115	115	120	115	125	125	120	115	120	115
Decade 2	105 6/	105	105	110	105	120	120	115	105	110	105
Decade 5	75 6/	95	95	100	95	110	110	100	95	100	95
PILEATED WOODPECKER Pairs											
Decade 1	370	375	375	380	375	400	395	395	375	370	375
Decade 2	320	350	350	355	350	380	375	375	350	350	350
Decade 5	225	295	295	300	295	330	320	310	295	300	295
MARTEN / NORTHERN 3-TOED WOODPECKER Pairs											
Decade 1	1150	1200	1200	1200	1200	1220	1220	1210	1200	1200	1200
Decade 2	1000	1100	1100	1100	1100	1110	1110	1100	1100	1080	1100
Decade 5	650	890	890	900	890	990	970	930	890	900	875
WILDLIFE AND PLANT HABITAT IMPROVEMENT Acre Equivalents											
Decade 1	0	1,305	1,900	1,900	1,545	1,695	1,925	1,190	1,600	1,630	1,920
Decade 2	0	1,305	1,900	1,900	1,545	1,695	1,925	1,190	1,600	1,630	1,920
Decade 5	0	1,305	1,900	1,900	1,545	1,695	1,925	1,190	1,600	1,630	1,920
RANGE- PERMITTED GRAZING 7/ CAPACITY 1000 AUMs											
Decade 1		36.4	40.6	38.7	39.7	38.4	38.5	38.8	36.8	38.9	40.7
Decade 2	24/	37.7	42.9	39.9	41.0	39.3	39.3	40.1	39.3	40.1	42.9
Decade 5		38.3	42.6	41.1	42.4	39.9	40.1	40.1	38.0	40.8	42.7

TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES											
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J	
RANGE- EXPECTED PERMITTED GRAZING USE 1000 AUMs												
Decade 1	←-----230-----→											
Decade 2	23.0	23.0	25.5	24.0	25.5	25.5	23.0	25.5	25.5	24.0	25.5	
Decade 5	20.0	20.0	36.0	24.0	36.0	31.5	23.0	33.5	36.0	24.0	36.0	
IMPROVED RANGE ALLOTMENTS Percent of acres, upward vegetated trend												
Decade 1	40	40	42	45	42	40	42	42	42	45	42	
Decade 2	35	35	60	70	60	50	60	55	60	70	60	
Decade 5	30	30	80	85	80	60	80	75	80	85	80	
STRUCTURAL IMPROVEMENTS												
<i>Fence - Constructed and Reconstructed Annually</i> Miles												
Decade 1	5.0	5.0	10.0	9.5	10.0	8.4	8.4	9.0	9.4	9.5	10.0	
Decade 2	5.0	5.0	12.5	9.0	12.5	9.2	7.5	10.0	10.9	9.0	12.5	
Decade 5	5.0	5.0	10.0	6.5	10.0	7.5	6.0	8.7	9.5	6.5	10.0	
<i>Springs - Developed and Replaced Annually</i> Number												
Decade 1	3	3	14	12	14	11	11	12	12	12	14	
Decade 2	3	3	15	11	15	11	9	12	13	11	15	
Decade 5	3	3	11	8	11	8	7	11	10	8	11	
NONSTRUCTURAL IMPROVEMENTS												
<i>Noxious Weed Control</i> Acres												
Decade 1	150	150	←-----					375	-----→			
Decade 2	150	150	←-----					375	-----→			
Decade 5	150	150	←-----					100	-----→			
TIMBER SALE PROGRAMMED QUANTITY Million BF												
Decade 1	176.8	130.3	181.5	146.0	153.2	75.7	81.6	105.1	157.5	166.0	186.6	
TIMBER SALE PROGRAMMED QUANTITY Million CF												
Decade 1	32.4 8/	23.4	36.0	26.1	27.4	13.8	14.6	18.7	28.9	29.6	36.5	
Decade 2	32.4	23.4	36.0	26.1	27.4	13.8	14.6	18.7	28.9	24.8	36.5	
Decade 5	32.4	23.4	36.0	26.1	27.4	13.8	14.6	18.7	28.9	24.8	36.5	

**TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C <i>Preferred</i>	D	E	F	G	H	I	J
ALLOWABLE TIMBER SALE QUANTITY Million BF Decade 1	170.8 <u>g/</u>	121.4	169.1	136.0	142.7	71.9	76.0	98.0	146.7	154.6	173.8
ALLOWABLE TIMBER SALE QUANTITY Million CF Decade 1	31.3 <u>g/</u>	21.8	33.5	24.3	25.6	12.9	13.6	17.5	27.5	27.7	34.1
Decade 2	31.3	21.8	33.5	24.3	25.6	12.9	13.6	17.5	27.5	23.2	34.1
Decade 5	31.3	21.8	33.5	24.3	25.6	12.9	13.6	17.5	27.5	23.2	34.1
FUEL WOOD SOLD <u>g/</u> 1000 CF Decade 1	4,396	3,052	4,690	3,400	3,580	1,810	1,900	2,450	3,850	3,880	4,770
Decade 2	4,396	3,052	4,690	3,400	3,580	1,850	1,810	1,900	2,450	3,250	4,770
Decade 5	4,396	3,052	4,690	3,400	3,580	1,850	1,810	1,900	2,450	3,250	4,770
REFORESTATION - PLANT 1000 Acres Decade 1	3.3	3.6	9.7	4.3	4.6	1.8	2.0	2.6	4.2	5.2	9.7
Decade 2	4.4	3.3	8.0	3.8	4.3	2.0	2.1	2.9	5.1	3.5	8.5
Decade 5	4.4	4.8	4.4	5.4	5.8	2.8	2.9	3.9	5.1	5.2	5.0
TIMBER STAND IMPROVEMENT 1000 Acres Decade 1 <u>10/</u>	5.9	3.4	7.3	4.2	3.5	3.0	3.0	3.4	5.8	3.8	7.4
Decade 2 <u>11/</u>	3.4	3.0	8.6	4.4	3.8	2.8	2.9	2.9	5.7	4.5	8.9
Decade 5	3.4	2.6	9.8	4.7	4.1	2.7	2.8	2.4	5.7	5.2	10.4
LONG-TERM SUSTAINED YIELD Million CF	29.9	27.7	34.2	27.2	30.8	18.7	19.2	23.4	29.0	27.1	34.8
TIMBER GROWTH IN YEAR 2030 Million CF	<u>24/</u>	15.3	24.6	16.6	19.4	10.0	10.4	12.2	15.8	18.1	25.6
LANDS TENTATIVELY SUITABLE FOR TIMBER PRODUCTION Acres	889,951	←----- 791,899 -----→									

**TABLE II-3A
 QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
 AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J
LANDS SUITABLE FOR TIMBER PRODUCTION Acres	787,751	591,794	681,186	576,074	643,639	410,935	421,265	503,326	603,620	576,074	686,918
LANDS WITH TIMBER YIELD REDUCTIONS Acres											
Full Yield <u>22/</u>	682,751	251,118	472,974	303,897	461,568	131,046	137,026	183,817	253,047	303,897	482,917
50-90% Full Yield	105,000	340,676	208,212	272,177	182,071	279,889	284,239	319,509	350,573	272,177	204,001
1-49% of Full Yield	<-----					0					----->
ACREAGES OF TIMBER HARVEST PRESCRIPTIONS <u>18/</u> (1st Decade from FORPLAN)											
Clearcut <u>19/</u>	3,944	2,590	7,976	3,433	5,136	611	869	1,124	1,521	5,603	8,050
Shelterwood <u>20/</u>	3,928	2,539	2,143	2,360	24	2,600	2,515	3,139	4,656	223	2,215
Partial Cut <u>21/</u>	1,896	2,564	5,060	2,896	2,569	1,605	1,692	2,131	3,089	2,913	5,133
WATER YIELD Background 1000 Acre Feet											
Decade 1	<-----					4,455					----->
Decade 2	<-----					4,455					----->
Decade 5	<-----					4,455					----->
Increase 1000 Acre Feet											
Decade 1	24.4	13.8	28.5	15.5	15.7	8.2	8.7	11.2	19.1	17.3	29.1
Decade 2	<u>25/</u>	18.9	40.2	21.0	22.2	11.5	12.1	15.5	27.3	22.2	40.6
Decade 5		21.6	39.3	23.8	24.9	14.7	15.3	18.6	28.9	22.9	37.9
DELIVERED SEDIMENT LEVELS Background Thousand Tons/Yr											
Decade 1	<-----					930.5					----->
Decade 2	<-----					930.5					----->
Decade 5	<-----					930.5					----->
Management Activity Thousand Tons/Yr											
Decade 1	94.9	69.2	94.9	72.4	65.5	50.3	51.5	60.9	89.4	71.4	96.6
Decade 2	<u>25/</u>	69.2	94.9	72.4	65.5	50.3	51.5	60.9	89.4	71.4	96.6
Decade 5		38.8	53.1	40.5	36.7	28.2	28.8	34.1	50.1	40.0	54.1

**TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES											
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J	
IMPROVED WATERSHED CONDITION <u>12/</u> (Watershed Improvement Projects-Treated Acres)	Decade 1					1,800						
	Decade 2					1,000						
	Decade 5					500						
MINERAL RESOURCE ACCESSIBILITY <u>13/</u> Acres	Withdrawn as Wilderness					841,034						
	Withdrawn by Prescription <u>25/</u>	1,717	1,717	2,247	2,247	2,247	3,837	3,689	2,247	1,717	2,247	
	Open But Highly Sensitive (Significant Controls or Restrictions May Apply)	411,199	411,199	384,868	482,876	384,868	654,598	606,495	536,513	417,325	482,876	365,046
	Open With Only Moderate to Few Constraints	910,230	910,230	936,031	838,023	936,031	664,711	712,963	784,386	904,104	838,023	955,853
ENERGY MINERALS PRODUCED <u>26/</u> Billion BTUs	Decade 1	NO PRODUCTION ANTICIPATED										
	Decade 2	140	140	143	137	143	126	130	134	140	137	144
	Decade 5	632	632	643	619	645	569	588	607	632	619	651
NON-ENERGY MINERALS PRODUCED <u>13/</u>	Decade 1	PRESENT PRODUCTION	-0.2%	-4.7%	-0.2%	-7.8%	-11.2%	-3.3%	-0.8%	-4.7%	-0.2%	
	Decade 2	PRESENT PRODUCTION	-0.2%	-4.7%	-0.2%	-7.8%	-11.2%	-3.3%	-0.8%	-4.7%	-0.2%	
	Decade 5	PRESENT PRODUCTION	-0.2%	-4.7%	-0.2%	-7.8%	-11.2%	-3.3%	-0.8%	-4.7%	-0.2%	

**TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C <i>Preferred</i>	D	E	F	G	H	I	J
FIRE MANAGEMENT											
14/ \$ per Thousand Acres Protected											
Decade 1	<					732					>
Decade 2	<					732					>
Decade 5	<					732					>
ARTERIAL AND COLLECTOR ROAD											
New Construction Miles											
Decade 1	2	2	2	2	2	0	0	2	2	2	2
Decade 2	0	0	0	0	0	0	0	0	0	0	0
Decade 5	0	0	0	0	0	0	0	0	0	0	0
Reconstruction Miles											
Decade 1	15	13	17	16	17	2	2	9	17	16	17
Decade 2	2	2	2	2	2	2	2	2	2	2	2
Decade 5	2	2	2	2	2	2	2	2	2	2	2
Timber Purchaser Road Construction/ Reconstruction Miles											
Decade 1	97	74	108	83	82	43	45	58	97	92	111
Decade 2		74	88	68	82	43	45	58	62	59	92
Decade 5	24/	4	5	5	4	3	4	4	9	6	8
ROADS SUITABLE FOR PUBLIC USE											
Passenger Car Miles											
Decade 1	<					1013					>
Decade 2	973	1031	1031	1031	1031	1013	1013	1031	1031	1031	1031
Decade 5	997	1031	1031	1031	1031	1013	1013	1031	1031	1031	1031
High Clearance Vehicle Only Miles											
Decade 1	3,348	3,348	4,238	3,202	3,202	3,202	3,246	3,373	3,670	3,878	2,502
Decade 2	3,434	3,494	5,085	3,202	3,202	3,202	3,289	3,545	3,968	4,308	2,502
Decade 5	3,961	3,494	5,085	3,202	3,202	3,202	3,289	3,545	3,968	4,308	2,502
Closed Road Miles											
Decade 1	1,481	1,481	896	1,703	1,702	1,311	1,288	1,296	1,364	1,121	2,666
Decade 2		2,066	896	2,364	2,508	1,726	1,681	1,695	1,662	1,265	3,542
Decade 5	24/	2,066	896	2,364	2,508	1,726	1,681	1,695	1,662	1,265	3,542
FUEL TREATMENT											
Acres											
Decade 1	3,400	6,100	11,100	6,700	6,100	4,200	4,500	5,300	7,200	6,800	11,300
Decade 2	4,800	5,300	10,800	5,800	6,200	3,900	4,000	4,600	6,700	6,300	11,500
Decade 5	4,800	7,000	6,400	7,800	7,900	4,700	4,800	6,100	7,900	7,700	6,600

**TABLE II-3A
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES,
AND COSTS BY ALTERNATIVE**

OUTPUTS/ EFFECTS AND UNITS OF MEASURE	ALTERNATIVES										
	NC	A/ NFMA	B	C Preferred	D	E	F	G	H	I	J
OPERATIONAL COSTS Million \$											
Decade 1	16.5	14.2	17.3	17.2	15.6	14.1	14.2	16.0	15.3	16.2	17.5
Decade 2	<u>24/</u>	14.2	17.7	17.0	16.3	14.2	14.2	16.0	15.0	16.6	17.9
Decade 5		14.8	18.1	16.7	17.3	14.8	14.9	17.1	16.0	17.3	18.2
CAPITAL INVESTMENT COSTS Million \$											
Decade 1	2.3	8.8	16.9	11.8	11.3	10.7	8.0	9.7	13.6	15.4	16.3
Decade 2	<u>24/</u>	7.8	13.1	8.4	8.8	9.1	6.4	7.1	11.4	11.1	13.9
Decade 5		5.8	9.4	6.1	6.4	7.5	4.5	5.0	9.1	9.7	9.1
TOTAL FOREST BUDGET Million \$											
Decade 1	17.6	23.0	34.2	29.0	26.9	24.8	22.2	25.7	28.9	31.6	33.8
Decade 2	<u>24/</u>	22.0	30.8	25.4	25.1	23.3	20.6	23.1	26.4	27.7	31.8
Decade 5		20.6	27.5	22.8	23.7	23.2	19.4	22.1	25.1	27.0	27.3
RETURNS TO TREASURY Million \$											
Decade 1	15.2	12.5	8.1	14.0	14.3	8.0	8.4	10.4	12.9	15.3	8.7
Decade 2	<u>24/</u>	13.7	10.5	15.1	16.3	8.6	8.9	11.6	13.6	14.4	10.4
Decade 5		14.4	26.1	14.3	15.8	9.8	10.3	12.4	15.3	12.8	25.7
CHANGES IN JOBS Number											
Decade 1	+378	+39	+577	+203	+279	-520	-473	-225	+324	+413	+630
CHANGES IN INCOME Millions \$											
Decade 1	+12.1 <u>15/</u>	+0.65	+15.31	+5.14	+7.20	-14.56	-13.30	-6.54	+8.43	+10.86	+16.76
PAYMENTS TO COUNTIES Million \$											
Decade 1	3.8 <u>15/</u>	3.0	2.0	3.3	3.4	1.9	2.0	2.5	3.1	3.7	2.1
Decade 2	<u>24/</u>	3.0	2.3	3.3	3.6	1.9	2.0	2.5	3.0	3.2	2.3
Decade 5		2.4	4.3	2.4	2.7	1.7	1.8	2.1	2.6	2.2	4.2
ACRES AVAILABLE FOR SPECIFIC RESOURCES											
Timber Harvest <u>16/</u>	825,651	657,307	681,186	630,514	681,186	487,409	497,741	653,845	657,345	630,514	689,918
Grazing <u>17/</u>	406,872	406,872	907,900	406,872	902,753	789,085	406,872	850,286	893,642	898,184	908,200
Mineral Exploration 1000 Acres						1,313.1					

FOOTNOTES

1/ Refer to the Glossary for definition of Units and Outputs

2/ Figures are "potential" capacities

3/ The figure for Decade 1 is the amount actually planned for this year. The others are average annual PAOT's

4/ Development will take place on these acres within the next 18 to 24 years, depending on the alternative

5/ The values reflect the estimated old growth acres by alternative and decade, but do not reflect any estimate for ingrowth (i.e. the development over time of stands that currently do not exhibit old growth habitat characteristics into stands that do). The amounts of old growth remaining would be relatively greater if ingrowth were included. Alternatives with lower harvest levels will develop old growth at a relatively higher rate.

6/ Assumes no areas for spotted owls are planned

7/ This is grazing capacity by alternative. Actual permitted grazing is not expected to exceed: First Decade - 23.0 MAUM's, Second Decade - 25.5 MAUM's, or Fifth Decade - 36.0 MAUM's, in some alternatives. Some alternatives will have less permitted use than others.

8/ Harvest volumes for Alternative NC are "potential yield" and include a 14.0 MMBF temporary inflation of the cut on the Naches Ranger District. Refer to Table II-3c for a further display of differences between the potential yield and other alternatives' ASQ.

9/ Estimated volume of fuelwood readily accessible is 14 percent of allowable sale quantity. Most of the accessible wood is logging residue and wood accessed by new timber sales.

10/ Average of FORPLAN for 13 decades

11/ Average of 2030 and 1990 from the plan

12/ The units shown are treated acres which are not indicative of the total area potentially affected by a given improvement project

13/ Area available with low to moderate sensitivity (acres). For accessibility data relative to mineral commodity information (eg, locatable minerals, energy minerals) and mineral potential ratings (eg, high, moderate, low, prospectively valuable), see the description of the alternatives considered in detail (this chapter).

14/ This figure was derived from the National Fire Management Analysis System as prepared for the Wenatchee National Forest. It is used to represent the most efficient level of protection identified in that process. The actual amount may vary significantly as there are changes in the values of resources and the costs incurred in fire suppression.

15/ Jobs and income figures are based on the actual timber volume harvested, not on the potential yield or volume sold.

16/ Includes "Land Suitable For Timber Production" plus lands that were tentatively suitable but not cost-efficient.

17/ Acres available for grazing include both currently suitable acres producing forage now and also those acres which will produce suitable transitory forage after trees have been harvested. Approximately one-half of the acres shown as available will be producing usable forage in any given decade. Acres shown for Alternatives NC, A/NFMA, C and F are acres within existing allotment only.

18/ Includes acres of clearcut and shelterwood regeneration cuts as computed by FORPLAN. Partial cutting acres are based on historic trends and 10 year action plans.

19/ Acres modeled in FORPLAN as clearcut. Includes some acres that may require shelter trees or, in extreme sites, unevenaged management to assure regeneration. Acres for Alternative NC are not modeled in FORPLAN.

20/ Acres of predominantly long rotation shelterwood - harvests. However, some clearcutting, and unevenaged management will be done based on site specific prescriptions by certified silviculturalists in consultation with various interdisciplinary specialists.

21/ Acres modeled in FORPLAN are labeled thinning but actually include overstory removal volumes as well. FORPLAN numbers do not include unestimated acres of salvage or unevenaged management as these were not modeled in FORPLAN. Historically, selective cutting included about 50 percent of the Forest acres harvested annually. Acres for Alternative NC are not modeled in FORPLAN.

22/ "Full Yield" includes GF-1, EW-1 and RM-1. For Alternative NC, Full Yield are the acres of "Standard" commercial forest land.

23/ "50 - 90 Percent of Full Yield" includes EW-2, OG-2, ST-1, WS-1 and WS-2. For Alternative NC, these are the acres of "Special" commercial forest land.

24/ The timber management plans upon which the No Change Alternative are based were developed in 1963 (Wenatchee) and 1969 (Naches). The plans were not integrated resource plans, and consequently did not address all resource uses and outputs. The missing information in this table cannot be reasonably estimated, since the original plans were based on yield tables and resource relationships which do not reflect the latest scientific techniques and information, do not reflect the standards in the NFMA regulations, or are otherwise inappropriate. Unit plans developed during the period 1976 to 1979 provided new standards and management objectives, which were used in on the ground management. Alternative A/NFMA - No Action is representative of the unit plans. Outputs and effects of all alternatives other than NC were calculated using updated inventories and yield tables and the latest methods of calculating timber harvest levels.

25/ This figure does not include all existing Forest Service administration withdrawals which are currently being reviewed per the requirements of the Federal Land Policy and Management Act of 1976. Those withdrawals cover approximately 7,627 acres (0.35% of the Forest), and have been included in the "Highly Sensitive" accessibility category of this table.

26/ These comparisons assume (1) Alternative "A/NFMA" is the base with which the other alternatives are varied, (2) a 1% decrease in the relative availability amount of area in withdrawals and/or highly restricted management prescription areas will result in a 1% decrease in production, (3) production of locatable minerals will come from areas identified as having a "moderate" to "high" potential for the occurrence of such, (4) production of energy minerals will come from areas identified to be prospectively valuable for these minerals.

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
1 AIR QUALITY	<p>None of the alternatives allow significant degradation of air quality</p> <p>The Forest will comply with all applicable air quality laws and regulations and coordinate with appropriate regulatory agencies. To meet Regional Standards and Guidelines, the Forest will demonstrate reasonable progress in reducing total suspended particulates (TSP) from prescribed burning. There will be no significant effects on air quality upon implementation of any of the alternatives proposed in this plan. Effects of air quality on other resources will not vary significantly by alternative. Prescribed burning would be done when atmospheric conditions allow dispersal of smoke and minimize smoke entering populated areas. Occasional short-term deterioration will occur in limited geographic areas.</p>				
2 VISUAL CHARACTER OF THE FOREST	<p>All major interstate scenic highways, Lake Chelan, portals to most wilderness areas would have protection along the foreground, but would be heavily altered in the middleground and background. The narrow strip of 200 foot foreground in this alternative creates high risk for retaining visual quality. Partial cutting with longer rotations will reduce screenings along travel routes. An unnatural appearing landscape would dominate the majority of the Forest landscape.</p>	<p>All major interstate scenic highway viewsheds would retain natural or slightly altered conditions. All major portals to wildernesses would retain natural or slightly altered visual character. The natural appearance of the Forest as viewed from Forest roads would be altered to heavily altered. The Alpine Lakes Management Unit would retain high visual quality. The natural appearing landscape character would appear slightly altered to altered on most of the Forest landscape.</p>	<p>Most interstate scenic highway viewsheds would retain natural or slightly altered conditions. White Pass (Hwy-12) would be an altered viewshed. Only Lake Chelan viewshed would retain natural visual character of the portals to wildernesses. All other major portals to wildernesses would not retain natural appearing character. The natural appearance of the Forest as viewed from Forest roads would be heavily altered. The Alpine Lakes Management Unit would retain high visual quality. An unnatural appearing landscape character would dominate the majority of the Forest landscape.</p>	<p>All major interstate scenic highway viewsheds would retain a natural or slightly altered conditions. Most major portals to wilderness would retain a natural appearing character. Unnatural portals would be Cash Prairie and North and South Fork of the Tieton. The natural appearance of the Forest as viewed from Forest roads would be altered. The Alpine Lakes Management Unit would retain high visual quality. The natural appearing landscape character would appear slightly altered on most of the Forest landscape.</p>	<p>Most interstate scenic highway viewsheds would retain natural or slightly altered conditions. An altered viewshed would be White Pass (Hwy-12). Only the Lake Chelan viewshed would retain a natural appearing character. The natural appearance of the Forest as viewed from Forest roads would be heavily altered. The Alpine Lakes Management Unit would retain high visual quality. The unnatural appearing landscape character would dominate the majority of the Forest landscape.</p>
3 CHANGES IN RECREATION USE PATTERNS	<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>	<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>	<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>	<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>	<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>
Unroaded Motorized Use Opportunity	<p>Increased in all portions of the Forest and somewhat evenly distributed.</p>	<p>Somewhat reduced in the north, greatly increased in the central and south.</p>	<p>Substantially increased in the north, moderately increased in the central and south.</p>	<p>Greatest use opportunity is on the northern half of the Forest.</p>	<p>Increased in both the north and south and essentially unchanged in the central portion.</p>
Unroaded Non-Motorized Use Opportunities	<p>Greatly increased in all areas with most opportunity in the north and south.</p>	<p>Substantially increased in the north, some increase in the central, and reduced in the south.</p>	<p>Greatly increased in the north, little change in the central and south portions of the Forest.</p>	<p>Are somewhat evenly distributed across the Forest.</p>	<p>Essentially unchanged in the north and central portions of the Forest. None available in the south other than on multi-purpose trails.</p>

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
<p>None of the alternatives allow significant degradation of air quality</p>					
<p>The Forest will comply with all applicable air quality laws and regulations and coordinate with appropriate regulatory agencies. To meet Regional Standards and Guidelines, the Forest will demonstrate reasonable progress in reducing total suspended particulates (TSP) from prescribed burning. There will be no significant effects on air quality upon implementation of any of the alternatives proposed in this plan. Effects of air quality on other resources will not vary significantly by alternative. Prescribed burning would be done when atmospheric conditions allow dispersal of smoke and minimize smoke entering populated areas. Occasional short-term deterioration will occur in limited geographic areas.</p>					
<p>All interstate scenic highway viewsheds would retain natural appearing visual character. All major portals to wildernesses would retain natural appearing visual character. The natural appearance of the Forest as viewed from Forest roads would be high. The Alpine Lakes Management Unit would retain high visual quality. The natural appearing landscape character would dominate the majority of the Forest landscape.</p>	<p>All interstate scenic highway viewsheds would retain natural appearing visual character. All major portals to wildernesses would retain natural appearing visual character. The natural appearance of the Forest as viewed from Forest roads would be high. All roadless non-motorized areas will have high visual quality. The Alpine Lakes Management Unit would retain high visual quality. The natural appearing landscape character would dominate the majority of the Forest landscape.</p>	<p>All interstate scenic highway viewsheds would retain natural appearing visual character. All major portals to wildernesses would retain natural appearing visual character. The natural appearance of the Forest as viewed from Forest roads would be high. All roadless motorized areas will have high visual quality. The Alpine Lakes Management Unit would retain high visual quality. The natural appearing landscape character would dominate the majority of the Forest landscape.</p>	<p>All interstate scenic highway viewsheds would retain natural appearing visual character. All major portals to wildernesses would retain natural appearing visual character. The natural appearance of the Forest as viewed from Forest roads would be heavily altered. The Alpine Lakes Management Unit would retain high visual quality. The natural appearing landscape character would appear slightly altered to altered on most of the Forest landscape.</p>	<p>All major interstate scenic highway viewsheds would retain natural or slightly altered conditions. All major portals to wildernesses would retain natural or slightly altered visual character. The natural appearance of the Forest as viewed from Forest roads would be altered to heavily altered. The Alpine Lakes Management Unit would retain high visual quality. The natural appearing landscape character would appear slightly altered on most of the Forest landscape.</p>	<p>Most interstate scenic highway viewsheds would retain natural or slightly altered conditions. White Pass (Hwy-12) would be an altered viewshed. Only Lake Chelan viewshed would retain natural visual character of the portals to wildernesses. All other major portals to wildernesses would not retain natural appearing character. The natural appearance of the Forest as viewed from Forest roads would be heavily altered. The Alpine Lakes Management Unit would retain high visual quality. An unnatural appearing landscape character would dominate the majority of the Forest landscape.</p>
<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>	<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>	<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>	<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>	<p>Current developed recreation use patterns would remain basically unchanged. Dispersed use would shift in accordance with the availability of unroaded areas and motorized/non-motorized opportunities as described below. Wilderness use opportunity is well distributed north to south along the western Forest boundary. Use may shift from older established areas to newer areas from visitors seeking a change or becoming acquainted with them.</p>	<p>Current developed recreation use patterns would remain basically unchanged. Roaded use would be more widely distributed across the forest with the roading of unroaded areas as described below. Wilderness use opportunity is well distributed north to south along the western forest boundary. Use may shift from visitors seeking a change or becoming familiar with new areas.</p>
<p>Most on the north part of the Forest.</p>	<p>Greatest use opportunity is on the northern half of the Forest.</p>	<p>Mostly in the north but reduced, balanced between the central and the south.</p>	<p>Increased both north and south and essentially unchanged in the central portions.</p>	<p>Reduced and mostly available in the north. Essentially the same for the central and south portions.</p>	<p>Greatly reduced across Forest with only a small amount of use opportunity in the north.</p>
<p>Most on the northern half of the Forest.</p>	<p>Somewhat evenly distributed across the Forest.</p>	<p>Increased in the north with little changes in the central and south portions of the Forest.</p>	<p>Essentially unchanged in the north and central portions of the Forest. None available in the south other than on multi-purpose trails.</p>	<p>Increased in the north, little changes in the central portions, substantially reduced in the south.</p>	<p>Decreased across the forest.</p>

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
Roaded Motonized Use Opportunity	Increased over the entire Forest.	Use and opportunity is evenly distributed	Increased over the entire Forest.	Slightly reduced but essentially evenly distributed	Increased over the entire Forest.
4 THE ACCESSIBILITY FOR EXPLORATION OF POTENTIAL MINERALIZED AREAS	This Alternative would restrict access to locatable and energy mineral resources the least of any alternatives.	This Alternative may encourage mineral exploration and development more than Alternatives C,E,F,G,H and I, but Alternatives B,D and J may encourage mining activities more than this Alternative will	This Alternative may encourage mineral exploration and development more than all of the Alternatives except D and I	This Alternative may encourage mineral exploration and development more than all of the Alternatives except A,B,D,H, and I	As with Alternative B, this Alternative may encourage mineral exploration and development more than all of the Alternatives except B and J
5 ENERGY FUELWOOD FOR DOMESTIC USE Accessibility, Quality, Location, and Quantity,	<p style="text-align: center;">←----- Fuelwood for both commercial and private collection exceeds demand at the present time Individual wood cutting permits currently are about 14 percent of the sawlog production As much of the quality wood available is the result of timber harvest residue and new road access, the amount of quality wood will closely follow the harvest level for at least the next five decades Amounts shown in Table II-3c are estimated to be approximately the same as the current 14 percent programmed sale volume Fuelwood available by alternative in thousands of cubic feet is</p>				
	4,396	3,052	4,690	3,400	4,018
Small Hydroelectric Sites (Proposed)	25	25	40	25	40
Transmission Corridors (Acres)	<p style="text-align: center;">←----- Existing 1/- 1,420 -----></p> <p style="text-align: center;">←----- Proposed 2/- 420 -----></p> <p>1/ Estimated acreage of National Forest land within utility corridors 2/ Estimate of National Forest acres that might lie within the "proposed" utility corridor identified in the Western Regional Corridor Study for the State of Washington</p>				
Conservation, In-Agency	Ranks tenth in the conservation of energy	The largest amount of energy is consumed in the processing and utilization of the timber resource. (See Table in Chapter IV) Those alternatives that harvest the least amount of timber conserve the most energy Therefore, Alternative A is ranked fourth	Ranks ninth in the conservation of energy	Ranks fifth in the conservation of energy	Ranks seventh in the conservation of energy
6 EFFECTS ON ON-GOING ECONOMIC TRENDS					
Changes in Industries	Logging and wood processing sectors increase above current levels to the second highest of any alternative Other industries increase slightly	Logging and wood processing sectors decline from the 1982 Base Period Level Retail and services trade sectors increase slightly	Logging and wood processing sectors increase from the 1982 Base Period Level Retail and services trade sectors increase slightly	Logging and wood processing sectors decline from the 1982 Base Period Level Retail and services trade sectors increase slightly	Logging and wood processing sectors decline from the 1982 Base Period Level Retail and services trade sectors increase slightly

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Little change in opportunity and evenly distributed	Little change but essentially even in distribution	Somewhat unchanged with relatively even distribution	Use and opportunity is evenly distributed	Slightly reduced but essentially evenly distributed	Increased over the entire forest.
<i>This Alternative may discourage mineral exploration and development more than any of the other Alternatives</i>	<i>This Alternative may discourage mineral exploration and development more than any of the Alternatives except Alternative E.</i>	<i>This Alternative may encourage mineral exploration and development more than Alternatives E and F, but may discourage such activities more than the other alternatives</i>	<i>This Alternative may encourage mineral exploration and development more than Alternatives C,E,F,G, and I, but may discourage such activities more than the other Alternatives</i>	<i>This Alternative may encourage mineral exploration and development more than all of the Alternatives except E,F and G activities more than Alternatives A,B,D and J</i>	<i>This Alternative may encourage mineral exploration and development more than all of the other Alternatives except B and D</i>

←----- Fuelwood for both commercial and private collection exceeds demand at the present time. Individual wood cutting permits currently are about 14 percent of the sawlog production. As much of the quality wood available is the result of timber harvest residue and new road access, the amount of quality wood will closely follow the harvest level for at least the next five decades. Amounts shown in Table II-3c are estimated to be approximately the same as the current 14 percent programmed sale volume. Fuelwood available by alternative in thousands of cubic feet is

1,810	1,900	2,450	3,850	3,880	4,770
10	15	20	25	25	40

←----- Existing 1/ - 1,420 -----
 ----- Proposed 2/ - 420 -----

1/ Estimated acreage of National Forest land within utility corridors
 2/ Estimate of National Forest acres that might lie within the "proposed" utility corridor identified in the Western Regional Corridor Study for the State of Washington

Ranks first in the conservation of energy	Ranks second in the conservation of energy	Ranks third in the conservation of energy	Ranks sixth in the conservation of energy	Ranks eighth in the conservation of energy	Ranks eleventh in the conservation of energy
Logging and wood processing sectors decline from the 1982 Base Period Level. Retail and services trade sectors increase slightly.	Logging and wood processing sectors decline from the 1982 Base Period Level. Retail and services trade sectors increase slightly.	Logging and wood processing sectors decline from the 1982 Base Period Level. Retail and services trade sectors increase slightly.	Logging and wood processing sectors increase from the 1982 Base Period Level. Retail and services trade sectors increase slightly.	Logging and wood processing sectors increase from the 1982 Base Period Level. Retail and services trade sectors increase slightly.	Logging and wood processing sectors increase from the 1982 Base Period Level. Retail and services trade sectors increase slightly.

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
Changes in Occupations & Employment	Increase of about 378 jobs from current situation. Approximately half of the jobs would be in the logging and wood processing sectors. The remainder would be primarily in wholesale and retail trade and the service sectors.	Increase of 39 jobs from 1982 Base Period Level. Logging and wood processing sectors decline by 132 jobs.	Increase of 577 jobs from 1982 Base Period Level. Logging and wood processing sectors increase by 137 jobs.	Increase of 203 jobs from 1982 Base Period Level. Logging and wood processing sectors decrease by 50 jobs.	Increase of 279 jobs from 1982 Base Period Level. Logging and wood processing sectors decrease by 12 jobs.
7 SOCIAL EFFECTS	←-----No measurable differences between alternatives-----→				
Population	←-----No measurable differences between alternatives-----→				
Lifestyles (Work and Leisure)	An increase of about 378 jobs from the current situation, with one-half of those jobs in rural woods products industrial communities (logging and wood processing). The remaining jobs would accrue in the wholesale and retail trade and service sectors. The altered appearance of the Forest would have adverse effects on rural recreational and residential communities and visitors from metropolitan areas. This alternative would be beneficial to other racial and cultural minorities, principally Hispanic Americans, owing to their participation in the increased general economic activity. Similarly, women would benefit from the increased economic activity.	Increase in employment in retail trade and service sectors. Decrease in logging and wood processing sectors. Adverse effects on rural communities with wood products industries. No effect on visitors from metropolitan areas or rural communities with tourism attractions.	Increase in employment in retail trade and service sectors. Increase in logging and wood processing sectors. Probable adverse effects with rural communities with tourism attractions and visitors from metropolitan areas. Positive effects on rural communities with wood products industries.	Increase in employment in retail trade and service sectors. Some decrease in logging and wood processing sectors. Positive effects on visitors from metropolitan areas and communities with tourism based economies. Some adverse effect on communities with wood products industries.	Increase in employment in retail trade and service sectors. Minor decrease in logging and wood processing sectors. Probable adverse effects on tourist based rural communities and tourists from metropolitan areas. Minor to no effect on communities with wood products industries.
Attitudes Beliefs and Values/ Expectations For Minimal Change	Land designations would not be consistent with people's beliefs and values. Adverse effects due to changes in local environmental amenities and recreational opportunities would conflict with what the American Indian community and other groups expect.	Land designations are generally consistent with people's beliefs and values. American Indian communities would benefit from improved protection of cultural sites, treaty right activities, and anadromous fish habitat.	Land designations would not be consistent with people's beliefs and values. Adverse effects due to changes in local environmental amenities and recreational opportunities would conflict with what the American Indian community and other groups expect.	Land designations are generally consistent with people's beliefs and values. American Indian communities would benefit from improved protection of cultural sites, treaty right activities, and anadromous fish habitat. Changes from current conditions would be minimal and occur gradually over time.	Land designations are generally consistent with people's beliefs and values. Changes would occur more rapidly in those areas designated for intensive timber management. The effects on American Indian beliefs and attitudes would be more intense in these areas.

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Decrease of 520 jobs from 1982 Base Period Level Logging and wood processing sectors decrease by 388 jobs	Decrease of 473 jobs from 1982 Base Period Level Logging and wood processing sectors decline 411 jobs	Decrease of 225 jobs from 1982 Base Period Level Logging and wood processing sectors decline by 264 jobs	Increase of 324 jobs from 1982 Base Period Level Logging and wood processing sectors increase by 11 jobs	Increase of 413 jobs from 1982 Base Period Level Logging and wood processing sectors increase by 55 jobs	Increase of 630 jobs from 1982 Base Period Level Logging and wood processing sectors increase by 164 jobs

←-----No measurable differences between alternatives----->

Slight increase in retail trade and service sectors Major decrease in Logging and wood processing sectors Positive effects on tourists from metropolitan areas and tourist based rural communities Major adverse effects on communities with wood products industries	Slight increase in retail trade and service sectors Major decrease in logging and wood processing sectors Positive effects on tourists from metropolitan areas and tourist based rural communities Major adverse effects on communities with wood products industries	Slight increase in retail trade and service sectors Large decreases in logging and wood processing sectors Neutral effects on tourists from metropolitan areas and tourist based rural communities Positive benefits to motorized users, generally blue-collar occupations Significant impacts on communities with wood processing industries	Increase in retail trade and service sectors Minor increase in logging and wood processing sectors Adverse effects with tourists and tourist based rural communities Positive effects on rural communities with wood products industries	Increase in employment in retail trade and service sectors Increase in logging and wood processing sectors Probable adverse effects with rural communities with tourists attractions and visitors from metropolitan areas Positive effects on rural communities with wood products industries	Large increase in employment in retail trade and service sectors driven by increase in logging and wood processing sectors Adverse effects on tourists from metropolitan areas and tourist based communities Major positive effects on rural communities with wood products industries
Land designations would not be consistent with the beliefs and values of rural/industrial and industrial communities American Indian concerns are alleviated in large part owing to the reduced activity on the Forest.	These effects are similar to those in Alternative E but would be less intense	These effects are similar to those in Alternative E but would be less intense	Land designations are generally consistent with people's beliefs and values Adverse effects are related to the more intensive timber management that would occur in areas designated for timber production	Land designations are generally consistent with people's beliefs and values Adverse effects are related to the more intensive timber management that would occur in areas designated for timber production	Land designations are generally consistent with people's beliefs and values Changes occur more rapidly in those areas designated for intensive timber management. The effects on American Indian beliefs and attitudes would be more intense in these areas

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
Community Cohesion	Community cohesion would be tested. There would be polarization on the roadless and scenery issues, and conflicts would intensify.	Community cohesion would be maintained. However, conflicts on the roadless area issue would intensify because of the loss of jobs.	Community cohesion would be tested. There would be polarization on the roadless and scenery issues, and conflicts would intensify.	Community cohesion is maintained. There would be increased conflict on the roadless issue and about sensitive scenic travel corridors, especially those near rural recreational and residential communities.	Community cohesion would be maintained. However, conflicts on the roadless issue would intensify because of the loss of jobs.
8 CIVIL RIGHTS	<-----The civil rights of individuals will be protected by all alternatives----->				
9 AMERICAN INDIAN	<-----Every alternative would involve continuing coordination with the American Indian community in accordance with the American Indian Religious Freedom Act. This will ensure that concerns regarding both the protection of ancestral sites and the freedom to continue traditional American Indian religious uses of the Forest lands and resources are considered. Until such time as specific use localities can be identified, the consequences of the individual alternatives cannot be determined, except to assume that the more intensive the level of modification the more likely is the alternative to adversely affect areas of potential significance to the American Indians.----->				
Treaty Rights	<-----Those rights reserved to the Indians of the Colville and Yakima Reservations by the Treaty with the Yakimas, June 9, 1855, will be honored in all alternatives----->				
(1) Anadromous Fisheries Treaty Rights	While best management practices would apply, Forest-wide Riparian and Fish Standards are not integrated into this Alternative and fish habitat improvement/rehabilitation is not emphasized. Because Alternative NC does not include Forest-wide Standards for fish and riparian habitat and because Alternative NC would allocate the most land to ground disturbing activities, this alternative has the highest risk of not meeting fish habitat objectives on the Forest.	<-----In all alternatives, except Alt. NC, the objective is to maintain and improve resident and anadromous fish habitat capability on the Forest. Each alternative includes Forest-wide Riparian and Fish Standards for managing fish habitat and includes expenditures for fish habitat improvement. Habitat improvement expenditures vary by alternative, but the net effect in each should be an improving trend in fish habitat capability.-----> Alternatives B, J and D allocate the most land to development activities such as timber management and roading and therefore have a relatively high risk of not meeting fish habitat objectives. Alternatives A, C, H and I pose a relatively moderate risk of not meeting habitat objectives, compared between Alternatives, while Alternatives G, F and E pose somewhat less risk. (See Chapter IV, Fisheries) Forest management of stream systems should maintain and improve habitat capability. Whether anadromous fish escapement to the forest and whether fish harvest attributable to fish produced on the Forest will increase will depend upon many factors. These revolve around programs aimed at improving fish runs in the Wenatchee, Entiat and Yakima Rivers and the Columbia Basin, such as the Northwest Power Planning Council's Fish and Wildlife program. With continued and improved coordination between the Forest Service and other groups and agencies which affect fisheries potential, long-term compliance with the Treaty is anticipated.			

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
In rural areas community cohesion would be strained because of the loss of jobs and unemployment in rural wood products communities. In metropolitan areas, the effects on cohesion are generally considered to be positive.	These effects are similar to those in Alternative E but would be less intense.	These effects are similar to those in Alternative E but would be less intense.	Community cohesion would be maintained. Some conflicts would likely develop because of the potential for reduced visual quality near rural recreational and residential communities.	Eastside urban areas and rural recreational and residential communities will experience more conflict and less cohesion because of the intensity of timber harvest in localized areas. People in metropolitan areas may experience concern because of the more intensive program with its attendant effects on unroaded areas and scenery.	Community cohesion would be maintained. However, conflicts on the roadless issue would intensify because of the loss of jobs.

←-----The civil rights of individuals will be protected by all alternatives----->

←-----Every alternative would involve continuing coordination with the American Indian community in accordance with the American Indian Religious Freedom Act. This will ensure that concerns regarding both the protection of ancestral sites and the freedom to continue traditional American Indian religious uses of the Forest lands and resources are considered. Until such time as specific use localities can be identified, the consequences of the individual alternatives cannot be determined, except to assume that the more intensive the level of modification the more likely is the alternative to adversely affect areas of potential significance to the American Indians----->

←-----Those rights reserved to the Indians of the Colville and Yakima Reservations by the Treaty with the Yakimas, June 9, 1855, will be honored in all alternatives----->

←-----In all alternatives, except Alt. NC, the objective is to maintain and improve resident and anadromous fish habitat capability on the Forest. Each Alternative includes Forest-wide Riparian and Fish Standards for managing fish habitat and includes expenditures for fish habitat improvement. Habitat improvement expenditures vary by Alternative, but the net effect in each should be an improving trend in fish habitat capability----->

Alternatives B, J and D allocate the most land to development activities such as timber management and roading and therefore have a relatively high risk of not meeting fish habitat objectives. Alternatives A, C, H and I pose a relatively moderate risk of not meeting habitat objectives, compared between Alternatives, while Alternatives G, F and E pose somewhat less risk. (See Chapter IV, Fisheries)

Forest management of stream systems should maintain and improve habitat capability. Whether anadromous fish escapement to the forest and whether fish harvest attributable to fish produced on the Forest will increase will depend upon many factors. These revolve around programs aimed at improving fish runs in the Wenatchee, Entiat and Yakima Rivers and the Columbia Basin such as the Northwest Power Planning Council's Fish and Wildlife program. With continued and improved coordination between the Forest Service and other groups and agencies which affect fisheries production and potential, long-term compliance with the Treaty is anticipated.

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	Alternative NC	Alternative A/NFMA	Alternative B	Alternative C Preferred	Alternative D
(2) Hunting and Gathering Treaty Rights	<p>Wildlife habitat is not fully integrated into the NC alternative so large game populations could decrease almost 60 percent as a result of loss of cover and habitat.</p> <p>There will be some decrease in huckleberry production, but no overall change in the availability of edible root plants.</p>	<p>There will be an overall negative impact on the size of large game populations. There will be a significant drop by the fifth decade due to the loss of cover. Populations will stabilize by the fifth decade but at a level 15 percent lower than present.</p> <p>There will be some increase in huckleberry production, but no overall change in availability.</p>	<p>There will be an overall negative impact on the size of the large game populations. There will be a significant drop by the fifth decade due to the loss of cover. Populations will stabilize by the fifth decade but at a level 20 percent lower than present.</p> <p>Huckleberry production should increase substantially, unless brush control becomes a major emphasis. There will be no overall change in the availability of edible root plants.</p>	<p>Large game populations will remain at about the current level.</p> <p>There will be some increase in huckleberry production, but no overall change in the availability of edible root plants.</p>	<p>There will be an overall negative impact on the size of the large game populations. There will be a significant drop by the fifth decade due to the loss of cover. Populations will stabilize by the fifth decade but at a level 20 percent lower than present.</p> <p>Huckleberry production should increase substantially, unless brush control becomes a major emphasis. There will be no overall change in the availability of edible root plants.</p>
10 URBAN QUALITIES AND THE BUILT ENVIRONMENT	<p>←-----None of the alternatives has an effect on urban qualities and the built environment.-----→</p>				
11 HISTORIC AND CULTURAL RESOURCES	<p>Majority of cultural resources are subject to potentially high levels of impact from other land uses. Substantial modification of visual settings around significant sites is likely. High risk of impact to currently unidentified, sub-surface sites. Loss of non-significant sites may be high. Likelihood of cumulative effects. Mitigation measures or project modification may frequently be necessary. High number of acres inventoried for cultural resources. Cultural resources management options are constrained and opportunities for interpretation limited.</p>	<p>Majority of cultural resources are subject to potentially moderate to high levels of impact from other land uses. Visual settings around significant sites may experience moderate risk of impact to the viewer. Moderate risk of impact to currently unidentified, sub-surface sites. High number of acres inventoried for cultural resources. Provides for a variety of management options and opportunities for interpretation.</p>	<p>Majority of cultural resources are subject to potentially high levels of impact from other land uses. Substantial modification of visual settings around significant sites is likely. High risk of impact to currently unidentified, sub-surface sites. Loss of non-significant sites may be high. Likelihood of cumulative effects. Mitigation measures or project modification may frequently be necessary. High number of acres inventoried for cultural resources. Cultural resources management options are constrained and opportunities for interpretation limited.</p>	<p>Majority of cultural resources are subject to potentially moderate to high levels of impact from other land uses. Visual settings around significant sites may experience moderate risk of impact to the viewer. Moderate risk of impact to currently unidentified, sub-surface sites. High number of acres inventoried for cultural resources. Provides for a variety of management options and opportunities for interpretation.</p>	<p>Majority of cultural resources are subject to potentially high levels of impact from other land uses. Substantial modification of visual settings around significant sites is likely. High risk of impact to currently unidentified, sub-surface sites. Loss of non-significant sites may be high. Likelihood of cumulative effects. Mitigation measures or project modification may frequently be necessary. High number of acres inventoried for cultural resources. Cultural resources management options are constrained and opportunities for interpretation limited.</p>
12 LAND USE CHANGES Prime Farmlands, Rangelands, and Forest land	<p>←-----We are coordinating with various entities, such as State and local governments and Indian tribes, and none of the alternatives create direction which is in conflict with State and local controls and directions.-----→</p> <p>←-----It has been determined by the U S D A. Soil Conservation Service and confirmed by the Forest Service that there are no prime farmlands or rangelands on the Forest.-----→</p> <p>Prime forest land is a term used only for non-federal land and does not apply to Forest Service lands.</p>				

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
<p>There will be beneficial effects on the availability of large game cover and forage. As a consequence, game populations should increase and stabilize by the fifth decade at a level approximately 10 percent greater than at present.</p> <p>There will be some loss in huckleberry habitat, but no overall change in the availability of edible root plants.</p>	<p>There will be beneficial effects on the availability of large game cover and forage. As a consequence, game populations should increase and stabilize by the fifth decade at a level approximately 10 percent greater than at present.</p> <p>There will be some loss in huckleberry habitat, but no overall change in the availability of edible root plants.</p>	<p>There will be beneficial effects on the availability of large game cover and forage. As a consequence, game populations should increase and stabilize by the fifth decade at a level approximately 10 percent greater than at present.</p> <p>There will be some decrease in huckleberry production, but no overall change in the availability of edible root plants.</p>	<p>There will be an overall negative impact on the size of large game populations. There will be a significant drop by the fifth decade due to the loss of cover. Populations will stabilize by the fifth decade but at a level 15 percent lower than present.</p> <p>There will be some increase in huckleberry production, but no overall change in the availability of edible root plants.</p>	<p>There will be an overall negative impact on the size of large game populations. There will be a significant drop by the fifth decade due to the loss of cover. Populations will stabilize by the fifth decade but at a level 20 percent lower than present.</p> <p>There will be some increase in huckleberry production, but no overall change in the availability of edible root plants.</p>	<p>There will be overall negative impact on the size of the large game populations. There will be a significant drop by the fifth decade due to the loss of cover. Populations will stabilize by the fifth decade but at a level 20 percent lower than present.</p> <p>Huckleberry production should increase substantially, unless brush control becomes a major emphasis. There will be no overall change in the availability of edible root plants.</p>

None of the alternatives has an effect on urban qualities and the built environment.

<p>Majority of cultural resources are subject to potentially moderate to low levels of impact from other land uses. Visual settings around significant sites will likely be unaltered. Very little risk to currently unidentified sub-surface sites. Protection of non-significant sites is likely. The necessity of mitigation measures or project modification will be infrequent. Total number of acres inventoried for cultural resources would be somewhat limited. Provides for a variety of management opportunities for interpretation.</p>	<p>Majority of cultural resources are subject to potentially moderate to low levels of impact from other land uses. Visual settings around significant sites will likely be unaltered. Very little risk to currently unidentified sub-surface sites. Protection of non-significant sites is likely. The necessity of mitigation measures or project modification will be infrequent. Total number of acres inventoried for cultural resources would be somewhat limited. Provides for a variety of management opportunities for interpretation.</p>	<p>Majority of cultural resources are subject to potentially moderate to low levels of impact from other land uses. Some conflicts with motorized trail use are likely. Visual settings around significant sites will be unaltered. Some risk to currently unidentified, sub-surface sites from motorbike and 4x4 vehicles. Protection of non-significant sites is likely. Total number of acres inventoried for cultural resources would be somewhat limited. Provides for a variety of management options and opportunities for interpretation.</p>	<p>Majority of cultural resources are subject to potentially moderate to high levels of impact from other land uses. Visual settings around significant sites may experience modification apparent to the viewer. Moderate risk of impact to currently unidentified, sub-surface sites. High number of acres inventoried for cultural resources. Provides for a variety of management options and opportunities for interpretation.</p>	<p>Majority of cultural resources are subject to potentially moderate to high levels of impact from other land uses. Visual settings around significant sites may experience modification apparent to the viewer. Moderate risk of impact to currently unidentified, sub-surface sites. High number of acres inventoried for cultural resources. Provides for a variety of management options and opportunities for interpretation.</p>	<p>Majority of cultural resources are subject to potentially high levels of impact from other land uses. Substantial modification of visual settings around significant sites is likely. High risk of impact to currently unidentified, sub-surface sites. Loss of non-significant sites may be high. Likelihood of cumulative effects. Mitigation measures or project modification may frequently be necessary. High number of acres inventoried for cultural resources. Cultural resources management options are constrained and opportunities for enhancement limited.</p>
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We are coordinating with various entities, such as State and local governments and Indian tribes, and none of the alternatives create direction which is in conflict with State and local controls and directions.

It has been determined by the U.S.D.A. Soil Conservation Service and confirmed by the Forest Service that there are no prime farmlands or rangelands on the Forest.

Prime forest land is a term used only for non-federal land and does not apply to Forest Service lands.

TABLE II-3b

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
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←-----The Riparian-Aquatic Habitat Protection Zone allocation (EW-2) is applied where vegetation manipulation can occur. Those alternatives which have the fewest acres in this allocation will offer the best protection for wetland and floodplains, because fewer acres are subject to timber harvest. Acres in this management area by alternative are as follows----->

38,012	40,832	47,573	52,301	47,361	52,470
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The management standards and guidelines for this prescription in the plan provide better habitat for dependent species in the future than has been done in the past. Therefore, species dependent upon this habitat will be maintained or increase in numbers. This should provide more species for non-consumptive recreational use of wildlife.

←-----The area around the Wenatchee National Forest is one of the areas not meeting the recovery objectives in the State of Washington. The Forest is emphasizing bald eagle management by increasing the recovery goals for this species from 2 in the Draft EIS to 8 in the Final EIS to meet the recovery plan. There is 1 active nest on the Forest now and 2 others suspected----->

The Forest has been partially surveyed for peregrine falcons and there are a number of good potential nesting sites. In coordination with other groups, the Forest is participating in Falcon introductions. Therefore, it is likely that active nests sites will be on Forest in a few years. Habitat and plans for sensitive animals will be developed for maintaining these species.

←-----Big game management is gathering habitat inventories. Once this is done, the Forest can use existing models and research to provide populations of these species. The alternatives provide increases and decreases in both summer and winter range at various magnitudes. There are management problems that are specific to each area that will be resolved in the future----->

←-----There is a moderate to good inventory of spotted owl habitat and occupancy by spotted owls. The estimates of effects are fairly accurate. The marten and pileated woodpecker need inventories of habitat and populations to determine if the estimates are valid. The fifth decade estimate of numbers is near the lowest population levels of these species----->

←-----The Forest has many acres of habitat for these species in wilderness or roadless areas. Therefore the question is not if the Forest will provide a viable population but whether the Forest will maintain distribution of habitat and enough numbers for recreational use----->

←-----In the past decade, there were less people hunting than in previous decades. This trend is expected to continue. Therefore, there will be less need to provide big game for hunting in the future. There has been a six-fold increase in non-consumptive use of wildlife from 1975 to 1985. This is a large increase. The trend is expected to continue but not at the same rate as during the past 10 years. Management of wildlife in coordination with recreation will be more important than in the past----->

←-----These estimates of Diversity by alternative were derived by combining estimates for both plant and animal species as well as community diversity elements. The rating reflects the similarity of the diversity in an alternative to that found within the natural environment, therefore High indicates a high similarity to natural diversity. Estimates do not include invertebrates or non-vascular plants----->

High	High	Moderate-High	Low-Moderate	Low-Moderate	Low-Moderate
The American, Cle Elum, Icicle, Little Wenatchee, White, Napeequa, Chiwawa, Entiat, Wenatchee, and Waptus Rivers are recommended for inclusion in the Wild and Scenic Rivers System, at their highest potential classification. See Table IV-3 for proposed river classification.	The American, Cle Elum, Icicle, Little Wenatchee, White, Napeequa, Chiwawa, Entiat, Wenatchee, and Waptus Rivers are recommended for inclusion in the Wild and Scenic Rivers System, at their highest potential classification. See Table IV-3 for proposed river classification.	The Chiwawa, White, and Wenatchee Rivers are recommended for inclusion in the Wild and Scenic Rivers System. See Table IV-3 for potential river classifications.	The American, Waptus, and Entiat Rivers, and segments of the Cle Elum, Icicle, Chiwawa, White, Napeequa, and Wenatchee Rivers are recommended for inclusion in the Wild and Scenic Rivers System. See Table IV-3 for proposed river classifications.	The American, Cle Elum, Waptus, Icicle, White, Waptus, Chiwawa, Napeequa, Entiat, and Wenatchee Rivers are recommended for inclusion in the Wild and Scenic Rivers System. See Table IV-3 for potential river classifications.	No rivers are recommended for designation. River corridors would be subject to a full range of management activities, with potential for effects to outstanding river values and free-flowing characteristics.

TABLE II-3C
COMPARISON OF PAST, PRESENT, AND ALTERNATIVE TIMBER OUTPUTS
(MMBF/Year)

TIMBER OUTPUT COMPONENTS	1963 & 1969 TM PLANS POTENTIAL YIELD ^{1/}	1975-1984 AVERAGE VOLUME SOLD	ALTERNATIVES ^{3/}									
			A/NFMA	B	C <i>Preferred</i>	D	E	F	G	H	I	J
I ALLOWABLE SALE QUANTITY (ASQ) The allowable sale quantity is composed of those volumes resulting from the yield projections of FORPLAN ASQ is obtained from lands designated as suitable for timber production under NFMA standards, and meets the utilization standards in the Regional Guide. When sold, the volume is called "chargeable", and is used to determine achievement of planned allowable sale quantity goals ^{4/}	170.8 ^{2/}	159	121	169	136	143	72	76	98	147	155	170
II SAWTIMBER FROM LANDS DESIGNATED UNSUITABLE FOR TIMBER PRODUCTION - This incidental volume is an estimate of timber that will be sold from lands not designated for timber production. These sales are generally associated with vegetative management for other resources. Though meeting Regional Guide utilization standards, this volume is not considered "chargeable" against the planned allowable sale quantity goals ^{5/}	6.0	2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
III SUBMERCHANTABLE VOLUMES FROM ALL LANDS - The estimated timber volume that does not meet the utilization standards in the Regional Guide, but which could be utilized for products other than sawtimber. It is not considered "chargeable" against planned allowable sale quantity goals ^{5/}												
A Fuelwood		4.4	3	5	3	4	2	2	2	4	4	4
B Other (Including Cull)		3.4	2	4	3	2	0	2	3	3	4	4
Total Submerchantable timber		7.8	5	9	6	6	2	4	5	7	7	9
TOTAL NET MERCHANTABLE SAWTIMBER	170.8	161	123	171	138	145	74	78	100	149	157	176
TOTAL NONCHARGEABLE	6.0	9.8	7	11	8	8	4	6	7	11	11	13
IV TIMBER SALE PROGRAM QUANTITY The timber sale program quantity includes the allowable sale quantity for the first decade and estimated additional volume planned for sale during the first decade, such as Fuelwood	176.8	169.6 ^{6/}	130	182	146	153	76	82	105	158	166	187

^{1/} The assumptions that were used in the existing timber management plan to calculate potential yield differ from those that were used to calculate Allowable Sale Quantity. While potential yield represented a level that could be produced, allowable sale quantity represents a timber objective and program for achievement of planned levels. However, both the potential yield and allowable sale quantity do represent a ceiling on the amount of chargeable timber volume that could be sold for a given decade. In this context, the two terms are comparable.

^{2/} Yield of timber projected for the period 1980 to 1989, as calculated for the 1963 & 1969 Timber Management Plans, revised in 1984. The potential yield is only that volume that is shown under Sawtimber (chargeable). Yield predictions are based on methods no longer used. The nonchargeable volume is marginal lands on the Wenatchee W.C.

^{3/} Allowable sale quantity calculated for the current land and resource management plan direction, projected into future using best available information for yield tables and suitability for timber harvest, and using the FORPLAN harvest scheduling model.

^{4/} Chargeable - wood that is attributed to Potential Yield (green and salvage) or Allowable Sale Quantity. ASQ includes salvage volume only when it otherwise would have been sound sawlog size volume. Examples are windthrow, fire kill, and widespread mortality from insect and disease.

^{5/} Non-chargeable - all volume not included in growth and yield projection for the selected management prescriptions used to arrive at Allowable Sale Quantity or the Potential Yield.

TABLE II-3d

TIMBER RESOURCE MANAGEMENT INFORMATION BY BENCHMARK AND ALTERNATIVE

Benchmark or Alternative	Selected Suitable Lands 1000 Acres (1)	Begin MMCF (2)	INVENTORY		FIRST DECADE ANNUAL ASQ			LONG-TERM SUSTAINED YIELD			AVERAGE ANNUAL NET GROWTH		
			Begin/Ac CF (3)	End MMCF (4)	MMCF (5)	% of Col(2) (6)	MMBF (7)	MMCF (8)	Col(4) (9)	Met (10)	Present CF/Acre (11)	2030 (12)	2030 MMCF (13)
Benchmark													
Max PNV	726	NA	NA	NA	29 9	NA	163 0	34 8	NA	NA	34 1	25 7	29 9
Max Timber	NA	NA	NA	NA	38 5	NA	209 8	39 2	NA	NA	47 7	37 1	38 5
Max Recreation	NA	NA	NA	NA	15 8	NA	86 1	19 8	NA	NA	38 7	17 8	15 8
Alternative													
NC	788	NA	NA	NA	31 3	NA	170 8	29 9	NA	1	NA	NA	NA
A/NFMA	592	1,901	2,528	1,567	21 8	1.1	121 4	27 7	1 8	14	22 8	25 9	15 3
B	681	1,986	2,916	1,224	33 5	1 7	169.1	34 2	2 8	1	21 0	36 1	24 6
C - Preferred	576	1,807	3,137	1,339	24 3	1.3	136 0	27 2	2 0	1/	21 3	28 8	16 6
D	644	1,986	3,084	1,655	25 6	1 5	142 7	30.8	1 9	14	21 5	30 1	19 4
E	411	1,296	3,154	925	12 9	1.0	71 9	18 7	2 0	7	23 4	24 4	10 0
F	421	1,344	3,192	953	13 6	1 0	76.0	19 2	2 0	7	23 7	24 6	10 4
G	583	1,615	2,770	1,233	17 5	1.1	98 0	23 4	1 9	14	20 0	20 9	12 2
H	604	1,902	3,148	1,184	27 5	1 5	146 7	29 0	2 5	15	22 3	26 2	15 8
I	576	1,807	3,138	1,418	27 7	1 5	154 6	27 1	1 9	1 2/	21.3	31 5	18 1
J	690	2,006	2,907	1,193	34.1	1 7	173 8	34 8	2.9	1	21 1	36 4	25 6

1/ Harvest in decade 15 is 89% of long-term sustained yield

2/ Departure alternative

NA = Not Available

TABLE II-3d

TIMBER RESOURCE MANAGEMENT INFORMATION BY BENCHMARK AND ALTERNATIVE

(Continued)

Benchmark or Alternative	AREA AND % OF SUITABLE LAND BY YIELD LEVEL						FIRST DECADE			
	Full Yield		50-90% Yield		Under 50% Yield		Clearout M Acres (20)	Shelterwood/Seed Tree M Acres (21)	Selection M Acres (22)	Harvest Total % Col (1) (23)
	M Acres (14)	% Col (1) (15)	M Acres (16)	% Col (1) (17)	M Acres (18)	% Col (1) (19)				
Max PNV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Max Timber	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Max Rec	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alternative										
NC	683	87	105	13	0	---	39 4	39 2	19 0	12
A/NFMA	251	42	341	58	0	---	25 9	25 4	25 6	13
B	473	69	208	31	0	---	79 8	21 4	50 6	22
C Preferred	304	53	272	47	0	---	34 3	23 6	29 0	15
D	462	72	182	28	0	---	51 3	0 2	25 7	12
E	131	32	280	68	0	---	6 1	26 0	16 1	12
F	137	33	284	67	0	---	8 7	25 2	16 9	12
G	184	37	320	63	0	---	11 2	31 4	21 3	13
H	253	42	351	58	0	---	15 2	46 6	30 9	15
I	304	53	272	47	0	---	56 0	2 2	29 1	15
J	483	70	204	30	0	---	80 5	22 2	51 3	22

Existing Timber Management Plan

Data from the timber management (TM) plan---

1) Potential yield in million board feet 170 8

2) Average annual chargeable volume sold during years TM plan was in effect in million board feet 147 9

3) Total acres of standard, special and marginal lands used to develop the potential yield 889,951

Table II-3d displays timber resource management information by alternative and benchmarks. However, not all outputs are available for the benchmarks. This is because there were changes in alternative formulations and modeling parameters which resulted in the benchmark data displayed in the Draft EIS no longer being comparable to the alternatives displayed in the Final EIS. Refer to Appendix B for complete details.

The suitable acres displayed in column (1) in Table II-3d reflect the differences in acreage scheduled among alternatives. With few exceptions, the total suitable acres are a function of allocations which allow scheduled timber harvest. Those alternatives which have the highest timber volumes (NC, J, B, D) generally will have the highest number of suitable acres.

The beginning inventory is a function of the amount of suitable timber acres and species present on those suitable acres. In general, the more suitable timberlands, the greater the beginning inventory. The ending inventory decreases less in those alternatives with the smaller Allowable Sale Quantity (ASQ). Alternatives E and F have the lowest amount of suitable acres, inventory and ASQ primarily because of high allocations to roadless prescriptions.

The first decade ASQ reflects the amount of resource allocations, suitable timberlands, and departures from nondeclining flow. Alternatives J, B, and NC harvest the highest volumes primarily because of the largest amount of suitable acres but also because of high intensities of timber management. Alternative I, has the highest first decade harvest in proportion to the number of suitable acres because it is the departure alternative. Alternatives E, F, and G have the lowest ASQ's because of high allocations to roadless management.

The long-term sustained yield (LTSY), columns (8) - (10) reflect the suitable acres and management intensity of the timber harvest prescriptions in the alternatives. Alternatives with the highest ASQ, Alternatives J, B, and NC, achieve the LTSY in the first decade. An exception is Alternative I, which is the departure alternative. It uses the same land base as Alternative C but has a high ASQ the first decade, then declines, then eventually follows Alternative C. Alternatives A/NFMA and H have similar land allocations but H produces a level of

timber harvest that maximizes first decade harvest subject to nondeclining flow, while Alternative A/NFMA produces a level of timber harvest that maximizes present net value.

The average annual net growth for the first and fifth decades reveals a consistent pattern: the growth increase in every alternative. The gradual conversion of overmature or stagnated stands of timber to young, fast-growing seedlings and saplings explains this trend. The full growth potential isn't realized until LTSY is reached. Alternatives with low ASQ's (Alternatives E, F, G) and Alternatives with a lot of extended rotation harvest methods (A and H) tend to reach LTSY later and consequently do not reach their full growth potential immediately.

Acres on the Forest managed for full yield range from 87 to 32 percent, varying by alternative. Alternatives with the higher ASQ's generally have the higher amount of full yield acres and likewise have the greatest amount of acres clearcut in the first decade. Alternatives E and F, with the lowest ASQ's, also have the least amount of acres clearcut. An exception to the trend is Alternative I, the departure alternative. While it allocates the some percentages of acreage to full and 50-90% yield as Alternative C, it has the third highest amount of acres clearcut in the first decade in order to meet the departure harvest levels.

K. ECONOMIC EFFICIENCY **ANALYSIS OF ALTERNATIVES**

1. INTRODUCTION

Economic efficiency analysis is required by the National Forest Management Act Regulations (36 CFR 219) and plays an important role in the development and evaluation of benchmarks and alternatives. Specifically, the Regulations (36 CFR 219.12(f)) state that:

“The primary goal in formulating alternatives, besides complying with NEPA procedures, is to provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits.”

This and following sections explain some of the key concepts and terms related to economic efficiency in general. Some of the significant differences between the alternatives and benchmarks with regard to their economic consequences and their responsiveness to the issues, concerns, and opportunities (ICO's) are also discussed. Please refer to Appendix B for a more detailed discussion of the process used to analyze economic efficiency for each of the benchmarks and alternatives considered during the development of this FEIS.

ECONOMIC EFFECTS

The purpose of this section is to display and compare the differences in economic costs and benefits of the alternatives, and to discuss the general reasons for these differences. More complete discussions of the relationship between economic values and net public benefits can be found in Chapter II, Major Tradeoffs Among Alternatives, and the Summary of Effects section in Appendix B.

COMPARISON OF COSTS AND BENEFITS

Table II-4 displays Present Net Value (PNV) and total discounted costs and benefits for the alternatives. PNV is the primary measure of economic efficiency used by the Forest Service. It is the sum of the priced benefits minus the sum of costs for the next 50 years, discounted to the present at the rate of four percent per year. An additional sensitivity analysis has been completed using a discount rate of 7-1/8 percent per year. Results of this analysis are shown in Appendix B.

The alternatives are ranked by decreasing present net value. Table II-5 displays the differences in PNV between adjacent pairs of successional ranked alternatives. The incremental changes in PNV are a measurement of the net economic values of the priced resources that would be foregone if a lower-ranked alternative is selected over a preceding one. This must be weighed against the nonpriced benefits of the alternatives.

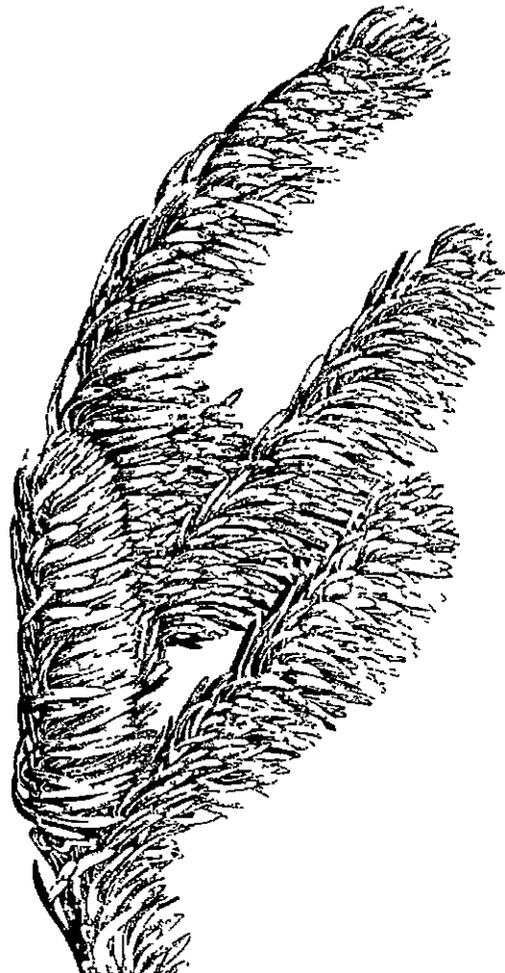


TABLE II-4
PRESENT NET VALUE AND DISCOUNTED COSTS AND BENEFITS OF ALTERNATIVES
(Million Dollars)

	Alternative/ Benchmark	PNV	Change	Discounted Costs	Discounted Change	Discounted Benefits	Discounted Change
	Max PNV	2,132		266		2,398	
(Current Mgt.)	A/NFMA	1,976	-156	329	-63	2,305	-93
	D	1,937	-39	410	+81	2,347	+42
(Preferred)	C	1,910	-27	409	-1	2,319	-28
	F	1,897	-13	312	-97	2,209	-110
	G	1,889	-8	371	+59	2,260	+51
	H	1,864	-25	435	+64	2,299	+90
(Departure)	I	1,837	-27	478	+43	2,315	+16
	E	1,834	-3	368	-110	2,202	-113
	J	1,825	-9	452	+84	2,277	+75
	B	1,756	-69	503	+51	2,259	-18
	NC	←-----Not Estimated-----→					

Alternative A/NFMA has the highest PNV at \$1,976 million. Alternative B has the lowest PNV at \$1,756 million. Alternatives A/NFMA, D, G, F, and E had a maximize PNV objective function in FORPLAN. Alternatives C, H, I, J, and B had either a timber volume target or were run under a maximize timber volume objective function in FORPLAN.

For the alternatives run under a maximize PNV objective function in FORPLAN, the greater the acreage allowing timber harvest the higher the PNV. The one exception is Alternative A/NFMA, which had a higher PNV because its recreation costs were significantly lower than for the other alternatives. The recreation benefits for Alternative A were similar to the other alternatives.

The present net values for Alternatives C, H, I, J, and B were directly related to the volume of timber produced in excess of the amounts that would maximize PNV for those alternatives' land allocations. That is, the value of the increased timber production in these alternatives is offset by less efficient production of timber.

Discounted costs equal the sum of all costs which would be incurred for an alternative during the 50 year planning horizon, discounted to their present values using a 4 percent discount rate. Alternative B has the highest discounted cost at \$503 million due to higher timber costs. As a general rule, costs were highest for those alternatives that produced the largest amounts of timber.

Discounted benefits equal the sum of all benefits which would be accrued for an alternative during the 50 year planning horizon, discounted to their

present values using a 4 percent discount rate. Alternative D has the highest discounted benefits at \$2,347 million. Alternative F had the lowest discounted benefits at \$2,187 million. Alternative D has the highest benefits because of its economically efficient timber harvest levels.

Table II-5 presents a more detailed breakdown of benefits and costs by resource groups. The alternatives are ranked in order of decreasing present net value. This display is only intended to give a broad indication of resource relationships. Many costs are nonseparable under multiple use management. It is difficult to attribute these costs to specific resources.

Resources having priced outputs are aggregated into groups for display in Table II-5. Timber refers to sawtimber. Recreation includes developed and dispersed recreation other than wildlife and fish related recreation. Wildlife includes wildlife and fish related recreation and commercially harvested anadromous fish. Range refers to permitted grazing. "Other" includes water yield.

Arterial and collector roads are shown as a separate costs item rather than being attributed to specific resources. Costs that were not clearly associated with a specific resource are included under "other."

Table II-5 reveals that almost all of the differences in present net value, discounted costs, and discounted benefits between alternatives is due to variations in the timber resource and changes in costs for the recreation and wildlife programs. The alternatives represent a wide range of timber harvest levels ranging from 81.6 MMBF to 186.6 MMBF for the first decade. With the exception of the departure alternative (I), discounted costs for timber rank in the same order as the timber harvest levels of the alternatives.

Present Net Value patterns are determined by whether the objective function in FORPLAN was maximize PNV or maximize timber volume objective or a timber volume target. Alternatives A/NFMA, D, E, F, and G had a maximize PNV objective function in FORPLAN. Alternatives B, C, H, I, and J had either a timber volume target or were run under a maximize timber volume objective function in FORPLAN. Alternative B was run under a maximize timber volume objective function to attempt to meet the RPA timber target assigned to the Forest by the Regional Guide for the Pacific Northwest Region. Alternative C had a 136 MMBF first decade target volume to meet local community needs. Timber harvest for Alternative H was set at the level which maximized timber production under the

TABLE II-5
PRESENT NET VALUE AND DISCOUNTED BENEFITS
AND COSTS BY RESOURCE GROUP 1/
(Million Dollars)

Alt.	Present Net Value	Discounted Benefits					Discounted Costs					
		Rec	Wild.	Tbr.	Range	Other	Rec.	Wild	Tbr	Roads	Range	Other
A/NFMA	1,976	1,344	681	274	4	2	56	55	146	42	5	25
D	1,937	1,346	674	321	4	2	126	45	162	43	9	25
C *	1,910	1,346	681	286	4	2	126	47	161	43	7	25
F	1,897	1,344	686	174	4	1	98	51	94	37	7	25
G	1,889	1,345	685	225	4	1	138	40	119	41	8	25
H	1,864	1,344	680	269	4	2	70	104	184	44	8	25
I	1,837	1,347	675	287	4	2	126	109	164	46	8	25
E	1,834	1,345	687	165	4	1	94	114	90	37	8	25
J	1,825	1,346	677	247	4	3	135	33	209	41	9	25
B	1,756	1,346	674	232	4	3	125	51	247	46	9	25
NC	←-----Not Estimated-----→											

1/Direct comparisons of benefits and costs by individual resource provide broad indications of relationships, but they may be misleading because many costs are nonseparable under multiple use management.

* Preferred

current land allocation in order to come as close as possible to the harvest level set by the Forest's current timber management plan. Alternative I is a departure alternative in which the first decade timber harvest is constrained to equal the average volume sold on the Forest from fiscal year 1975 to fiscal year 1984. Alternative J was run under a maximize timber volume objective function to reach a harvest level as close to 180 MMBF as possible. For all these alternatives, the timber volume level exceeds the PNV level. This results in higher harvest volume, but increases the ratio of costs to benefits. It is for this reason that the PNV's are lower for these alternatives.

Recreation benefits do not vary significantly between alternatives. All alternatives supply enough recreation capacity to exceed projected demand during the 50-year planning horizon. A shortage of unroaded recreation is projected for some alternatives beyond the planning horizon. The quality of the recreation experience would vary between alternatives even though the PNV benefits show little change. This effect was beyond the Forest's ability to quantify into dollar values and is considered as a nonpriced contribution to net public benefits. Recreation costs vary with the objectives of the alternative.

Wildlife and fish benefits vary slightly among alternatives due to different levels of investment in habitat improvements. The bulk of fish and wildlife benefits are recreation oriented and most of this recreation activity would occur regardless of the levels of investment in habitat improvement. The wildlife costs vary significantly by alternative. These costs are related to the goals and objectives for the alternative.

Range benefits and costs vary between alternatives. However, the differences are small enough that they are not reflected in Table II-5, where values are rounded to the nearest million dollars.

b. NET CASH FLOWS OF ALTERNATIVES

Table II-6 compares the expected cash flows to and from the United States Treasury that would be associated with the alternatives. Receipts are fees collected for sawtimber, firewood, grazing, developed camping, recreation and other special uses, and mineral leases. Costs include only

Forest Service budgetary costs. Net receipts equal total receipts less total costs. Non-cash benefits to the user are the difference between priced benefits and receipts actually collected for goods and services.

Alternatives are ranked by decreasing net receipts in Table II-6. All alternatives have negative net receipts for the first and fifth decades. This indicates negative net cash flows to the United States Treasury. Net receipts range from -10.5 million dollars for Alternative A to -26.1 million dollars for Alternative B for the first decade. Net receipts improve significantly by the fifth decade, but are still negative. Alternative B net cash flow improved to -1.4 million dollars, while Alternative I had the worst cash flow at -14.2 million dollars.

The reason for the negative cash flow is that both recreation and wildlife programs produce substantial benefits for which no revenue is collected for the Federal Government. For recreation, the only receipts are generated from campground fees and recreation special uses, all other users do not pay fees to the Federal Government. Likewise, the wildlife program produces substantial benefits for which no fees are collected. As Exhibit 3 indicates, non-cash benefits to users total approximately 81 million dollars for the first decade and 115 million dollars for the fifth decade. For the timber program, the variation in receipts is due to the differences in the volume, species mix, and size of timber harvested. The variation in costs is due to differences in the volume, location, and silvicultural system of timber harvested. In the first decade, all alternatives except B and J produce positive net receipts. Alternatives B and J have high costs and lower unit values in the first decade than other alternatives. By the fifth decade, the timber program is producing positive net receipts for all alternatives. The alternatives with the largest net cash receipts in the fifth decade are Alternatives B and J as a result of the large investments in the timber program in the first decade.

Total receipts are higher for the fifth decade than for the first decade. The general trend is for the alternatives to harvest more valuable timber in the future due to the assumption that timber will increase in real value by one percent a year for the next 50 years. Costs tend to be stable to somewhat lower in the future, primarily due to lower capital investments for roads. Non-cash benefits also increase due to increased recreational use, grazing, and wildlife and anadromous fish production.

Receipts plus non-cash benefits exceed costs in all alternatives for all decades.



TABLE II-6

**AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS IN THE
FIRST AND FIFTH DECADES 1/**
(Million Dollars)

ALT.	Decade 1				Decade 5			
	Net Receipts	Total Costs	Total Receipts	Non-Cash Benefits to Users	Net Receipts	Total Costs	Total Receipts	Non-Cash Benefits to Users
A/NFMA	-10.5	23.0	12.5	81.3	-6.2	20.6	14.4	115.4
B	-12.6	26.9	14.3	81.2	-7.9	23.7	15.8	114.1
F	-13.8	22.2	8.4	80.3	-9.1	19.4	10.3	114.9
C*	-15.0	29.0	14.0	81.3	-8.5	22.8	14.3	115.3
G	-15.3	25.7	10.4	81.4	-9.7	22.1	12.4	115.8
H	-16.0	28.9	12.9	81.3	-9.8	25.1	15.3	115.4
I	-16.3	31.6	15.3	81.2	-14.2	27.0	12.8	115.0
E	-16.8	24.8	8.0	81.3	-13.4	23.2	9.8	115.9
J	-25.1	33.8	8.7	81.2	-1.6	27.3	25.7	114.9
B	-26.1	34.2	8.1	81.2	-1.4	27.5	26.1	114.2
NC	-----Not Estimated----->							

1/Costs include only those of the Forest Service; receipts do not include payments to counties

*Preferred

L. MAJOR TRADEOFFS AMONG ALTERNATIVES

This section summarizes the relationships among economic values, community effects and the differing responses among alternatives to selected issues, concerns, and opportunities (ICO's). The purpose is to highlight major economic and noneconomic tradeoffs, or differences between alternatives, that can be quantified as indicators of response to ICO's among alternatives. However, a complete understanding of differences among alternatives requires reading all of this chapter and Chapter IV. Appendix A discusses the ICO's in greater detail.

To provide a partial framework for assessing these tradeoffs, the long-term resource demands or needs of the nation, region, and local communities are briefly summarized. Then selected economic values and quantified indicators of responsiveness to major ICO's are tabulated. Finally, differences and similarities among individual alternatives are summarized in terms of major tradeoffs among competing objectives or responses to expressed public issues, management concerns, or resource use and development opportunities.

1. NATIONAL, REGIONAL AND LOCAL OVERVIEW

The Draft Environmental Impact Statement for the 1985 Resources Planning Act Program estimates that total national demands will rise for all outputs of the National Forests. At the same time, there is a strong demand to protect and enhance the quality of the environment.

The Regional Guide for the Pacific Northwest Region estimates that demands for all outputs of the National Forests will rise in the States of Oregon and Washington. Recreation use is expected to increase as the population increases and its characteristics change. The Pacific Northwest has a much greater ratio of public forest and range lands to population than most of the country. The bulk of recreation use is expected to be from residents of the region. Demand for wilderness recreation is expected to exceed what

can be supplied within the Wilderness Preservation System regionally. Demand could be met in the near future, at least, by utilization of undeveloped lands outside of the Wilderness Preservation System. Development of these lands would intensify pressure on the formally designated wilderness.

Although the regional demand for hunting is expected to increase, the local demand for big game hunting is decreasing slightly while demand for other game is remaining constant. These trends have been documented by Washington State Department of Wildlife. The local demand for nonconsumptive use of wildlife is rapidly increasing due to public desires to view wildlife. This local increase is comparable to national and regional studies.

Demand for livestock grazing is expected to increase at a faster rate in the Pacific Northwest than nationally. Additional demands for natural range forage are stemming from loss of feedlot opportunities due to increasing costs.

The National Forests of the Pacific Northwest supply almost one-half of the sawtimber of the entire National Forest System. The quantity of timber demanded regionally in the year 2000 is expected to be only one percent greater than the 1976 level. The stumpage price of timber is expected to rise dramatically, however.

The local situation is similar to that of the regional, with a few exceptions. Wilderness demand is not expected to exceed supply in the near future on the Wenatchee. Over one-half million acres of currently unroaded land exists outside of formally designated wilderness.

Demand for cattle grazing cannot be met in the future under some alternatives. Supply of sheep grazing exceeds demand in all cases. Much of the excess sheep range is not suitable for cattle grazing. The range potential of the Forest cannot be fully realized unless there is an increased emphasis on sheep production by local ranchers

2. ECONOMIC VALUES AND RESPONSES TO MAJOR ISSUES, CONCERNS, AND RESOURCE USE AND DEVELOPMENT OPPORTUNITIES

The major reason that alternatives differ is that each responds in different ways to the issues, concerns, and resource use and development opportunities (ICO's) identified for this Forest. This section summarizes many of these differences in responses by defining indicators of those responses that can be quantified. It also discusses indicators of central concern to the nation as a whole, as owner of this Forest. Appendix A fully discusses each of the ICO's. A less quantified comparison of the responsiveness of the alternatives is found earlier in this chapter in Table II-1. The ICO's and indicators of responsiveness found in Table II-7 include:

- Recreation opportunities and use conflicts

Indicator:

-percent of Forest by recreation opportunity spectrum (ROS) class

- Management of areas that are presently undeveloped

Indicator:

-allocation of inventoried roadless areas to roaded versus unroaded management

- Water quality and quantity

Indicators:

-first decade increased water yield
-average annual sedimentation over the planning horizon

- Wildlife and fish

Indicators:

-acres allocated to Key Big Game Habitat Management Area
-acres of old-growth retained (fifth decade)
-commercial harvest of anadromous fish

- Management of scenery

Indicator:

-percent of Forest by visual quality objective (VQO).

- Timber Management

Indicators:

-first decade average annual harvest (allowable sale quantity plus unregulated volume)
-long-term sustained-yield capacity
- acres of suitable timber lands

- Minerals

Indicators:

-lands that are withdrawn and relatively unrestricted by management prescriptions in terms of total forest area.

- Social/Economic

Indicators:

-first decade payments to counties
-first decade change in employment
-first decade change in income

In addition, the nation as a whole has an interest in ensuring that the Forest is managed in a financially prudent manner while the quality of the physical environment is protected and enhanced. Indicators of national interest include:

- Present net value
- First and fifth decade net receipts (cash flows)
- First and fifth decade noncash benefits

TABLE II-7

**INDICATORS OF RESPONSIVENESS OF ALTERNATIVES
TO MAJOR ISSUES AND NATIONAL CONCERNS**

INDICATORS OF RESPONSIVENESS	ALTERNATIVES 1/										
	A/NFMA	D	C	F	G	H	I	E	J	B	NC
Present Net Value (million \$)	1976	1937	1910	1897	1889	1864	1837	1834	1825	1756	1/
Average Annual Net Receipts											
Decade 1 (MM \$)	-10.5	-12.6	-15.0	-13.8	-15.3	-16.0	-16.3	-16.8	-25.1	-26.1	-2.4
Decade 5 (MM \$)	-6.2	-7.9	-8.5	-9.1	-9.7	-9.8	-14.2	-13.4	-1.6	-1.4	1/
Average Annual Non-cash Benefits											
Decade 1 (MM \$)	81.3	81.2	81.3	80.3	81.4	81.3	81.2	81.3	81.2	81.2	1/
Decade 5 (MM \$)	115.4	114.1	115.3	114.9	115.8	115.4	115.0	115.9	114.9	114.2	1/
First Decade Payment to Counties (MM \$)	+3.0	+3.4	+3.3	+2.0	+2.5	+3.1	+3.7	+1.9	+2.1	+2.0	+3.8
First Decade Changes in Jobs Compared to 1982 Base Period	+39	+279	+203	-473	-225	+324	+413	-520	+630	+577	+378
First Decade Change in Income (MM \$)	+65	+7.2	+5.14	-13.3	-6.54	+8.43	+10.86	-14.56	+16.76	+15.31	+12.1
Second Decade Area by ROS Class											
Wilderness	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%
Primitive	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	1/
Semi-Primitive											
Non-Motorized	6	7	8	14	6	5	8	15	7	7	1/
Semi-primitive											
Motorized	12	12	11	11	16	13	11	10	10	11	1/
Roaded Modified, or Natural or Rural	43	43	42	39	43	36	42	36	44	43	1/
Allocation of Inventoried Roadless Areas											
Roaded Mgmt	55.2%	58.8%	46.4%	22.0%	31.0%	55.2%	46.4%	10.2%	62.4%	58.8%	93.3%
Unroaded Mgmt	44.8	41.2	53.6	78.0	69.0	44.8	53.6	89.8	37.6	41.2	6.7
First Decade Increased Water Yield (M Acre Ft)	13.8	15.7	15.5	8.7	11.2	19.1	17.3	8.2	29.1	28.5	24.4
Average Annual Activity Sediment (M Tons)	69.2	65.5	72.4	51.5	60.9	89.4	71.4	50.3	96.6	94.4	94.9
Key Wildlife Habitat (Acres)	17151	77784	118742	148189	146493	17151	118742	148189	123025	77784	0
Old-Growth Retained Decade 5 (M Acres)	261.6	254.5	261.2	275.7	254.3	258.4	261.2	277.7	250.1	250.4	1/

TABLE II-7 (continued)

**INDICATORS OF RESPONSIVENESS OF ALTERNATIVES
TO MAJOR ISSUES AND NATIONAL CONCERNS**

INDICATORS OF RESPONSIVENESS	ALTERNATIVES 1/										
	A/NFMA	D	C	F	G	H	I	E	J	B	NC
Anadromous Commercial Fish Harvest (M Lbs)	328	328	328	328	328	328	328	328	328	328	1/
Visual Quality Objectives											
Preservation	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Retention	22.4	18.0	24.2	35.2	29.7	22.5	24.2	38.3	16.1	18.0	11.2%
Partial Retention	21.2	10.5	15.4	12.3	16.9	21.1	15.4	11.4	11.0	10.5	0
Modification	2.6	7.6	6.8	7.4	7.4	2.6	6.8	7.4	8.8	7.6	0
Maximum Mod	14.9	25.0	14.7	6.2	7.1	14.9	14.7	4.0	25.2	25.0	49.9%
									2/		
First Decade Average Annual Harvest - Programmed Timber Sales(MMCF)	23.4	27.4	26.1	14.6	18.7	28.9	29.6	13.8	36.5	36.0	32.4
Long-Term Sustained Yield (MMCF)	27.7	30.8	27.2	19.2	23.4	29.0	27.1	18.7	34.8	34.2	29.9
Suitable Timber Lands (Acres)	591794	643639	576074	421265	503326	603620	576074	410935	686918	681186	787751
Mineral Resource Accessibility											
Withdrawn as Wilderness (%)	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9
Withdrawn by Prescription(%)	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Open, but highly Sensitive (%)	19.0%	17.8%	22.3%	28.1%	24.8%	19.3%	22.3%	30.3%	16.9%	17.8%	19.0%
Open with Only Moderate to Few Constraints (%)	42.1%	43.3%	38.8%	33.0%	36.3%	41.8%	38.8%	30.8%	44.2%	43.3%	42.1%

1/ Alternatives are ranked in order of decreasing present net value (except for NC which does not have a PNV computed) All resource outputs cannot be reasonably estimated for Alternative NC because the TM plans were based on different yield tables and resource relationships.

2/ Alternative J has different standards and guidelines for key wildlife habitat areas and Retention/Partial Retention areas than the other alternatives. Refer to Appendix D for more information

3. DIFFERENCES AND SIMILARITIES OF INDIVIDUAL ALTERNATIVES

The alternatives are ranked in order of decreasing present net value (PNV) in Table II-7. They are discussed below in the same order.

a. ALTERNATIVE A/NFMA

Alternative A/NFMA is the No-Action Alternative. It is implementable as it now provides for the management requirements mandated by the National Forest Management Act of 1976 (NFMA).

Alternative A/NFMA has the highest present net value of the alternatives. One major contributor to the high PNV for this alternative is the low recreation budget, while recreation benefits remain high. Alternative A/NFMA has the highest net receipts (though still negative) of all the alternatives for the first decade. By the fifth decade, Alternative A/NFMA slips to third in net receipts because the intensive timber management practices in Alternatives B and J increase receipts over Alternative A/NFMA. It has non-cash benefits at a level slightly higher than the other alternatives.

Alternatives A/NFMA and H allocate the fewest acres of the inventoried roadless areas to un-roaded management with the exception of Alternatives B, D, J, and the No-Change Alternative. Of those areas remaining roadless, a greater proportion is assigned to motorized use than most alternatives. By the end of the second decade, only Alternatives G and H have a greater percentage in the Semi-Primitive Motorized Recreation Opportunity Spectrum class.

With the exception of Alternative NC, alternative A/NFMA has the fourth lowest level of water yield and the fifth lowest level of sedimentation. Both factors are closely correlated to timber harvest levels, although they are also influenced by the location and type of harvest. The sedimentation level is higher than would be expected based on harvest level alone.

Alternatives A/NFMA and H have the fewest acres allocated to management for key big game species than other alternatives. Alternative A/

NFMA, by the fifth decade, has greater amounts of old-growth remaining than any other alternatives, except for Alternatives E and F. Anadromous fish production is the same for all alternatives in the first decade.

Alternatives A/NFMA and H result in 17.5 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. This is near the middle of the range of alternatives as five alternatives modify the visual environment more with three alternatives modifying it less. The modification of the visual environment is directly proportional to the volume of timber harvest and its rate.

Alternative A/NFMA has the eighth highest timber harvest in the first decade with the sixth highest long-term sustained yield. It has the sixth highest acreage of suitable timberlands. The objective function in FORPLAN is to maximize present net value.

Alternatives A/NFMA and NC are fourth highest in acres open to mineral resources with only moderate to few constraints.

Alternative A/NFMA has the eighth highest level of jobs and income change from the 1982 base period. The change in jobs and income is directly related to the timber harvest level. The higher the timber harvest, the greater the gain in jobs and local income. Alternative A/NFMA has the sixth highest level of payments to counties. The payment to counties is somewhat related to the level of timber harvest. In general, there is a direct correlation, but for Alternatives B and J the payment to counties level is lower because these alternatives harvest less valuable timber in the early decades. For the later decades, the payment to counties increases for these alternatives.

b. ALTERNATIVE D

Alternative D has the second highest present net value of the alternatives. This is due to the high acreage allocated to some sort of timber management coupled with the use of the maximize present net value objective function in FORPLAN. Alternative D has the second highest net receipts of all the alternatives for the first decade. By the fifth decade, Alternative D is fourth in net receipts.

Alternatives D and B have the third lowest allocation of the inventoried roadless areas to unroaded management. Only Alternatives J and NC have less roadless areas allocated to unroaded management.

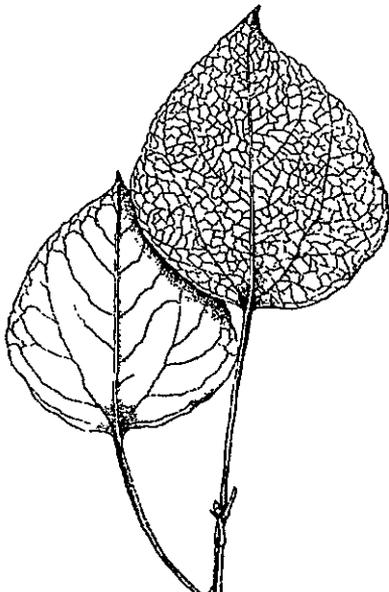
Alternative D has the sixth highest level of increased water yield and eighth highest level of sedimentation of the alternatives. This is closely correlated with timber harvest level. Alternative D also has the sixth highest level of timber harvest.

Alternatives D and B have the third fewest acres allocated to key big game species. By the fifth decade Alternative D has the fourth fewest acres of old-growth remaining. Anadromous fish production is the same as other alternatives.

Alternatives D and B result in 32.6 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. Only Alternatives J and NC end up with a more modified visual environment. Alternative D has the sixth highest timber harvest, but the third highest long-term sustained yield. It has the fourth highest suitable timberland base.

Alternatives D and B are second highest in acres open to mineral resources with only moderate to few constraints.

Alternative D has the sixth highest level of jobs and local income of the alternatives and the third highest level of payment to counties.



c. ALTERNATIVE C - Preferred

Alternative C has the third highest present net value of any alternative. Alternative A, which has the highest present net value, is 3.5 percent higher. Alternative C was constrained in FORPLAN to produce an allowable sale quantity of 136 MMBF. This resulted in a reduction of about one percent from the maximum PNV level for this alternative. Alternative C, however, maximizes net public benefits and was, therefore, selected as the preferred alternative.

For the first decade, Alternative C has the fifth highest level of net receipts. By the fifth decade, this ranking would likely slip to sixth highest level of net receipts. It has non-cash benefits at a slightly higher level than most of the other alternatives, but the difference is not significant.

Alternatives C and I allocate the fourth highest acreage of the inventoried roadless areas to roadless management. Alternative I, which is the departure alternative, has the same land allocations. Only Alternatives E, F, and G have greater allocations to unroaded management. Roadless areas allocated to roaded management would be developed faster under Alternative I than under Alternative C.

Alternative C has the seventh highest water yield and the fifth highest rate of sedimentation.

Alternatives C and I have the fifth highest acreage allocated to key big-game species. At the end of the fifth decade, Alternatives C and I will have the third highest level of old-growth remaining. At this point, there should be 261,200 acres of old growth remaining. Anadromous fish production is the same as other alternatives.

Under Alternatives C and I, 21.5 percent of the forest ends up in a modified visual environment over the 50-year planning horizon. In the range of alternatives, this is the fifth highest.

To maximize net public benefits, the allowable sale quantity for Alternative C was set at 136 MMBF. This is the seventh highest timber harvest level. It also has the seventh highest long-term sustain yield level and suitable timberland base.

Alternatives C and I have 38.8 percent of the land base open to mineral resources with only moderate to few constraints.

Alternative C has the seventh highest level of job increase and income. This alternative has the fourth highest level of payment to counties.

d. ALTERNATIVE F

Alternative F has the fourth highest present net value. It has a large portion of the inventoried roadless areas allocated to roadless management. This reduces the level of timber harvest, which reduces PNV. Most of the benefits of not roading these areas are unquantified and must be subjectively weighed to determine the net public benefits of the alternative.

Alternative F has the fourth highest net receipts in the first decade, dropping to the sixth highest net receipts by the end of the fifth decade. The non-cash benefits to users are slightly lower than the other alternatives, but the differences are not significant.

Alternative F allocates the second highest acres of the inventoried roadless areas to unroaded management. Only Alternative E has a greater allocation to unroaded management.

Alternative F has the next to lowest water yield of any alternative. It also has the next to lowest amount of sedimentation. Both factors are closely correlated to timber harvest levels.

Alternatives F and E have the highest acre allocation to management for key big-game species with. Alternative F maintains the second highest level of old-growth, only slightly lower than Alternative E. Anadromous fish production is the same as other alternatives.

Alternative F would have the second most natural appearing landscape of the alternatives. Only Alternative E would have a more natural appearing landscape.

Alternative F has the next to lowest level of timber production both in the first decade and long-term. It has the second fewest acres of suitable timberlands.

Alternative F has the second fewest acres available for relatively unconstrained mineral related activities.

Alternative F has the next to lowest level of jobs and income of the alternatives. The job change is -473 jobs and the income change is -13.3 million dollars. The payment to counties level is the ninth highest at 2.0 million dollars.

e. ALTERNATIVE G

Alternative G has the fifth highest present net value. It has the sixth highest net receipts for the first decade; by the fifth decade the net receipts drop to the seventh highest. The non-cash benefits are slightly higher than the other alternatives for the first decade. By the fifth decade, this alternative drops to second highest in non-cash benefits. However, the differences are not significantly different between the various alternatives.

Alternative G has the third highest allocation of inventoried roadless areas to unroaded management. Only Alternatives E and F have more roadless areas allocated to roadless management. This alternative has the greatest amount of roadless area available for the trail bike use.

Alternative G has the ninth highest water yield sediment produced. These correspond fairly closely to the level of timber harvest.

Alternative G has the third highest allocation to key big-game species. It is only a couple of thousand acres below the maximum for Alternatives E and F. The old-growth acreage at the end of the fifth decade is the eighth highest of the alternatives. Anadromous fish production is the same as other alternatives.

Alternative G results in 14.5 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. Only Alternatives E and F have less acreage in a modified visual environment. This is because the modification of the visual environment is directly proportional to the volume of timber harvest and its rate.

Alternative G has the third lowest level of timber harvest and long-term sustain yield level. The suitable timberland base is also the third lowest of the alternatives.

Alternative G has the third lowest level of land open to mineral development with 36.3 percent of the land with only moderate to few constraints.

Alternative G has a net change of -225 jobs and -6.54 million dollars. The payment to counties level is 2.5 million dollars--the seventh highest level of the alternatives.

f. ALTERNATIVE H

Alternative H has the sixth highest present net value of the alternatives. This alternative has the same allocations as Alternative A/NFMA, except for the Wild and Scenic River recommendations which match Alternative C recommendations with private land removed from the recommended segments. Alternative A/NFMA produces a level of timber harvest that maximizes present net value, while Alternative H produces a level of timber harvest that maximizes first decade timber harvest subject to non-declining flow. Alternative H produces 24 percent more timber than Alternative A/NFMA in an attempt to meet historic levels of timber harvest. This results in a decrease in total present net value of 5.5 percent.

Alternative H has the fifth lowest net receipts for the first decade, dropping to the third lowest net receipts by the fifth decade. The level of non-cash benefits to users is similar to the other alternatives.

Only Alternatives NC, B, D and J have fewer acres of inventoried roadless area allocated to unroaded management. Alternative A has the same roadless allocation as Alternative H; the roadless areas, however, would be entered at a faster rate in Alternative H.

Alternative H would have the fourth highest increased water yield and sedimentation. Alternatives NC, B and J are the alternatives that would be higher.

Alternative H has the second fewest acres allocated to key big-game species of the alternatives. At the end of five decades, Alternative H does have the sixth highest level of old-growth remaining. Anadromous fish production is the same for all alternatives in the first decade.

Alternative H results in 17.5 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. This is in the middle of the range of alternatives. The modification of the visual environment is directly proportional to the volume of timber harvest and its rate. For this reason, modification of the visual environment would occur at a faster rate under Alternative H than Alternative A/NFMA.

Alternative H has the fifth highest harvest level in the first decade, and the fifth highest long-term sustain yield level. It also has the fifth highest acreage of suitable timberlands. The objective function in FORPLAN is to maximize first decade timber harvest subject to non-declining flow.

Alternative H is the sixth highest in acres open to mineral resources with only moderate to few constraints.

Alternative H has the fifth highest level of job increase, the sixth highest level of income increase, as well as the fifth highest level of payments to counties.

g. ALTERNATIVE I

Alternative I ranks seventh in present net value. This alternative has the same allocations as Alternative C. This is a departure alternative where higher timber harvest occur during the first two decades. The harvest level then starts declining in the third decade. For the first decade, Alternative I has the eighth highest net receipts, declining to the lowest net receipts by the end of the fifth decade. This is the result of having higher harvest levels for the first two decades. Alternative I has the same roadless allocations as Alternative C. This is the fourth largest level for the alternatives with 53.6 percent of the inventoried roadless areas remaining roadless. Only Alternatives E, F, and G have greater allocations to unroaded management. Rooding of the

roadless areas proceeds faster in Alternative I than in most of the other alternatives because of the higher levels of timber harvest in the first two decades.

Alternative I has the fifth highest water yield and the sixth highest sedimentation rate.

Only Alternatives E, F, G and J have greater allocations for management of key big-game species. Alternative I maintains the fourth highest level of old-growth at the end of the fifth decade. The level of anadromous fish production is the same as the other alternatives.

Under Alternative I, 21.5 percent of the Forest ends up in a modified visual environment over the 50-year planning horizon. In the range of alternatives this is the fifth highest.

Alternative I has the fourth highest harvest level of the Alternatives. The long-term sustained yield is only the eighth highest of the alternatives. This alternative has the seventh highest suitable timberland base.

The allowable sale quantity for Alternative I is a departure from the base sale schedule established for Alternative C. It equals the average timber volume sold between Fiscal Year 1975 and Fiscal Year 1984 gradually declining to the same level as Alternative C.

Alternative I has 38.8 percent of the land base open to mineral resources with only moderate to few constraints.

Alternative I has the third highest job and fourth highest income change from the 1982 base period. This alternative had the second highest payment to counties level of the alternatives.

h. ALTERNATIVE E

Alternative E has the third lowest present net value of the alternatives. It has the greatest allocation of unroaded management and the lowest level of timber production. This results in a greater proportion of its benefits being subjective contributions to net public benefits rather than being quantified as part of present net value.

Alternative E has the third lowest net receipts in the first decade dropping to the next to the lowest net receipts in the fifth decade. The non-cash benefits to users are comparable to the other alternatives in the first decade and slightly higher than the other alternatives in the fifth decade. The differences, however, are not significant.

All the inventoried roadless areas outside the Alpine Lakes Management Area are allocated to unroaded management (90 percent Forest-wide). This is the most of any alternative.

Alternative E has the least amount of increase in water yield of the alternatives. It also has the least amount of sedimentation and the highest water quality.

Alternatives E and F have the highest acre allocation to management for key big game species. Alternative E maintains the highest level of old-growth of all the alternatives. Anadromous fish production is the same as other alternatives

Alternative E would have the most natural appearing landscape of any alternative. Only 11.4 percent of the Forest would be managed under the visual quality objective of modification or maximum modification.

Alternative E has the lowest level of timber harvest both in the first decade and the lowest long-term sustained yield level. It has the fewest acres of suitable timberlands.

Alternative E has the fewest acres available for mineral-related activities. For the alternative, 30.8 percent of the land is open to mineral activities with only moderate to few constraints

Alternative E shows the lowest level of jobs and income of all the alternatives. This alternative shows a change of -520 jobs and -14.56 million dollars. Alternative E also has the lowest payment to counties level at 1.9 million dollars.

i. ALTERNATIVE J

Alternative J has the next to the lowest present net value of all the alternatives. This is a result of heavy timber investments in the early decades which significantly reduced present net value for this alternative. Alternative J has the next to the lowest net receipts for the first decade. By the fifth decade, however, the early timber investments raise the net receipts to the second highest.

Alternative J allocates the second fewest acres of the inventoried roadless areas to roadless management. Of the inventoried roadless areas, 37.6 percent would remain roadless under this alternative.

Alternative J has the highest increased water yield and the highest sedimentation rate of the alternatives. This is closely correlated with timber harvest level. Alternative J has the highest timber harvest level of the alternatives.

Alternative J has the fourth highest allocation to key big-game species. The prescription for key big-game species is slightly different than the other alternatives in its treatment of thermal cover. The yield tables used in Alternative J are the same as that for general forest prescription, but it has road closures and other management activities to protect and enhance key big-game species habitat. By the fifth decade, Alternative J has the lowest acreage of old-growth remaining. Anadromous fish production is the same as other alternatives.

Alternative J results in 34.0 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. This is the second highest level of the alternatives. It uses different standards and guidelines for visual treatment along roads and visual corridors. These guides do not correspond to the ST-1 or ST-2 prescriptions. See Appendix D.

Alternative J has the highest first decade harvest level, the highest long-term sustained yield, and the second highest acreage in suitable timberlands.

Alternative J has the largest amount of acreage open to mineral resources with only moderate to few constraints.

Alternative J has the highest gain in jobs and income of the alternatives. This is because this alternative has the highest timber harvest level. Alternative J has the eighth highest level of payment to counties.

j. ALTERNATIVE B

Alternative B has the lowest level of present net value of any alternative. It has the same land allocations as Alternative D, which has the second highest PNV of the alternatives. Alternative D produced the quantity of timber which achieved the highest level of PNV, subject to meeting other resource considerations. Alternative B produces 31 percent more timber than Alternative D, while still meeting other resource constraints. The costs of producing the additional timber exceed the benefits. This results in a PNV nine percent below the level of Alternative D.

Alternative B has the lowest net receipts in the first decade due to the high level of timber investments in the early decades. However, this investment results in Alternative B having the highest net receipts of all alternatives by the fifth decade.

Alternative B has the third lowest acres of inventoried roadless area allocated to unroaded management. Rooding of the areas allocated to rooded management would occur the fastest in this alternative and Alternative J.

Alternative B has the second highest level of increase water yield and third highest level of sedimentation of any alternative. This is a result of the level of timber harvest.

Alternative B has the seventh highest level of acreage allocated to management for key big-game species. Alternative B will have the second lowest level of old growth remaining by the fifth decade. Anadromous fish production is the same as for the other alternatives.

Alternative B would have the third least natural appearing landscape by the fifth decade. At that time, 32.6 percent of the landscape will appear modified. Alternative B would alter the landscape at the second fastest rate.

Alternative B harvests the second highest level of timber of the alternatives. It also has the second highest long-term sustained yield capacity and the third highest acres of suitable timberland. In Alternative D, which has a maximize present net value objective function and the same land allocations as Alternative B, not all the timber is harvested on land available for timber harvest. Some acres are not utilized because they are not economically efficient. Alternative B, however, harvests timber on lands that were not utilized in Alternative D. Alternative B also utilizes more intensive management with more precommercial and commercial thinning.

Alternative B has 43.3 percent of the land area open to mineral activities with only moderate to few constraints.

Alternative B is second to Alternative J in change of jobs and income increasing by 577 jobs and 15.31 million dollars. This alternative has the third lowest payment to counties level at 2.0 million dollars.

k. NO CHANGE (NC)

The No Change Alternative does not have a PNV computed. A comparison of resource outputs is not made for Alternative NC because the Timber Management plans were based on different yield tables and resource relationships.



CHAPTER III

AFFECTED ENVIRONMENT

A. INTRODUCTION

This chapter describes the area that will be affected by the proposed plan or the alternatives to it. In Section B of this chapter, each significant environmental component ^{1/} or land use is described in terms of (1) current conditions, (2) historic trends, (3) anticipated conditions and use levels, and (4) the role of the environmental component, or land use in the ecological systems of the Forest and affected area, and in the social and economic structure of the areas affected by the Forest.

^{1/} The term "environmental component" is used to identify those significant components which make up the physical, biological, and social environment of the Forest. These terms are used to direct our discussions toward the actual environment with less emphasis on the Forest Service programs. Use of these terms strengthens the ties between this chapter and Chapter IV, Environmental Consequences.

The environmental components discussed in the descriptions are arranged in the following order:

Recreation Setting
Roadless Areas
Wild, Scenic and Recreational Rivers
Cultural Resources
Scenery
Wilderness
Wildlife
Fisheries
Vegetation: Trees
Vegetation: Old Growth
Vegetation: Forage
Vegetation: Unique Ecosystems
Vegetation: Sensitive Plants
Vegetation: Research Natural Areas
Water
Soils
Air
Minerals
Roads
Fire
Social/Economic

INTRODUCTION

1. LOCATION

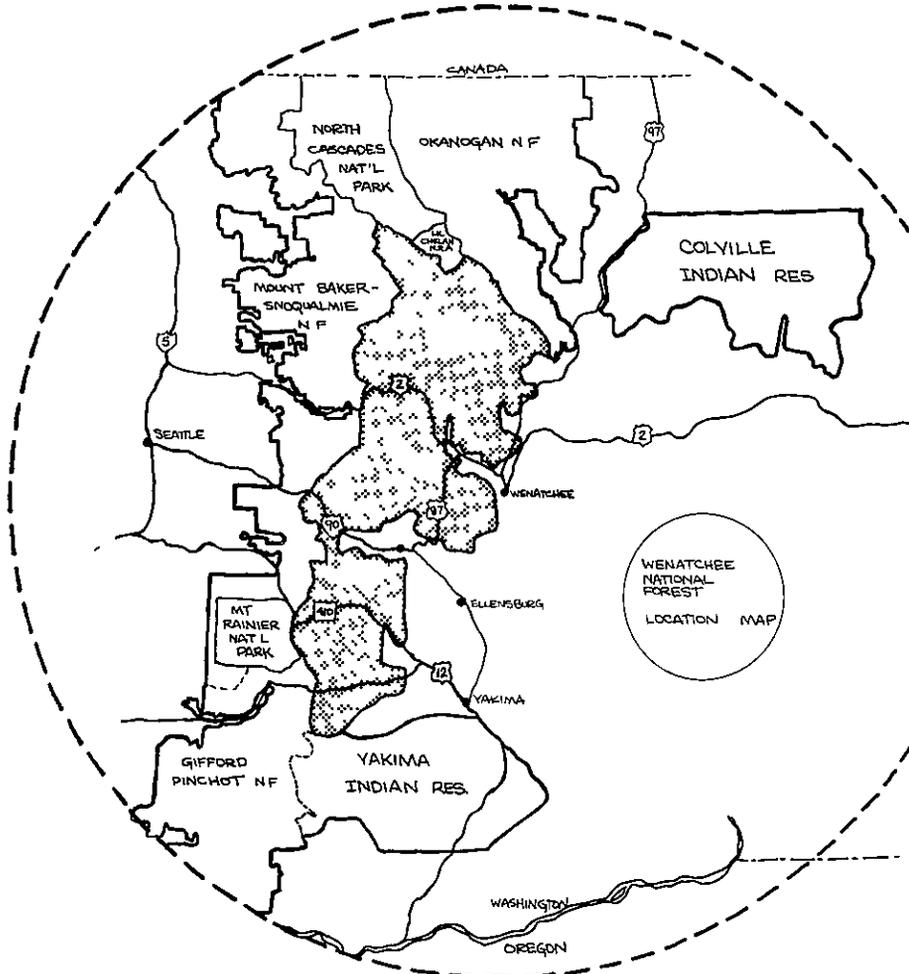
The Wenatchee National Forest is on the east slope of the Cascade Mountains in Central Washington (Figure III-1). The Forest, with a net area of 2,164,180 acres, extends about 140 miles from north to south and from 25 to 55 miles east to west. There are 2,457,379 acres of land within the Forest boundaries of which 293,199 acres are State, private, or other Federal lands.

The Forest is located in Chelan, Kittitas, and Yakima Counties. Badger Mountain lookout site, an isolated two acre tract in Douglas County, is also included in the Forest area. Neighboring National Forests include the Okanogan in the north and the Mt. Baker-Snoqualmie and the Gifford Pinchot National Forests on the west. The Naches Ranger District is within the proclaimed boundaries of the Mount Baker-Snoqualmie National Forest but is administered

by the Wenatchee National Forest. A parcel of Okanogan National Forest near Chelan is also administered by the Wenatchee. An isolated 9,032 acre parcel of the Wenatchee in the Liberty Bell area, in the northern tip of Chelan County, is administered by the Okanogan National Forest. The Forest is bounded by portions of the Lake Chelan National Recreational Area, the North Cascades and Mt. Rainier National Parks, and the Yakima Indian Reservation (Figure III-1).

Major east-west highways on the Forest include U.S. 12 - White Pass, I-90 - Snoqualmie Pass, U.S. 2 - Stevens Pass, and Highway 410 - Chinook Pass (closed in the winter). U.S. Highway 97 is a major north-south route that crosses Blewett Pass and then parallels the east side of the Forest from Wenatchee to Chelan. Much of the Forest is within a two hour drive for the 2 million people who live in the heavily populated Puget Sound region.

**FIGURE III-1
WENATCHEE NATIONAL FOREST LOCATION MAP**



2. LANDFORMS AND GEOLOGY

a. Landforms

The Forest extends into parts of three different landforms as described by Easterbrook and Rahm (1970). Each landform has its own distinct structural architecture. The three landforms are the North Cascades and South Cascades in the Cascade Province and the Yakima Folds in the Columbia River Province. Elevations range from about 800 feet on the eastern edge of the Forest to a little more than 9,500 feet (Bonanza Peak) in the Glacier Peak Wilderness.

North Cascades Landform

The North Cascades landform encompasses all of the Forest north of Snoqualmie Pass, I-90. The higher elevations are characterized by very rough, broken, and jagged features. Most of the valleys have been glaciated, so have been straightened and widened, and have the characteristic "U" shape. There are a few "V" shaped valleys that were formed by faulting and stream down cutting.

South Cascades Landform

All of the Forest south of Snoqualmie Pass and Interstate 90 is in the South Cascades landform, except a few areas along the eastern edge that are in the Yakima Folds Landform. The South Cascades landform is less rugged than the North Cascades and has much less relief. Most of this area was not glaciated, however, there were a few alpine glaciers that came down some of the valleys along the western edge of the Forest.

Yakima Folds Landform

The Yakima Folds landform borders the eastern edge of the Forest south of Wenatchee including Oak Creek and eastern edge of Manastash Ridge. This landform is characterized by Columbia River basalt flows that overrode older landforms. Today these flows form long, broad, gently sloping plateaus that have cliffs and steep talus slopes along the base of the cliffs.

b. Geology

There are more than 30 different geologic formations occurring within the Forest. These can be grouped into six main groups as follows:

(1) granite, gneiss, schist, and diorite; (2) basalt, andesite, and rhyolite; (3) sandstone, shale, conglomerate, and dolomite; (4) flow breccia, tuffs, and volcanic ash and pumice; (5) serpentine; and (6) glacial till, glacial outwash, and alluvium. Geologically the Forest is very complex; changes in rock types often occur within short distances.

3. CLIMATE

The Cascade Mountains and the prevailing westerly winds are the dominant climatic factors on the Forest. The usual situation is that moist maritime air from the Pacific Ocean uplifts and cools as it moves east over the Cascades. Most precipitation occurs in late fall and winter.

The Cascade Crest area is characterized by heavy precipitation (90-140+ inches), low temperatures, heavy snow accumulation (25 feet +), and a short frost free season (95 days at Stevens Pass). As the air masses move east toward the Columbia River Basin, moisture progressively drops off resulting in near desert conditions with less than 10 inches of precipitation, high summer temperatures, very low relative humidity, and a long frost free season (174 days at Wenatchee) on the eastern fringes of the Forest. The wide range in climate creates a related range in forest vegetative types.

Violent summer thunderstorms periodically occur on the Forest, which results in the ignition of forest fires when conditions are right. Such storms may also result in flash floods when accompanied by high intensity rains.

4. LAND OWNERSHIP

a. Overview

About 12 percent, or 293,199 acres, of the land within the Forest boundary is not National Forest land. Many of these lands are in a "checkerboard" ownership pattern, where private individuals or companies own alternate land sections. Most of this checkerboard ownership is in the center of the Forest in the vicinity of Stevens (U.S. 2) and Snoqualmie (I-90) Passes and along the east side of the Forest. Much of the inter-

INTRODUCTION

mingled private land is managed for timber production by large corporate landowners. Almost all of it is within the roaded portion of the Forest and only a minor amount is within wilderness or other unroaded areas. This pattern is evident on the Forest map.

In addition to the large corporate ownerships, the forest has within and adjacent to it many thousands of acres of small private parcels. These ownerships usually originated as homesteads and, until recently, were managed as farms. These private parcels are now being rapidly converted to small, recreation oriented parcels, multiplying the number of private landowner/neighbors within the Forests. These new neighbors have different views than the traditional settler/farmer of how the adjacent National Forest land should be managed.

Other public agencies also manage land within the Forest. The Washington State Department of Natural Resources manages more than 30 square miles of land scattered throughout the northeast part of the Forest (primarily Sections 16 and 36). The Washington State Department of Wildlife manages about 10 square miles of land within affected sections inside Forest boundaries and the Washington State Parks Commission manages Lake Wenatchee State Park which is about one square mile of land.

Other agencies have withdrawal authority for such activities as mineral entry for power sites, reclamation administration, and recreation. The Bonneville Power Administration has several major energy transmission corridors on the forest which are managed under Memorandums of Understanding. The need of other agencies (Federal, State, and local) to occupy and use National Forest land for travel and utility corridors requires considerable management attention and interagency coordination.

To improve resource management and reduce the costs of National Forest administration, the Forest continues to be engaged in several land exchanges with owners of intermingled lands. Occasionally it is in the public interest to purchase private lands. This was the case with the private lands within the Alpine Lakes Intended Wilderness and key recreation lands within the Lake Chelan and Lake Wenatchee recreation areas.

In the last few years, especially on Lake Chelan, emphasis has shifted from purchase to acquiring recreation or scenic easements.

Many rights-of-way have also been acquired through private land. In addition, there is a continuing program for the acquisition of trail and road rights-of-way in order to ensure public access to National Forest lands.

b. Land Adjustments

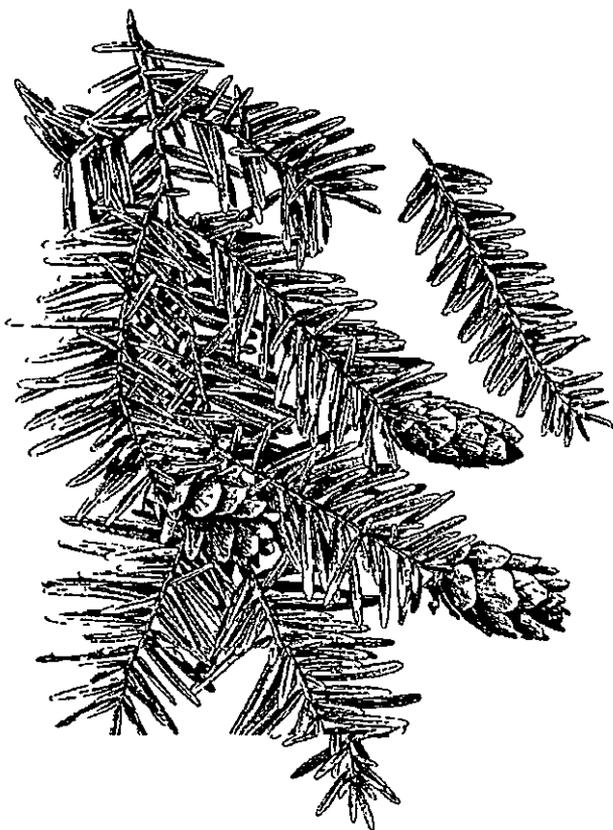
The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) targets for land purchase and exchange for the Forest are shown in Appendix B of the Forest Plan. Under current national direction, little or no purchase can occur outside the Congressionally directed Alpine Lakes acquisitions.

Land exchange activities will largely be limited to those under existing agreements with Burlington Northern Timberlands Inc. (Plum Creek Limited Partnerships), the State of Washington Department of Natural Resources (DNR), and Longview Fibre Co. The agreement with the DNR identifies an eventual adjustment involving about 20,000 acres in each ownership. The program with Burlington Northern Timberland Inc. proposes the study of about 83,000 acres of Burlington Northern lands and about 53,000 acres of National Forest land for possible exchange. The Forest is also working on exchanges involving about 17,000 acres of National Forest land for about 23,000 acres owned by Longview Fibre Company. A long-term land ownership adjustment program involving these three major landowners could potentially involve about 120,000 acres of private land and a similar acreage of National Forest land. Other small parcels would be acquired by exchange or purchase on a need and opportunity basis.

In "checkerboard" ownership areas, industrial forest management practices result in much faster harvest of old-growth timber on private land. This rate of cutting and the related road building substantially affects road building and timber harvest on public lands because of the cumulative effects of these activities on soil and water quality. These intermingled areas also limit the opportunity to manage the public lands for unroaded uses.

The subdivision and development of private lands within and adjacent to the Forest is accelerating. Current examples are: (1) The Murray Pacific lands in Chelan County above Fish Lake and in the Chiwaukum, Hatchery and Icicle Creek areas; and (2) the Pack River Management Co. lands in the bottom of the Icicle Creek drainage. Such changes impact public land management in several ways. These include fire protection, access, sanitation (water quality), and trespass. Private land development also increases the recreation use of the Forest in these areas increasing the demand for the use of National Forest lands including water systems, sanitation systems, utilities, and access. There are also demands to preserve the natural environment in proximity to summer homes or residences. This development creates pressure to restrict management options on activities such as timber harvesting and road, trail, and campground construction.

In order to allow maximum utilization and adequate protection of public resources, the ownership pattern requires either: (1) a large, long-term landline survey program; (2) large scale land ownership adjustments to eliminate the mixed ownership; or (3) a combination of the two.



5. LAND USES BY OTHERS

a. Special Land Uses and Utility Corridors

The Forest provides lands for a wide variety of uses by private individuals and public agencies. Such uses are authorized by special use permits, mining laws, and withdrawal authority of other agencies. The most common are those covered by special use permits. Examples of permitted uses are recreation residences, pastures, power or telephone lines, fences, irrigation ditches, water transmission pipelines, roads, dams, emergency airstrips, electronic sites, ski areas, and resorts.

There are about 1,700 special uses on the Forest. Six hundred ninety of these special permits, occupying 2,855 acres, are for recreational purposes. Another 1,010 occupy about 25,000 acres of National Forest land, and are termed non-recreational special uses. Special uses produced \$236,084 in fees in fiscal year 1984. The number of permits and acres under permit change as some permits terminate and new uses are added. However, the trend is for more and more uses as time goes on. The uses have the effect of limiting the options in these areas for other uses including public recreation, timber harvest, domestic livestock grazing, and facility construction.

Special uses are periodically inspected to insure compliance with conditions of the permit and to evaluate the appropriateness of continuing such use. Most permittees are charged fees for the privilege of using National Forest lands.

Utility corridors are managed under Cooperative Agreements and Memorandums of Understanding. The Forest maintains about 200 of these documents to administer various uses. Currently, power transmission lines are the major use of utility corridors on the Forest with three major energy utility corridors crossing the Forest through Stevens, Snoqualmie, and Stampede Passes. The rights-of-way for these lines are from 100 feet to 1,400 feet in width and they occupy about 1,420 acres of National Forest land. The Western Regional Corridor Study for the State of Washington has also identified one additional potential corridor. It would cross the crest of the Cascade Range in the area between Tacoma Pass and Pyramid Pass. The corridor would then run

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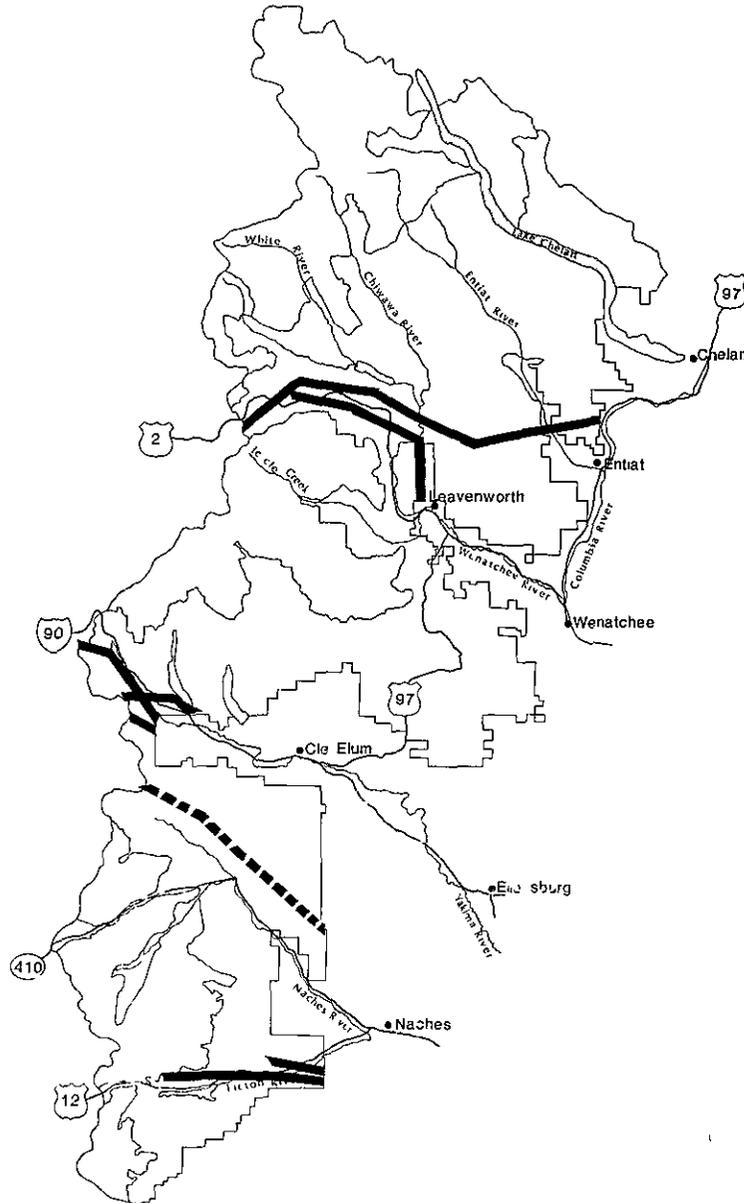
southeasterly toward the Hanford and Tri-Cities area. In the short term, additional power transmission needs can be met by increasing the capabilities of existing utility corridors.

A moderate to strong demand can be expected for all special uses in the future. This is based on the number of applications currently received for non-recreation special uses. The right-of-way acquisition, grants of right-of-way, and road construction cost sharing are expected to continue at about the current level. As the road system develops over time, these programs should be phased out, except for cost sharing of road reconstruction

and maintenance. The need for these activities will also be reduced to the extent that land exchanges with the major landowners within the Forest will consolidate ownerships, eliminating the need for cost sharing, granting and acquiring right-of-way, and surveying and marking property boundaries.

The effects of the Forest ownership pattern on the recreation, fish, wildlife, cultural, and timber resources are further discussed in this chapter in sections dealing with those resources.

**FIGURE III-2
UTILITY CORRIDORS**



b. Hydroelectric Energy Development

There are no major hydroelectric power projects within the Forest. There are several projects adjacent to the Forest on the Columbia River. One project, Chelan Falls, relies on water storage in Lake Chelan. Generation of electric power results in a 17 foot annual fluctuation in the level of Lake Chelan, and affects National Forest land management adjacent to the shoreline.

There are two minor projects of long standing on the Forest. One is the Holden project on Copper Creek at Holden Village. The other is the Trinity project on Phelps Creek on the Lake Wenatchee Ranger District. Both of these projects have existed for more than 30 years and serve small, isolated camp/organization sites.

Over the last five years, the Forest has had an average of about 25 small hydroelectric proposals pending. Most of these never go beyond the preliminary permit and feasibility study stage. Many are "repeats", where one proponent surrenders a preliminary permit for a proposal and another party applies for a preliminary permit for the same site.

Three proposals have reached the stage of applying for licenses to construct and operate small hydroelectric projects. They are the Tieton, Clear Lake, and Railroad Creek projects. The Tieton and Clear Lake proposals involve "retrofitting" existing irrigation storage dams to produce power. The Railroad Creek proposal would have been a totally new project to provide power for the Holden Village organization site. However, after reaching the license application stage, Holden Village withdrew its application.

Under federal hydroelectric licensing procedures, the Forest Service prepares a report, [called a "4(e) report"] on each hydroelectric project proposed on National Forest system lands. The report is done after the feasibility study has been completed and when an application for a license to construct and operate a hydroelectric project has been filed with the Federal Energy Regulatory Commission (FERC). In the 4(e) report, the Forest Service identifies the project's impacts on the National Forest system lands and resources involved in the project. Also, in the report the

Forest Service identifies the terms and conditions needed to avoid, minimize and/or mitigate the effects of these impacts. The FERC then incorporates the terms & conditions from the 4(e) report in the license for the project.

6. LAW ENFORCEMENT AND PUBLIC SAFETY

The major responsibility of law enforcement is to ensure the safety and peace of National Forest System visitors and to protect natural resources and Federal property. The protection of Forest users is generally accomplished through cooperative agreements with the respective County Sheriff's Departments to provide law enforcement service.

Search and rescue is primarily the responsibility of the Sheriff's Department for Chelan, Kittitas, and Yakima Counties. Forest Service personnel may either supervise initial search and rescue operations until the Sheriff's Department personnel take control, or may assist as provided for under cooperative agreements. As the amount of public use of the public lands under National Forest administration increases, we have experienced and will continue to experience a corresponding increase in search and rescue activities. This will intensify the on-going coordination between the Forest and the appropriate Sheriff's Department.

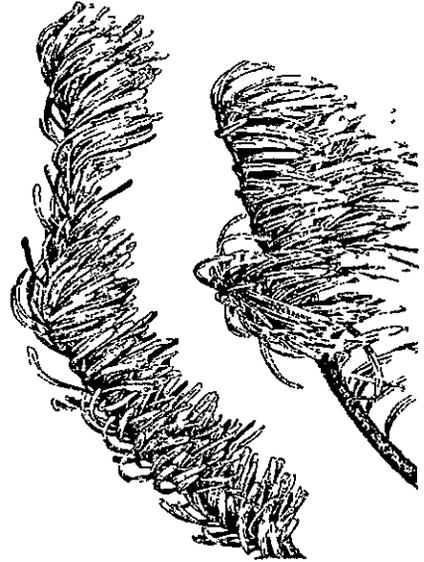
Crimes occurring within the National Forest, such as thefts of personal property, assaults, homicides, drug usage, and marijuana cultivation, are primarily the responsibility of the Sheriff's Department and are typically covered by the cooperative agreements. As the amount of public use of National Forest increases, there are corresponding increases in criminal activity.

It is more difficult to predict the increase in criminal activity which results in the theft or destruction of natural resources. Theft of natural resources appears to be influenced by many socio-economic factors. Market prices, demand for resources, access to the natural resource (sawlogs, firewood, Christmas trees, minerals, etc.), and the general condition of the economy all appear to be related to the incidence of natural resources theft.

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Without management action, destruction of natural resources and Federal property can be expected to increase with the increased use of the Forest. Proper planning and management is necessary to minimize the adverse effects of increased use on the safety of Forest users and to insure protection of natural resources from theft, vandalism, and fire.

Forest users themselves are important contributors to effective law enforcement as they exert peer pressure on other users, extinguish abandoned campfires, gather litter, and report suspicious activity to Forest authorities.



B. DESCRIPTION OF THE ENVIRONMENTAL COMPONENTS

1. RECREATION SETTING

a. Overview

A tremendous diversity of elevation, vegetation, and precipitation on the Wenatchee National Forest results in an equal variety of recreation uses and opportunities. The Forest has been the sixth most heavily visited National Forest in the country for the past several years, and the diversity of uses is unsurpassed.

The Forest stretches 140 miles from north to south and is 25 to 55 miles wide. It lies entirely east of the crest of the rugged Cascade Range in typically sunny eastern Washington. It rises in elevation from the breaks of the Columbia River in the Columbia Basin through open stands of ponderosa pine and bitterbrush to broad forested plateaus like Table Mountain southwest of Wenatchee. From there it rises through dense forests of pine and Douglas-fir to sub-alpine stands of spruce and fir. Next it reaches into the alpine areas with lofty gardens of hardy conifers sculptured by the elements, lush flowered meadows, and sparkling lakes and tarns. Finally, the Forest leaps to the tips of the peaks themselves--towering granite spires more than 9,500 feet tall, which are draped in ice and snow for much of the year.

Vast acreages of open, accessible forest, plus thousands of miles of winding forest roads and trails, are an invitation to recreation use. Since most of the Forest is within a two hour drive of the Puget Sound metropolitan area, tens of thousands of vehicles bearing recreation visitors stream through the mountain passes on typical summer weekends. Thousands of additional users come from the communities of eastern Washington to the cool, green forest retreats in the mountains.

Recreation is heaviest in the summer months, but occurs in all seasons of the year. In the early spring, hikers, horse users, and trailbike enthusiasts flock to low elevation trails. These activities follow the melting snows upward during the summer until fall storms begin to push users back down into the valleys. Scenic highways and forest roads are equally attractive to visitors, and driving for pleasure is one of the most popular public recreation uses of the Forest. There are 121 campgrounds and picnic areas offering visitors a rustic camping experience for a few hours or for several days, typically accented by the sound of a breeze in tall conifers and the splashing of a nearby stream.

Indeed, water is one of the focal points for recreation of the forest. Dozens of rivers and creeks begin in melting snows and glaciers and course down through forested valleys to the Columbia River beyond. Hundreds of lakes in shades of green and blue dot the alpine highcountry, and seven very large lakes and reservoirs offer recreation opportunities in mid and lower elevations of the Forest. Water oriented recreation includes fishing, swimming, boating, river rafting, and even gold panning.

The Forest is famed for its colorful variety of wildflowers throughout the spring and summer. Its varied vegetation and topography also is home to hundreds of species of fish, animals, and birds, so viewing wildlife is a common and rewarding recreational activity. The Forest also offers a smorgasbord of huckleberries, blackberries, wild strawberries, and mushrooms at various times during the spring, summer, and fall which attracts dedicated legions of pickers.

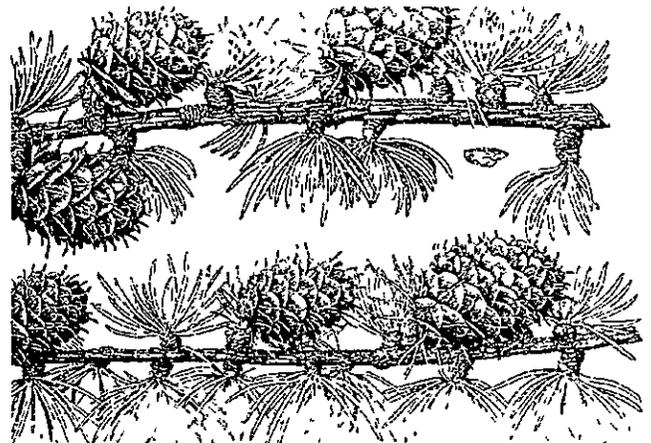
The varied geology of the Forest provides opportunities for rockhounds, who comb the hills in search of agate, geodes, garnets, and soapstone. The Red Top Mountain area north of Ellensburg is a popular gathering spot for rockhounds from throughout the State.

In the fall, Forest visitors are treated to splashes of autumn color from the golden hues of larch, aspen, cottonwood, and big leaf maple and the brilliant reds of vine maple and huckleberry brush. The foliage is picked by visitors for bouquets and serves as the centerpiece for the popular Autumn Leaf Festival at the Bavarian-theme community of Leavenworth.

Another popular activity in spring and autumn is woodcutting. More than 10,000 people purchase woodcutting permits each year, and the roared portion of the Forest echoes with the determined buzz of chainsaws at the peak of the cutting season in the fall. Timber sales in accessible areas are specially designed to make cull logs and slash available to citizen woodcutters.

Fall is also hunting season on the Forest, beginning with seasons on grouse and deer, and ending with elk seasons in late fall and early winter. Since some of the state's largest herds of deer and elk are found within the Forest, thousands of hunters take to the woods each fall. Hunting camps in the Table Mountain and Naches-Tieton areas resemble small communities during elk season.

As snow falls, visitors come to the Forest for winter recreation. Downhill skiing was once the major focus of winter use, and continues to increase steadily in popularity at seven ski areas. Snowmobiling use soared in the 1960's and leveled off in popularity in the late 1970's. However, snowbound forest roads, groomed snowmobile trails, and miles of open rolling terrain continue to attract hundreds of snowmobilers on winter weekends. Cross-country skiing has exploded in popularity in recent years, and outdoor sports shops have done a brisk business in "skinny" ski sales. Skiers also take advantage of snow-covered forest roads as well as several ski trails developed through scenic forest terrain with volunteer labor. Snowmobilers take full advantage of parking provided by state snowplowing at 24 "Sno-Park" sites scattered throughout the Forest.

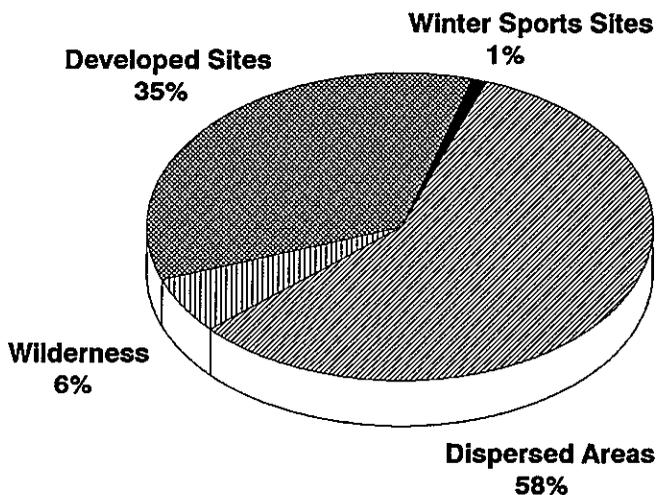


RECREATION SETTING

Because of its size, diversity, and accessibility, the Wenatchee National Forest has a remarkable capacity to absorb recreation use any time of the year. Although recreation use is projected to increase steadily in the future, the Forest has so much to offer that crowding and shortages are expected to be only localized problems.

The Wenatchee National Forest, with almost five million (4,990,000) recreation visitor days (RVD's) of use in 1986, is one of the ten National Forests highest in recreation use. The use is distributed as follows:

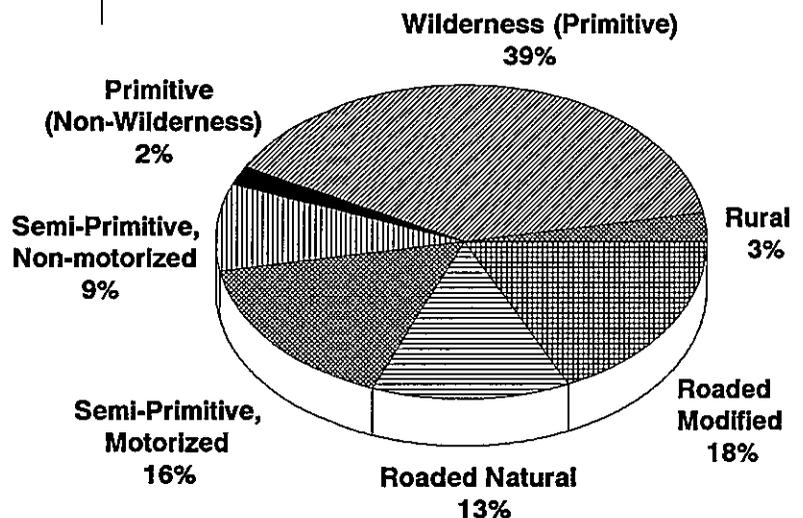
**FIGURE III-3
DISTRIBUTION OF RECREATION USE**



The climatic, topographic, and biologic variety of the Forest, coupled with its road and trail network, lakes, reservoirs, streams and developed facilities, provides a wide array of recreation opportunities. For management and conceptual convenience, possible mixes or combinations of activities, settings and probable experience opportunities have been arranged along a spectrum, or continuum. This continuum is called the Recreation Opportunity Spectrum (ROS) and is divided into six classes ranging from primitive to urban.

The Forest currently has the following distribution of Recreation Opportunity Spectrum classes expressed in percent of net National Forest acres:

**FIGURE III-4
DISTRIBUTION OF RECREATION
OPPORTUNITY SPECTRUM CLASSES**



b. DEVELOPED RECREATION

The Forest provides a full spectrum of developed recreation opportunities. Table III-1 indicates the kind and number of developed sites now in existence.

**TABLE III-1
KINDS AND NUMBERS OF
RECREATION SITES**

Kind of Site	Number of Each
Observation	3
Boating	7
Trailhead	12
Campground, Family	115
Campground, Organized Group	3
Picnic Ground	8
Hotel, Lodge, or Resort	7
Organization Site	20
Other Recreation Concession	2
Recreation Resident Tract	54
Winter Sports	7
Information	6
TOTAL	244

Most of the use in the developed recreation setting takes place in camp and picnic grounds. These sites were used to near capacity on weekends in 1988.

It should be noted, however, that on some of the more popular weekends during the summer months, many camp sites are filled to capacity, with some visitors having to move to undeveloped sites or seek other camping opportunities. There are many private, local government, and state managed campgrounds within or in proximity to the Wenatchee National Forest. In most recreation oriented communities such as Chelan, Leavenworth, Cle Elum, and Yakima, these recreation sites supplement available Forest sites.

The resorts, organization sites, and recreation resident tracts which are under special-use permits to commercial entrepreneurs, organizations, and individuals provide additional recreation opportunities throughout the Forest.

At the present time, there are 45 campgrounds where a user fee is being charged. This fee ranges from \$3.00 to \$6.00 per day for individual family camp units. There are many multi-family units where the fee is adjusted according to the size of the unit and number of families it will accommodate.

In addition to the family unit campgrounds, the Forest has nine group reservation sites that can be reserved in advance at a fee that ranges from \$12.00 to \$50.00.

Camping fees are based on services and facilities provided and the average fees charged at state and private campgrounds in the general area. National Forest campgrounds are designed to offer a full spectrum of recreation opportunities. Campgrounds that offer showers, electrical hookups, and flush toilets will be provided in the urban, rural, or more developed roaded, natural recreation settings. Campgrounds that are more rustic with fewer facilities and conveniences will be provided in areas where the recreation setting is semi-primitive or roaded natural appearing.

There was \$253,000 of camping fees collected during the 1987 season and returned to the Ranger Districts for recreation program management.

In order for a campground to qualify as a fee site it must meet the following criteria: 1) designated camp units; 2) available drinking water; 3) access road; 4) refuse containers; 5) toilets; 6) fee collection facilities; and 7) reasonable visitor protection and campfire facilities.

The Forest is attempting to convert as many campgrounds as possible to the fee system in order to increase revenues and improve the facilities and service to the public.

The developed family campground sites listed in Table III- 1 have a total site capacity of 12,480 People at One Time (PAOT). This equals a potential output of 3,200,000 Recreation Visitor Days (RVD's) a year. The campground use for 1986 was 1,250,000 RVD's which indicates there is 1,950,000 potential surplus RVD's for the Forest at the present time. The majority of this

RECREATION SETTING

capacity is available mid-week. Developed sites receive heavy use on weekends and mid-week during late July and early August.

Almost all of the campgrounds on the Forest are in need of major rehabilitation work. This work is planned for completion through the Recreation Capital Investment program over the next 10 years. The larger, more highly developed sites will be upgraded with more services and some sites will be expanded to meet the growing demand for high quality recreation opportunities.

The 1979 State-wide Comprehensive Outdoor Recreation Plan (SCORP) for the State of Washington lists the supply level in number of camping units for the Wenatchee National Forest Zone of Influence (Chelan, Douglas, Okanogan, Kittitas, and Yakima Counties) as follows. Non-Forest Service sites are: local government - 332, State - 1,546, and private - 2,898, for a total of 4,776 units. Based on 5 PAOT per unit, this is equal to a capacity of 23,880 PAOT. Adding in the Forest's 12,480 PAOT for family camping units gives a total of 36,360 PAOT capacity.

The combined Federal, State and County facilities provide opportunity for 4,725,000 RVD's per year. The projected demand for camping in the zone of influence to the year 2000 is about 2,000,000 RVD's per year. Based on these figures, there is adequate existing and planned development to meet projected demand.

Developed Winter Sports Sites

The Forest Service objective for downhill skiing is to provide the opportunity to the private sector, through special-use permits, to develop successful ski areas which enhance the total outdoor recreation opportunity spectrum for the general public. There are seven sites on the Forest and current emphasis is on expansion of the Mission Ridge and White Pass Areas. There has also been some discussion with proponents concerning the expansion of the Crystal Mountain Ski Area in the upper reaches of the American River drainage. The Stevens Pass Ski Area Master Plan includes a potential development area in the Mill Creek drainage east of Stevens Pass.

The Forest supports new development where demand for winter recreation exceeds the current supply. However, new development will not occur on sites with poor potential for providing consistent, high quality recreation opportunity, or on sites with extremely high, unmanagable avalanche hazard.

The Chiwaukum Mountains in the vicinity of the Dardanelles on Highway 2 is the most promising potential ski area that has been inventoried. If this potential is pursued, it would be subjected to thorough environmental analysis as required by the National Environmental Policy Act. The analysis would include full public involvement.

The seven downhill ski areas offer a variety of skiing opportunities and challenges in alpine, subalpine, and low elevation settings. Stevens Pass, Snoqualmie Pass, and Pack West Ski Areas are administered by the Mt. Baker-Snoqualmie National Forest. White Pass and Mission Ridge are large developments, administered by the Wenatchee National Forest, that draw skiers from all over the Pacific Northwest. Chelan and Leavenworth Ski Areas are modest operations serving very local clientele.

The developed winter sports sites that are administered by the Wenatchee National Forest received the following use in the winter of 1985/1986:

<u>Name</u>	<u>Use In Recreation Visitor Days</u>
Chelan	5,200
Leavenworth	1,500
Mission Ridge	44,000
White Pass	40,800
Total	91,500

The White Pass Ski Area is located primarily on the Gifford Pinchot National Forest, but due to the proximity to Wenatchee National Forest administrative sites, it is administered by the Wenatchee. This ski area also operates one chairlift during the summer season as a tourist attraction. Portions of the Snoqualmie Pass, Pack West, and Stevens Pass Ski Areas are within the administrative boundaries of the Wenatchee National Forest but are administered by the Mt. Baker-Snoqualmie National Forest.

This exchange of administrative duties also provides a more balanced workload between the three Forests involved.

Developed winter sport sites are located at higher elevations and thus are subject to adverse weather and possible avalanches. The Mission Ridge area has trained personnel who use several methods of controlling avalanches. One method is the use of hand placed explosives in predetermined high hazard areas. The other method is skier control by trained personnel. Avalanche control is usually done after major snowstorms or when weather conditions create a high avalanche hazard.

The White Pass Ski Area has terrain and weather conditions which can contribute to avalanche hazards but the use of explosives is seldom required.

c. DISPERSED RECREATION

Dispersed recreation refers to those recreation activities that occur outside of developed sites such as camp or picnic grounds, resorts, organization sites, etc. It includes such activities as camping in undeveloped areas, hiking, off-road vehicle use (ORV), fishing, hunting, horseback riding, mountain climbing, cross-country skiing, gathering fuelwood, gathering berries, boating, driving for pleasure, etc. Recreational activities within wilderness areas are reported under Wilderness and are considered separate from dispersed use. Dispersed use occurs over the entire range of landforms, climate, and vegetative characteristics described at the beginning of this section.

Dispersed recreation outside of wilderness is divided into roaded and unroaded. The dispersed roaded area is comprised of the Roded Natural, Modified, and Rural ROS classes (See Table III-2 for definitions), distributed over 33 percent of the total Forest land area.

The unroaded area outside of the wilderness is made up of the areas having Primitive (P), Semi-primitive Non-motorized (SPNM) and Semi-primitive Motorized (SPM) ROS classes.

Table III-2 indicates that the majority of the vehicle oriented visitor use is taking place in the Roded, Natural and Roded Modified areas. These areas are mainly along the roads that have been and are being used for timber harvest such as the Swauk Corridor, Entiat River, Chirwawa, American River, Tieton River, and other major drainages. Although there is some evidence of resource utilization, resource managers have paid close attention to good visual management principles and most of the areas have retained their natural appearing character.



RECREATION SETTING

Based on the current inventory, dispersed recreation use outside of the 841,034 acres of wilderness on the Forest is distributed as follows:

TABLE III-2
DISPERSED RECREATION USE BY
RECREATION OPPORTUNITY SPECTRUM (ROS) CLASSES
1986

ROS CLASS	DESCRIPTION	RVD's	PERCENT OF USE
Primitive (Non-Wilderness)	An essentially unmodified environment, where trails may be present but structures are rare, and where the probability of isolation from the sights and sounds of man is extremely high.	418,500	18
Semi-Primitive Non-Motorized	A predominantly unmodified natural environment of a size and location that provides good to moderate opportunity for isolation from the sights and sounds of man.	80,500	4
Semi-Primitive Motorized	A predominantly unmodified natural environment in a location that provides good to moderate isolation from the sights and sounds of man.	247,300	11
Roaded, Natural and Roaded, Modified	A predominantly natural environment with evidence of some resource utilization.	1,190,000	53
Rural	Areas characterized by a substantially modified natural environment.	324,700	14
		TOTAL	1/ 2,261,000 100

1/ Does not include wilderness or developed site use

Table III-3 indicates the projected demand for Dispersed Recreation in terms of Roaded, Unroaded-motorized and Unroaded-non-motorized kinds of uses.

The supply, however, will vary over time as the inventory shifts from an unroaded condition to a roaded condition. Our current supply for each of these categories exceeds the projected demand through the year 2030.

TABLE III-3
DISPERSED RECREATION PROJECTED DEMAND
IN MILLIONS OF RECREATION VISITOR DAYS

	DECADE 1	DECADE 2	DECADE 5
<u>ROADED</u> Estimated Projected Demand	1.998	2.126	2.630
<u>UNROADED MOTORIZED</u> Estimated Projected Demand	.279	.301	.405
<u>UNROADED NON-MOTORIZED</u> Estimated Projected Demand	.099	.106	.143

Some types of dispersed recreational activities are as follows:

Driving for Pleasure

Within the Forest boundaries and surrounding areas, many opportunities exist for driving in a scenic rural or urban setting. The Forest manages some road corridors to preserve their scenic quality. Refer to Table III-8 for details. Some 4,667 miles of various types of roads are available for travel in the Forest's roaded natural setting. There were about 540,900 Recreation Visitor Days of use for this activity reported for 1986.

Off-Road Vehicle (ORV) Use

There were 116,700 Recreation Visitor Days use for this activity reported for 1986. The Forest has had various off-road vehicle plans for more than a decade. Over the years, ORV routes have been adjusted to meet changing conditions and needs. The current plan, adopted in 1977 after much public and other agency involvement, has been revised to take advantage of ORV opportunities while protecting basic resources. Mountain bicycling is a new and growing non-motorized use on National Forest trails.

Three and four-wheeled machines are becoming very popular but in most areas the existing trail system cannot physically accommodate their use. The trails are usually too narrow, therefore, the opportunity for their use is limited at this time.

Approximately 813 miles of trail outside of wilderness are open to motorized ORV use. These trails are open to hikers and horseback riders as well. There are an additional 307 miles of trail outside of wilderness open to hikers and horseback riders but closed to motorized use. Of the total trail miles on the Forest, about 33 percent are available for motorized means of transport (primarily trailbikes).

Water Activities

The Forest has several large lakes and many rivers and streams which attract a variety of water-oriented activities. Fishing is a major activity with over 183,000 Recreation Visitor Days in 1986. Much of the demand for power boating, water skiing, and sailing is met on Lake Chelan and reservoirs including Keechelus, Kachess, Cle Elum, Rimrock, and Bumping Lake. Quality varies because of fluctuating water levels resulting from draw-downs for irrigation. Lake Wenatchee is not as popular because of its smaller size, low water temperatures, and the strong winds that often occur there.

There are 235 small lakes and 6 major irrigation reservoirs inventoried on the Forest. Many of the lakes are in wilderness. Of the lakes outside of wilderness, 12 are accessed solely by trail.

River floating by various means has become increasingly popular and continued growth of this sport is expected. Several commercial enterprises are available and the most popular stream on the

Forest has been the Tieton River where 14 to 16 special-use, commercial rafting permits are issued annually. Heavy river floating use also occurs on rivers outside of the National Forest, notably on portions of the Yakima and Wenatchee Rivers. This results in increased use of National Forest campgrounds in the vicinity, such as those in the Icicle Creek drainage. As many as 60 different commercial rafting companies have been operating on the Wenatchee River near Leavenworth over the past four years.

Camping

Many visitors seek a dispersed camping opportunity where they provide and arrange their own facilities. They may be isolated from others or camp in their own small group. Most of the Forest is open to and suitable for this type of camping. Dispersed camping is a very popular activity in small spots along lakes, streams, or roads. Conflicts occur when campers use fire prone areas, pollute streams, disturb wildlife, or damage vegetation and scatter litter.

Some of the more popular dispersed camping areas on the Forest are the Little Naches River drainage and the Taneum-Manastash area. There are many suitable sites where camping impact on the physical and biological environment are low.

In some locations, such as the Icicle drainage, suitable dispersed camping sites are limited as logging company inholdings are sold and subdivided. These sites are then no longer available for public recreation use. This adds to the cumulative effect of increased use on National Forest lands.

Hunting

Hunting for big and small game, as well as upland game birds, attracted 239,600 Recreation Visitor Days use in 1986. Hunting accounts for some of the heaviest use that occurs on some parts of the Forest. This includes an early high country deer hunt in the Phelps Creek Area on Lake Wenatchee and hunting for elk on the Naches Ranger District.

Snow Activities

The Forest is expanding dispersed winter recreation opportunities by developing groomed snowmobile trails (445 miles), marked cross-country ski routes (40 miles), and snowshoeing areas. During 1986, snowmobiling use amounted to 77,300 RVD's and cross-country skiing and snowshoeing amounted to 180,800 RVD's.

There are 24 Sno-Park sites within the Forest. These Sno-Parks are planned, developed, and maintained in cooperation with the Washington Department of Transportation and the Washington Parks and Recreation Commission. Snow is regularly plowed from these areas along travel corridors in the snow belt. The most popular Sno-Parks are along the U.S. Highway 97 Corridor, in the Chiwawa Loop Road area around Lake Wenatchee, and in the Interstate 90 Corridor east of Snoqualmie Pass. The more highly used sites, such as the one on Swauk Pass, also have sanitary facilities provided during the winter months. Funds for construction and maintenance of these sites are derived from the sale of snowmobile permits, parking permits, and a percentage of the Washington State gas sales tax.

Dispersed winter recreation has an inherent risk of avalanches in the back country and it is not as practical to control as is done on the developed ski areas. However, the Forest Service, the U.S. Department of the Interior, and the Washington State Department of Transportation, jointly participate in funding an avalanche hazard forecast center based in Seattle. The Forest also has a weather station on the Mission Ridge Ski Area which contributes data for forecasting avalanche hazards. These are broadcast over local radio stations and printed in local papers.

d. TRAILS

Trails provide access for recreation in the more remote and undeveloped areas on the Forest. The mode of transportation allowed on them is a major issue on the Forest.

There are 2,463 miles of trails on the Forest. Approximately 48 percent of the Forest trails are in wilderness. The Forest Service is currently working with users to develop 4-wheel drive

routes, trail bike, cross-country ski, and snowmobile routes. Use of trails by all types of users is steadily increasing. The planning and management of this trail system requires active participation by user groups, a requirement not difficult to achieve in view of the high interest shown.

With the increase in population in the Puget Sound area, trail use has increased dramatically. More and more people are using the backcountry to vary their recreation experiences. The trail system provides the access to accommodate this increasing use.

The trail system evolved along traditional travel routes often without planning or consideration for protection of the area being served. Many of the trails now in use on the Forest were developed years ago for fire fighting access, grazing, or mineral exploration, and were located and built by the Civilian Conservation Corps, miners, sheepherders, and other users. Information on routes is published in numerous guide books making remote routes instantly popular.

With recreation now a dominant use of trails, a trail is no longer considered just a means of getting from here to there but is a recreation facility itself. Development and management of trails influences how we will manage an area. From the users' viewpoint, the trail should provide the challenge, variety, and views that they seek.

On the Forest, there are 293,199 acres of intermingled private or State land, much of it the result of railroad land grants in a checkerboard ownership pattern. As a result, many trails cross private land where there are no easements. Major landowners, such as Burlington Northern and Boise Cascade, permit public use of these trails but are not willing to grant permanent easements or alter their management practices to specifically protect trails. The exception is the Pacific Crest National Scenic Trail where Burlington Northern has granted an easement to the United States (September 10, 1973) with reservations for harvesting timber and the right to cross and recross the trail.

There are approximately 93 miles of trail covered by temporary private land easements or agreements. These cumulatively affect 350 miles or 28

percent of the trail system outside of wilderness areas. Should the private owners close these trails, it would have a severe impact on access to the Forest.

Project work such as timber sales, road and campground construction, mining, and range improvements can adversely affect trails. The effect will be addressed in the project environmental analysis and mitigating measures will be developed if the trail is to be retained. Forest policy is to restore trails dislocated by management activities or to replace them with an equal mileage of new trail elsewhere on the Forest.

Trails on the Forest provide a wide variety of opportunities for various user groups. Trail plans will include trailhead and camp area plans, plus plans to protect "natural" attractions such as lakes, meadows, and mountain passes.

The Wenatchee National Forest has ample potential to meet the annual construction/reconstruction miles assigned in the Regional Plan.

Trails are addressed by category as follows:

Wilderness Trails

Existing wilderness trails will be managed in accordance with standards and guidelines by Wilderness Recreation Opportunity Class. Relocation, reconstruction, or obliteration of trails will be done to meet wilderness management objectives and to correct safety problems. Most trails are open to pack and saddle stock unless specifically closed by order. There are 1,188 miles of inventoried trail in wilderness. These trails are not available for mechanized or motorized equipment use.

Pacific Crest National Scenic Trail

A total of 153 miles of the Pacific Crest National Scenic Trail traverse portions of the Forest. This trail is used as a major hiking route reaching from Canada to Mexico and is not open to use by motorized or mechanical equipment.

Non-Wilderness Trails

There are 1,275 miles of inventoried non-wilderness trails on the Forest. Of this, 813 miles are classified as multipurpose which means they are open to horses, hiking, and motorized trail bike use. There are 118 miles closed to motorized bikes but open to horse, mountain bikes, and hiker use.

4X4 Routes

Four-wheel-drive routes, by technical definition, are very low standard roads. There are approximately 120 miles of such routes on the Forest. These routes are generally used by short wheel-base vehicles. The areas that are most popular for this type of recreation are Table Mountain, Manastash Ridge, Clover Springs, and Divide Ridge.

Off-Road Vehicle (ORV) Trails

In Washington State, there are several governmental agencies which manage land in large tracts to provide for ORV recreation. These agencies can be grouped into three categories: Federal, State and local. The Forest Service is the principal Federal agency with designated ORV facilities in the State of Washington. Of seven National Forests in Washington, two provide almost 87 percent (2,290 miles) of the total Federal trail bike and four-wheel drive trail supply. Thirty-nine percent of the State total inventoried ORV multiple use trails occur within the Wenatchee National Forest.

In addition to working with Yakima and Kittitas Counties, the Forest has worked directly with Washington State Interagency Committee for Outdoor Recreation (IAC) and representatives of ORV users. The results have been 43 supplemental agreements with a value of \$1,446,939. All of these project areas are heavily used by hikers, horsemen, and trail bikers for a variety of activities such as backpacking, sightseeing, fishing, hunting, and trail riding. The funds used are derived through direct assessments to ORV users through license fees and gas taxes.

IAC has three types of supplemental agreements: one for planning, one for development, and one for maintenance. The planning agreement provides funding for comprehensive plans, which include environmental analysis, trail condition survey, and project survey and design. Development agreements provide project construction funds. Trail maintenance funds are used as supplemental funds for emergency purposes on those trails where IAC funds were used for reconstruction.

National Recreation Trails

The Forest has three trails designated as National Recreation trails: Domke Lake No. 1280 (Chelan Ranger District); Silver Falls No. 1442 (Entiat Ranger District); and Boulder Cave No. 962 (Naches Ranger District). This designation indicates these trails are popular, close to urban areas, open for a long season of use, attractive, and usually short.

Snowmobile Routes

The Forest has entered into a cooperative agreement with the State of Washington Parks and Recreation Department for grooming snowmobile routes and installation of appropriate trail signs on approximately 450 miles of winter trails. Four ranger districts participate in this program, with grooming done by Forest Service personnel on two of the districts. The other two districts administer permits for grooming done by the Yakima County Parks and Recreation Department and by a snowmobile club.

Snowmobile trail mileage varies from year to year depending on logging activities and snow conditions. All groomed trails are on roads rather than trails. The annual budget to groom these trails come from assessments on snowmobiles through State license fees.

Cross-Country Ski Trails

Cross-country ski trails have been developed and maintained over the years by the Forest Service and volunteers. There are approximately 119 miles of cross-country ski trails on the Forest. Snow-covered Forest roads provide many additional miles of skiing opportunities.

2. ROADLESS AREAS

Inventoried roadless areas are undeveloped Federal land which must be more than 70 percent Federally owned. The area must contain at least 5,000 acres and must not have improved roads maintained for vehicles intended for highway use. Exceptions are areas less than 5,000 acres that are manageable in their natural condition due to physiography or vegetation, are contiguous to existing wilderness, or are of issue to the public. Management of the inventoried roadless areas within the Alpine Lakes Management Area is directed by the Alpine Lakes Management Plan (see Alpine Lakes Area Management Act of 1976, PL 96-35). The Washington State Wilderness Act of 1984 designated 340,975 acres of inventoried roadless area as wilderness. Remaining roadless areas are listed here in brief and a more detailed description may be found in Appendix C.

Figure III-5 shows the current wilderness area and inventoried roadless areas. Table III-4 lists the roadless areas, location by Ranger District, and size in net National Forest acres.

Wilderness areas are discussed separately in this document.

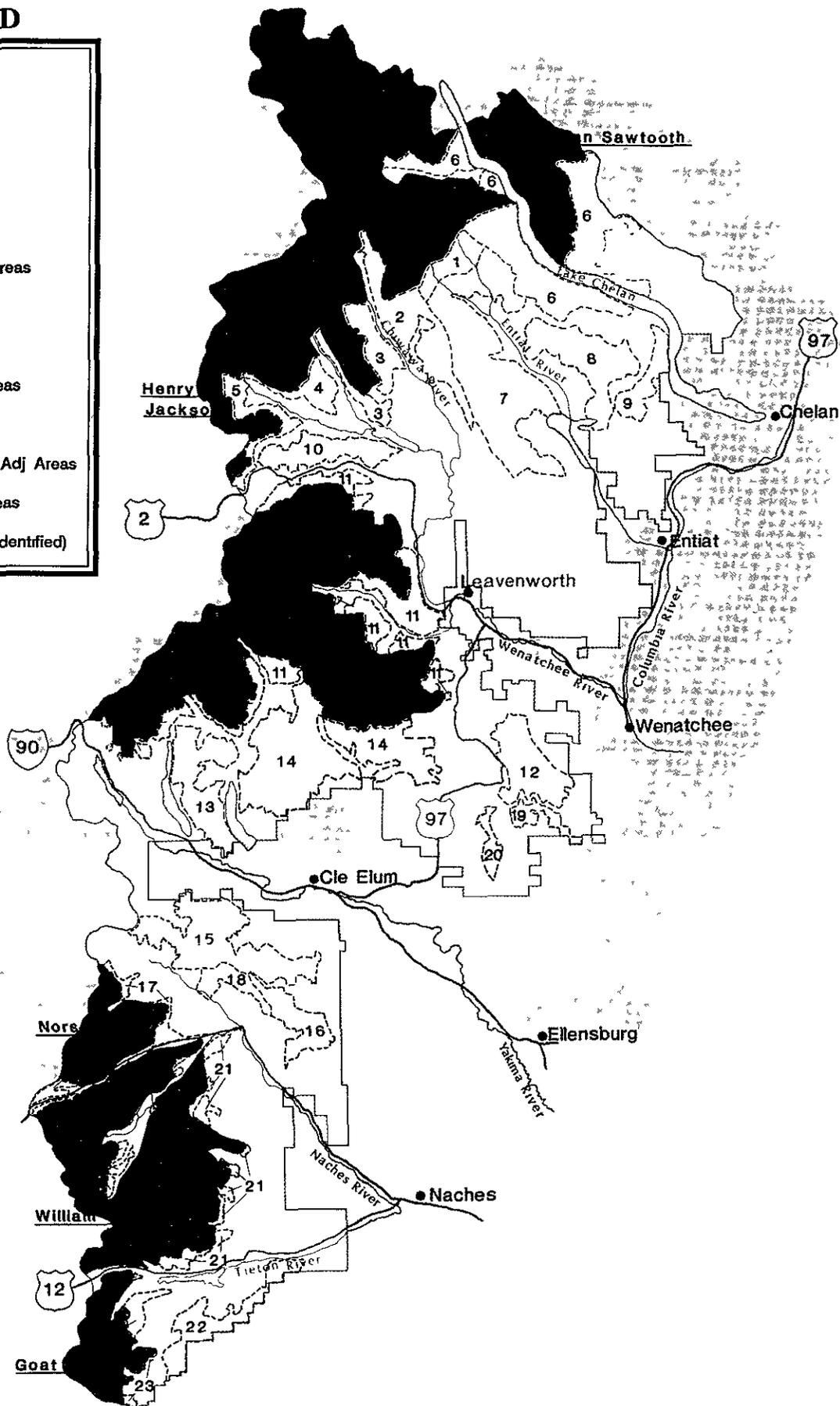


**FIGURE III-5
INVENTORIED ROADLESS AREAS**

LEGEND

1. Myrtle Lake
2. Rock Creek
3. Twin Lakes
4. Canyon Creek
5. Heather Lake
6. Chelan
7. Entiat
8. Stormy Mountain
9. Slide Ridge
10. Nason Ridge
11. Alpine Lakes Adj Areas
12. Devil's Gulch
13. Thorp Mountain
14. Teanaway
15. Taneum
16. Manastash
17. Norse Peak Adj Areas
18. Quartz
19. Naneum
20. Lion Rock
21. William O. Douglas Adj Areas
22. Blue Slide
23. Goat Rocks Adj Areas

(note Wilderness areas identified)



**TABLE III-4
ROADLESS AREAS**

AREA NAME	RANGER DISTRICT (S)	WENATCHEE NATIONAL FOREST ACRES
Myrtle Lake	Entiat	10,918
Rock Creek	Lake Wenatchee	32,924
Twin Lakes	Lake Wenatchee	22,048
Canyon Creek	Lake Wenatchee	9,158
Heather Lake	Lake Wenatchee	11,067
Chelan	Chelan	71,063
Entiat	Entiat	71,254
Stormy	Chelan, Entiat	32,500
Slide Ridge	Chelan	10,091
Devil's Gulch	Leavenworth	25,186
Taneum	Cle Elum, Naches	25,122
Manastash	Cle Elum, Naches	8,798
Norse Peak Adjacent	Naches	11,300
Quartz	Naches	8,756
Naneum	Cle Elum	6,911
Lion Rock	Cle Elum	4,834
William O. Douglas Adj.	Naches	22,938
Blue Slide	Naches	18,571
Goat Rocks Adjacent	Naches	7,357
Nason Ridge <u>1/</u>	Lake Wenatchee	19,123
Alpine Lakes Adj. <u>1/</u>	Lake Wenatchee, Leavenworth	44,393
Thorp Mountain <u>1/</u>	Cle Elum	15,667
Teanaway <u>1/</u>	Cle Elum	66,293
	TOTAL	556,272

1/ Located within the Alpine Lakes Management Area

3. WILD, SCENIC, AND RECREATIONAL RIVERS

On October 7, 1968, Congress enacted the Wild and Scenic Rivers Act (PL 90-542) in an attempt to protect certain outstanding free-flowing rivers that remain in the United States. The objectives of the Act were to keep these rivers or river segments in a free-flowing condition, and to recognize their importance to our natural and cultural heritage through the institution of a national Wild and Scenic River System. The Act also authorized eight rivers within the Nation for inclusion in the Wild and Scenic Rivers System, and established the methods for designating additional components to the system. Twenty-seven rivers were identified for further study. This number was augmented by an additional 29 study rivers through the January 3, 1975 amendment to the Act. However, none of the rivers involved in the legislation were located on the Wenatchee National Forest.

In the late 1970's, the Heritage Conservation and Recreation Service (HCRS) branch of the National Park Service conducted a nationwide inventory of rivers having potential for inclusion in the Wild and Scenic Rivers System. The purpose of the inventory was to ensure that the Nation's best rivers, representing a diversity of river types, were considered for inclusion within the National Rivers System. The importance of this inventory was highlighted in 1979, when then President Carter, in his Environmental Message, directed that "...federal land management agencies shall assess whether rivers located on their lands and identified in the National Inventory prepared by the Heritage Conservation and Recreation Service are suitable for inclusion in the Wild and Scenic Rivers System; if so, these agencies shall take prompt action to protect the rivers - either by preparing recommendations for their designation or by taking immediate action to protect them..."

The inventory was later revised and completed by the National Park Service in 1982. Joint guidelines were also established at that time by the Department of Agriculture and the Department of Interior for determining the eligibility, classification and management of river areas.

Consideration of potential Wild and Scenic Rivers has subsequently become an inherent part of the Forest Service land and resource management planning process. Within this process, river studies are to be conducted to assess the eligibility of the rivers for designation, and to evaluate the potential physical, biological, economic and social effects of adding the river or rivers to the National System. Eligibility is to be based upon the following criteria set forth under section 1(b) and 2(b) of the Wild and Scenic Rivers Act and as supplemented by the USDA-USDI Guidelines:

- 1) The rivers are free-flowing; and
- 2) They possess one or more outstandingly remarkable scenic, recreational, geologic, fish, wildlife, historic, cultural, or ecological values.

On the Wenatchee National Forest, the Nationwide Rivers Inventory (NRI) was used as a starting point for identifying potentially eligible rivers. The Chiwawa, White, Wenatchee and Yakima Rivers were listed in the inventory. The initial Forest planning effort also included the Entiat River and two tributaries, in response to a proposal submitted at that time by a coalition of environmental groups.

As a result of public comments received after release of the DEIS, the consideration of potentially eligible rivers on the Forest was expanded to include:

1. All rivers identified by the public which appeared to meet the criteria outlined in the joint USDA/USDI Guidelines for Evaluating Wild, Scenic and Recreational Rivers.
2. Those rivers identified through in-Service study, which had characteristics similar to the rivers identified in the NRI, and which appeared to meet the criteria of the joint agency guidelines. This study included consultation with other agencies and review of the Pacific Northwest Rivers Study.

A total of 33 rivers, river segments and creeks were ultimately examined for eligibility, through a two phase study (the details, process and results of the study are described in Appendix E). Of these 33, ten were determined to meet the eligibility criteria. Each eligible river or river segment was then assigned to one of three potential classes, based on the condition of the river and the adjacent lands as they presently exist. These classifications are defined in the Wild and Scenic Rivers Act as follows:

- a. Wild river areas - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- b. Scenic river areas - Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- c. Recreational river areas - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Through this process, Table III-5 was developed, which lists the eligible rivers on the Wenatchee National Forest, with the highest potential classification for each segment:

TABLE III-5
RIVER CLASSIFICATION ELIGIBILITY
UNDER THE WILD & SCENIC RIVERS ACT

River ¹	Segment	Classification Eligibility	Length/Miles		
			NF	Other	Total
AMERICAN	Headwaters to confluence w/Rainier Fork	Wild	6.0		6.0
	Confluence w/Rainier Fork to confluence w/ Bumping River	Scenic	16.0		16.0
CLE ELUM	Headwaters to Alpine Lakes Wilderness boundary	Wild	4.0		4.0
	Alpine Lakes Wilderness boundary to above Lake Tucquala	Scenic	2.0		2.0
	Above Lake Tucquala to Salmon La Sac bridge	Scenic	4.0	10.0	14.0
	Salmon La Sac Bridge to head of Lake Cle Elum	Recreational	3.5	1.0	4.5
WAPTUS	Headwaters to Alpine Lakes Wilderness bndry.	Wild	12.0		12.0
	Alpine Lakes Wilderness boundary to confluence with Cle Elum River	Wild	1.0		1.0
ICICLE	Headwaters to Alpine Lakes Wilderness bndry.	Wild	12.0		12.0
	Alpine Lake Wilderness Boundary to City of Leavenworth water intake	Scenic	7.5	6.5	14.0
LITTLE WENATCHEE	Riverside CG Falls to Lake Wenatchee	Scenic	8.0		8.0
NAPEEQUA	Headwaters to Glacier Peak Wilderness bndry.	Wild	15.0		15.0
	Glacier Peak Wilderness boundary to confluence w/ White River	Scenic		1.0	1.0
WHITE	Headwaters to Glacier Peak Wilderness bndry.	Wild	15.0		15.0
	Glacier Peak Wilderness boundary to above Tall Timbers Ranch	Scenic	7.0		7.0
	Above Tall Timbers Ranch to Lake Wenatchee	Scenic	4.5	7.5	12.0
CHIWAWA	Headwaters to Glacier Peak Wilderness boundary	Wild	5.0		5.0
	Glacier Peak Wilderness boundary to Goose Creek	Scenic	22.75	1.25	24.0
	Goose Cr. to confluence w/ Wenatchee River	Recreational	2.75	3.25	6.0
ENTIAT	Headwaters to Glacier Peak Wilderness boundary	Wild	12.5		12.5
	Glacier Peak Wilderness boundary to Cottonwood trailhead	Wild	4.0		4.0
	Cottonwood Trailhead to private land boundary	Scenic	15.0		15.0
WENATCHEE	Lake Wenatchee to Tumwater Campground	Recreational	9.25	11.75	21.0
	Tumwater Campground to National Forest boundary	Recreational	5.0	2.0	7.0

¹ The Yakima River was not included in the eligibility determination, due to the fact that National Forest lands make up less than one percent of the ownership in the Yakima drainage

Present management of these rivers and their adjacent corridors will continue to provide for the protection of the special river values to the standards of their highest potential classification, until such time as Congress formally determines their status as Wild and Scenic Rivers.

A full description of the affected environment of each river is provided in Appendix E, as are the results of the suitability study that was also carried out.

4. CULTURAL RESOURCES

The cultural resource base of the Wenatchee National Forest includes a diverse and unusually rich range of historic and prehistoric artifacts and sites. These include: 1) historic cabins, trails, mines, ditches, railroad grades, emigrant trails, original highway grades, mills, and homesteads; 2) historic Forest Service structures including guard stations, lookout towers, corrals, camps, administrative centers, and Depression-era campgrounds and buildings; and 3) prehistoric campsites, villages, graves, quarries, pictographs, workshops, trails, rock shelters, and religious sites.

Many of these properties are unique. They provide the sole record of former habitats, ways of life, and past human activities. They help provide an understanding of the human adaptations, uses, and alterations of the Cascade Mountain environment.

The cumulative effects of landscape modifications, private land developments and major hydroelectric projects have destroyed much of this record in the Columbia River system. What remains on the Wenatchee National Forest may be a major portion of the historical record of central Washington. Much of it is unique and unduplicated elsewhere.

In several instances, the cultural resources on the Forest are also part of what was once a larger cultural complex, which encompasses portions of the Columbia Plateau and Puget Sound. The cultural resources on the Forest are often of local or state significance and, in about 20 percent of the cases, are of National Register significance (based on records on file at the Wenatchee National Forest Supervisor's Office).

In accordance with the National Historic Preservation Act of 1966 as amended, the National Environmental Policy Act of 1969, Executive Order 11593, as well as a series of implementing regulations and policy direction, the Forest has undertaken a program to identify, evaluate, preserve, protect and interpret the cultural resources.

A cultural resource overview, pulling together most of the recorded information relating to the prehistoric and ethnographic uses of the Forest, has been completed and is available for review. An overview of the historic resources of the Forest still needs to be completed.

Between 1976 and 1985 cultural resources were inventoried on about 123,372 acres of the Forest, or 6 percent of the total Forest acreage. Most field examinations have been done in conjunction with other Forest activities. These surveys have determined the location and nature of cultural sites within potential project areas. At the present rate, project inventory will be completed at a rate of about 30,000 acres per year. Most of this will be in support of the timber sale program.

Inventories have been mostly confined to surface examinations only. Archaeological test excavations have been carried out at five sites on the Forest to determine their subsurface extent and potential eligibility for inclusion in the National Register of Historic Places. These sites were selected for testing because of their relationship to planned timber sales and campground developments. Ultimately, the data retrieved may provide important contributions to archaeological research.

In addition to field inventory, on-going literature search and interviews with knowledgeable local residents has resulted in the identification of a total of 597 known and suspected sites as of 1985.

CULTURAL RESOURCES

Of these, 233 have been documented on site inventory forms or other agency registers. Of the 233 sites, 108 have been evaluated. Sixty-seven of these did not meet the criteria for inclusion in the National Register of Historic Places (State Historic Preservation Office Consultations 1976-1985), however, they may be candidates for future interpretive programs because of local interest.

Another 24 appear to be significant sites and will require more complete documentation and evaluation. Ten individual buildings or building groups (a total of 55 buildings) have been determined eligible for the National Register as part of the USDA Forest Service Pacific Northwest Region evaluation of Depression-era administrative structures.

The remaining sites include formally designated National Register or National Register eligible properties. In this grouping are portions of the Stevens Pass Historic District, the Liberty Historic District, and of the Yakima-Tieton Irrigation District. There are also several individual properties in the group, including the Salmon La Sac Guard Station, the Crow Cabin, the Tumwater Canyon Penstock Bridge, the Wallin Ditch, and the Old Tieton Road.

Table III-6 is a summary of the known and reported cultural resources of the Forest as of 1985. Historic sites are those associated with the period for which there are written records. In Central Washington, the historic era begins at roughly 1805 A.D., with the Lewis and Clark expedition on the lower Columbia River. Prehistoric sites are those predating this period, and are linked with the American Indians and their ancestors.

**TABLE III-6
INVENTORIED AND REPORTED CULTURAL SITES
1985**

Ranger District	Number of Inventoried Sites 1/		Number of Reported Sites and/or Use Areas 2/		Conditions of Remains			Interpretive Value		
	Historic	Prehistoric	Historic	Prehistoric	Poor	Fair	Unknown	Yes	No	Unknown
Chelan	5	2	40	32	20	23	36	23	48	8
Cle Elum	68	11	108	58	97	77	71	52	170	23
Entiat	6	38	8	21	17	14	16	26	10	10
Lake Wenatchee	17	12	83	13	43	47	35	32	83	10
Leavenworth	10	4	78	20	37	42	33	36	63	13
Naches	61	82	25	68	50	76	110	39	182	15
TOTAL	167	111	372	199	268	282	299	198	572	79

1/Includes Forest Service Site Inventories, University/WARC Inventories, State and National Registers.

2/These include sites situated on adjacent and intermingled private land.

The number of sites known and evaluated may represent only a small portion of the total of cultural resources that actually exist on the Forest. Prehistoric and historic land use patterns suggest a high probability for the occurrence of other significant cultural resources within the Forest.

Preservation and protection of the Forest's cultural resources is closely associated with the location of the resources, the nature of the management activities with which they interact, and the particular characteristics of their environmental setting. Impacts to cultural resources may be natural, project-related, or the consequence of public use.

Natural threats include weathering, insect infestation, erosion, moisture, tree fall, trampling by wildlife, and fire. These forces are especially likely to affect historic buildings, resulting in the loss or decay of structural elements and the ultimate demise of the building. On the Forest, most of the inventoried historic wood frame or log structures, aside from the administrative sites under current use, have experienced substantial decomposition. Erosion is a major factor in the irretrievable loss of archaeological data. At least two known Indian housepit/refuse sites on the Forest are experiencing severe degradation through river action. Regular maintenance work, rehabilitation, site stabilization, and data retrieval are just a few ways of preventing the further deterioration or loss of properties and data.

As lands are allocated to uses involving land and vegetation modification, the probability of adverse impacts on cultural resources increases. Studies on the Forest indicate certain locations have the greatest probability for overlap between cultural resources and other management activities (Wenatchee National Forest Sampling Design, 1983).

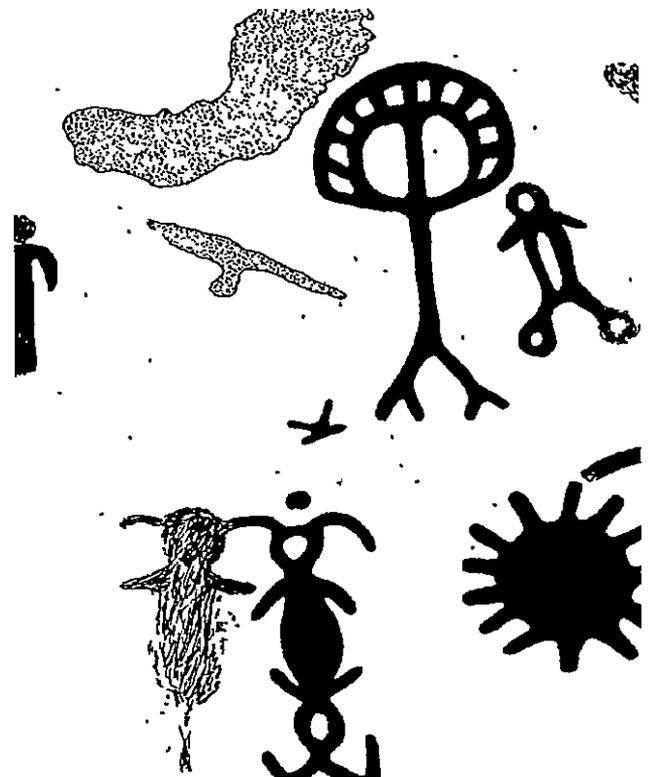
The most important step in the preservation and protection of significant cultural resources is systematic inventory well in advance of Forest projects. Proposed roads, trails, and project boundaries can often be adjusted with very little additional cost or impacts to the proposed projects if the need is determined during the very early planning stages. In this way, other uses can

frequently be carried out without endangering the historic qualities of nearby cultural sites.

Occasionally, public use may result in the deliberate destruction of cultural properties through vandalism, relic collecting, theft and carelessness. Archaeological sites are especially subject to the hazard of "pot hunting" (illegal relic gathering). This results in the loss of information vital to the reconstruction of prehistoric ways of life.

Several protective measures have been used to deal with this problem. These include maintaining the confidentiality of specific site locations, directing public use away from them, and periodic monitoring of sensitive areas. However, a more positive approach is also needed. This would involve education of the public to the values and fragility of the cultural resource

The management of cultural resources also has an effect on the management of other environmental components on the Forest. These effects may be mutually supportive, or may cause conflicts requiring resolution. Among these considerations are the level of significance of the property and its condition, suitability for scientific research or interpretive opportunities, importance to a community or ethnic group; accessibility, and compatibility with other activities.



CULTURAL RESOURCES

At this time, a Washington State Preservation Plan is being prepared under the direction of the Washington State Office of Archaeology and Historic Preservation. This plan should provide additional data and considerations of help in evaluating and developing management strategies for the cultural resources of the Wenatchee National Forest. There will be continuing coordination between the Forest cultural resource program and the State Plan when it becomes available.

The future demand for cultural resources is likely to be a function of three factors: recreational use, the specific association of a community or ethnic group with historic site or area, and the development and expansion of archaeological research. Since the Forest receives approximately 4.9 million Recreation Visitor Days use per year (Recreation Information Management 1986), it is likely that interpretive programs and designated historic points of interest would experience substantial public use.

The demand for protection and preservation of historic sites and areas because of community associations will probably continue at about the same rate as in the past. Salmon La Sac Guard Station, the Liberty Historic District, and Stevens Pass Historic District were all the products of community efforts to recognize historic values embodied in these properties (Wenatchee National Forest correspondence files). Generally, community associations develop as the Forest Service plans for the disposition of the sites and properties.

Representatives of the Yakima and Colville Indian Reservations have also expressed a concern for the protection of archaeological sites on the Forest. These properties represent a very special link between the Indians and ancestors who once occupied the Forest lands. A more detailed discussion of Indian concerns and interaction is presented in the American Indian Uses and Concerns section.

Research by the scientific community is expanding into the uplands, carrying with it the recognition of the exceptional value of hinterland sites to the reconstruction of prehistoric subsistence patterns. Many references to this research are on file at the

Wenatchee National Forest Supervisor's Office. The demand for the protection and preservation of all archaeological properties will remain high. Requests for research are not anticipated to be frequent, but one university has expressed an interest in conducting a field school at a Forest site if funding becomes available.

American Indian Uses and Concerns

The Forest is within the area ceded to the U.S. Government by the Yakima Indian Treaty, dated June 9, 1855. (Refer to the copy of the 1855 Treaty in Appendix G.) Originally, the Forest was home to the Yakima and Wenatchee tribes, who wintered in villages along the Columbia River and its tributaries. They traveled widely in spring, summer, and fall to gather berries, root vegetables and medicinal herbs, and to hunt and fish in the forested Cascade Mountains.

With the conclusion of the Yakima Indian Treaty and the subsequent Executive Order of July 2, 1872, most of the original Native American inhabitants of what are now Chelan, Kittitas, and Yakima Counties were resettled onto the Yakima and Colville Reservations. However, certain rights and privileges to the ceded lands were retained. Article 3 of the Yakima Indian Treaty states, "...has also the right of taking fish at all usual and accustomed places in common with the citizens of the territory, and of erecting temporary buildings for curing them; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land...".

This places the Forest in a special position with respect to the Yakima and Colville Tribes. Coordination of the Forest programs and activities involves the Yakimas as adjacent neighbors. It recognizes the Tribes as concerned public interest groups and as people with ancestral ties to the land base of the Forest. It requires a special working relationship responsive to the rights and privileges of the Tribes as defined by the 1855 Treaty. This includes the accompanying responsibility by the U.S. Government to protect water quality and anadromous fish habitat on the Forest from environmental degradation (Northwest Indian Cemetery Protective Association, et al. v. R. Max Peterson, et al. 1983).

Certain additional uses of the Forest lands by the American Indians are authorized by the American Indian Religious Freedom Act (P.L. 95-341), which states that it shall be the policy of the United States to protect and preserve for American Indians their traditional religions. This includes, but is not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites (refer to a copy of this Act in Appendix G).

Currently, information with respect to location of traditional American Indian religious sites on the Forest is unknown. Members of the Yakima Indian Nation are reluctant to share this information because of its private nature. What is known is that many ceremonies and religious activities are directly related to the importance of certain food sources. Roots, salmon, venison, and berries are still served and eaten as part of traditional religious ceremonies (Galm, et al. 1981). Within the mid-Columbia region, many of the traditional food gathering areas (especially root localities) are now in private ownership. Consequently, many of the Indians obtain their traditional resources from federal lands.

With respect to the Forest, this has raised another concern. About 12 percent of the Forest is in non-federal ownerships. These exist largely as a checkerboard pattern in which alternate sections are owned primarily by large landowners. This condition is particularly noticeable on the Cle Elum, Leavenworth, and Naches Ranger Districts. Since this ownership resulted from the Railroad Land Grants, there is no relationship between the distribution of ownership and the location of traditional or critical food and materials collecting areas. Not infrequently these areas, such as Camas Meadows, occur on private land. These areas may be subject to severe alteration or closed to public entry. The private ownership and the cumulative effects of the management of these lands has and will continue to limit the traditional uses of these localities.

The relationship and interaction between American Indian rights and uses of the Forest and other Forest management activities is complex. Rights reserved to the Indians by the Yakima Treaty will affect Forest management activities, particularly those actions that could impact water quality and

anadromous fish habitat. Other Indian-related issues that may influence Forest programs are protection of wildlife resource values and ancestral sites; recognition of social/cultural/religious values with respect to the landscape and resources of the Forest; and assurance of access to traditional resource collection areas. Litigation with respect to Indian rights is ongoing in many areas of the United States and may result in future changes in management practices on the Forest.

5. SCENERY

The Wenatchee National Forest is well known for its outstanding mountain, valley, and lakeshore scenery.

The Cascades landscapes are distinctive in beauty and nature, with sweeping vistas and a variety of topography, ecotypes, and lifeforms. Natural appearing environments exist on much of the Forest, even where intensive commodity management is occurring. Approximately 63 percent of the Forest, including wilderness areas, are in a natural appearing visual condition.

Visual quality is classified according to the scenic variety of an area and how often it is seen by the viewing public. The most scenic classifications are Preservation, Retention, and Partial Retention. Definitions of Visual Quality Objectives and percent of land in each under current management are depicted in Table III-7. The Forest Plan will contain specific visual quality objectives for all areas of the Forest.



TABLE III-7
EXISTING VISUAL QUALITY OBJECTIVES
1985

VQO Objectives	Description	Percent of National Forest Land
Preservation (P)	Areas in which only ecological change has taken place except for trails needed for access. They appear to be untouched by human activities.	42
Retention (R)	Areas in which changes in the landscape are not visually evident to the average person unless pointed out. They appear to be natural.	21
Partial Retention (PR)	Areas in which changes in the landscape may be noticed by the average forest visitor but they do not attract attention. The natural appearance of the landscape still remains dominant. They appear to be minor disturbances.	24
Modification (M)	Areas in which changes in the landscape are easily noticed by the average forest visitor and may attract some attention. They appear to be disturbances but resemble natural patterns.	2
Maximum Modification (MM)	Areas in which changes in the landscape are strong and would be obvious to the average forest visitor. These changes stand out as a dominating impression of the landscape. Yet, they are shaped so that they might resemble natural patterns when viewed from 3-5 miles or more distant. They appear to be major disturbances when viewed at closer distances.	11

The most valuable scenery occurs on lands that are distinctive in character and highly visible. The Forest provides the public with seven wildernesses, six major reservoirs, including scenic Lake Chelan, several large natural lakes, including Lake Wenatchee, many free flowing rivers, five Washington State "scenic" designated highways, and numerous main travel routes penetrating the Forest toward recreation areas and wildernesses. Thirty-four viewsheds or travel routes have been identified as being important inventoried recreational travelways on the Forest. See Table III-8 for Visual Condition of Travel Routes and Viewsheds and Existing Visual Quality Levels. A viewshed is the total landscape seen, or potentially seen, from all or a logical part of a travel route, use area, or water body.

Visual condition of travel routes and viewsheds are a summary rating of the overall impression a visitor would have of the visual appearance of the lands seen in a total area. These are expressed in terms directly related to the amount and type of individual activity alterations found during Individual Activity Evaluations.

Visual Quality Levels are the output of the inventory process of the Visual Management System. A desired level of excellence is based on physical and sociological characteristics of an area.

TABLE III-8
VISUAL CONDITION OF TRAVEL ROUTES AND VIEWSHEDS
AND EXISTING VISUAL QUALITY OBJECTIVES

Present Inventories			Visual Quality Objectives		
No.	Viewshed or Travel Routes	Existing Visual Condition	Foreground	Middleground	Approx. Acres
1	Lake Chelan	Natural Appearing	Retention	Partial Retention	84,800
2	Railroad Creek	Natural Appearing	Retention	Preservation	14,600
3	Cooper Mtn. to S. Narrave	Altered	Modification	Modification	3,300
4	Shady Pass	Natural Appearing	Partial Retention	Partial Retention	18,800
5	Entiat Valley	Natural Appearing	Retention	Partial Retention	73,300
6	French Corral	Altered	Partial Retention	Modification	3,800
7	Mad River	Natural Appearing	Retention	Not Seen	15,700
8	Sugarloaf-Maverick Saddle	Slightly Altered	Partial Retention	Not Seen	4,700
9	Eagle Creek	Slightly Altered	Retention	Modification	5,600
10	Chumstick-Plain Rd. 209	Natural Appearing	Partial Retention	Modification	26,600
11	Chiwawa River	Natural Appearing	Retention	Partial Retention	59,200
12	White River	Slightly Altered	Retention	Partial Retention	20,200
13	Little Wenatchee	Slightly Altered	Retention	Partial Retention	28,500
14	Beehive to Swauk Pass	Natural Appearing	Partial Retention	Modification	6,900
15	Mission Creek	Natural Appearing	Modification	Modification	6,400
16	Table Mountain Reecer Creek	Slightly Altered	Retention	Partial Retention	9,600
17	Taneum-Manastash Quartz Mountain	Slightly Altered	Partial Retention	Modification	12,000
18	Little Naches	Slightly Altered	Partial Retention	Modification	6,900
19	Ravens Roost	Slightly Altered	Partial Retention	Modification	5,500

TABLE III-8 (Continued)
VISUAL CONDITION OF TRAVEL ROUTES AND VIEWSHEDS
AND EXISTING VISUAL QUALITY OBJECTIVES

Present Inventories			Visual Quality Objectives		
No.	Viewshed or Travel Routes	Existing Visual Condition	Foreground	Middleground	Approx. Acres
20	Mather Memorial (Hwy-410)	Natural Appearing	Retention	Retention	22,500
21	Bumping Lakes	Natural Appearing	Retention	Preservation	22,200
22	Little Bald	Altered	Partial Retention	Modification	2,000
23	Rattlesnake Creek	Slightly Altered	Partial Retention	Modification	4,300
24	Cash Prairie	Slightly Altered	Partial Retention	Modification	4,500
25	Little Rattle-snake Creek	Slightly Altered	Modification	Modification	2,300
26	White Pass (Hwy-12)	Natural Appearing	Retention	Partial Retention	53,900
27	North Fork Tieton	Altered	Partial Retention	Partial Retention	12,200
28	South Fork Tieton	Slightly Altered	Partial Retention	Modification	8,500
29	Tieton Road	Natural Appearing	Retention	Not Seen	6,400
30	Stevens Pass (Hwy-2)	Altered	Retention	Partial Retention	50,600
31	Swauk Pass (Hwy-97)	Slightly Altered	Retention	Partial Retention	31,100
32	Snoqualmie Pass	Heavily Altered	Retention	Partial Retention	21,500
33	Icicle Valley	Altered	Retention	Partial Retention	18,300
34	Cle Elum Valley	Slightly Altered	Retention	Partial Retention	31,500

Nineteen lakes and reservoirs have been identified as being important recreational lakes with high visual sensitivities. Many of the lakes are along travel routes. See Table III-9 and map, Visual Condition of Lake Viewsheds and Existing Visual Quality Objectives. Natural appearing settings are important to users and the demand for retention of these settings is great.

Concerned residents of communities within and adjacent to the Forest, such as Chelan, Cle Elum, Leavenworth, and Lake Wenatchee, have high expectations that a natural appearing Forest environment will be maintained. Outfitter guides, resorts, club sites, organizational sites, and recreation residences add to the public demand for natural settings.

Preservation of old growth for aesthetic reasons is an important value for many members of the public. Areas of old growth are characterized by mature and overmature trees with a multi-layered canopy. These areas show little evidence of man's activities. Section 9b of this chapter, Vegetation: Old Growth discusses old growth forests in more detail.



TABLE III-9
VISUAL CONDITION OF LAKE VIEWSHEDS
AND EXISTING VISUAL QUALITY OBJECTIVES

Present Inventories		Visual Quality Objectives	
Lakes and Surrounding Landscape	Existing Visual Condition	Foreground	Middleground
Antlon Lake	Altered	Modification	Not Seen
Domke Lake	Natural Appearing	Retention	Preservation
Fish Lake	Slightly Altered	Retention	Modification
Lake Wenatchee	Natural Appearing	Retention	Partial Retention
Beehive	Altered	Partial Retention	Not Seen
Manastash Lake	Natural Appearing	Retention	Not Seen
Bumping Lake	Natural Appearing	Retention	Preservation
Granite Lake	Natural Appearing	Partial Retention	Not Seen
Leech Lake	Slightly Altered	Retention	Not Seen
Dog Lake	Natural Appearing	Retention	Not Seen
Clear Lake	Natural Appearing	Retention	Partial Retention
Rimrock Lake	Natural Appearing	Retention	Partial Retention
McDaniel Lake	Slightly Altered	Modification	Modification
Bear Lake	Natural Appearing	Modification	Modification
Lost Lake	Natural Appearing	Partial Retention	Not Seen
Cooper Lake	Natural Appearing	Retention	Partial Retention
Cle Elum Lake	Slightly Altered	Retention	Partial Retention
Kachess Lake	Slightly Altered	Retention	Partial Retention
Keechelus Lake	Altered	Partial Retention	Retention

Wilderness, unroaded, non-motorized areas, and Research Natural Areas have a "preservation" Visual Quality Objective. The other inventoried visual quality objectives listed above apply to the rest of the Forest.

Approximately 68 percent of the commercial forest lands are inventoried as either "retention" or "partial retention".

The existing Alpine Lakes Plan, the Kittitas Plan, and the Swauk and the Entiat Visual Corridor Plans provide current visual quality standards and direction for meeting them. In other areas, the landscape is managed by visual quality objectives (Table III-7).

Impacts on the visual resource can be measured by analyzing two basic inventories. The first is an inventory of the visual characteristics of the present landscape measured on a scale ranging from "natural appearing" to "permanently modified".

Four main classes describe the existing visual condition of the Forest's landscape. These are listed below:

TABLE III-10
EXISTING VISUAL CONDITION
OUTSIDE OF WILDERNESS
1984

Description of Visual Condition	Total Forest Lands
Natural appearing landscape	63%
Activities have slightly altered the natural appearing landscape	15%
Activities have altered and heavily altered the natural appearing landscape	21%
Activities have permanently altered the natural appearing landscape (e.g., powerline corridors)	1%

A natural appearing landscape equates with preservation and retention visual quality objectives. Activities that have slightly altered the natural appearing landscape are associated with partial retention visual quality objectives. Activities that have altered, or heavily altered, the natural appearing landscape are associated with the modification and maximum modification visual quality objectives.

The second inventory method is the visual absorption capacity. It uses criteria for predicting the capability of the landscape to absorb visual alteration.

Factors used include slope of terrain, vegetative composition, soil color contrast, and the ability of an area to return to its natural appearance after alteration by human activity. The most critical visual factors are the steep and moderately steep slopes on commercial forest lands. Of the total commercial forest land, 15 percent is steep and 64 percent is in moderately steep landscapes. These areas are highly visible and, therefore, have the greatest potential for visual resource impact.

Recreation Information Management (RIM) data indicates that approximately 15 percent of the 5.0 million visitor days of recreational use in 1986 was driving for pleasure and viewing scenery. Public demand for scenic quality and concern for its maintenance is increasing and is expected to continue to increase over the foreseeable future. Visual quality concerns are highest along the major state routes that criss-cross the Forest; along collector roads accessing wilderness; and in areas near recreation sites or communities.

Recreationists intensively use the five interstate scenic highways, 5,110 miles of existing forest roads, and 2,463 miles of trails. These facilities traverse a wide variety of forest and non-forest lands. Of all these lands, the greatest potential for impact on the visual resource will be within roadless and commercial forest areas that are delineated as "retention" and "partial retention" in the Landscape Management Inventory.

There has been a trend toward increased timber harvest in higher elevation, steeper areas with high scenic values. Many of these distinctive areas are visible from scenic travelways and

recreation areas. Logging plans require careful design and sophisticated technology to preserve scenic values.

The cumulative effects of visual change is most noticeable in areas of mixed ownership where differences in cutting practices, road construction and development are accentuated. The prime example is the Snoqualmie Pass (I-90) viewshed. The combination of private land management and the Forest Service activities increases the alteration of the natural landscape. Recently, the Stevens Pass (U.S. 2) viewshed shows increased change of the natural landscape through both private and Forest Service vegetation management. The roadless areas are presently in a natural appearing state. These lands will be altered as the land becomes available for timber management.

Existing management direction can be expected to continue the historical trend of altering the overall visual condition by timber harvest during the next decade.

The valley bottom drainages contain most of the transportation corridors, utilities, residential development, and other intensive land uses. Some of the land is privately owned. The majority of the private land uses which impact scenic quality in these areas are controlled by the counties. Increased development is expected on private lands within the valley bottoms. Protection of scenic values can best be achieved through proper zoning and landscape ordinance.

6. WILDERNESS

Wilderness fulfills a strongly expressed social need, not only from those who partake of the wilderness experience, but also from those who, although they may never see or visit wilderness, have a "peace of mind" knowing it exists and is available for generations to come. According to the 1964 Wilderness Act, wilderness is an area where "man is a visitor who does not remain" and a place offering visitors an opportunity for solitude. Protection of the natural qualities of the area takes precedence over human and recreational use.

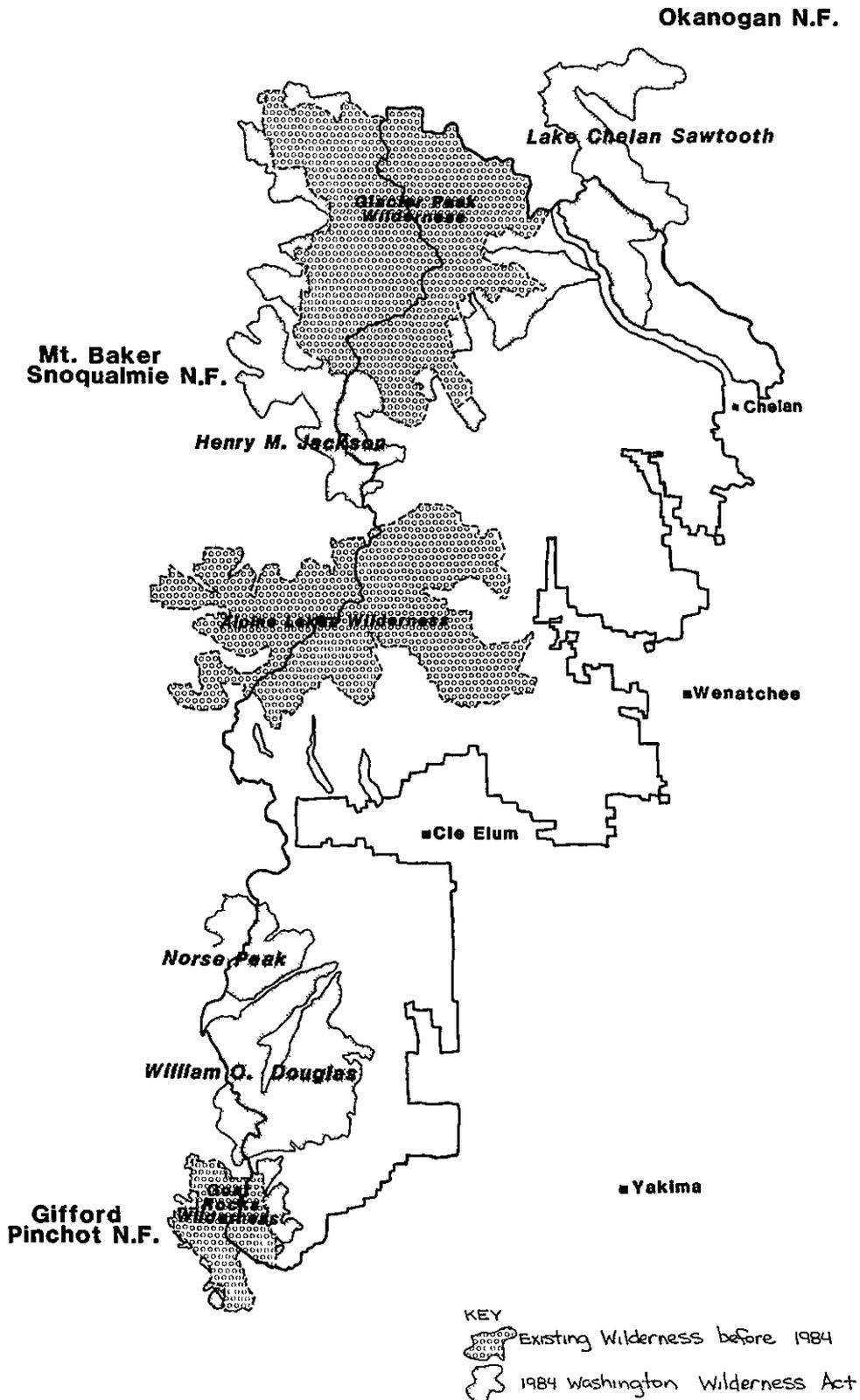
Wildernesses occupy 39 percent of the area on the Wenatchee National Forest and span a multitude of environments and elevations ranging from low, open, grassy slopes to timber stands of all ages and varied species; from subalpine and alpine areas to the rugged, rocky peaks of the Cascade Range. Some of these areas are inherently fragile and easily disturbed such as lakeshores, meadows, and thin-soiled steep slopes.

Wilderness on the Wenatchee National Forest was designated by Congress with the Wilderness Act of 1964 (Goat Rocks and Glacier Peak Wilderness Areas), the Alpine Lakes Area Management Act of 1976 (Alpine Lakes Wilderness), and the Washington State Wilderness Act of 1984 (Lake Chelan-Sawtooth, Henry M. Jackson, Norse Peak and William O. Douglas Wilderness Areas). The 1984 Act also added 62,712 acres to Glacier Peak Wilderness and 11,173 acres to Goat Rocks Wilderness.

Glacier Peak, Alpine Lakes, Henry M. Jackson, and Norse Peak Wilderness Areas extend across the Cascade Crest into the Mt. Baker-Snoqualmie National Forest while the William O. Douglas and Goat Rocks Wilderness Areas extend into the Gifford Pinchot National Forest. In the north, the Wenatchee and Okanogan National Forests share the Lake Chelan-Sawtooth Wilderness (Figure III-6). Managers of neighboring Forests worked together to develop uniform direction to be used by each forest for the management of these shared wilderness areas.



FIGURE III-6
WILDERNESS AREAS
WENATCHEE NATIONAL FOREST



WILDERNESS

Following is the total area for each of the wilderness areas and the amount that lies within the Wenatchee National Forest:

**TABLE III-11
WILDERNESS AREA ACREAGE**

Wilderness	Total Acres	Wenatchee National Forest Net Acres
Lake Chelan-Sawtooth	145,667	56,414
Glacier Peak	576,865	289,001
Henry M Jackson	103,591	27,221
Alpine Lakes	393,360	244,057
Norse Peak	50,923	36,295
William O. Douglas	167,195	151,730
Goat Rocks	105,633	36,316
TOTAL	1,543,234	841,034

The Forest's wilderness areas contain a vast number of lakes and tarns, and afford many challenges for rock climbing, mountaineering, and cross-country travel. They also provide many opportunities for solitude.

The designation as wilderness carries with it some limits as to the kinds and amount of uses permitted which differ considerably from restrictions outside of wilderness. Motorized use is prohibited; group sizes and numbers of people visiting selected areas are limited; use of pets, recreation stock, fires, and firewood are restricted; and camping is not allowed in some fragile locations. Road construction and timber harvest are prohibited.

The wilderness environment for each wilderness area is briefly described below. In addition, specific features and uses for each, as they pertain to the Wenatchee National Forest only, are included.

a. LAKE CHELAN-SAWTOOTH

LOCATION: Wenatchee and Okanogan National Forests; Chelan, Twisp, and Winthrop Ranger Districts

SIZE: 145,667 acres

KEY ACCESS POINTS: Along Lake Chelan, the trailhead at Prince Creek accesses Prince Creek Tr. #1255 and Lakeshore Tr. #1247; in the northern portion, access is possible via the Twisp River Road, Libby Creek Road, Buttermilk Creek Road, and Wolf Creek Trail.

MILES OF TRAIL: Approximately 194 miles.

ELEVATION RANGE: From 1,100 feet on the surface of Lake Chelan to 8,974 feet on North Gardner Mountain.

GENERAL DESCRIPTION: Located in Chelan and Okanogan Counties, the Wilderness borders include the north shore of Lake Chelan, the North Cascades National Recreation Area to the northwest, and the Sawtooth Mountains to the northeast. Fifty-one mile long Lake Chelan is a significant feature of interest adjacent to the Wilderness. A diversity of landforms is found in the area including sharp rocky canyons, deep mountain valleys, and jagged peaks. A great variety of habitat is represented by alpine meadows, subalpine fir forests, lodgepole pine thickets, grassy openings, large Douglas-fir and Englemann spruce, hardwoods, and sagebrush. Numerous high mountain lakes are found in the area. Wildlife includes mule deer, elk, mountain goat, cougar, and black bear. Bald and golden eagles are commonly seen in winter months. Rattlesnakes are numerous on dry slopes. Extensive mineral exploration and development has occurred over the last hundred years.

This moderately visited area, although rugged, offers considerable opportunity for cross-country travel across large expanses of open, wildflower adorned meadows. Its location affords a sunnier, drier climate than the other wilderness areas which lie straddled along the Cascade Crest. Surprise Lake is a major attraction. Portions of this Wilderness can be accessed by powerboat where it borders Lake Chelan.

b. GLACIER PEAK

LOCATION: Wenatchee and Mt. Baker-Snoqualmie National Forests; Lake Wenatchee, Entiat, Chelan, and Darrington Ranger Districts

SIZE: 112,607 acres of additions
464,258 acres original area
576,865 acres total Wilderness

KEY ACCESS POINTS: On the west side, Highway 20 accesses FS Road numbers 23 and 49 and Highway 530 accesses FS Road #26; and on the east side, U.S. Highway 2 to State Highway 207 and FS Roads #6400 #6200, and #6300, and U.S. Highway 97 to Entiat Valley Rd. #5100 or via Lucerne on Lake Chelan to Rd. #8301 - all FS roads lead to trailheads accessing the Wilderness.

MILES OF TRAIL: 450 miles

ELEVATION RANGE: From 2,000 feet to 10,541 feet on Glacier Peak

GENERAL DESCRIPTION: The Glacier Peak Wilderness is located within portions of Chelan, Snohomish, and Skagit Counties in the northern Cascade Mountains. The area is characterized by heavily forested stream courses, steep sided valleys, and dramatic glacier crowned peaks. The area contains numerous streams and many small high elevation lakes. It contains more active glaciers than any other area within the lower 48 states. Glacier Peak, a dormant volcano, is the dominant geologic feature. Forest vegetation is comprised of true firs, spruce, and hemlock, as well as stands of pine on eastern slopes. Various species of wildlife inhabit the area and include deer, elk, bear, mountain goat, marten, and lynx. Grouse are found throughout the area, and the primary fishery is cutthroat trout. Other species include eastern brook, german brown, rainbow and bull trout; and sockeye, steelhead, and chinook salmon. At Twin Lakes, the State Department of Wildlife operates a cutthroat trout egg breeding area, the only one in the State.

Glacier Peak is a heavily used Wilderness. Lyman Lakes receives considerable use from visitors at Holden Village, a church camp in the Railroad Creek drainage. Spider Meadow is a popular

area. Buck Creek Pass near Glacier Peak is a heavily used area. Indian Creek and White River trails provide access to the Pacific Crest National Scenic Trail (PCNST). There are also several mountain climbing routes on Glacier Peak that begin at White Pass.

c. HENRY M. JACKSON

LOCATION: Mt. Baker-Snoqualmie and Wenatchee National Forests, Darrington, Skykomish, and Lake Wenatchee Ranger Districts

SIZE: 103,591 acres

KEY ACCESS POINTS:

1. East of Granite Falls to Mt. Loop Hwy. via Barlow Pass and the North Fork of Sloan Creek to Trail #648, the Cougar Lake Trail.
2. Stevens Pass. Pacific Crest Trail 2 miles north to Wilderness.
3. Northeast from the town of Index, North Fork Skykomish River Road #63. All trails north of Garland Mineral Springs.
4. U.S. Highway 2 to Smithbrook/Rainy Creek Road #6700 to access the southern portion; U.S. Highway 2 to State Highway 207 to Little Wenatchee Road #6500 and Heather Lake Trailhead Road #6701 400 in the northern portion. Main trail access is via Little Wenatchee Trail #1525, Cady Creek Trail #1501 and Cady Ridge Trail #1532.

MILES OF TRAIL: 49 miles

ELEVATION RANGE: 2,350 to 7,835 feet (Sloan Peak)

GENERAL DESCRIPTION: The Henry M. Jackson Wilderness is located within Snohomish, King, and Chelan Counties. This area is adjacent to the existing Glacier Peak Wilderness. Streams in the northern portion of this area drain into the Sauk River, while the southern portion is drained by the Skykomish River. The southern portion lies adjacent to the Old Cascade Tunnel and

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Nason Creek. The vegetation includes cedar, Douglas-fir, true firs, spruce, western and mountain hemlock, and at higher elevation, alpine meadows. The area supports cougar, mountain goat, marten, lynx and hoary marmot. Deer is the major big game species. Blue grouse also inhabit the area. Cutthroat trout is the main fishery.

The terrain is rugged, with steep slopes and finger ridges dissected by small intermittent or permanent drainages. Main features of the area include Cady Creek and upper Little Wenatchee River. The Pacific Crest National Scenic Trail (PCNST) traverses the south portion of the Wilderness. The area is rich in mining history with approximately 900 acres of patented mining claims within the Wilderness. This area contains approximately 30 lakes which receive moderate use for fishing as well as use by horseback riders.

This is a heavily used Wilderness north of Stevens Pass. It contains a popular portion of the PCNST and easy day hike attractions such as Lake Valhalla and Lake Janus. Popular horseback and hiker destinations are Top and Pear Lakes and the Little Wenatchee, Cady Creek, and Cady Ridge Loop trail system. Other attractions include Fortune Pond, Lake Sally Ann, Heather Lake, and scenic Grizzly Peak.

d. ALPINE LAKES

LOCATION: Wenatchee and Mt. Baker-Snoqualmie National Forests; Lake Wenatchee, Leavenworth, Cle Elum, Skykomish, and North Bend Ranger Districts

SIZE: 393,360 acres

KEY ACCESS POINTS:

1. On the east side--U.S. 2 to Icicle Road #76 and various trailheads in the Icicle Valley.

2. U.S. 97 to County Route #970 to FS Road #9737, and various trailheads in the Teanaway River drainage; or to State Route #903, to FS Road #4600 to trailheads in the Cooper River drainage; or FS Road #4330 and trailheads in the Cle Elum River Valley.

3. On the west side--U.S. 2 to Stevens Pass and PCNST access; or to FS Road #6410 and Tr. #1072.

4. Interstate 90 to Snoqualmie Pass and PCNST access; or to FS Road #6410 and Tr. #1072.

5. Interstate 90 to Snoqualmie Pass and PCNST access; or to FS Road #5630 and Tr. #1002; or to FS Road #5620 to the Waptus River Trail from the west.

MILES OF TRAIL: Approximately 800 miles

ELEVATION RANGE: 1,600 feet in the lowest valleys to 9,415 on the summit of Mt. Stuart.

GENERAL DESCRIPTION: The Alpine Lakes Wilderness lies in portions of Chelan, King, Kittitas, and Snohomish Counties between Stevens Pass and Snoqualmie Pass. It was so named because of the over 700 small mountain lakes nestled among the high rock peaks and timbered valleys of the region. Additionally, numerous rivers and streams traverse the Wilderness. Fish planting by the Washington Department of Wildlife has provided sport fishing for cutthroat and rainbow trout in many of the previously barren high lakes.

Wildlife species represented include blacktailed and mule deer, elk, mountain goat, beaver, otter, weasel, mink, bobcat, badger, and bald eagle. This Wilderness is one of the most heavily visited natural areas in Washington State, with nearly half the State's population within an hour's drive of the area. Several hundred miles of recreation trail traverses the Wilderness.

This is one of the most popular and heavily visited Wilderness in the Cascade Mountain Range, as well as the United States. The unique Enchantment Area is a major attraction. Other popular areas are: Frosty Pass; Icicle Ridge; and Eightmile, Stuart, Spectacle, and Waptus Lakes. Fishing and rock climbing are also popular. The Pacific Crest National Scenic Trail traverses the Wilderness from Snoqualmie Pass to Stevens Pass.

e. NORSE PEAK

LOCATION: Mt. Baker-Snoqualmie and Wenatchee National Forests; White River and Naches Ranger Districts

SIZE: 50,923 acres

KEY ACCESS POINTS:

1. Highway 410 to Crystal Mt. turnoff. Four miles to Norse Peak Trailhead #953.
2. Highway 410 to FS Rd. #7174 to road end at Corral Pass. Trail numbers 1155 and 1184.
3. Greenriver Rd. to Hines Camp. Greenwater River Trail #1175.
4. Highway 410 to Tr. #953; and FS Rd. #1902 to Tr. #951.

MILES OF TRAIL: 52 miles

ELEVATION RANGE: 3,200 to 6,858 on Norse Peak.

GENERAL DESCRIPTION: The Norse Peak Wilderness is located in northeastern Pierce County and northwestern Yakima County. The area straddles the Cascade Crest between Chinook and Naches Pass. Topography is generally high and steep with rocky terrain at the high elevations; narrow valleys, mountain lakes, and open park-like basins. Vegetation includes Douglas-fir, true firs, western and mountain hemlock, ponderosa and white pine, Englemann spruce, as well as some lodgepole pine, larch, and Alaskan and red cedar. A variety of wildlife inhabits the area including mule and blacktail deer, elk, black bear, mountain goat, Canada lynx, cougar, fisher, and wolverine. Game birds include spruce, ruffed, and blue grouse. Cutthroat, rainbow, and eastern brook trout are found in area waters. Some deposits of placer gold at the heads of Morse and Crow Creeks are of interest to recreational miners. A notable attraction is Fife's Peak which is a remnant volcanic cone. Norse Peak is a prominent feature.

This is a moderately used Wilderness. Major attractions are Lake Basin, and Shepherd and Crow Creek Lakes.

f. WILLIAM O. DOUGLAS

LOCATION: Wenatchee and Gifford Pinchot National Forests; Naches and Packwood Ranger Districts

SIZE: 167,195 acres

KEY ACCESS POINTS: Highway 410 parallels the northern boundary of the unit providing access to Road #1800 395 and #1800 and trailheads such as Kettle Creek Trail #957; from Highway 410, access is possible to American Ridge Trail #958 in the Bumping Lake vicinity; and Highway 12 accesses Roads #1500, #1306, and #1308 in the Rimrock area.

MILES OF TRAIL: Approximately 250 miles

ELEVATION RANGE: From about 3,200 feet in the valley bottoms to 7,766 feet on Mt. Aix.

GENERAL DESCRIPTION: This area is characterized by forest vegetation types such as mountain hemlock, alpine and subalpine fir, western hemlock, grand fir, Douglas-fir, and ponderosa pine. Topography includes scattered peaks, sharp ridges, and steep slopes. In contrast, Tuma Plateau, south of the Cougar Lakes vicinity appears flat. There are also areas of gently sloping topography with numerous natural openings of various sizes. Hundreds of small lakes and potholes are scattered throughout the area. Many high lakes are stocked with trout. Major big game species are found in the area, as well as mountain goats. Cougar, Canada lynx, Cascade red fox, fisher, and wolverine have been known to inhabit the area. Blue grouse, and ruffed grouse are among the game birds in the area. Notable topographic features include American Ridge on the north and the Cascade Mountain Crest. To the east, Nelson Ridge contains several major peaks which include Mt. Aix, Bismarck, Shellrock, and Rattlesnake. The tributaries of four major river drainages lie within the area and include the American, Bumping, Little Naches, and Tieton Rivers. A variety of recreation use is available, and a portion of the Pacific Crest National Scenic Trail (PCNST) serves the area.

Main features of this moderately visited Wilderness include popular day use areas such as Dewey Lake and Twin Sisters Lakes. Other popular

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areas are Cougar, Fish, Apple, Pear, and the Tumac Plateau Lakes. The PCNST traverses the length of the Wilderness from White Pass to Chinook Pass.

g. GOAT ROCKS

LOCATION: Wenatchee and Gifford Pinchot National Forests; Naches and Packwood Ranger Districts

SIZE: 22,953 acres of additions
82,680 acres original area
105,633 acres total Wilderness

KEY ACCESS POINTS: Highway 12 to FS Rds. #1000, and #1207, and PCT #2000 and other trailheads from the north; I-5 to Highway 12 to FS Rds. #1114 and #1104 from the southwest.

MILES OF TRAIL: Approximately 120 miles

ELEVATION RANGE: From 3,000 feet in river valley bottoms to 8,200 feet on Gilbert Peak.

GENERAL DESCRIPTION: The Goat Rocks Wilderness is located in portions of both Yakima and Lewis Counties, generally between Mt. Rainier and Mt. Adams. The area is bounded by U.S. Highway 12 and the White Pass Ski area on the north and the Yakima Indian Reservation on the southeast. The Tieton and Klickitat River systems drain the east side of the Wilderness, and streams of the Cowlitz River system feed from the west side. Vegetation types consist of true firs and hemlocks as well as some Alaska yellow cedar and western white pine. The alpine soils are shallow and rocky. A recent influence on these soils was the May 1980 eruption of Mount St. Helens which deposited a layer of ash on the area which was several inches thick in places. Wildlife populations include deer, elk, coyotes, bear, pika, northern three-toed woodpecker, and marten. Mountain goats may be sighted within the area. Game birds such as blue, ruffed, and spruce grouse are also present. Streams and lakes support cutthroat and rainbow trout. Dolly Varden trout inhabit the North Fork of the Tieton River. The Pacific Crest National Scenic Trail, traverses the Wilderness from north to south.

This moderately used wilderness attracts visitors to popular McCall Basin via the PCNST. Visitors can also ride the White Pass Ski area chair lift to access Shoe Lake and the PCNST easily.

7. WILDLIFE

a. Overview

The Wenatchee National Forest provides year-round or seasonal habitat for an estimated 394 species of wildlife, which includes 13 amphibians, 18 reptiles, 273 birds, and 90 mammals.

The wide variety and number of wildlife species is due to the diversity of habitat found on the Forest: from high elevation habitat suitable for mountain goats, to low elevation habitat suitable for jack rabbits. There is wet, westside type habitat used by spotted owls and dry eastside habitat with mule deer. These extremes of habitat and the habitat in between often occur close together with the result being a large patchwork of vegetation types. Fire also plays a role in providing a range of successional stages of diverse tree types.

b. Proposed, Endangered, and Threatened Species

Proposed, endangered, and threatened wildlife species found on the Forest are the bald eagle, peregrine falcon, grizzly bear, gray wolf, and northern spotted owl.

1. Bald Eagle

Nesting habitat for the bald eagle consists of large, dominant or codominant trees in a heterogeneous stand of mature or old-growth coniferous timber. Bald eagles utilize additional nests within their territory. Nesting habitat is generally within 1/2 mile of feeding habitat which is composed of open areas having a wide field of view (Brown et al., 1985). Feeding habitat is almost always rivers and lakes where fish, waterfowl and other species are preyed upon.

Roosting habitat are areas where eagles spend the night, use some time during the day, and use in severe weather conditions. Roost areas have clear lines of sight to surrounding terrain, favorable microclimates, stout perches high above the ground, and have limited human activity nearby. Roost trees are larger than average in size and tend to be located in mature or old-growth conifer stands. These sites may be as far as 9 miles from the feeding habitat (Brown et al, 1985).

The tallest trees, on the edge of stands, with strong lateral branches high in the crown (often a snag), make up the perching habitat (Brown, et al., 1985). Perching habitat is usually within or close to the edge of the feeding habitat. This habitat is where bald eagles may spend as much as 90% of their time.

Bald eagles winter in areas with open waterways or areas where sources of carrion are available and communal perch and roost trees are close by.

Although populations are lower now than 50-100 years ago, they have increased in the last 5 years. The Wenatchee National Forest currently has one nest site which was established in 1985, and two more suspected nest sites were reported in 1988. The existing nest site is being protected. The suspected sites will be surveyed to determine if nests do exist.

The Forest has 241 lakes with approximately 50,000 surface acres of water and 1,149 miles of streams and river receiving fish and waterfowl use. There are thousands of acres of mature and old-growth stands available for bald eagle nesting within one mile of the potential feeding habitat. Nesting and feeding habitat appear to be plentiful on the Forest. Therefore, the limiting factors may be lack of adult eagles, activity of people, or lack of perching habitat near feeding areas.

2. Peregrine Falcon

The nesting habitat for the peregrine falcon is characterized by rocky cliffs or bluffs, often overlooking rivers and lakes. However, there may be up to 10 miles between the nest and feeding habitat. Feeding habitat includes marshes, lakes,

and rivers, as well as upland, open habitats where there is an abundance of song birds, shorebirds and waterfowl (Welty, 1975).

Historically, the peregrine falcon nested on the Forest and throughout central Washington. Single birds have been reported flying or feeding between August and October each year, but no active nest sites have been found (Peregrine Falcon Survey, Washington Department of Wildlife, 1987). The Washington Department of Wildlife (WDW) has inventoried part of the cliffs, bluffs, and rock outcrops on the Forest and rated them for nesting. This survey shows there are at least 10 potential sites where falcons could nest in the future.

Peregrine falcons are very sensitive to human disturbance near nest areas between April to June (Sackett, 1989). Habitat can be affected by timber harvesting, road and trail construction, and recreation activity.

3. Grizzly Bear

Grizzly bear dening habitat consists of boulders, logs, caves, or soils deep enough for digging a den in a setting that is steep, high in elevation, and near timberline.

Because grizzly bears are omnivorous, their forage species and foraging areas change with the season. Feeding habitat is made up of generally small, interspersed openings in close proximity to cover for hiding and isolation from human disturbance. Late winter and early spring habitat includes deer or elk winter ranges, avalanche chutes, riparian areas, and meadows. Summer habitat includes meadows and shrub areas where deer fawning may occur, as well as rivers and riparian areas when salmon are spawning. Berry shrub fields make up their fall habitat.

Historically, the grizzly bear was found throughout the Forest. Although there have been recent sightings in a number of areas on the Forest, no dens have been located (Historical and Recent Grizzly Bear sightings in the North Cascades, J. Bjorklund, 1980). Portions of the Forest are included in the North Cascades Grizzly Bear Ecosystem, which is currently being studied as part of an interagency effort to determine if grizzly bear populations will be restored here.

4. Gray Wolf

Dening habitat of the gray wolf is located in remote country on high ground near sources of water. The dens are occupied for only a two month period for birth and care of the young (WDW Sackett, 1988). The wolf's feeding habitat occurs in remote areas having an abundance of big game and small mammals. Feeding occurs in a variety of habitats and shifts as the locations of the prey populations shift.

Human activities have had serious impacts to wolf populations through exploitation, habitat reduction, and population control. (Northern Rocky Mountain Wolf Recovery Plan, 1987) Historically, the gray wolf was found throughout the Forest and there have been a few sightings on the Forest (WDW data base on wildlife sightings).

There is no direction at the present time to provide habitat for the gray wolf.

5. Northern Spotted Owl

The status of the northern spotted owl changed between the Draft and Final EIS. In the Draft, the spotted owl was listed as a Region Six sensitive species. On June 23, 1989, the U.S. Fish and Wildlife Service (USFWS) issued a ruling that proposed the listing of the northern spotted owl as a Federal threatened species pursuant to the Endangered Species Act (as amended) of 1973.

In addition to the ruling by USFWS, the Forest Service issued a Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide (SEIS) in July 1988. The SEIS established specific direction for the management of northern spotted owl habitat areas to be used in Forest planning.



The northern spotted owl is a species that typically depends on mature or old-growth forest stands for nesting and feeding. The old-growth habitat requirements for spotted owls have been described in the SEIS. For the Wenatchee National Forest, these requirements include:

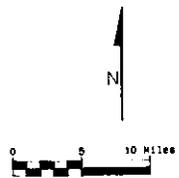
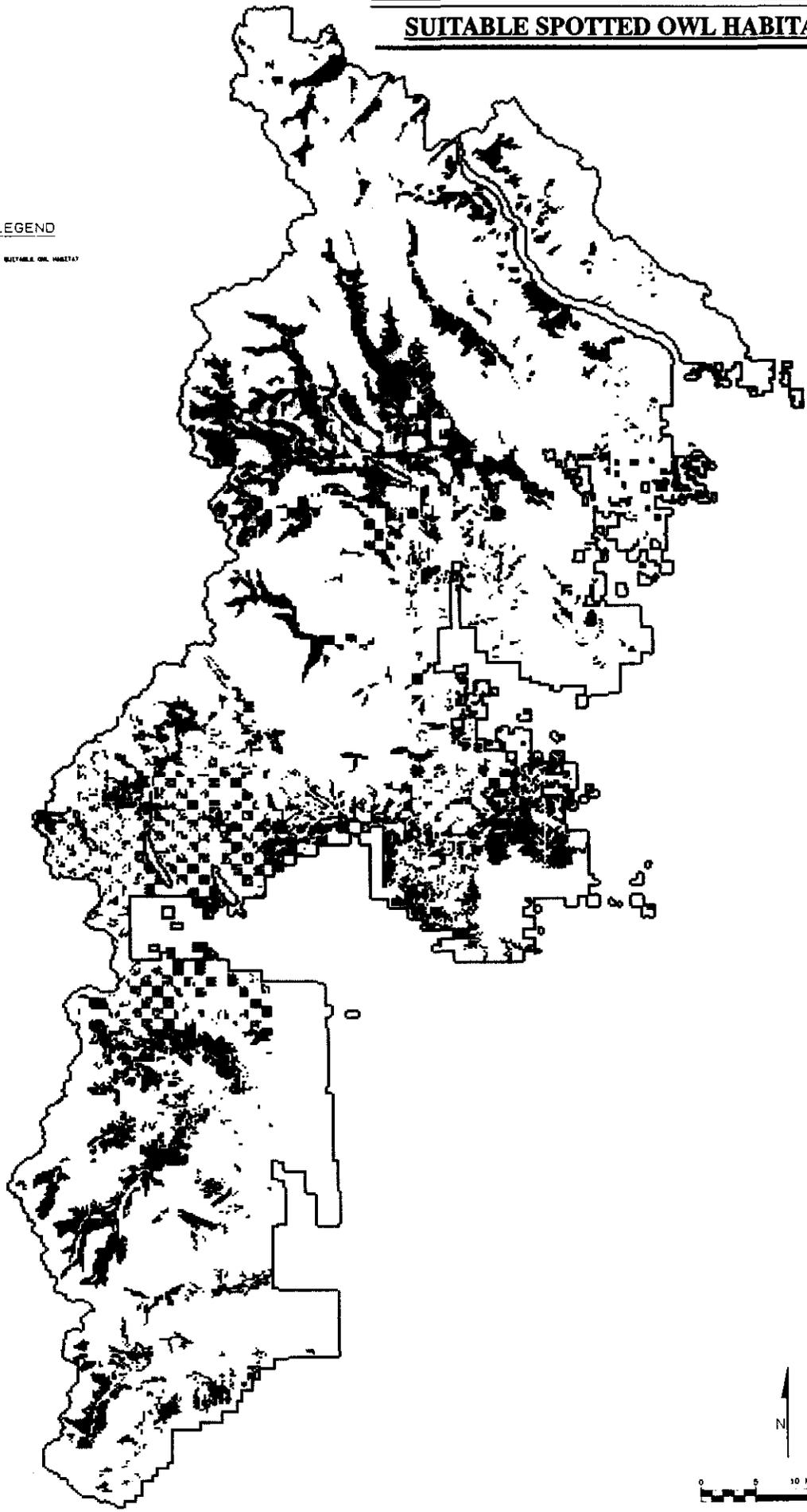
- a. Mature to old stands of conifer trees characterized by cavities caused by disease and mechanical damage, and platforms created by mistletoe and/or goshawk nests. Generally the stands are a mix of Douglas-fir, western red cedar, grand fir, spruce, lodgepole pine and ponderosa pine.
- b. The stands have an uneven-aged multi-layered canopy. There may be an overstory of 100-400 year old trees; an understory of mature to pole sized trees which are 50-150 years old; and a sapling/trees/shrub layer 10-50 years old.
- c. Overstory canopy closure may be as low as 40%, but is usually 60% or greater.
- d. Owls prefer the larger diameter trees in an area. These may be the older trees, with the dominant ones usually 20 inches in diameter or larger, but there are occasions when the dominant trees may be as small as 12-14 inches in diameter.
- e. Dead standing trees reflect the diameter of the stand. Due to the low site potential and because the non-dominant trees die first, most of the dead trees are less than 20 inches in diameter. Dead standing trees are abundant, with an estimated 10-50 per acre.
- f. Fallen trees and decayed logs are abundant and often small in diameter.

The above definition of habitat applies to nesting areas and spring, summer and fall roosting areas. The winter habitat needs of the spotted owl are not known. The size of habitat areas for spotted owls on the Forest has been determined to be 2,200 acres (SEIS).

SUITABLE SPOTTED OWL HABITAT MAP

LEGEND

 SUITABLE OWL HABITAT



The Forest is currently collecting timber and stand structure information from stands with known spotted owl nest trees as a result of its Memorandum of Understanding with National Council of Paper Industry for Air and Stream Improvement (NCASI). The Pacific Northwest Experiment Station of the Forest Service has begun a research project to determine more specifically the habitat needs and home range of the spotted owl.

As of 1988, suitable spotted owl habitat on the Wenatchee National Forest was estimated to be 519,000 acres. From 40 to 70% of these acres have dominant trees larger than 20 inches in diameter. Another 149,000 acres of the total is located in wilderness areas. The estimates of suitable habitat are continually being refined as biologists learn more about spotted owl habitat needs and visit sites to verify habitat suitability.

By the end of 1988, 139 spotted owl sites had been located on the Forest. During the past five years, 36 sites had nesting birds, 19 contained a pair of spotted owls, 72 had single spotted owls, and 12 sites had negative responses. Young owls have been produced in at least 11 of the last 12 years on the Forest. Most of the nest sites are platforms of mistletoe; up to 1/3 of which were former goshawk nests. As more inventories and monitoring is completed, it is expected that more active nest sites and pairs will be found.

Many of the sites containing spotted owls have goshawks nearby. There are also many great horned owls, barred owls, and a few great gray owls on the Forest. These species compete with spotted owls for habitat and prey species; they also have been known to prey upon spotted owls when opportunities arise.

Spotted owls prey mostly upon flying squirrels and other small mammals. Many of these mammals require standing dead or down woody habitat during some part of their life cycle.

Spotted owls are found on the most northerly, southerly, and western parts of the Forest. They are not generally found in pure ponderosa pine stands, alpine fir, large stands of lodgepole pine, or grass/shrub habitat.

c. Sensitive Species

Wildlife species listed as sensitive by the Regional Forester and found on the Forest include: big-horn sheep, Townsend's big-eared bat, Canadian lynx, California wolverine, ferruginous hawk, Swainson's hawk, and the long-billed curlew.

1. Bighorn Sheep

Bighorn sheep live in steep, open, dry grass/shrub habitats generally below 4,000 feet in elevation. Their winter range is composed of south facing, open slopes with nearby forests for cover (Johnson, 1983). This habitat overlaps with the lower elevation deer winter ranges. Three populations are known to use the east edge of the Forest.

Bighorn sheep were found throughout eastern Washington before settlement by the white man. They were eliminated from the Forest between 1900 and 1940. Re-introductions occurred to former ranges in the 1960's and 1970's. Diseases from domestic sheep and poaching are the two factors that appear to keep the populations at a low level.

Some information on habitat inventories and locations of habitat for bighorn sheep is available from the Washington Department of Wildlife (WDW). Management plans for this species need to be developed in coordination with the WDW.

2. Townsend's Big Eared Bat

Roosting and reproductive habitat for the Townsend's big eared bat is composed of caves, mine shafts, and buildings, with adjacent forest for thermal cover (Humphrey and Kunz, 1976).

This bat lives communally in a cave that is used year after year by the same population. In the spring and summer, nursery colonies are used to raise young. Feeding habitat has not been defined, but water near or within the feeding area is essential. The bats feed primarily on insects. They are sensitive to human disturbance and will abandon sites when disturbed (WDW Species Status Summary, 1987).

Boulder Cave on the Naches Ranger District is the only known site on the Forest where these bats are known to exist.

There are many rock cliffs on and adjacent to the Forest containing caves that may be used by this bat. Only a few scattered population inventories and samples have been completed on the Forest.

3. Canadian Lynx

The habitat for lynx occurs in high elevation areas dominated by lodgepole pine and spruce/sub-alpine fir forests. They hunt in thickets, feeding mostly on snowshoe hare and tree squirrels, and den in mature and old growth stands with a high number of down trees. Since the Wenatchee has few large areas of lodgepole pine stands, it appears most of the lynx use some other habitat.

Lynx have been trapped or seen on the Forest for many years. Sightings are uncommon, the most recent being on the Cle Elum Ranger District in 1987.

The effects of timber harvesting and recreation activities on the lynx are not understood. More specific information on habitat and distribution of Canadian lynx on the Wenatchee National Forest is needed.

4. California Wolverine

The California wolverine utilizes a variety of habitats over extensive, remote areas. The wolverine is a resident of boreal forests and is particularly fond of marshy areas. They den in rocks, under wind-thrown trees and under the snow. While this species has been sighted on the Forest, there have not been inventories of habitats or populations. This species is heavily impacted by man-caused disturbances and habitat alterations. The population levels and habitat requirements for wolverine are unknown at this time.

5. Ferruginous Hawk

Nesting habitat for the ferruginous hawk consists of tall trees along streams and on cliffs or rocky pinnacles. The feeding habitat is made up of

grasslands, shrublands, and open timber stands. The ferruginous hawk preys upon rabbits, gophers, mice, bats, snakes, lizards, and grouse.

Ferruginous hawks are occasionally sighted on the Forest; the latest sighting was in the Taneum Ridge area in the fall of 1988. The habitat for this species is found on the east edge of the Forest in the drier more open habitats. There is little known about the populations and distribution of this species on the Forest. Timber harvesting and road construction could affect this bird by altering habitats and the prey base.

6. Swainson's Hawk

Swainson's hawk nesting habitat consists of trees in open timber stands or scattered trees in non-forested areas. They also have been known to nest on cutbanks or low cliffs. The Swainson's hawk forages for prey in open fields, grassland, or open stands of trees. It feeds primarily on insects, mice, or bats.

Occasional sightings of this hawk have occurred on the Forest. Habitat for the Swainson's hawk is found on the east edge of the Forest in the drier sites of open ponderosa pine and Douglas-fir. The Forest has no inventory of this species or its habitat. Management activities that could affect the Swainson's hawk include timber management, livestock grazing, and road construction.

7. Long-billed Curlew

The nesting habitat for the long-billed curlew occurs in moist or dry meadows. Their feeding habitat is grasslands, uplands, ponds, marshes, lakes, and rivers. Curlews feed on insects, crayfish, berries, and snails.

While the long-billed curlew could potentially be found in a number of locations on the Forest, a limited amount of habitat is available. Few sightings have been reported on the Forest. The Forest has no inventory information of populations or habitats of this species. Livestock grazing and recreation activities in summer, spring, and fall could have some effects on this bird. Road and trail construction through habitat used by the long-billed curlew could adversely affect it.

d. Management Indicator Species

Management Indicator Species (MIS) are plant or animal species whose population characteristics (presence, number, density, sex ratio, age structure, recruitment, mortality rates, and distribution) can be used to evaluate the effects of land and resource management practices on the habitats they use. Indicator species management is a wildlife management strategy designed to monitor environmental changes.

In selection of the MIS, the following categories will be represented where appropriate:

1. Endangered and threatened species;
2. Species with special habitat needs that may be influenced significantly by planned management programs,
3. Species commonly hunted, fished or trapped, non-game species of special interest; and
4. Species whose population changes are believed to indicate the effects of management activities on other species of major biological communities (CFR 219.19).



**TABLE III-12
WILDLIFE MANAGEMENT
INDICATOR SPECIES
AND THE HABITATS THEY REPRESENT**

Species	Habitat
Northern Spotted Owl	Mature or old-growth coniferous habitat
Pileated Woodpecker	Mature or old-growth coniferous habitat
Marten/Northern Three-Toed Woodpecker	Mature or old-growth coniferous habitat
Mountain Goat	Rockland, alpine, high elevation old growth conifer habitat
Mule Deer	Shrub, grass, meadow, thermal and hiding cover
Rocky Mountain Elk	Shrub, grass, meadow, thermal and hiding cover
Primary Cavity Excavators	Standing and down dead and defective trees
Beaver/Ruffed Grouse	Riparian/deciduous habitat

1. Mature and Old Growth Coniferous Habitat

Spotted owls, pileated woodpeckers, marten, and northern three-toed woodpeckers were selected as management indicator species on the Forest to maintain distribution and viability of all wildlife species dependant upon mature/old growth conifer habitat. The requirements for marten and northern three-toed woodpeckers are combined This was because it appears both species requirements can be met while reducing the complexity of their management on the Forest. For more information, see Appendix I.

a). Northern Spotted Owl

For further information on the spotted owl, see the previous discussions above and the management requirements analysis in Appendix I.

b). Pileated Woodpecker

The nesting and roosting habitat of the pileated woodpecker is a cavity in a large, dead tree in a shaded place, usually near valley bottoms, and often near water. Each woodpecker excavates 1-3 cavities per year for nesting or roosting purposes. Their feeding habitat consists of rotten standing trees, rotten logs, live trees with rot and rotten stumps. Pileated woodpeckers feed mostly on ants and wood-boring beetles.

The nesting and feeding habitats are found in mature or old-growth conifer stands which are often in riparian areas. On the Wenatchee, this habitat is found throughout forested areas below about the 5,000 foot elevation level. The pileated woodpecker is rarely seen in the Forest, but signs of their feeding activities can often be found.

Harvesting of dead trees, mature trees, and old-growth trees reduces or eliminates suitable habitat for the pileated woodpecker and the species it represents. There are no inventories of populations or suitable habitat on the Forest for this woodpecker. The State of Washington lists the populations of the pileated woodpecker as being on a decline (Species Status Summary, WDW, 1987).

c). Marten

Denning habitat for the marten consists of holes in snags, hollow logs, and burrows under trees and large rocks. Due to its size, large snags or down trees are required. The marten's feeding habitat occurs near a food source on the ground or in the trees. Their prey may be mammals, reptiles, fish, insects or berries.

The marten requires habitat with sufficient cover, using tree canopy for security and cavities in trees for resting. Mature or old-growth conifer stands throughout the Forest, with the exception of pure ponderosa pine stands, may provide suitable

habitat if a prey base is available. The harvest of dead, mature, and old-growth trees reduces or eliminates suitable habitat.

Pine marten are occasionally sighted and are also trapped on the Forest. The Forest has no inventories of populations or suitable habitat for the pine marten. Information is available for the locations and numbers of pine marten that have been trapped on the Forest from the Washington State Department of Wildlife. A study of the marten was also done on the Forest (Newby, 1951). The State of Washington lists the populations of this species as declining (Species Status Summary, WDW, 1987).

d). Northern Three-Toed Woodpecker

The nesting habitat for the northern three-toed woodpecker is a cavity in a dead tree within a clump of dead trees located near live conifers. Its feeding habitat is dead or living mature and old-growth trees, where prey are obtained from under the bark. The prey are most commonly beetles and wood-boring larvae.

This species is often seen or heard throughout the conifer habitat of the Forest. No inventories of populations or suitable habitat have been completed.

e). Mountain Goats

Mountain goats were selected as a management indicator species because the present population is divided into a number of sub-populations where management activities, or the lack of them, could potentially eliminate a sub-population and thus reduce distribution. The potential also exists for losing a viable population because a given population may be small.

The rearing habitat for mountain goats is south or east facing slopes, with a good mixture of boulder fields or rocky outcrops and forage areas. Free-flowing water should be within 1/2 mile of kidding grounds (Johnson, 1983). Their feeding habitat is open, shrubby areas and meadows in spring, summer and fall. Escape cover is provided by cliffs, rimrock and talus slopes and is a critical year-round habitat component.

Winter habitat for mountain goats is a limiting factor. It consists of relatively snow-free south or east-facing slopes below timberline, or wind swept ridges above timberline. Mature and old growth forest stands are preferred as optimum thermal cover; however, this habitat component is not always available. Preferred foods for mountain goats are shrubs, mosses, and lichens within the stands of trees.

Increased use of an area in or adjacent to mountain goat habitat, by either recreation or management activities, can result in reduced mountain goat use in the area. The disturbance of escape cover is especially a problem during the kidding season (May 15 - June 15).

The Washington Department of Wildlife manages mountain goat areas on the Forest for either viewing or hunting, and has transplanted mountain goats from other locations in Washington to several locations on the Forest.

The Wenatchee National Forest maintains a population of 1,600 goats, which is a large part of the mountain goat population within Washington State. Mountain goats are found in small populations scattered across the Forest; the majority of their habitat is located within wilderness areas. Mortality within the population is high due to natural causes.

f). Mule Deer

The mule deer was selected as a management indicator species because of the demand for it as a big game species. The mule deer is an MIS for bighorn sheep habitat and for species requiring early successional habitat needs.

Rearing habitat for mule deer requires high quality forage within 600 feet of water with nearby hiding cover (Thomas, 1979). Their feeding habitat consists of high quality summer forage, which provides a large part of the energy needed for winter survival. On spring ranges, mule deer need forage with a high protein value to help recuperate from the stress of winter.

Cover requirements on winter ranges is an important habitat component; thermal cover can reduce the amount of energy lost during periods of extreme cold.

The Wenatchee National Forest has an abundance of summer range for mule deer, but a limited amount of winter and spring range. There is an estimated 106,000 acres of winter range on the Forest. As winter range off the Forest is developed for recreation, agriculture, residential or other commercial uses, the winter range on the Forest will receive increased importance in maintaining deer herds.

It is estimated that the summer range on the Forest maintains 20,000 to 25,000 deer on a estimated 1,500,000 acres. The number of deer maintained on the winter range managed by the Forest is about 10,000.

The Wenatchee National Forest, in cooperation with the Washington Department of Wildlife, Chelan County Public Utility District, and other interested groups, has made improvements to deer winter range.

The Washington Department of Wildlife would like to emphasize management for mule deer rather than elk north of Highway 2 because the conflicts between orchards and deer would be much less than those for elk. The Forest Service and Washington State Department of Wildlife both have significant acreages of winter range and will continue to coordinate activities that affect deer winter range.

Management activities that affect mule deer and mule deer habitat include timber harvest which modifies the arrangement of habitat components; livestock grazing which can affect the availability of forage and browse; road construction and use which eliminates habitat and can reduce animal use in adjacent areas; and mining operations which can eliminate habitat and reduce use in adjacent areas. The activities which have the most pronounced effect on mule deer are the use of roads and the removal of thermal cover in areas where cover is limiting.

Deer populations can be adversely affected when activities such as timber harvest, livestock grazing, mineral exploration, and winter recreation are active on the winter and spring ranges while the deer are present.

Hunting and viewing of deer are major recreation pursuits. Many areas of summer range receive only limited hunting pressure due to limited access and rough terrain. Some people like to view deer in the winter and spring. Winter range access is accomplished via includes four-wheel-drive vehicles, snow machines, skis, or by walking. Disturbance on winter and spring ranges causes deer to use energy needed for survival. The loss of energy at this time may adversely affect survival and/or production of young.

g). Rocky Mountain Elk

The Rocky Mountain elk was selected as a management indicator species because of its importance as a big game species. Management activities that affect elk and elk habitat are timber harvest which modifies the arrangement of habitat components; livestock grazing which can affect the availability of forage and browse, road construction and use which eliminates habitat and can reduce animal use in adjacent areas; and mining operations which can eliminate habitat and reduce use in adjacent areas. The activities which have the most pronounced effect on Rocky Mountain elk are the use of roads and the removal of thermal cover in areas where cover is limiting. While these activities and effects are similar to those for mule deer, they tend to have more impact on elk. Rocky Mountain elk are more sensitive to changes in habitat condition than mule deer.

Rearing habitat for elk consists of high quality forage areas with slopes less than 15% and hiding cover nearby, within 1000 feet of water (Thomas, 1979). Preferred feeding areas have high quality forage with hiding cover nearby and little human disturbance.

Hunting and poaching activities have conditioned elk to avoid humans and vehicles. Roads and trails can increase access by people to feeding areas. The results of human disturbance can significantly reduce or prevent the use of high quality forage areas by elk.

Elk need cover habitat for escape, hiding, and resting. Optimal thermal cover is most important at higher elevations during the winter. At low elevations, shrubs and topography may provide sufficient thermal cover. At mid-elevations, elk may need 30% of an area in forest stands providing thermal cover. Each winter range area has its own habitat characteristics, depending upon those characteristics and elk population goals, the winter ranges will have differing management objectives.

The Forest and the Washington Department of Wildlife have agreements to close some roads during the hunting season to increase the quality of hunting, or provide "fair chase." Because the cost of administering these closures is high, WDW would like to see road closures year-round rather than seasonally. This would significantly reduce the road densities and increase the overall habitat effectiveness for big game.

The WDW has established management objectives that maintain or increase elk populations south of U.S. Highway 2, but reduce populations north of the highway. The purpose of the management strategy north of U.S. Highway 2 is to avoid damage to orchards from wintering elk.

A portion of the winter range on the Forest has wintering elk; however, the actual area of use has not been calculated. Elk winter at relatively high elevations (e.g. Rimrock and Bumping Lakes) but the Forest has not inventoried these high elevation winter ranges. As winter range off the Forest is developed for uses that conflict with elk, there will be increasing demand to maintain elk herds. In order to increase the number of wintering elk and prevent the elk from impacting private lands, the WDW has established several feeding areas for elk near the Forest. WDW feeds an estimated 15 to 30 percent of the elk wintering near the Forest.

An estimated 12,500 elk are summering on the Forest and use about 750,000 acres. The number wintering on the Forest is about 5,600. The large majority of the elk are hunted for bulls, with some level of cow hunting conducted to minimize problems or control herd numbers. This hunting strategy provides 60-80 hunter days per harvested animal.

The Washington Department of Wildlife owns and manages the Colockum winter range which is adjacent to the Forest. The Colockum winter range has the capability to support a larger herd of wintering elk than it does now, however, the herd size is limited by the availability of summer range. About 3,000 elk summer on the Forest, yet winter in the Colockum range. Livestock grazing can reduce the availability of forage in the Colockum area of the Forest. The Forest Service, WDW, and the Rocky Mountain Elk Foundation are cooperatively funding a study in this area. The situation is the opposite of the problems elk have in other areas where winter range is the limiting factor.

Roads and trails in key elk foraging habitat affect the amount of use a foraging area will receive. Access by humans is believed to be the most significant adverse effect on elk numbers on the Forest. Livestock grazing and timber harvesting can be beneficial to elk, or can decrease elk habitat depending on the changes in habitat effectiveness and the timing of the activity.

The Forest has some mid-to high-elevation elk wintering areas where timber harvest has reduced the optimal thermal cover component to a level where the habitat effectiveness value is below that desired for elk management. The demand for elk hunting on the Forest is very high. Due to overcrowding in some areas, the WDW has established split hunting seasons and other regulations to reduce the hunting pressure and improve the quality of the hunting experience.

h). Primary Cavity Excavators

Primary cavity excavators were selected as management indicator species to represent species dependant upon dead and down tree habitats. This habitat is being reduced in amount and distribution by management activities.

Nesting and roosting habitat for the birds are cavities in dead or defective trees. Their feeding habitat consists of rotten standing trees, rotten logs, live trees with rot, and live trees with highly furrowed and rough bark.

Because this indicator is a group of species, the habitat is throughout the forested area in all successional stages. This group uses dead trees in all stages of decay.

There are about 1,451,100 acres of the Forest that are capable of providing habitat for species dependent upon dead and defective trees. Of this total, about 807,200 acres of the capable habitat have no plans for timber management. Therefore, 55% of the dead and defective tree habitat on the Forest will be in a natural or near natural condition. The problem with management of the primary cavity excavators is not in maintaining the amount of habitat for viability, but in maintaining the distribution and quantity of habitat to provide other benefits.

Fuel management personnel have quantified the amount of down material in many parts of the Forest. This information is available for use by biologists for predicting habitat but is seldom used. There are no inventories of populations or maps of suitable habitat but there is a survey of the number of snags by decay class in unlogged stands. This survey has not been analyzed and the information is not available for use. There are a number of other studies and models available on primary cavity excavators but this information has not been put in a document to show the effects on the Forest.

Primary cavity excavators are insect eaters. As a result, the population of excavators has an effect on the number of insects in the forest. This in turn may affect recreationists or the use of trees for other purposes.

2. Riparian/Deciduous Habitat

a). Beaver and Ruffed Grouse

Beaver and ruffed grouse were selected as the management indicator species to represent other species that require water (e.g. ducks, water ouzel) and species that require deciduous trees (e.g. Wilson's warbler, western tanager).

The riparian area is the most heavily used habitat by wildlife; an estimated 262 species use riparian habitats on the Forest. Species groups such as primary cavity excavators will often be abundant in this habitat. Habitat characteristics of the riparian area of importance to wildlife are: natural edge effect with other plant communities, vertical habitat diversity, plant composition, travel routes, connection between similar habitats, free-flowing water, cooler temperatures in the summer and warmer microclimate in the winter.

The rearing habitat for beaver is made up of lodges or bank dens with underwater entrances. Their feeding habitat consists of deciduous trees such as aspen, cottonwood, and willow generally within 100 yards of water. Beaver cover habitat includes streams, ponds, lakes and reservoirs with water depths greater than 1 foot. To maintain beaver populations, streams must have low sediment loads and an adequate supply of deciduous woody plants.

The beaver utilizes all age classes of deciduous woody plants in and adjacent to riparian areas throughout the Forest. Most of the habitat is under-utilized because past trapping practices have limited the number of beaver. Other factors limiting habitat for the beaver include aggressive planting of conifer trees that compete with deciduous trees, the presence of roads in and adjacent to riparian areas that reduce the availability of habitat, and livestock grazing on deciduous woody plants within riparian zones.

Riparian habitat on the Forest is estimated to total 159,800 acres, or about 3% of the land base. The Forest has no inventories of populations or suitable habitat for beaver.

Ruffed grouse prefer deciduous or deciduous/conifer plant communities for nesting and roosting habitat. Preferred feeding habitats include open areas and meadows near deciduous trees where grouse eat various parts of deciduous shrubs and trees as well as insects. Winter cover is found in dense stands of conifer trees. The ruffed grouse depends on logs in deciduous or deciduous/conifer forests for drumming sites during the breeding season. There are no inventories of ruffed grouse populations or habitats on the Forest.

Management activities such as timber harvest, road construction, and livestock grazing can have both positive and negative impacts on ruffed grouse habitat. Timber harvest will often increase grouse habitat diversity in riparian areas, provided sufficient amounts of deciduous woody vegetation is left on the site. Road construction in and adjacent to riparian areas, meadows, and openings with deciduous woody vegetation can result in a direct loss of ruffed grouse habitat. Livestock grazing in riparian areas and meadows can reduce the value of those areas for wildlife for short periods of time. Reforestation with conifer trees reduces the amount of available deciduous habitat.

Grouse hunting is a popular sport on the Forest. The hunting seasons are long, but the number of birds harvested is dependent upon weather conditions and access.

It is not clear how these indicator species represent amphibians in the riparian zones where year-round water is not available. Habitat requirements for amphibians include logs and rocks in a cool environment within or near the stream channel.

e. Management Requirements

The Forest Service Region 6 wildlife guidelines for incorporating management requirements for wildlife into alternatives of the Forest Plan are:

1. Wildlife habitats shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated number and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area. (36 CFR 219.19)

2. Habitat determined to be critical for threatened and endangered species shall be identified, and measures shall be prescribed to prevent the destruction or adverse modification of such habitat. (36 CFR 219.19 (a) (7)).

Table III-13 displays the list of species included under the Management Requirements.



TABLE III-13

SPECIES INCLUDED UNDER THE REGIONAL MANAGEMENT REQUIREMENTS

Wenatchee National Forest

HABITAT	SPECIES	INFORMATION REFERENCE
Mature and Old Growth	Northern Spotted Owl	FEIS, Chapter III, Wildlife
	Pileated Woodpecker	FEIS, Appendix I
	Marten	
	Northern three-toed Woodpecker	
Dead and Defective	Primary Cavity Excavators	FEIS, Chapter III, Wildlife
Riparian	To be identified by each Forest	FEIS, Chapter III, Wildlife
Threatened and Endangered Species	Bald Eagle	FEIS, Chapter III, Wildlife
	Peregrine Falcon	Wildlife
	Grizzly Bear	

f. Unique and/or Special Habitats and Species

Unique and special habitats are identified because there is a need to protect some habitats and species that are not identified as threatened, endangered, sensitive, indicator species or protected by management requirements

Species or habitat are identified into this category because the requirements for acres of habitat is so small that it is insignificant at the Forest scale, but is significant to meeting the requirements for wildlife on a specific project. They are also in this category because there is suspected to be some need for management of the species but there is so little known about the species on the Forest that no specific species management or habitat

has been identified. It is suspected that some management for these species or habitats will be developed in the future.

The unique and special species identified on the Forest at this time are great gray owl, boreal owl, barred owl, great blue heron, wild turkey, swifts, goshawks, osprey, sharp-shinned hawks, cougar, bobcats, and amphibians. The Forest has inventories for great blue heron and partial inventories of goshawks, great gray owls, and barred owls.

Furbearers provide an economic value to some individuals, but the overall value to the Forest and community is low. As a result, there is no management direction or evaluation of furbearers. The effects of timber harvest on furbearers are shown in the following table.

TABLE III-14

FURBEARERS BY EFFECTS OF TIMBER HARVEST

No Effects	Positive Effects	Negative Effects
Coyote	Bobcat	Marten
Mink	Red Fox	Wolverine
Opossum	Long Tailed	Fisher
Raccoon	Weasel	Striped Skunk
Badger		Lynx
Short-Tailed Weasel		
Nutria		
Muskrat		
River Otter		
Beaver		

g. Demand for Wildlife

Because of the Forest's location in relation to large population centers and easy access to most of the Forest, there is a large demand for wildlife viewing and hunting. The Forest was known in the past for its good deer hunting but, due to loss of winter range on private land, that reputation has declined. The elk hunting on the Forest is known throughout the state as one of the best. There are opportunities for cougar hunting, upland bird hunting, and trapping on the Forest. The number of big game hunters has decreased in the past few years due to unavailability of animals and poor quality hunting conditions. The quality of the hunt and the number of animals available for harvest can be controlled by the management of the habitat. Wildlife viewing has increased over the last decade and the trend is expected to continue.

In 1975, the U.S. Fish and Wildlife Service conducted a national study to determine the amount of wildlife use in the country. That study revealed that for every hunter there was another person using wildlife for viewing. In 1985, the study was repeated and the ratio of wildlife viewers increased to about 6.5 for every hunter. This same trend has occurred on the Forest in the last few years. More people are coming to the Forest to view wildlife now than ever before, yet to date, no plans have been made to provide areas for wildlife viewing. The problem is one of how to provide viewing of wildlife without destroying the conditions people come to see. However, many opportunities currently exist to develop areas for wildlife viewing on the Forest.

TABLE III-15

**ESTIMATED NUMBER OF WILDLIFE
USER DAYS (WFUDs)
PRODUCED FOR WILDLIFE IN 1987**

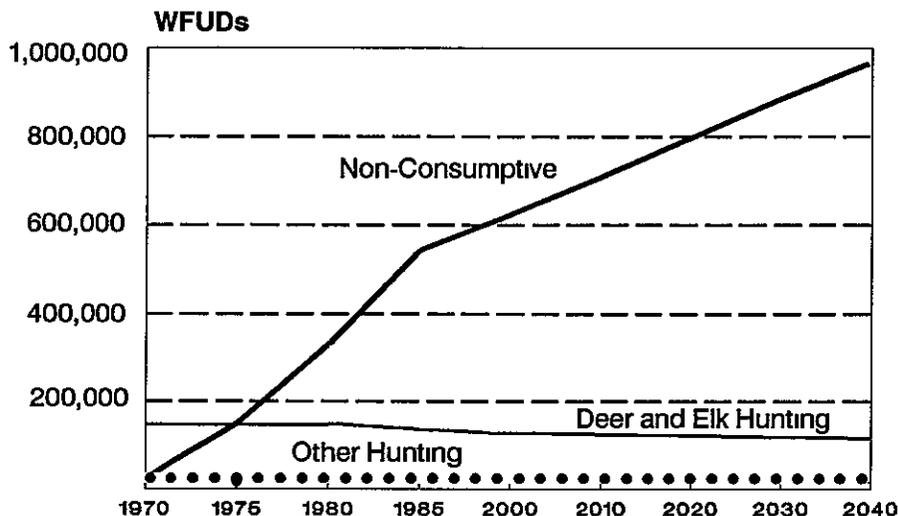
Species	Hunting	Viewing
Non-Game Species	0	971,069
Mule Deer	61,161	35,623
Rocky Mt. Elk	58,698	18,548
Grouse	9,299	0
Bear	5,041	0
Mountain Goats	221	1,911
Chukar	200	0
Quail	167	0
Cougar	163	0
Other Game Species	200	0
Total	135,150	1,027,151

TABLE III-16

VALUES OF WFUDs IN 1987

Big Game	\$33 62
Non Game	\$28.01
Other Game	\$21.29
Wildlife and Fish Rec Use	\$23 53
Furbearer (\$/M Pelts)	\$30,304.00

**FIGURE III-7
TRENDS OF WILDLIFE WFUDs**



When Tables III-15 and III-16 are put together, they show the wildlife value on the Forest to be about \$40,000,000 and rising.

8. FISHERIES

a. Overview

Fish and the aquatic resources on the Wenatchee National Forest provide major recreational and aesthetic assets. Commercial and sport fisheries depend upon the Forest ecosystem to provide spawning and rearing habitat, as well as a quality source of fresh water for downstream fisheries. Maintenance and improvement of current habitat, along with protection of long-term fish habitat and water quality, is a strong concern of the public, State and Federal natural resource agencies, and representatives of the Colville and Yakima Indian Nations.

The Forest has about 241 lakes and reservoirs and 1,769 miles of streams and rivers that support fish. Approximately 806 miles of streams and one large lake are available to anadromous fish.

The feasibility of reintroducing sockeye salmon into the Yakima system is currently being investigated. It is estimated that an additional 260 miles of streams also provide fish habitat.

The Forest has very few detailed stream or lake surveys to evaluate fisheries production, habitat potential, or susceptibility to environmental impacts. Therefore, numbers or pounds of fish and habitat capability estimates shown in this document are only a best approximation based on existing knowledge. Recent work, funded by the Forest, Indian Tribes, Chelan County PUD, state and federal fish management agencies, is beginning to fill some of the gaps.

Nationally (in 1977) the Forest ranked sixth, among the 154 National Forests and 19 National Grasslands, and first, in the Forest Service Pacific Northwest Region, for recreation visitor days spent in cold water fishing (USDA Forest Service, 1982). Calculation of recreation visitor days in 1984 showed that there were 192,800 days spent fishing or about 580,000 actual fishing trips. Of these, 65 percent or approximately 125,000 days were in roaded areas and 67,000 in roadless areas.

The aquatic habitats support 15 species of coldwater game fish and 3 species of warmwater game fish (Table III -17). Five species of coldwater anadromous and resident salmonoid species

account for 95 percent of the angling. Four percent of fishing is distributed among the other cold water species, while less than one percent is spent in warm water fishing.

TABLE III-17
SPECIES OF GAME FISH ON THE
WENATCHEE NATIONAL FOREST

COLD WATER ANADROMOUS	COLD WATER RESIDENT	WARM WATER RESIDENT
Chinook salmon	Kokanee salmon	Smallmouth bass
Sockeye salmon	Mountain whitefish	Largemouth bass
Coho salmon	Pygmy whitefish	Yellow perch
Steelhead trout	Golden trout	
	Cutthroat trout	
	Rainbow trout	
	Lake trout (Mackinaw)	
	Brown trout	
	Brook trout	
	Bull trout (Dolly Varden)	
	Burbot (ling cod)	

A primary management consideration, on the Wenatchee National Forest, are the fisheries rights reserved to the Indians by the Yakima Treaty of 1855. The Yakima Indian Nation is concerned for the development of environmental standards which ensure the protection and/or enhancement of the fisheries resource (Jim, 1981). Litigation concerning the protection of water quality and fish spawning habitat has emphasized the responsibility of the Forest Service for those treaty resources reserved to the Indian tribes of the Pacific Northwest (Northwest Indian Cemetery Protective Association, et al., V. R. Max Peterson, et al. 1983). This responsibility includes protection and enhancement of the fishery given the resources and abilities available (U.S. et al. v. State of Washington, et al., No. 81-3111 9th Cir. 1982).

Resident Fish

Resident trout fishing makes up the majority (95 percent) of the recreational fishing on the Forest and, therefore, its continuance is of major concern. Although most Forest streams have very low productivity due to low nutrients and cold water, recent measurements of rainbow trout in the Yakima River system indicate one of the best growth rates documented in North America

FISHERIES

(Washington State Department of Wildlife, 1984). This may be partially due to the long-term reduction in competition with anadromous fish and the high nutrient content due to cropland runoff.

Self-sustaining wild populations of resident trout inhabit most of the Forest's streams. Because of heavy fishing pressure on the roaded portions of the Forest, wild resident trout populations are often supplemented with periodic stocking by the Washington Department of Wildlife (WDW). Some popular rivers stocked with catchable adult fish are the Tieton, Wenatchee, Little Naches, Naches, Chiwawa, and Entiat Rivers, and Icicle and Peshastin Creeks. WDW also stocks many suitable high altitude and/or previously barren lakes.

Of special importance for the resident fishery is the WDW's egg-taking facility for cutthroat trout at Twin Lakes near Lake Wenatchee. These eggs provide fish for many high lakes around the State. A kokanee egg source is available on the North Fork of the Tieton River below Clear Lake. This egg source could be utilized to raise fingerlings for stocking around the State.

Only one lake on the Forest, Fish Lake near Lake Wenatchee, provides a significant warmwater fishery. Yellow perch and smallmouth and largemouth bass inhabit this lake. One resident trout variety, the bull trout, is listed as a Category 2 species by the USDI Fish and Wildlife Service.

Anadromous Fish

Four species of anadromous fish, including steelhead trout and chinook, sockeye, and coho salmon, utilize the Forest for spawning and rearing. Numbers of all species, except sockeye,

are less than the historical run levels which occurred prior to the construction of irrigation diversions and the mainstem Columbia River dams, and prior to the onset of large commercial fisheries. Part of the decline could also be attributed to effects of land use activities such as mining, logging, and grazing.

The Northwest Power Planning Council has established a goal of doubling the anadromous fish runs into the Columbia River System. Attainment of this goal will require cooperation and coordination between Treaty Indian Tribes, State and Federal fish management agencies, power companies and land management agencies, such as the Forest Service. The Forest, as the managing entity for approximately 77 percent of the Wenatchee River watershed, 84 percent of the Entiat and 23 percent of the Yakima River watersheds, will play a major role in reaching fish production goals for those drainages. The Forest is currently investing appropriated money in the Subbasin Planning Process and, will develop an aggressive fish habitat management program through implementation of "Rise To The Future" (the National Forest System Fisheries Initiative) and the Forest Plan.

Maintenance of current anadromous fish habitat quantity and quality, protecting long-term habitat capability, and improvement of habitat degraded by past activities, is an important component of efforts to achieve fish production goals. Habitat on the Forest is vital to the production of wild and naturally reproduced populations. These wild populations often form the nucleus for further production increases and provide a vital genetic resource for long-term population viability.

TABLE III-18
ESTIMATED AVERAGE PRESENT
ESCAPEMENT OF ANADROMOUS FISH ON THE WENATCHEE N.F.
(TEN YEAR AVERAGE)

	Sockeye	Coho	Spring Chinook	Summer Chinook	Steelhead
Yakima River	0	20	870	0	130
Wenatchee River	31,785	0	4,270	1,950	1,100
Entiat River	0	0	860	0	500
Total	31,785	20	6,000	1,950	1,730

TABLE III-19

**ESTIMATED EXISTING SMOLT HABITAT CAPABILITY OF ANADROMOUS FISH
WITH FULL ESCAPEMENT ON THE FOREST**

	Sockeye	Spring Coho	Summer Chinook	Chinook	Steelhead
Yakima River	1,500,000 ^{1/}	not	345,000	0	86,000
Wenatchee River	1,795,800	estimated	923,000	646,000	70,000
Entiat River	0		80,000	0	16,000
Total	3,295,800		1,348,000	646,000	172,000

^{1/} Assumes passage provided into Cle Elum system.

Fisheries are also regulated based on the health of the wild populations. Table III-18 displays the current estimated average anadromous run sizes attributable to the Forest, including production from private lands intermingled within the Forest boundary.

The habitat is believed to be capable of producing much larger numbers of anadromous fish. Because numbers of returning adults are not necessarily a measure of the ability of the habitat to produce fish, smolt habitat capability (SHC) is used to measure habitat potential. These numbers are also being developed by the agencies, and the chart above represents only a best approximation.

Estimated smolt losses on the downstream migration are approximately 15 percent per dam and adult losses on the upstream migration are approximately 5 percent per dam (Table III-20). It is generally agreed that full production in the Yakima, Wenatchee, and Entiat Rivers cannot be achieved, due to the passage problems, without supplementing natural production. Management of the Forest habitat is vital to providing habitat for the natural component.

The Northwest Power Planning Council's Fish and Wildlife Program (amended 1984) has identified downstream and upstream migratory problems of the mainstem Columbia River hydroelectric dams as a major factor limiting anadromous fish production. The program includes numerous measures to attempt to reduce the losses.

Following is a brief discussion of each species of anadromous fish as it applies to the Wenatchee National Forest.

TABLE III-20

EFFECTS OF DAMS ON THE FOREST'S ANADROMOUS FISH

	Percentage of Smolts Lost	Percentage of Adults Lost	No. of Dams
Yakima River	48	19	4
Wenatchee River	68	30	7
Entiat River	73	34	8

Sockeye

The Wenatchee River system supports the only remaining run of spawning sockeye salmon on the Forest. The size of the run varies considerably from year to year with an average run of approximately 31,000 fish which may be close to the historical run size. Historically, the Yakima River system also produced a large sockeye run. However, barriers, including Cle Elum, Kachess, Keechelus, and Bumping Lake Dams, have blocked all access to the lake habitat. The result has been complete elimination of sockeye in the Yakima system. The National Marine Fisheries Service is currently doing a feasibility study of reintroducing sockeye salmon to the Yakima system. There are also plans to supplement sockeye production in Lake Wenatchee by net rearing pens. Historically, there has been a fluvial (river) sockeye population in the Entiat River, too.

A recent publication, Determinants of Sockeye Salmon Abundance in the Columbia River by James W. Mullan (Fisheries Assistance Office, U.S. Fish and Wildlife Service, Leavenworth, WA., Draft Report FRI/FAO-84-3, June 1984), reviews most of the sockeye information available for the Columbia Basin including all the Wenatchee National Forest's rivers.

Coho

The Yakima River system supports a very small run of coho salmon of which all are probably of hatchery origin. At least 237 miles of anadromous fish habitat have been lost in the system due to the cumulative effects of diversions, dams, and insufficient low flows. Based on historical run size and geographic distribution of known habitat (stream miles), 42 percent or 50,000 to 70,000, of the coho salmon from the upper Columbia River would have originated in the Yakima River drainage. Similar values for other Forest upstream tributaries would have been: 5 percent in the Wenatchee, or 6,000 to 7,500 coho, 8 percent in the Entiat, or 9,000 to 13,000 coho (Mullan, 1983).

The report, Overview of Artificial and Natural Propagation of Coho Salmon (*Oncorhynchus kisutch*) on the Mid-Columbia River by James W. Mullan (Fisheries Assistance Office, U.S. Fish and Wildlife Service, Leavenworth, WA., Report No. FRI/FAO-84-4, December, 1983), reviews the recent history of the coho salmon in the Wenatchee and Entiat Rivers and indicates that natural and artificial (hatchery) runs are now practically nonexistent. The report concludes that reestablishment of runs have failed primarily due to necessary reliance on lower river fish stock which lack genetic suitability.

Chinook

Chinook salmon are found in all the major river systems of the Forest: the Yakima, Wenatchee, and Entiat Rivers. Three runs are commonly delineated in the Columbia system. The spring chinook, entering the Columbia River mouth in the spring and spawning in the late summer, are most dependent on Forest habitats since they use the upper river reaches. Summer chinook enter the Columbia River mouth in the summer and spawn later than the spring chinooks, using mid-river reaches. Summer chinook utilize habitats on the Forest only on portions of the Wenatchee River between the mouth of Tumwater Canyon and Lake Wenatchee. Fall chinook, to a large extent, use the mainstem Columbia River and lower Yakima River and therefore are not directly dependent on Forest habitats.

While chinook runs in the Wenatchee, Entiat, and Yakima river systems are supplemented with hatchery fish, a significant portion of the returning spring chinook to the Wenatchee and Entiat rivers and summer chinook returning to the Wenatchee River are wild fish produced within the National Forest boundary.

In the Yakima system, a major research project on spring chinook enhancement is being funded by the Bonneville Power Administration and conducted by the Yakima Indian Nation with scheduled completion in 1990. The Yakima system is being used as the "showcase" by the Northwest Power Planning Council in its Fish and Wildlife Program to show the benefits of offsite enhancement and mitigation of hydroelectric

projects (Northwest Power Planning Council, 1984) Chinook salmon are the primary enhancement species. Efforts to use the Yakima Basin for offsite enhancement could be complimented by the Yakima River Basin Water Enhancement Project. That study may lead to improved in-stream fish flows throughout the Basin.

Spring chinook production within the Wenatchee drainage will soon be supplemented under terms of the Rock Island Settlement Agreement. The project will include trapping wild spring chinook adults from the Chiwawa River, a Wenatchee River tributary, then spawning the adults and initially rearing the progeny at the Chelan County PUD facility at Eastbank. The fry will then be transferred to a satellite rearing facility located on the Chiwawa River on National Forest land, and eventually released directly into the Chiwawa

Steelhead Trout

Steelhead trout, the sea-running relative of the resident rainbow trout, are found in the three major Forest river systems. Like other species of anadromous fish, their habitat and run sizes have been greatly reduced by barriers and habitat alteration. Current runs are composed of a mixture of natural and hatchery produced fish

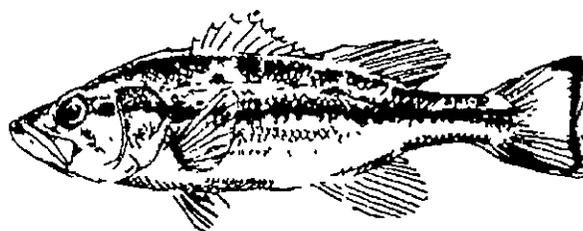
If location, methods, and season for fishing are not adequately controlled, young steelhead can inadvertently provide a major "resident trout" fishery. The Washington Department of Wildlife, in their fishing regulations, is actively attempting to reduce these incidental catches. In addition, attempts are being made to limit sports harvest to hatchery reared adult fish, allowing returning wild adult fish to escape to the spawning areas

b. Demand for Fish

The demand for fish, and therefore high quality fisheries habitat, is not readily measurable. For anadromous fish, which are commercially harvestable, there appears to be practically an inexhaustible demand. At one time, commercial landings of Columbia River fish were over five times their present level, indicating that demand is very high. Treaty rights reserved in the Yakima Treaty of 1855 include considerable demand for increased fish production over the present

Resident fish demand is also unquantifiable, but very high. To meet a portion of the demand, the Washington State Department of Wildlife has fish planting programs in streams and lakes. There is no indication that there is a limit to the numbers of fish, of appropriate species and size, that could be harvested (Washington Department of Wildlife, James Cummins, personal communication, March 1985)

Due to the high demand for fish, the maintenance, rehabilitation, and enhancement of fisheries habitat is of primary concern to the public, tribes, and Federal, state, and local governmental agencies.



c. Management Indicator Species

To measure the effects of land and resource management practices on the many fish species and on the integrity of the aquatic habitat, management indicator species are used as a tool. These species are chosen to represent all other species. In other words, it is assumed that if the needs of the management indicator species are met, then the needs of all other species living in similar habitat are also met.

For fish, anadromous salmonids, bull trout, and cutthroat trout (resident) have been chosen as the management indicator species. These species, along with the beaver (discussed in the wildlife section of this chapter), represent all species dependent on high quality habitat in the riparian-aquatic zone. Anadromous fish, including spring and summer chinook salmon, sockeye salmon and steelhead trout, are chosen because of their commercial, recreational and cultural values. These fish are also dependent upon complex aquatic habitat, which differ by species and life cycle stage. Anadromous fish population sizes may be below full habitat production potential and may not fully represent the effects of land management. However, quantifying habitat production potential, and preserving that potential, is important to fish production goals.

Resident cutthroat trout are also an indicator of aquatic habitat especially in streams which do not support anadromous fish. Bull trout are chosen because they are a Regional Forester's Sensitive Species.

d. Threatened, Endangered, and Sensitive Species

There are no species of Federally designated threatened or endangered fish known to inhabit the Forest. One fish species, the bull trout, is listed as a Category 2 Species by the USDI Fish and Wildlife Service. Little is currently known about bull trout habitat requirements or distribution.

e. Fisheries Habitat

At first glance, fish habitat on the Forest appears to be in fairly good condition overall. However, the lack of recent inventory information needed to quantify current habitat, changes from the historic condition, and potential for improvement, makes it difficult to assess habitat condition. In some locations, habitat impacts, such as the effects of mining, road location, firewood cutting and timber harvest, are easily observed. Visual evidence of adverse habitat impacts is not so easily discernable in other areas. For example, historic logging in the riparian zone accompanied by stream cleanout and log drives may have often reduced habitat complexity. Man-caused fish passage barriers may also limit the amount of habitat available for fish production. Some barriers, such as culverts, may be on the Forest.

For resident trout, it is not known whether there is a net significant loss in habitat quantity and quality from the historic levels. In fact, for resident fish, there is now a significantly greater area of habitat available, without anadromous competition, than there was fifty years ago.

9. VEGETATION

Vegetation on the Wenatchee National Forest is a complex mosaic of plant communities. These plant communities reflect variations in landform, elevation, aspect, moisture, and soils. They have also been modified by the influence of fire, insects, disease, grazing, logging, and the introduction of non-native plants. Identifiable associations of vegetation occur as repeating patterns within this mosaic.

The area that the Wenatchee National Forest encompasses is extremely diverse. The plants and animals, and the ecosystems of which they are a part, are many and varied. Biological diversity is undoubtedly different now than it was in the past or will be in the future. Change in diversity is ongoing and natural but is also affected by management activities. Consequently, diversity changes are a critical consideration in all that we do.

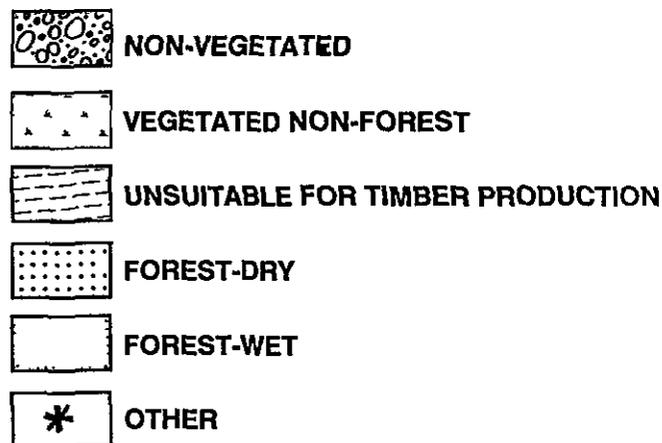
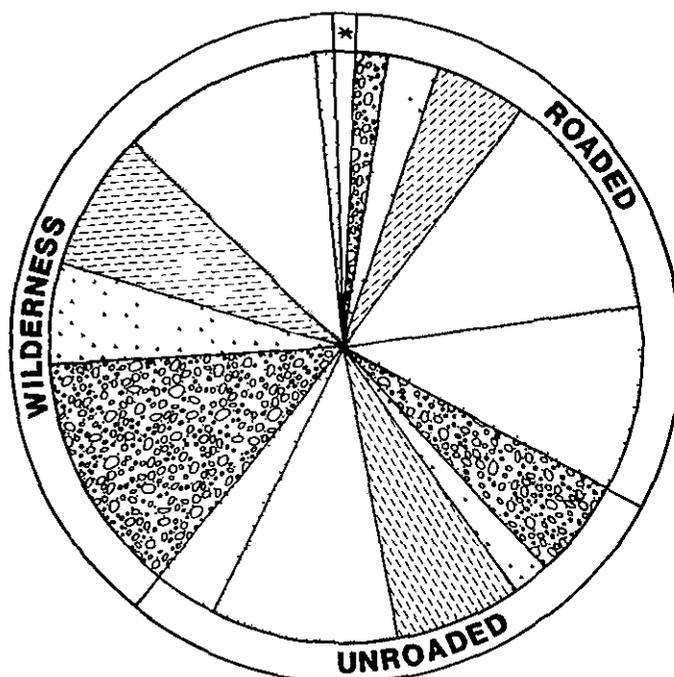
Biological Diversity

A number of definitions exist for biological diversity, both legal and operational. In simple terms however, biological diversity is the distribution and abundance of different plant and animal communities and species. Diversity is characterized by a number of attributes, the complexity of which makes the understanding of this important issue difficult. Measures of diversity must include attributes that involve time, space, and organisms because diversity change relates to all these things. Biological diversity has not been characterized in any objective way on the Wenatchee National Forest at this time.

Biological diversity touches many planning issues. Issues related to forest structure distribution over time potentially affect diversity. These issues include the amount and distribution of old-growth forest; the conversion of hardwood-dominated stands to conifer-dominated stands; the amount and rate of timber harvested; the amount, quality, and distribution of animal habitat; and the structure of our streams. Other issues are commonly related to species composition concerns - such as sensitive plants and animals, management indicator species, and species diversity.

The tremendous diversity of cutting intensity, fires, insects, and diseases will continue the diversity of vegetation on the Forest. The graphics below show the acres and percentages of the current vegetative conditions on the Wenatchee National Forest.

FIGURE III-8
CURRENT VEGETATIVE CONDITION
WENATCHEE NATIONAL FOREST
ACRES



**TABLE III-21
ACRES BY VEGETATIVE CONDITION**

	ROADED			UNROADED			WILDERNESS			OTHER		TOTAL	
	ACRES	% OF ROAD	% OF TOTAL	ACRES	% OF UNRD	% OF TOTAL	ACRES	% OF WILD	% OF TOTAL	ACRES	% OF TOTAL	ACRES	% OF TOTAL
NON-VEGETATED	37,165	5.3	17	116,096	19.1	5.4	266,839	34.2	13.2			440,100	20.3
VEGETATED NON-FORESTED	61,502	8.9	2.8	42,634	7.0	2.0	120,248	14.4	5.5			224,384	10.3
UNSUITABLE FOREST	103,351	14.9	4.8	147,107	24.2	6.8	166,188	19.8	7.7			416,646	19.3
FORESTED - DRY							23,193	2.8	1.1			23,193	1.1
Mature	28,450	4.1	1.3	19,949	3.3	0.9						48,399	2.2
Immature 2-story	79,904	11.5	3.7	26,924	4.4	1.3						106,828	5.0
Immature 1-story	73,014	10.5	3.4	17,999	3.0	0.8						91,013	4.2
Seedlings & Saplings	36,803	5.3	1.7	10,685	1.8	0.5						47,488	2.2
Non-Stocked (Regen)	1,123	0.2	0.1									1,123	0.1
Total Forest - Dry	219,294	31.6	10.2	75,557	12.5	3.5	23,193	2.8	1.1			318,044	14.8
FORESTED - WET							241,322	28.8	11.1			241,322	11.1
Mature	85,458	12.3	3.9	106,446	17.5	4.9						191,904	8.8
Immature 2-story	81,939	11.8	3.8	45,262	7.4	2.1						127,201	5.9
Immature 1-story	67,798	9.8	3.1	66,525	11.0	3.1						134,323	6.2
Seedlings & Saplings	31,291	4.5	1.5	5,978	1.0	0.3						37,269	1.8
Non-Stocked (Regen)	6,402	0.9	0.3	1,760	0.3	0.1						8,162	0.4
Total Forest - Wet	272,888	39.3	12.6	225,971	37.2	10.5	241,322	28.8	11.1			740,181	34.2
OTHER										24,825	1.1	24,825	1.1
TOTAL	694,200	100	32.1	607,365	100	28.2	837,790	100	38.6	24,825	1.1	2,164,180	100

* Includes acres of water, RNA's, botanical areas, developed recreation, roads, special uses, administrative sites and utility corridors

Because of the complexity inherent in the environmental component of vegetation, it has been divided into subcomponents: trees; old growth; forage; unique ecosystems; sensitive plants, Research Natural Areas; and Entiat Experimental Forest.

9a. VEGETATION: TREES

a. Overview

Conifer forest ecotypes occupy approximately 69 percent of the Forest. Elevation, soil types, precipitation, and aspect combine to create a wide variety of ecological vegetative types. For simplicity, these can be combined into the following three forest ecotypes which occur on both suitable and unsuitable land:

Dry Forest (Ponderosa Pine/Douglas-Fir)

The low elevation, dry sage brush, bitterbrush, grass type along the east edge of the Forest changes to the ponderosa pine/Douglas-fir zone with increasing elevation and moisture. Pine-grass, elk sedge, kinnikinnick, serviceberry, and ocean spray are some of the common understory plants.

Past logging, fires, disease, and insects have created a predominately two-storied stand condition in this type. The stand class distribution is shown in Table III-22.

TABLE III-22
DRY FOREST ECOTYPE
STAND CLASS DISTRIBUTION

Stand Size Class	Acres	% of Tentatively Suitable Acres ^{1/}
Mature Stands	48,399	6.1
Immature Two-Storeyed Stands	106,828	13.5
Pole Stands	91,013	11.5
Seed and Saplings	47,488	6.0
Bare Ground	1,123	.1
Subtotal	294,851	37.2

^{1/} See Table III-25

Timber harvesting is common in this zone with the earliest commercial timber sales dating back to 1910. Early sales concentrated on the harvest of ponderosa pine which was used to make apple boxes. Timber production potential is approximately 52.3 cubic feet (280 board feet) of tree growth per acre per year, although this is quite variable depending on local site conditions and intensity of management. This production estimate is based on performing three thinnings (1 precommercial and 2 commercial) and a clearcut harvest at about age 120. On some of the dry site areas, either shelterwood or uneven-aged management may be needed to assure regeneration. This determination is made on a site specific basis by certified silviculturists.

Wet Forest (Mixed Conifers)

The wet forest zone is characterized by a wide variety of plant species. Ponderosa pine may be present, but without disturbance it will gradually be replaced by shade tolerant grand fir, silver fir, western hemlock, or western red cedar. Less abundant, but highly valued trees because of their wood and aesthetic qualities, are western larch, noble fir, and western white pine. At the upper elevations in this zone, lodgepole pine, mountain hemlock, subalpine fir, and Englemann spruce become more prevalent.

The most common mixed conifer wet forest type is Society of American Foresters (SAF) type 213 grand fir (Eyre 1980). The next most common type is SAF 206 Alpine fir-Englemann spruce. However, on the Wenatchee, much of the area in this type has a large component of pacific silver fir.

Douglas-fir and ponderosa pine are common tree species in the drier portions of the moist forest. However, in the absence of fire or other major disturbances, both these species will be replaced by the more tolerant grand fir, silver fir, sub-alpine firs, hemlock, or cedar.

Lodgepole pine (218) and western larch types (212) are even more dependent on fire for maintenance. Most sites occupied by these species are the result of hot fires that killed the more shade tolerant species.

High elevation types include mountain hemlock (205), and white bark pine (208). These are combined with areas of alpine larch to form a type classified by Hall (1978) as CA Alpine open park type. This open park condition is an important dispersed recreation and big game summer forage area. The intermingled grass forb communities in the high mountain meadows contain highly palatable protein rich forage. Fire in these areas can shift the vegetative cover from conifers to shrubs including huckleberries, mountain ash, and mountain maples. These can persist for many years before being replaced again by conifers.

Hardwoods that are common along drainageways at both low and moderate elevations are black cottonwood, white alder, river birch, and aspen. They usually occupy sites with high water tables. Only black cottonwood is presently used for commercial wood products in significant volumes and is occasionally planted in wet areas for commercial use.

The most common mid-elevation shrubs are vine maple, salal, salmonberry, devil's club, Oregon grape, sticky currant, and elderberry. Elk sedge and pinegrass are also very common.

TABLE III-23

**WET FOREST ECOTYPE
STAND CLASS DISTRIBUTION**

Stand Size Class	Acres	% of Tentatively Suitable Acres 1/
Mature Stands	191,904	24.2
Immature Two-Storeyed Stands	127,201	16.0
Pole Stands	134,323	16.9
Seed and Saplings	37,269	4.7
Bare Ground	8,162	1.0
Subtotal	498,859	62.8

1/ See Table III-25

The wet zone has considerably more mature forest and bare ground than in the dry forest zone. Most of the bare ground acres are from recent clearcuts and fire. The increase in even-aged mature stands reflects less frequent fire occurrence.

Timber production is estimated at 60.3 cubic feet (323 board feet) per acre per year when a three thinning (one precommercial and two commercial) regeneration harvest system is used with final harvest at about age 110. Timber, recreation, wildlife, and water are the resources that are emphasized in this zone.

Sub-Alpine Parkland and Mountain Meadows

This zone is best known for its wide variety of flowering herbs and forbs. Parklike stands of whitebark pine, Engelmann spruce, subalpine fir, and alpine larch adjoin the barren or treeless upper mountain slopes. Much of this zone is in wilderness and unroaded recreation areas.

Dispersed recreation is the primary management emphasis in this zone. Some portions of this zone are grazed by domestic sheep. The heavy precipitation and snowpacks in this zone contribute greatly to the Forest's annual stream runoff.

b. Timber Management

In both the dry and wet zones, the most common conifer species is Douglas-fir. However, old-growth ponderosa pine receives the most interest from local sawmills. Douglas-fir and ponderosa pine make up 50 percent of the existing volume of timber on the Wenatchee. The 16 species of conifers in order of standing volume from the 1977 Forest inventory are shown in Table III-24.

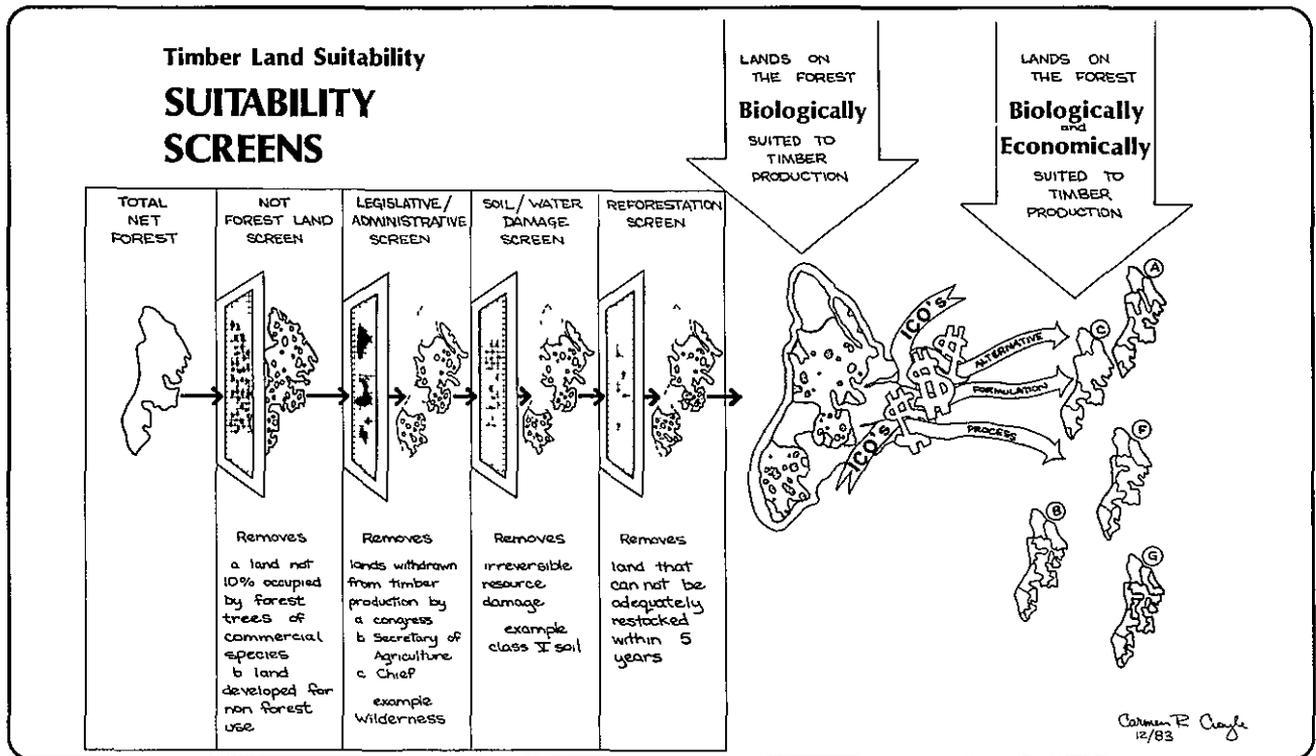
TABLE III-24

**STANDING VOLUME OF WENATCHEE
NATIONAL FOREST CONIFER SPECIES**

Species	% Standing Volume
Douglas-fir	37%
Ponderosa pine	13%
Pacific silver fir	11%
Grand fir	7%
Lodgepole pine	6%
Western hemlock	5%
Subalpine fir	5%
Western larch	5%
Mountain hemlock	4%
Englemann spruce	3%
Western white pine	2%
Western red cedar	1%
Alaska yellow cedar	1%
Noble fir	
Whitebark pine	
Subalpine larch	

The process for the determination of which lands are suitable for timber production is indicated by Figure III-9. The details for this process are included in the planning records located in the Forest Supervisor's Office.

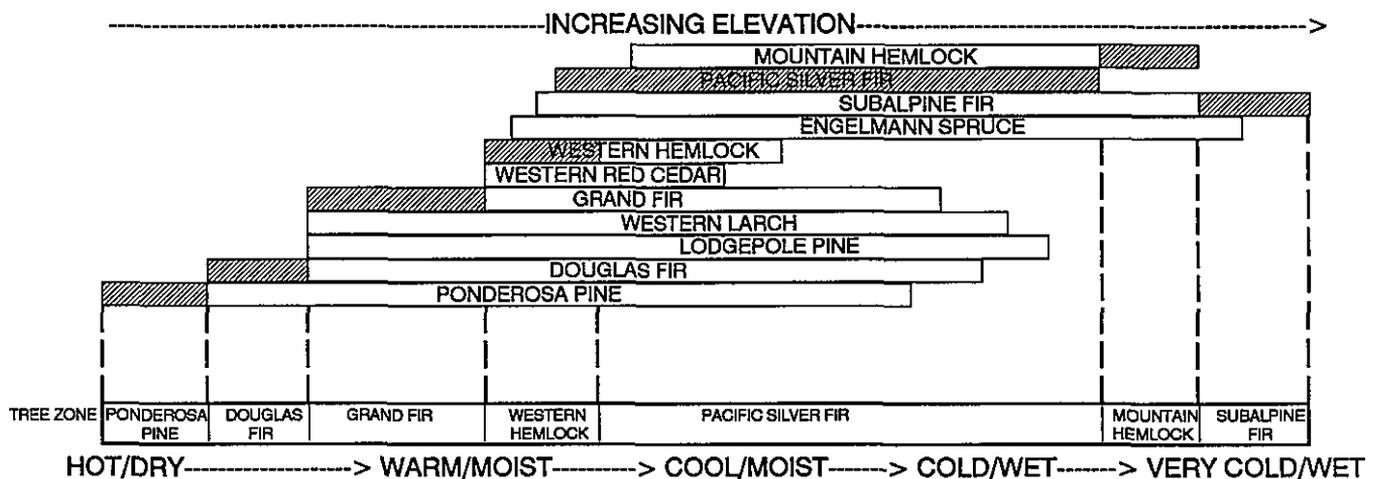
**FIGURE III-9
TIMBER SUITABILITY SCREEN**



Of the 2,164,180 acres of Wenatchee National Forest, 791,899 acres, or 37 percent, are tentatively suitable for timber production. These lands are capable of growing industrial wood and are available and suitable for timber management activities.

Table III-25, following, summarizes Forest land suitability for timber production. (For details of the suitability process see Field Review Timber Land Suitability, Wenatchee National Forest, 1984.)

**FIGURE III-10
DISTRIBUTION OF MAJOR TREE SPECIES WENATCHEE NATIONAL FOREST**



Schematic distribution of major tree species usually encountered with increasing elevation in mature upland forest stands on the Wenatchee National Forest. That portion of the tree species range where it is considered climax is shaded. Zone refers to that area where a particular tree is climax dominant.

TABLE III-25
TIMBER LAND SUITABILITY
ACRES

	Not Sulted for Timber Production	Totals
I. Total National Forest Area		2,457,379
Other Ownerships		293,199
II. Net National Forest		2,164,180
A. Water	11,024	
B. Non-Forest (not stocked with 10% tree cover)	666,828	
C. Lands developed for other than timber production purposes: Ski areas, developed recreation, administrative areas, improved roads, special uses.	35,230	
III. Forested Lands ^{1/}		1,451,098
A 1. Wilderness	430,788	
2. Research Natural Areas	1,038	
3. Other such as:		
Turnwater Botanical Area	784	
Entiat Experimental Forest	4,219	
Subtotal	436,829	
B. Lands growing less than 20 cu. ft./ac /yr.		
1. Lands classified as unsuitable	137,717 ^{2/}	
2. Lands classified as suitable		(6,148) ^{3/}
3. Lands classified as separate suitability component	0	
C. Irreversible resource damage (219.14(a)(2))	18,720	
D. Regeneration Difficulty (Reforestation cannot be guaranteed) (219 14(a)(3))	65,933	
E. Regeneration difficulty-lands classified as a separate suitability component	0	
IV. Tentatively suitable Forest Land		791,899
V. Total of Nonsuitable Land	1,372,281	
VI. Land status under current Timber Management Plan Revised/Approved 10/19/84	Standard Special Subtotal Marginal TOTAL	682,251 105,500 787,751 102,000 889,951

^{1/} Includes Alpine Lakes Management Area Non-harvest land allocations

^{2/} Due to reforestation difficulty.

^{3/} Currently producing less than 20 cubic ft /ac /yr but can be reforested

This tentatively suitable forest land (791,899 acres) is slightly higher than the current timber management plan standard and special acres of 787,751. Most of the marginal acres have been reclassified as unsuitable.

The current timber harvest level as revised after the Washington State Wilderness Act of 1984 is:

	Million Board Feet	Million Cu. Ft.
Annual sale quantity	170.9	31.4
Unregulated volume	5.9	1.0
	176.8	32.4

Predicted future harvest levels depend upon the amount of investment in prompt reforestation, thinning and weeding, fertilization, and tree improvement. Tree improvement involves selection of the best parent trees for seed and seedlings for reforestation through the use of seed orchards and genetic tests.

c. Reforestation

Prompt planting immediately after fire or logging is the general rule on the Forest. Historically, 90 percent of the clearcut acres are planted. Only those acres where natural regeneration of the desired species is assured within five years are left for natural regeneration. Approximately 50 percent of the shelterwood acres are planted.

Aerial seeding is used for wildfire areas when not enough seedlings are available or the area is too rocky for successful planting. Wildfire areas which have been successfully seeded include portions of the 1970 fires on Chelan and Entiat Districts, and the Hornet Creek burn. Few, if any, seedlings were found after seeding with tree seed mixed with grass seed on the Mineral Springs fire or the Eight-mile fire. However, this method was used for the steep rocky portions of the Five-mile fire in September 1985 and portions of the Dinkleman Fire in 1988.

Planting acres during the 1970's, following the Entiat-Chelan burns, rose to over 5,000 per year. All suitable 1970 fire acres have been planted, except some that have poor access. Reduced timber harvest and completion of the backlog led

to a low of 1,852 acres planted in 1983. Expected future planting is shown on Table II-3a by alternative. Current planting of seedlings originating from tree improvement seed has increased to 70 percent. These seedlings are from specially selected trees chosen for good growth, form, and disease resistance.

The best of these seedlings will be allowed to crossbreed in specially designed seed orchards to increase future yields. The oldest seed orchard trees were planted in 1980 on the Naches and Cle Elum Ranger Districts. Of the 16 species present on the Forest, only six are considered important enough commercially to warrant investment in tree improvement activities. The six tree improvement species are Douglas-fir, ponderosa pine, western white pine, noble fir, pacific silver fir, and western larch. Seed orchards have been established for all six except western larch. Seed for other species will come from felling or climbing wild trees that appear to have desirable characteristics.

d. Timber Stand Improvement (TSI)

An estimated 15,474 acres are in need of precommercial thinning (Wenatchee Reforestation TSI Needs Report). Many of these stands originated after the 1970 fires on the Chelan and Entiat Districts. In order to precommercially thin these stands at approximately the optimum age, the Forest proposes thinning a minimum of 2,000 acres each year for 10 years. Precommercial thinning was accomplished on 2,880 acres in 1984, 3,062 acres for 1985, and 3,435 acres in 1986.

The Timber Stand Improvement Needs Report shows release of conifer trees from other vegetative competition is needed on 5,091 acres. Potential treatment methods include herbicides, grazing, mechanical methods, and hand cutting or pulling. In 1983, conifers were released from competition on 753 acres. However, the work accomplished in 1984 was drastically reduced due to a Federal court order banning herbicide use in Washington and Oregon pending a "worst case analysis" of potential impacts on human health.

Researchers have concluded that brush will have an adverse effect on growth and yield of conifer plantations (McDonald and Oliver, Forestry Research West, 1985). They also state that aerial applications of herbicides are the most effective and economical brush control technique. At the same time, there has been considerable public concern about potential health and environmental impacts of herbicide spraying in some areas of Oregon and Washington. Past public opposition to herbicide use on the Wenatchee Forest has been less intense than on other forests, perhaps due to intensive agricultural use of such chemicals on private lands in eastern Washington.

The primary herbicides the Forest uses for vegetation control are Velpar (hexazinone) and Roundup (glyphosate). As relatively few acres are treated, no reduced annual allowable harvest has been calculated if herbicides can not be used in the future. However, some treatments such as hand cutting vine maple or large hand-scalping in pinegrass will be more expensive than chemical treatments. Some hand methods, such as pulling out ceanothus, may actually be cheaper and more species specific than herbicides.

Some acres on the Wenatchee lend themselves to vegetation control through sheep or cattle grazing. Areas of tall brush or steep, erosive sites do not lend themselves to brush control by livestock, and there is potential for damage to young tree seedlings. For example, a trial utilizing sheep to graze domestic grass created a need to replant several acres of planted pines in the Mineral Springs fire area south of Swauk Pass. The sheep also caused soil displacement in this generally very steep area. Successful release of young seedlings have been experienced by using sheep where succulent forbs are available for grazing and where sheep are moved before they begin to eat the trees. An environmental analysis is planned in 1990 to deal with the existing areas where trees are in danger of being out competed by brush or other vegetation.

e. Forest Insects and Diseases

Insects and disease cause an estimated 11.4 million cubic feet (62 MM Board feet) of timber loss per year. The loss to disease alone is estimated to be 30 percent of the Forest's potential tree growth (Hadfield, 1982).

Selective logging and uneven-aged management increase disease and insect losses in many sites. Root rot, especially Phellinus weirri, was found to infect about one-third of the trees left in a partial cut stand at Naches (Filip 1979). Dwarf mistletoe is also a common problem in partial cut stands on the forest.

The shift in inventory volume from pines to firs through partial cutting increases the probability of western spruce budworm, and Tussock moth outbreaks. The budworm was aerial sprayed using the chemical BT on approximately 43,000 acres of grand fir and Douglas-fir trees on the Naches Ranger District in 1986. During an eight year period, 1971 through 1978, the budworm defoliated 793,000 acres from Ellensburg north to Chelan. Aerial spray treatments in 1976 and 1977 appeared to reduce damage and population levels to endemic levels by 1979.

Although the budworm affects large acreages, bark beetles actually kill more timber. The most important bark beetle on the Forest is the mountain pine beetle. Average loss is 5 million board feet per year. In the past, this was primarily in western white pine. However, pole-sized stands of ponderosa pine and lodgepole pine are susceptible if density is not controlled by thinning.

Thinning to promote healthier and more rapid growing trees is the best approach to prevent outbreaks of mountain pine beetle in ponderosa pine (Sortwell 1975). For mature lodgepole pine stands, cutting a series of small blocks so a mosaic of age classes result is recommended to reduce future losses (Safranyik 1974.) This is the current strategy being used on the upper elevations of the Entiat District. Logs are being utilized by the Big Toy Mill for construction of playground equipment.

Of special concern for the future is the potential for a beetle infestation in thousands of acres of even-aged stands of lodgepole pine that originated after the Entiat-Chelan fires of 1970. Without early precommercial thinning, these stands will become susceptible to beetles by the year 2020.

f. Timber Harvest

From 1910 until about 1955 selective removal of the largest, most valuable trees was the predominant harvest method on the Wenatchee. On acres where disease-free small trees of desirable species were present, this was a cost efficient and silviculturally acceptable method. This is still true today.

Since about 1955, increased use of shelterwood and clearcutting methods to reduce mistletoe, root rots, and undesirable species has increased. Currently overwood removal from shelterwoods and natural two-storied stands accounts for about 50 percent of the Forest harvest. Clearcutting has increased to approximately 3,000 acres per year or about 30 percent of the Forest harvest volume. The remaining volume is from salvage and commercial thinning areas.

Tree removal methods to implement the above silvicultural treatments include all methods from horses to helicopter. Historically, horses and then tractors, were the primary methods of log skidding. Ground skidding machines, including tractors and rubber-tired vehicles, are still the most common logging method used today.

The proposed five year timber sale schedule has the following amounts of each logging method:

LOGGING SYSTEM METHODS				
Tractor	High Lead	Skyline	Longspan Skyline	Helicopter
41%	15%	31%	10%	3% 1/

1/ Additional helicopter volume will occur due to the Dinkleman Fire that was not planned when the timber sale schedule was prepared.

Explanation of these methods and typical use is shown below:

Logging Systems:

Tractor - Use of tracked or rubber-tired vehicle to skid logs to a central loading point. This method is typically used on dry, gently sloping ground.

Highlead - A cable system operated from a tower, which drags logs to a central loading site. One end of a log may be lifted off the ground for short distances. Used most often in moderately steep terrain over relatively short distances.

Skyline - The log yarding cable is attached between a tower and an elevated point in the distance. Logs are transported partially or completely suspended above the ground with a movable carriage on the cable. Used in steep or unstable terrain with minimal impacts on the land, this method can reach for long distances.

Helicopter - Use of helicopter to lift logs from a logging site to a nearby central loading point. Most economical on relatively remote and difficult to reach sites. Avoids road building where roading is inappropriate because of steep terrain, unstable soils, visual considerations, etc. Also very applicable to rapid removal of fire-killed timber over large areas such as the Dinkleman fire.

g. Costs and Returns

Recent concerns about deficit (below cost) timber sales have focused attention on the costs incurred in preparing and administering a timber sale project compared to the cash returns and values generated from the timber harvested. The occurrence of a "below cost" program is dependent on the analysis approach used. For example, Tables III-26 and 27 are a comparison of returns and values generated from harvest activities yearly from 1980 through 1984 with the expenditures for preparing the timber sale programs for 1980-1987. It is important to understand that the costs displayed are for preparing sales to be sold that year and for the next 2 to 4 years. These costs also continue after the sale is sold in the form of contract administration costs and monitoring costs. Costs incurred or generated by a specific timber sale often span a period of 10 years, commencing with the start of sale planning and ending with the completion of post sale activities such as reforestation and certification that the harvested area is satisfactorily reforested. The cash returns and values are generated by actual log removal from sales that were sold prior to the year of the returns. The returns and values from a specific timber sale frequently occur over a period of 1 to 5 years after a sale is sold. Very few timber sales are completely harvested in 1 year or during the same year it was sold.

Two different cost bases are displayed. The first cost (Resource Support) is a budget cost that represents all timber sale support costs in the budget appropriation. These costs include budget items for slash disposal (site preparation) and cooperative work as well as resource specialist support. Resource specialist support are costs incurred by specialists in differing resource areas assisting in preparing environmentally sound timber sale proposals. These resource areas include: fire management, range, minerals, geology, recreation, cultural resources, wildlife, soil and water, lands, and engineering. The second cost (Timber Costs) reflects those costs incurred in sale preparation, sale administration, sale planning and inventory, sale stand exams, and reforestation and timber stand improvement. The total of the two costs reflect as nearly as possible the amount of money Congress appropriates to finance the timber sale program on the Wenatchee National Forest for a given year.

The returns and values reflect the total monies and values received by the Forest Service for timber removed from the Wenatchee National Forest. The returns and values include deposits made to the National Forest Fund (NFF), Knutson-Vandenberg collections (K-V), Road Value (Purchaser Credit), Slash Disposal (BD) collection, Salvage Sale Fund (SSF), and Cooperative Deposits for Erosion Control, Scaling, Road Maintenance, etc. (CWFS). These are all returns or values that serve to offset costs or pay for work done by the Forest Service made necessary by the timber sale. The value of the road system built by the timber sale is considered to equal the amount the NFF deposits were reduced. This amount is called Purchaser Credit.

TABLE III-26

TIMBER SALE COSTS

	1980	1981	1982	1983	1984	1985	1986	1987
Resource Support	(not avail)	(not avail)	\$2,009,226	\$2,788,911	\$3,454,447	3,403,000	3,775,000	4,975,000
Timber Costs	\$6,544,399	\$5,029,731	\$4,063,561	\$4,948,314	\$6,283,730	4,078,000	4,962,000	6,020,000
Total Costs	(not avail)	(not avail)	\$6,072,787	\$7,737,225	\$9,738,177	7,481,000	8,737,000	10,995,000

TABLE III-27
TIMBER SALES RETURNS AND VALUES

	1980	1981	1982	1983	1984
Firewood sales	0	0	0	\$133,515	\$119,745
NFF Deposits	\$20,396,983	\$4,887,711	\$4,058,837	\$5,842,789	\$7,639,032
K-V Collections	(Inc in NFF)	944,712	793,477	1,901,912	2,079,604
Road Value	(Inc in NFF)	2,576,419	1,231,352	2,201,385	2,831,172
CWFS Deposits	(Inc in NFF)	408,912	256,767	399,554	425,287
SSF Deposits	(Inc in NFF)	0	57,771	145,586	152,697
BD Deposits	(Inc in NFF)	1,122,193	707,783	1,127,684	1,008,443
TOTALS	\$20,396,983	\$ 9,939,947	\$7,105,987	\$11,752,425	\$14,255,980
Harvest Volume (MMBF)	133.6	156.8	105.8	136.3 1/	149.6 1/

1/ Does not include fuelwood volume.

As can be seen in Table III-27, returns and values are highly variable between years. This is a result of the forest industries reaction to market conditions and the high interest rates that occurred early in the decade. Logging activity is directly related to strength of the lumber market. This relationship is not as strong on the cost side. The timber sale program is based on an even-flow concept with annual sell levels balanced over a decade. This provides flexibility on a year to year basis while maintaining the long-term sustained yield. As a result of this concept, actual sell levels will vary somewhat each year in response to a variety of stimuli. The cost (budget) deviations are more related to Congressional and Administration efforts to manage the national economy consistent with the outputs available from the National Forest System.

Our present accounting practices do not provide for tracking the costs incurred in preparing a specific timber sale since these costs are spread over several fiscal years. The cost of a specific sale can only be estimated by using average costs determined by dividing the budget cost by the volume offered for sale that year. That results in

an average cost per thousand board feet (MBF) which is then multiplied by the sale volume. The result is an estimate of the sale cost. This cost can then be compared with the anticipated returns and values of the sale. This comparison will not provide a reliable picture of the individual sales cost/return relationship.

The cost of a specific sale will vary widely from the average based on the complexity of that sale. For example, if a sale is within an area that is visually sensitive, significantly more time and expertise is involved, hence the sale is more costly than a sale that is not in a visually sensitive area. Sales in unroaded area are significantly more costly than sales in areas that have been previously roaded. Also, sales that harvest small volumes of timber are generally more costly than sales that harvest large volumes. The return and value potential of a sale also varies widely depending on the timber species composition, logging systems needed to harvest the timber, mitigating work required of the purchaser, and the environmental constraints incorporated in the sale.

h. Local Wood Product Demand

The demand for wood products from the Wenatchee National Forest in the 1989-1999 decade is obviously difficult to predict. Such influences as the national economy, Canadian log imports, housing starts, exports to Pacific-rim countries, etc., are outside of regional and local control. Other more specific factors will, or could, affect the Forest's programmed harvest and the local wood products industry. These are the effects resulting from: rulings from "old growth" and "Spotted Owl" appeals and court decisions; significant changes in Congressional and Administration direction regarding budgets and targets (outputs); and delays or constraints from new emerging issues which undoubtedly will surface.

Certain localized situations will also have an effect. These include: the accelerated harvest of commercial timber on the private lands ("checkerboard" ownership) within the Forest by Longview Fibre, Boise Cascade, and Plum Creek Timberlands in the next ten years; the potential phase out of antiquated sawmills and the possible construction of new facilities; the continued sale of large volumes of timber by the Yakima Indian Nation from their reservation lands; and the continued close and intense scrutiny of many Forest Service projects by local publics. The various factors influencing the demand for wood products are often conflicting.

The past demand for logs from the Wenatchee as evidenced by the long-term average cut is about 168.6 million board feet per year. During this same period, the sell volume target was 175.9 million (MM) board feet per year, and the average sell was 173.3 MM board feet. See Table III-28. The Forest has an uncut timber volume under contract (as of October 1988) of 370 MM board feet. This is a significant reduction from the 850 MM board feet under contract in 1985. This reduction is due to the Timber Relief Act, increased demand, reduced stumpage values, and reduced timber supply. Although some Forest offerings in 1989 did not receive bids, an increase in demand is evidenced by the decreased volume under contract.

Future demand is likely to increase above the historic 168 million due to the decreases in supply from the adjacent west side Forests.

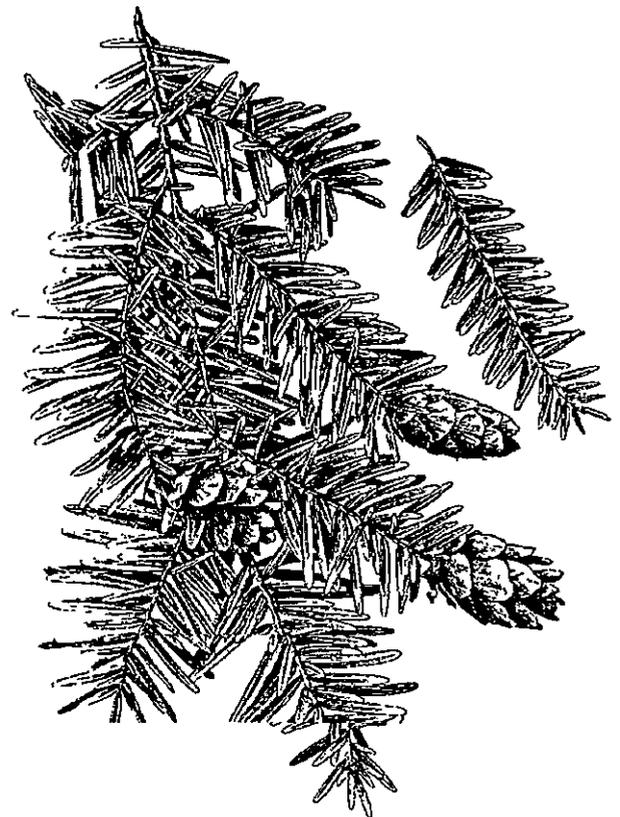


TABLE III-28
TIMBER SALE AND HARVEST FOR
WENATCHEE NATIONAL FOREST 1963-1987
(MILLION BOARD FEET)

FY	NACHES-TIETON WORKING CIRCLE					WENATCHEE WORKING CIRCLE					FOREST TOTAL				
	ASQ	SELL NON- CHG	SELL CHG	TOTAL SELL	TOTAL CUT	ASQ	SELL NON- CHG.	SELL CHG	TOTAL SELL	TOTAL CUT	ASQ	SELL NON- CHG.	SELL CHG	TOTAL SELL	TOTAL CUT
1963						125.2	-	109.1	109.1	112.4					
1964						125.2	-	124.2	124.2	115.5					
1965						125.2	-	110.8	110.8	131.5					
1966						125.2	-	105.7	105.7	141.0					
1967	81.7	3	56.7 ¹	57.0	53.3	125.2	.8	146.1	146.9	115.6					
1968	81.7	7	69.2	69.9 ²	68.9	125.2	1.7	89.3	91.0	111.5					
1969	81.7	3.1	42.0	45.1	65.1	125.2	14.4	149.0	163.4	109.6					
1970	81.7	8.3	114.3	122.6	62.9	125.2	9.2	112.2	121.4	84.2					
1971	81.7	1.7	37.8	39.5	62.9	125.2	2.3	80.8	83.1	83.5					
1972	81.7	0.7	95.4	96.1	89.6	125.2	27.4	84.9	112.3	134.1					
1973	81.7	2.8	79.4	82.2	61.8	125.2	2.7	124.3	127.0	174.6					
1974	81.7	11.9	73.9	85.8	109.5	125.2	4.3	98.3	102.6	87.0					
1975	67.7	3.1	62.6	65.7	79.7	107.4	3.6	56.7	60.3	93.5	175.1	6.7	119.3	126.0	173.2
1976	67.7	.3	74.1	74.4	75.2	107.4	.9	78.1	79.0	85.5	175.1	1.2	152.2	153.4	160.7
00 ^{6/}	16.9	-	9.3	9.3	24.3	26.5	-	19.1	19.1	39.3	43.4	-	28.4	28.4	63.6
1977	67.7	1.3	34.7	36.0	85.5	106.1	2.0	75.6	77.6	91.1	173.8	3.3	110.3	113.6	176.6
1978	67.7	1.2	72.1	73.3	52.7	106.1	2.2	86.9	89.1	83.0	173.8	3.4	159.0	162.4	135.7
1979	67.7	3.8	67.6	71.4	55.2	106.1	2.5	127.3	129.8	83.2	173.8	6.3	194.9	201.2	138.4
1980	72.6	1.9	51.1	53.0	54.0	110.5	7.8	145.4	153.2	66.0	183.1	9.7	196.5	206.2	120.0
1981	72.6	3.6	80.2	83.8 ^{5/}	69.2	110.5	9.9	100.7	110.6 ^{5/}	103.0	183.1	13.5	180.9	194.4	172.2
1982	72.6	6.1	71.4	77.5	55.9	110.5	11.6	79.5	91.1	45.1	183.1	17.7	150.9	168.6	101.0
1983	72.6	9.3	65.3	74.6	61.1	110.5	20.7	93.2	113.9	84.5	183.1	30.0	158.5	188.5	145.6
1984	67.0	7.7	51.7	59.4	69.2	103.8	8.5	122.6	131.1	115.9	170.8	16.2	174.3	190.5	185.1
1985	67.0	6.4	47.1	53.5	78.2	103.8	10.3	117.3	127.1	135.4	170.8	16.7	164.4	181.1	213.6
1986	67.0	7.8	20.3 ^{3/}	71.6 ^{4/}	71.3	103.8	4.0	60.7 ^{3/}	131.1 ^{4/}	155.3	170.8	11.8	81.0	202.7	226.6
1987	67.0	11.2	19.4	85.8	74.1	103.8	4.5	70.8	93.8	147.2	170.8	15.7	90.2	179.6	221.3
TOTAL	1567.1	93.2	1295.6	1487.5	1479.6	2919.2	151.3	2568.6	2804.3	2728.5	2330.6	152.2	1960.8	2296.6	2233.6
AVE	73.8	4.4	60.9	70.0	69.6	115.6	6.7	101.7	111.1	108.1	175.9	11.5	147.9	173.3	168.6
MOST RECENT 5-YR AVERAGE		8.5	40.8	69.0	70.8		9.6	92.9	119.4	127.7		18.1	133.7	188.5	198.4

1/ From Naches/Tieton Management Plan dated 03-03-69, page 64

2/ From 5-Year Action Plan Data 1978-1982

3/ Does not include resell volume

4/ Includes resell volume

5/ From Timber Management Control Record - Sell

6/ Fiscal year transition quarter

ASQ = Allowable Sale Quantity in Million Board Feet (MMBF)

SELL NON-CHG = Non-chargeable volume sold in MMBF

SELL CHG = Chargeable volume sold in MMBF

VEGETATION-TREES

It has been a long accepted practice to have about two years of programmed harvest under contract. For the Wenatchee, this would be about 372 MM board feet. The remaining volume is available to sell until the new Forest Plan is approved and implemented. Obviously, the previously mentioned budgets, appeals/litigation, etc., will have their influence for most of the decade.

The accelerated harvest of timber from private lands is affecting, and will continue to affect, the demand for timber from the National Forest. Both Longview Fibre and Plum Creek export a significant amount of their logs to the Pacific-rim countries. The pine, smaller logs, and logs which are not "marketable" to export customers at a particular time, are generally sold locally to some of the same purchasers who rely on National Forest timber. The greater the harvest of the major private landowners, the greater is the supply of logs to others. It is very reasonable to assume their activity will continue at a high rate during the decade. The effect of the high private industrial harvest currently occurring and the downward projection on the second decade is shown on Table III-29.

In addition to the private landowners, the Yakima Indian Nation will continue to make timber readily available to traditional purchasers of National Forest timber. The Yakimas have harvested heavily in the Yakima Basin and are major suppliers of timber to local industry. Bureau of Indian Affairs volume for eastern Washington is estimated to be 479 MM board feet. This is down approximately 50 MM board feet from harvested volumes of the past decade (Larson, 1982). The Washington Department of Natural Resources (DNR) proposed volume from Eastern Washington is 87 MM board feet annually thru 1993 (DNR, 1983). If stumpage prices increase, there exists a strong potential of an increase in yield from other private lands. As shown in the following table, the Department of Natural Resources projects a strong increase in volume from other private lands that may equal the decreases in forest industry and public timber supplies.

Much of the potential increase from private lands is small diameter timber located in NE Washington Counties and not volume immediately adjacent to the Wenatchee National Forest in Chelan, Kittitas and Yakima counties.

TABLE III-29
CONIFER HARVEST PROJECTIONS
BY DECADE AND OWNER CLASS, EASTERN WASHINGTON
(Million Cubic Feet)

Decade	Owner Class					Total
	National Forest 1/	Bureau of Indian Affairs	Other Public	Forest Industry	Other Private	
1970	734	529	317	390	368	2,338
1980		479	262	247	743	
1990		479	262	247	743	
2000		479	262	247	743	
2010		479	262	247	743	
2020		479	262	247	743	
2030		479	262	247	743	
2040		479	262	247	743	
2050		479	262	247	743	
2060		479	262	247	743	
2070		479	262	247	743	
2080		479	262	247	743	
2090		479	262	247	743	
Total		6,277	3,461	3,354	9,284	

1/ The estimated harvest for the 1970 decade is based on the actual harvest for the years 1969-1978

TABLE III-30
INVENTORY OF CONIFER STOCKED ACRES BY DECADE 1/
(Million Cubic Feet)

Decade	Owner Class					Total
	National Forest	Bureau of Indian Affairs	Other Public	Forest Industry	Other Private	
1980	7,375	3,000	1,729	1,257	3,546	16,907
1990	6,833	2,691	1,594	1,128	3,356	15,602
2000	6,277	2,496	1,495	1,039	3,462	14,769
2010	5,831	2,541	1,440	1,079	3,718	14,609
2020	5,374	2,538	1,367	1,110	3,662	14,051
2030	5,049	2,501	1,374	1,173	3,673	13,770
2040	4,821	2,596	1,427	1,276	3,866	13,986
2050	4,764	2,718	1,472	1,385	4,142	14,481
2060	4,837	2,841	1,521	1,451	4,336	14,986
2070	5,027	2,977	1,565	1,506	4,565	15,640
2080	5,258	3,125	1,644	1,597	4,761	16,385
2090	5,531	3,260	1,712	1,663	4,815	16,981

1/ Inventory for timber 40 years old and older

Because of the long distances to major pulp and paper facilities, demand for low quality and small size material has historically been low. Under the 1963 Wenatchee Working Circle Plan, these materials were not counted in calculating the proposed harvest. Since 1963, new industries utilizing smaller logs have been installed in Entiat, Cashmere, Yakima, Ellensburg and Naches.

The Forest has spent a great deal of time and money to dispose of logging and other residues for the purpose of minimizing fire hazard, preparing planting sites, and making cutting activities more acceptable visually. In recent years, the demand for pulpwood and firewood have helped reduce the amount of residues by about one-third, but the Forest still has a large program for disposal.

During the summer of 1984, a marketing specialist position was created and filled for the purpose of helping to dispose of the remaining residues. This is an area position for the Olympic, Mt. Baker-Snoqualmie, and Wenatchee National Forests. During this past year, our marketing specialist has identified several residue utilization opportunities including California and Asian markets where prices for residues are generally much higher.

Current central Washington mill capacity is 314 MM board feet. Historically such mills rely on the Wenatchee National Forest for approximately 60 percent of their production. This dependency by individual mills ranges from 40 percent to 100 percent (telephone survey, Walk, 1985). Higher prices for quality timber at west side mills often results in the best quality logs being transported to the Puget Sound area. In addition to the log supply for central Washington, a 1980 mill survey found over 13 MM board feet from the Wenatchee going to Puget Sound area mills annually (Socio-Economic Overview, 1982).

In summary, the best estimate of the future demand for wood products appears similar to the harvest level during the past decade or higher. There are no indications that there will be a surge of new mill capacity developed in the area, but decreased supply from adjacent westside Forests may increase prices and demand outside the local area. Any changes in mill facilities will likely be a replacement of antiquated operations with state-of-the-art mills. The exception would likely be the increased utilization and marketing of lodgepole pine. The significant amounts of timber volume available from Longview Fibre, Boise Cascade, and Plum Creek lands, as well as continued sales from the Yakima Nation, should make

timber supplies readily and competitively available for the first decade. It appears that the second decade is when demand may increase significantly due to decreased large industrial timber. Without major silvicultural investments in all land ownerships and a decrease in conversion to non-forestry uses, it appears the supply/demand gap will increase in future decades.

i. Cumulative National Forest Supply Outlook

1) Supply:

Four factors have a major influence on the supply of sawtimber in northeastern Washington. They are: a) acres of suitable timber land available for timber production; b) intensity of silvicultural practices; c) working group and productivity class; and d) management direction.

The past and projected sawtimber supply from the major institutional suppliers is shown in Tables III-29 and III-30.

Based upon the Allowable Sale Quantity (ASQ) in the preferred alternatives, timber available for harvest from National Forests in northeastern Washington will approximately equal volumes sold during the past decade and slightly exceed sawtimber actually harvested. However, the proposed ASQ represents a decline of 16% from the programmed harvest under existing timber management plans. Local availability of National Forest sawtimber will change substantially. Supplies of National Forest timber will increase in the Colville area, while supplies will decrease in the Okanogan and Wenatchee areas. There will also be a shift in species from mixed conifer to more lodgepole pine on the Okanogan National Forest. All Forests show a decline in available old-growth ponderosa pine, and increased numbers of smaller diameter trees.

Table III-31

COMPARISON OF OUTPUTS FROM OKANOGAN, COLVILLE, AND WENATCHEE NATIONAL FORESTS
(Million Board Feet per Year)

	<i>Existing TM Plan Potential Yield 2/</i>	<i>Programmed Harvest</i>	<i>10-Year Average 3/ Offered 1/ Sold Cut</i>			<i>FEIS Preferred ASQ 4/</i>	<i>Max Timber Benchmark</i>
Okanogan NF	93	87	80	73	61	69	107
Colville NF	115	115	94	78	78	118	247
Wenatchee NF	177	177	192	172	162	136	211
Total	385	379	366	323	301	317	565

TM = Timber Management
ASQ = Allowable Sale Quantity

1/ Sell target from attainment reports.

2/ Post 1984 Washington Wilderness Act. Prior to passage of the Act, the programmed harvest level for the three Forests was as follows: Colville National Forest 115 MMBF, Wenatchee National Forest 189 MMBF, and Okanogan National Forest 92 MMBF.

3/ Based upon FY 1977 - 1986 data Chargeable volume only. Non-chargeable estimated for "Cut". Data from timber sale cut and sold reports Colville National Forest data available shows no non-chargeable harvest Chargeable cut estimated from proportion of non-chargeable in sold volumes.

4/ Okanogan National Forest data for ASQ taken from the Okanogan plan DEIS.

Public demand for firewood permits increased rapidly on the Forest from 1973 through 1981. Introduction of a charge permit system in 1982 resulted in a temporary decrease in permits. However, in 1984 nearly 10,000 permits were sold, an 8 percent increase over 1983. Income in 1984 from wood permits (four cords for \$10, with a 10 cord maximum) was \$119,745.

j. Regional Timber Supply and Projections

The principal projections used in developing long-range plans and programs for management of the National Forests are contained in the Forest and Rangeland Renewable Resources Planning Act (RPA) Assessment and 1984 Update (USDA, 1984). These projects focus on the situation for the long term (50 years) and do not necessarily recognize current short-term regional fluctuations. A summary of the projected RPA trends (year 2030) for timber supplies follows.

1.) Hardwoods

The current balance between growth of wood and its removal shows that hardwood forests and eastern softwood forests can support additional timber harvests. However, this balance will change, and future harvests, particularly in the decade beyond 2000, could vary over a wide range. Nonetheless, if commercial timberland owners continue to respond to price and inventory changes, then timber harvests can be increased substantially during the next few decades. The largest hardwood increase will be in the South, with an increase of 6.0 billion cubic feet in 2030 (USDA, 1984).

2.) Softwoods

Total projected softwood harvest would rise 24 percent from 1980 to 11.9 MMCF per year by 2030. There are important differences among the major softwood timber producing regions. In the Douglas-fir subregion, projected annual harvest from 1980 to 1990 is about 2.3 MMCF per year, then declines to about 2 MMCF per year. This level is roughly maintained through the rest of the 50-year projection period.

In contrast, the other major source of softwood timber harvest is the South, which is projected to rise from about 4.1 MMCF in 1980 to 7.3 MMCF per year in 2030. However, most recent forecasts are now showing a downward modification in the rate of economic supply. This may indicate that the South could be expected to be shifting to a slower rate of increase above present levels until the year 2030. Much of the expansion in the South with softwoods, as well as hardwoods, is due to the fact that its wood products production has become more diversified as compared to other regions of the country.

3.) Short-Term and Long-Term Demand Trends

Over the next ten years, timber demand for the Pacific Northwest geographic region will grow slowly. Although there is a backlog of unfulfilled housing demand, the future will depend primarily on the continuing strength in personal income and the availability of affordable housing and financing. In addition, projections of exports to the Pacific Rim countries show a continuing slow economic growth. The analysis acknowledges there will be a declining trend in the construction sector. Structure replacement, rather than new constructions, will characterize the housing market. Projections for increase in demand may be described as considerably restrained and cautious (Nomura, 1981).

Evaluation of recent data and information indicates that the demand for timber is changing to a moderate rate of increase as compared to the slowdown that occurred in the early 1980's. The ability to sustain this increase is linked to the *critical issue of costs*. The short-term future of timber and wood products demand is clouded by the severity and length of the housing and wood products recession that began in 1980.

The long-term trends in housing demand, the growing popularity of construction methods that use less wood, the availability of wood substitutes, and a shift in business management strategies all contribute to a potential shift in future demand (Adams and Haynes, 1985).

Wood supply will continue to be an issue because it will be highly dependent on the ability of producers to lower costs to be competitive with wood substitutes (Schallau, 1986). Although overall current timber supply levels in the Pacific Northwest Region may be capable of meeting future demand, the shifting of industry within the region, the shifting emphasis on the types of wood products produced, and the ability of the subregion to supply the various kinds of wood needed are subregional problems.

An effort by the wood products industry to broaden the economic base may enable the Pacific Northwest to regain much of its previous economic strength; this will take time. The opportunity to increase exports to international markets by modernizing facilities, adopting state-of-the-art technology, reducing costs, and diversifying into other sectors of production (similar to what the South has done) could help to rebuild and stabilize the wood based sectors of the region (Schallau, 1985).

4.) Private and Public Land Interrelationships

Currently, part of the timber formerly supplied by the Pacific Northwest Region is being supplied by the South and Canada. However, the situation with Canada can be expected to change as there are indications that the economic supply may begin dropping off within 6 years, or at least by 15 years. The projected change indicates a potential drop in supply capability of 30 to 50 percent from the current relatively high levels. The South should be able to maintain or show a slow increase in harvest because of its remaining inventory and some substitution of hardwoods. However, both the economic and physical supply of softwoods from that area may begin to show a decline by the year 2030.

At about the same time this drop in supply capability begins to occur for the other sources, the growth of wood fiber on private lands in the Pacific Northwest would again be increasing its capability. The private lands in the Pacific Northwest could then become a major source of supply for softwoods to meet National and international demand. Further, during the period before the private lands in the Region regain their full supply

potential, the public forests would be looked upon as a major source for a relatively stable supply of wood fiber (Schallau, 1986).

The demand for timber harvest in the area surrounding the Wenatchee National Forest is assumed to be infinitely elastic. This means any increase or decrease in local timber supply will not affect long-term price trends which are determined by the prevailing market conditions such as mortgage rates, strength of the U.S. dollar, and other factors at the National and regional level.

A broader vision of the future that includes developing a flexible regional basis for stabilizing wood supplies and a forward looking perspective on wood fiber management, will also allow the Pacific Northwest region to better utilize the opportunity to increase exports to international markets. To achieve this, the forest products industry will need to learn the workings of a different market system and provide more products in the form demanded (Campbell, et al., 1983). In addition, actions by industry, such as modernizing facilities, adopting state-of-the-art technology, reducing costs, and diversifying into other sectors of production, similar to what the southern region of the country has done, could help to rebuild and stabilize the wood-based sectors of the region (Schallau, 1985).

9b. VEGETATION: OLD GROWTH

Old growth is typically thought of as a plant community made up of very large trees and other related vegetation that has no visible evidence of human activities and may be several hundred years old. There are areas of old growth like this on the Wenatchee National Forest. However, characteristics of old growth vary with site potential and much of the forest land on the Wenatchee probably has never supported the awe-inspiring stands commonly equated with old growth. Agreement on a common definition of old growth is difficult to achieve because each individual site has its own potential to produce old stands with characteristics that are unique. However, there are some attributes of old-growth stands that can be addressed in a general way.

The Pacific Northwest Region of the Forest Service defines old-growth forests as having: (1) Mature and overmature trees in the overstory that are well into the mature growth stage; (2) a multi-layered canopy and trees of several age classes; (3) standing dead trees and down materials are present; and (4) evidence of man's activities may be present, but do not significantly alter the other characteristics (Pacific Northwest Regional Guide).

Because there are numerous types of old growth it is not possible to present definitive descriptions for each site. It is possible to present some general characteristics typical of "dry" forested sites and "moist" forested sites. On the Wenatchee, dry forest includes those stands within the ponderosa pine, Douglas-fir, and perhaps the marginal grand fir series sites. Moist sites generally are those characterized at climax by the dominance of Pacific silver fir, western hemlock, grand fir, subalpine fir, and western redcedar. Other marginal forest sites at very high elevation, although "moist" and often dominated at climax by subalpine fir (and other harsh site adapted species), are not described.

From the Forest Service Pacific Northwest Regional Guide:

The dry site stands contain at least 10 mature to overmature trees (21 inches or more in diameter) per acre with ponderosa pine or Douglas-fir representing 75 percent of the overstory canopy. On each acre, a minimum of two standing snags will be present with at least 1.5 tons of down material, including 3 logs.

The moist site stands include both shade tolerant and intolerant tree species. These stands contain at least 15 trees per acre (21 inches or more in diameter), and each acre will have 2 snags with at least 3 tons of down material including 3 logs. Broken-topped trees may be present.

The Forest has completed several old growth surveys. Different criteria were used in each case and there was only a small amount of ground verification. Consequently, the amount of old growth on the Forest can only be estimated. The estimates indicate that there are 319,000 acres of old growth on the Wenatchee National Forest, of which 148,000 acres are in wilderness, 70,000 acres are outside of wilderness but not available or are unsuitable for timber production in existing plans, and 101,000 acres are outside of wilderness but available and suitable for timber production in existing plans.

Most old growth is found in wilderness or unroaded areas. It extends from Rimrock Lake north to Lake Wenatchee in scattered parcels ranging in size from five acres to several thousand acres. Low elevation areas that have been readily accessible to timber harvest historically, have few old-growth stands. Generally, old-growth stands have supported high timber volumes and have often been targeted for harvest. Consequently, the amount of old growth has been in decline for many years.

The future of old growth on the Wenatchee is in debate. Some publics feel that all remaining old growth should be preserved while other publics would like to continue harvest of old-growth stands. The Forest Service realizes the need for the preservation of old growth for biological diversity, wildlife, and plant habitat and for aesthetic reasons. Spotted owls, pileated woodpeck-

ers, and pine martens are management indicator species that require old growth and mature forest habitat. Spotted owl areas will not be harvested and pileated and marten areas will be managed under a long rotation strategy. Other areas will be set aside strictly for the maintenance of diversity, aesthetics, or for species habitat. For the next decade, the wilderness areas, unroaded areas, and the management indicator species areas (especially spotted owl areas) will be where the majority of old growth remains.

9c. VEGETATION: FORAGE

a. Overview

The vegetative types within the Forest environment have evolved through the natural interactions of grazing animals and wildfire occurrence. Fire removed or thinned the tree vegetation while large grazing animals used and modified the resulting forage resource. This interaction has provided a wide diversity of vegetation and wildlife. Grazing of vegetation by large wildlife species such as elk modified the forage. It also retained some types in successional stages beneficial to use by deer, mountain sheep, and many small game and non-game species.

Forage for grazing animals is present throughout the Wenatchee National Forest as a component of all vegetative types. These vegetative types can be combined into the following four zones:

1) Grass-Shrub

The lowest elevation, driest habitat is a combination of vegetative community types with plants such as sagebrush, bitterbrush, and bunchgrasses. Although thought of as a low elevation type, the grass-shrub zone can occur on dry south aspects up to 6,000 feet in elevation. Balsam root, creeping phlox, mariposa, and rock lilies color these open areas in early spring.

2) Dry Forest (Ponderosa Pine/Douglas-fir Climax Forest)

The low elevation, dry non-forest zone gradually changes to the ponderosa pine/Douglas-fir zone with increasing elevation and moisture. A mixed ponderosa and Douglas-fir stand is the most common situation but pure stands of pine or Douglas-fir occur occasionally on small areas. Pinegrass, elk sedge, wheatgrass, ceanothus, bitterbrush, serviceberry, and ocean spray are some of the common understory plants under the older stands.

3) Moist Forest (True Firs, Hemlock, Cedar, and Spruce Climax Forest)

The moist forest zone is characterized by a wide variety of plant species. Douglas-fir and ponderosa pine may be present, but without disturbance it will gradually be replaced by shade tolerant grand fir, silver fir, western hemlock, or western red cedar which are all important components of a typical wet forest habitat. Elk sedge, pinegrass, and many brush species are common understory plants. These plants provide forage primarily after timber harvest or fire removes the tree overstory.

4) Sub-Alpine Parkland and Mountain Meadows

This zone is best known for its wide variety of flowering herbs and forbs. Parklike stands of whitebark pine, Englemann spruce, subalpine fir, and alpine larch adjoin the barren or treeless upper mountain slopes. Many grasses, sedge, and shrub species provide some of the highest producing forage areas on the Forest. However, due to the short snow-free season, they are available to use for only a short duration.

The total annual forage production on the Forest is estimated to be 336,000 tons. One-third, or 112,000 tons, are located on steep slopes and only 10 percent of this production is considered available to wildlife only. Of the remaining 224,000 tons, reductions are made for plant survival and soil and watershed protection. The total amount available to wildlife and livestock is 65,000 tons or 130,000 Animal Unit Months (AUM). An Animal Unit Month is considered one cow with calf grazing for one month, which requires approximately 1,000 pounds or one-half ton of forage. In 1988, there were 20,900 AUMs used by livestock which allowed 109,100 AUMs for wildlife.

b. Livestock Management

The management of rangelands on the Wenatchee National Forest involves the use of livestock as a tool to manage the non-tree vegetation. When the management of range vegetation is approached in this manner, there is a substan-

tial opportunity to use livestock grazing to enhance other resource objectives. Cover and forage can be manipulated to improve habitat for wildlife. Vegetative competition with trees can be reduced, or vegetative cover increased to protect soils and improve watersheds. The relationships between range management and other resources and land uses are discussed in more detail later in this section.

Of the 2,164,180 acres within the Forest, 18.5 percent, or 401,100 acres, is within vegetation types and on slopes suitable for grazing by livestock. There are an additional 500,871 acres outside of wilderness potentially capable of providing livestock forage following silvicultural practices such as regeneration harvests or thinning.

Current inventoried range allotment boundaries do not include all of the available and suitable range resource on the Forest (see Table III-32). There are 40 allotments for cattle and sheep grazing under permits to livestock owners dependent on forage to balance their year-long operation. Another 36 allotments are available to the recreation livestock owners. These inventoried allotments contain approximately 203,500 acres of suitable range, or 51 percent of all suitable range on the Forest. The annual grazing capacity is estimated to be 23,210 Animal Unit Months (AUMs) on the 40 commercial livestock allotments and 4,307 AUMs on the recreation livestock allotments. When grazing opportunities outside these allotments are considered, the total annual grazing capacity for the Forest is estimated to be 37,031 AUMs under existing management strategies. Overall range condition on commercial grazing allotments is considered satisfactory. Most ranges are in good condition. The overall trend in range condition is considered either up (45%) or static, but is not in a downward trend.

Past use by livestock on the Forest was much more extensive than it is today. There is little of the existing suitable range that was not used historically to some extent. The high country provided grazing for sheep in numbers greatly exceeding today's use, while the lower rangelands provided horse and cattle grazing to the hundreds of homesteaders located in or near the Forest boundaries. This heavy use did have an impact on

VEGETATION. FORAGE

the vegetation, soil, and water resources. As grazing was brought under management, the emphasis was to reduce animal numbers and spread out use with salting and herding. At the same time, managers sought to provide the forage to produce red meat and help stabilize the agricultural community.

It has only been in the past 10-15 years that intensive grazing systems have been developed on the Forest using fencing and rotation of use seasons, which has improved the vegetation, soil, and water resources. Most of the real or perceived resource conflicts and competition between grazing and other resources has been a result of past use and management practices. More recently range scientists and resource managers have begun to understand and use livestock as a total resource management tool.

Because of the introduction of intensive management systems there are no problem allotments on the Forest with widespread unacceptable resource damage. A few do have relatively small problem areas where cattle concentrate, resulting in over use, soil compaction, or competition with wildlife. Two examples include the Table Mountain Allotment, where there is some competition for space during elk calving season, and Manastash Allotment where cattle concentrate in the drainage bottoms.

Management practices occurring on the Forest in addition to administration of the permit and allotment management systems include: construction of structural range improvements, control of undesirable plants, and seeding and fertilization of deteriorated rangelands. These practices are necessary to maintain or improve the condition of the forage resource. Existing structural improvements include 112 miles of fence, 152 spring developments with 8 miles of pipeline, 52 cattle-guards, and 7 holding corrals.

TABLE III-32

SUITABLE RANGELANDS 1/ AND ANIMAL UNIT MONTHS AVAILABLE TO LIVESTOCK 2/

	Number of Allotments	Suitable Rangelands (Acres)	Percent of Suitable Rangelands	Percent of Total National Forest Acres	Estimated Livestock Grazing Capacity (AUM)	1988 Actual Use (AUM)	1988 Livestock Numbers
Inventoried Commercial Livestock Allotments (Cattle, Sheep, and Horses)	40	182,742	45 5%	8 4%	23,210	18,499	1,984 Cattle 8,607 Sheep 87 Horses
Inventoried Recreation Livestock Allotments	36	20,719	5 2%	1 0%	4,307	2,377	13,550 Head Recreation Livestock
Sub Total in Allotments	76	203,461	50 7%	9 4%	27,517	20,876	---
Suitable Range Outside Inventoried Allotments and Outside Wilderness	---	197,639	49 3%	9 1%	9,514	---	---
Total Forest	76	3/ 401,100	100 0%	18 5%	37,031	20,876	---

1/ Suitable Rangelands are those areas currently producing forage suitable for livestock use on lands less than 60 percent slope.

2/ Animal Unit Month capacities are for livestock only Total production in pounds per acre have been reduced to reflect needs of wildlife, soil, and watershed protection, in addition to the plant needs

3/ There are an additional 500,871 acres outside of wilderness that have potential to contribute to the suitable rangeland base after timber has been harvested

c. Livestock Forage Demand and Supply

Assumptions and methodology of projecting future demand are contained in the 1985 Draft RPA Assessment. The demand for range grazing nationally is projected to increase above current levels. In the Pacific Northwest, the demand is expected to increase 50 percent by the year 2000 (Pacific Northwest Regional Guide). The "Wenatchee National Forest Socioeconomic Overview" discusses the difficulty of projecting demand due to past variability of the livestock industry. However, it estimates the demand for grazing on the Forest will increase one to two percent per year over the next ten years. Although estimates of the amount of increase in demand may vary by source document, all agree that there will be an increase in demand for livestock forage from all sources, including grazing from National Forest lands.

Applications for grazing cattle on the Forest is expected to be higher than the supply. Permitted use, however, is expected to remain below the biological potential because:

- (1) Twenty to 30 percent of the potential is sheep range which is unsuited to cattle and significant increases in sheep grazing are not expected.
- (2) A high investment is required by both the permittee and the Forest Service before the forage can be made available for use by cattle.
- (3) There is a high potential for increased grazing capacities on private range lands.

Demand for cattle grazing is expected to be greater than the one to two percent projected increase, particularly after the first decade.

The demand for sheep forage is more difficult to project. National demand is down and this trend is expected to continue indefinitely. Locally permitted numbers on the Forest have fluctuated year to year over the past six years. Based on the Five Year Grazing Statistical Report, sheep numbers were down slightly between 1975 through 1980. However, numbers for 1984 were higher than the 1975 level. The demand for sheep grazing on the Forest is expected to remain at or slightly above current levels for the next ten years.

The most extensive range grazing opportunities are on the more than one million acres of private range and pasture land in Chelan, Kittitas, and Yakima Counties. The 2,990 head of cattle permitted to graze on National Forest lands represent less than 2 percent of the number of head tallied in the 1982 Census of Agriculture Preliminary Reports for those Counties. The 8,800 sheep represent approximately one half of the total tri-county sheep population.

The total permitted grazing use is not expected to exceed 36,000 AUMs annually by the fifth decade. A 2,000 - 4,000 AUM increase per decade over the next five decades is anticipated.

There have been between 15,100 and 20,500 Animal Unit Months actually grazed on the Forest over the past 5 years. The forage for livestock is provided from suitable rangelands through grazing permits to 37 local livestock owners. These permittees are dependent on the forage for spring, summer, and/or fall grazing to balance their year-long operations. Although the Forest grazing represents less than two percent of the number of head grazing in the three county area, the privilege to graze is important to the individual permittees. To many of these permittees, grazing provided by the Forest represents all or most of the grazing resource they have available and loss of this resource would force many of them out of business.

Supply is expected to exceed permitted use through five decades which will allow resolution of resource conflicts, and also offer an opportunity to utilize livestock to enhance other resource objectives. Intensively managed livestock will be used to improve and increase wildlife forage. Reforestation problems with competing vegetation will be reduced through use of grazing management systems, while timber management on commercial forest land will contribute to the livestock forage base (transitory range).

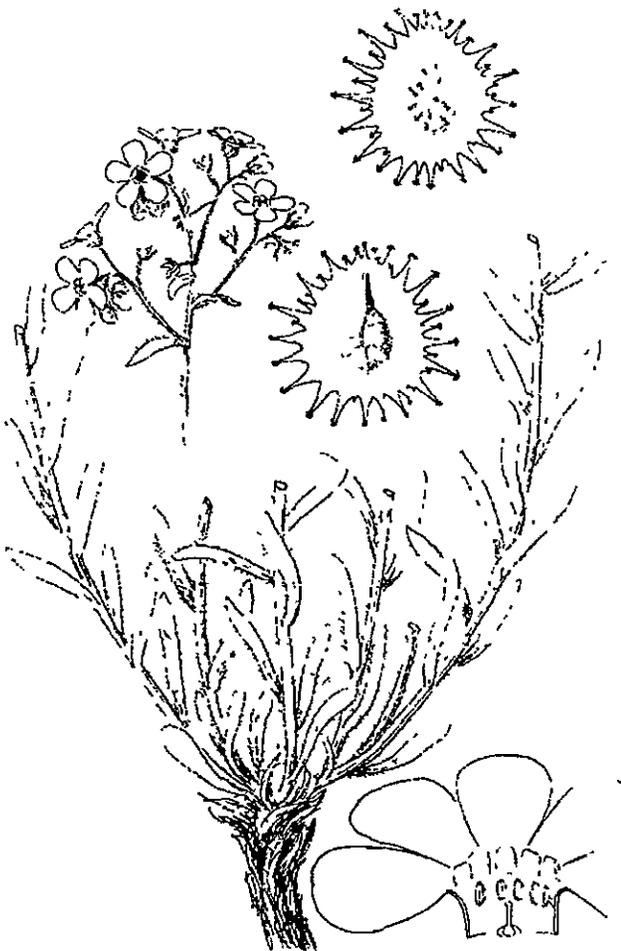
There are threats and hazards that have the potential to diminish the supply or reduce the quality of the range resource. These include the occurrence and invasion of undesirable plants and insects and funding levels less than necessary to implement and monitor high quality resource management systems.

9d. VEGETATION: UNIQUE ECOSYSTEMS

The Tumwater Botanical Area was established under Regulation T-9(I) on June 10, 1938, for the protection of the plant Lewisia tweedyi. The 1,104 acres was redesignated in 1971 as a Botanical Area under 36 CFR 251.22 to be managed in a near natural condition to protect plant species which occur there.

Although the area is located along a major highway, it is rather inaccessible due to the steep, rugged terrain. It is usually visited only by people who wish to view or study the Lewisia tweedyi. The area lays within sections 28 and 34, T.25N., R.17E., and is approximately four miles north of Leavenworth, Washington, in the Tumwater Canyon.

The objective of the botanical area is to maintain a natural ecosystem. This precludes activities such as timber harvest, heavy recreation use, prescribed fire, and grazing.



9e. VEGETATION: SENSITIVE PLANTS

The Forest has a large variety of unique plant species. These species represent habitats and plant communities which have developed as a result of various geological processes. The Wenatchee Mountains, in the upper reaches of the Teanaway drainage, have the most extensive serpentine outcrops in Washington. These serpentine soils support unique plant life that is different than other soils.

Also, portions of the Forest along the east and southern margins were not affected by the continental ice sheet. In these areas mountain tops and some valleys escaped glaciation. As a result, one of the highest concentrations of unique endemic plants in Washington occur in the mountains near Wenatchee.

There are no known Federally listed threatened or endangered plant species on the Forest.

There are 34 plant species on the Forest that are on the Region 6 sensitive plant list (Table III-33). Of the 34 species, 4 are candidates for Federal listing and the remaining 30 are listed by the State of Washington. The extent of the populations of these species on the Forest is unknown.

Before a project is initiated, inventories for populations and distribution of threatened, endangered, and sensitive species will be conducted on a priority basis.

TABLE III-33
SPECIAL PLANT SPECIES IN THE WENATCHEE N.F.

LIST OF SENSITIVE SPECIES

Date Last Revised 5/23/88

PLANTS

<u>Scientific Name</u> common name	Status 1/	Occurrence 1/
<u>Agoseris elata</u> tall agoseris	RF - S	D
<u>Anemone nuttalliana</u> pasque flower	RF - S	D
<u>Astragalus arrectus</u> Palouse milkvetch	RF - S	D
<u>Antennaria parvifolia</u> Nuttall's pussy-toes	RF - S	D
<u>Botrychium lunaria</u> lance-leaved grape-fern	RF - S	S
<u>Botrychium minganense</u> Victorin's grape-fern	RF - S	D
<u>Botrychium montanum</u> mountain moonwort	RF - S	D
<u>Calamagrostis tweedyi</u> Cascade reedgrass	Cat. 2	D
<u>Carex bauxbaumii</u> Bauxbaum sedge	RF - S	D
<u>Carex camosa</u> bristly sedge	RF - S	D
<u>Carex interrupta</u> green-fruited sedge	Cat. 3c	D
<u>Carex macrochaeta</u> large-awn sedge	RF - S	S
<u>Carex proposita</u> smokey mountain sedge	RF - S	D
<u>Carex scopulorum</u> var. <u>pronophylla</u> saw-leaved sedge	RF - S	D
<u>Cicuta bulbifera</u> bulb-bearing water hemlock	RF - S	D
<u>Chaenactis ramosa</u> branching chaenactis	Cat. 3c	D
<u>Chaenactis thompsonii</u> Thompson's chaenactis	Cat. 3c	D
<u>Cryptogramma stelleri</u> Stellar's rock-brake	RF - S	D
<u>Cypripedium calceolus</u> var. <u>parviflorum</u> yellow ladyslipper	RF - S	S
<u>Cypripedium fasciculatum</u> clustered ladyslipper	Cat. 3c	D
<u>Delphinium viridescens</u> Wenatchee larkspur	Cat. 1	D

TABLE III-33 (continued)
SPECIAL PLANT SPECIES IN THE WENATCHEE N.F.

LIST OF SENSITIVE SPECIES

PLANTS			
<u>Scientific Name</u>		Status 1/	Occurrence 1/
common name			
<u>Eleocharis atropurpurea</u>		RF - S	S
purple spike-rush			
<u>Epipactis gigantea</u>		RF - S	D
giant helleborine			
<u>Erithrichium nanum</u> var. <u>elongatum</u>		RF - S	D
pale alpine forget-me-not			
<u>Gentiana douglasiana</u>		RF - S	S
swamp gentian			
<u>Geum rossii</u> var. <u>depressum</u>		RF - S	D
Ross' avens			
<u>Githopsis specularioides</u>		RF - S	D
common bluecup			
<u>Hackelia hispida</u> var. <u>disjuncta</u>		RF - S	D
rough stickseed			
<u>Hackelia venusta</u>		Cat. 2	D
showy stickseed			
<u>Iliamna longisepala</u>		RF - S	D
longsepal globemallow			
<u>Limosella acaulis</u>		RF - S	S
southern mudwort			
<u>Mimulus suksdorfii</u>		RF - S	S
Suksdorf's monkey flower			
<u>Nicotiana attenuata</u>		RF - S	D
wild tobacco			
<u>Orobanche pinorum</u>		RF - S	D
pine broomrape			
<u>Oryzopsis hendersonii</u>		RF - S	S
Henderson ricegrass			
<u>Pellaea brachyptera</u>		RF - S	D
Sierra cliff-brake			
<u>Pellaea breweri</u>		RF - S	D
Brewer's cliff-brake			
<u>Pedicularis rainierensis</u>		RF - S	D
Mt. Rainier lousewort			
<u>Petrophytum cinerascens</u>		Cat. 2	S
Chelan rockmat			
<u>Platanthera sparsiflora</u>		RF - S	D
Canyon bog-orchid			
<u>Poa nervosa</u> var. <u>nervosa</u>		RF - S	S
Wheeler bluegrass			
<u>Ribes irriguum</u>		RF - S	S
Idaho gooseberry			
<u>Salix vestita</u> var. <u>erecta</u>		RF - S	D
rock willow			

TABLE III-33 (continued)
SPECIAL PLANT SPECIES IN THE WENATCHEE N.F.

LIST OF SENSITIVE SPECIES

PLANTS

<u>Scientific Name</u> common name	Status 1/	Occurrence 1/
<u>Saxifraga debilis</u> pygmy saxifrage	RF - S	D
<u>Saxifraga integrifolia</u> var. <u>apetala</u> swamp saxifrage	RF - S	D
<u>Sidalcea oregana</u> var. <u>calva</u> Wenatchee checker-mallow	Cat. 2	D
<u>Silene seelyi</u> Seely's silene	Cat. 2	D
<u>Spiranthes romanzoffiana</u> var. <u>porrifolia</u> western ladies-tresses	RF - S	D
<u>Tillaea aquatica</u> pigmy-weed	RF - S	S
<u>Trifolium thompsonii</u> Thompson's clover	Cat. 2	D

1/ Key to Abbreviations Used Above

Federal Candidate Species

Cat. 1 = Category 1 Species (US Fish and Wildlife Service has enough information to support the appropriateness of proposing the species to the list of Endangered or Threatened species)

Cat. 2 = Category 2 Species (Needs further information to confirm the appropriateness of proposing the species to the list of Endangered or Threatened species)

Cat. 3 = Category 3 Species (No longer being considered for listing as Endangered or Threatened and are not regarded as candidate species:

a. Taxon extinct

b. Not a taxonomic entity

c. Taxon more abundant and/or widespread than previously thought and/or not subject to any identifiable threat)

RF - S = Regional Forester Sensitive Species

D = Documented occurrence

S = Suspected occurrence

9f. VEGETATION: RESEARCH NATURAL AREAS

Research Natural Areas (RNA's) are part of a Federal system of such tracts established for non-manipulative research and educational purposes. Each RNA is a site where some features are preserved for scientific purposes and natural processes are allowed to dominate. Their main purposes are to provide: (1) baseline areas against which effects of human activities can be measured; (2) sites for study of natural processes in undisturbed ecosystems; and (3) gene pool preserves for all types or organisms, especially those which are classified as rare and endangered types.

Prior to establishment, a comprehensive formal report is made. For RNAs proposed on National Forest System lands, the report is submitted to the Chief of the Forest Service for approval.

Established RNAs

There are two established RNAs on the Forest. Meeks Table RNA on the Naches Ranger District is 64 acres in area and represents the ponderosa pine/pine grass plant community with a co-dominance of Douglas-fir. It was established on July 7, 1948, and is now within the William O. Douglas Wilderness.

Thompson Clover RNA located in Swakane Canyon on the Entiat Ranger District is 276 acres in size and exemplifies a plant community characterized by Thompson clover. It was established on February 17, 1977.

Formally Proposed RNAs

The Research Natural Area Committee for the Pacific Northwest has formally proposed two additional RNA's. Eldorado Creek located in the Teanaway drainage of the Cle Elum Ranger District is 1,336 acres in size and represents a plant community found on serpentine soils. The Eldorado Creek area was designated as a Special Area (Proposed RNA) in the Alpine Lakes Management Plan (November 2, 1981).

Fish Lake Bog on the Lake Wenatchee Ranger District is a 106 acre area on the west end of Fish Lake near Lake Wenatchee. This represents a floating bog community.

Preliminary reports have been made for both of these areas, Fish Lake Bog on July 5, 1979, and Eldorado Creek on August 9, 1972. A supplemental report on the mineral character of the proposed Eldorado Creek RNA was made on November 6, 1974.

Recommended RNAs

The Research Natural Area Committee for the Pacific Northwest Region determined that the candidate RNAs listed in Table III-34 represent the best examples of particular kinds of natural ecosystems in the Region and are needed to meet present and future demands. There may be some future RNA needs that can best be satisfied on the Wenatchee National Forest. When suitable new areas are identified, they will be considered for addition to the Research Natural Area inventory.

TABLE III-34
RECOMMENDED RESEARCH NATURAL AREAS
1984

Name	Area (Acres)	Location (District)	Plant Community Exemplified
* 1. Cedar Creek	2205	Naches	Mixed old-growth conifer/shrub forest and Pacific silver fir forest.
** 2. Icicle/Frosty Creek	784	Leavenworth	Western red cedar/western hemlock forest.
** 3. Chiwaukum Creek	1124	Leavenworth	Grand fir mixed old-growth conifer/shrub
4. Drop Creek	530	Cle Elum	Englemann Spruce/Subalpine fir forest
* Within the William O. Douglas Wilderness		** Within Alpine Lakes Wilderness	

Steps in Establishment of RNA's:

1. R-6 Research Natural Area Committee working in conjunction with the Washington Natural Heritage Plan (Department of Natural Resources, 1985) identifies the need for a site representing a specific natural ecosystem.
2. This committee then works with the area ecologist and ranger district personnel to identify several potential representative sites.
3. The committee visit and evaluates the sites and narrows the list down to the most representative site.
4. This site is then recommended through the Forest Plan for establishment as an RNA.
5. If the area is allocated as a proposed RNA by the alternative in the Forest Plan which is implemented, then an establishment report is developed. In the past, ranger district personnel have worked with personnel from the Pacific Northwest Forest and Range Experiment Station in the development of this report.

6. The approval procedure for an RNA Establishment Report is as follows:

- District Ranger - Review and Recommend
- Forest Supervisor - Review and Recommend
- Pacific Northwest Station Director - Review and Recommend
- Regional Forester - Review and Recommend
- Director of Division of Recreation - Review and Recommend
- Deputy Chief of Research - Review and Recommend
- Chief, U.S. Forest Service - Approve

7. Upon approval by the Chief, the area is designated as a Research Natural Area and will be managed accordingly.

**9g. VEGETATION: ENTIAT
EXPERIMENTAL FOREST**

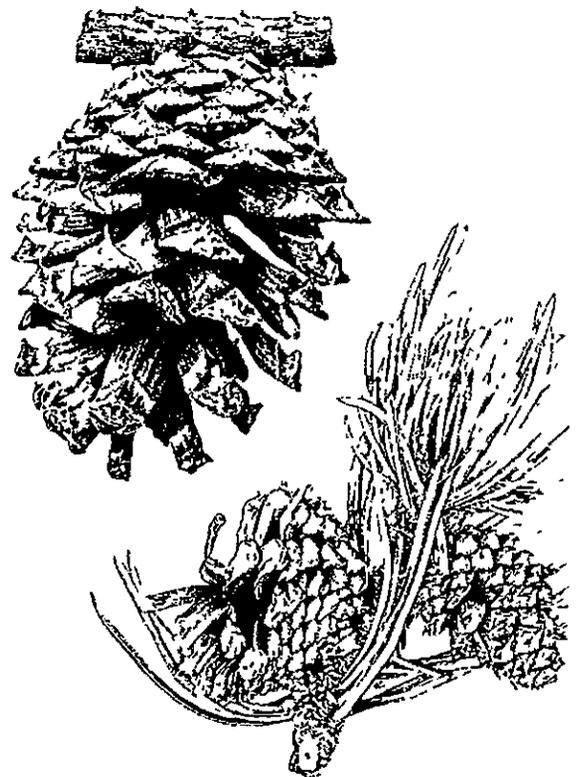
The Entiat Experimental Forest includes 4,770 acres of forest lands located within the Entiat River drainage northwest of Wenatchee, Washington. Research has been conducted on the area since 1957; in 1971, it was formally designated as an Experimental Forest. The Pacific Northwest Forest and Range Experiment Station and the Wenatchee National Forest cooperatively administer the area with the primary goal of providing opportunities for studying the effects of forest management and fire on vegetation, soil, and water resources. The area was selected as being representative of steep, forested watersheds occurring along the east slope of the Cascades. It consists of three similar, contiguous watersheds ranging in size from 1,168 acres to 1,393 acres and in elevation from 1,800 feet to 7,000 feet. Mean slope is 50 percent ranging up to 90 percent.

Geology, soils, climate, and vegetation in the Experimental Forest are representative of the surrounding Wenatchee National Forest. Parent materials are granitic with much evidence of glaciation at lower elevations. Overlying deposits of volcanic ash and pumice from Glacier Peak eruptions have significantly influenced soil development. Climate is characterized by moderately cold, wet winters and hot, dry summers. Precipitation averages 22 inches, occurring mainly as snow between November and May.

A major wildfire which burned most of the area in 1970 has had a dramatic impact on Forest vegetation. Pre-fire vegetation was primarily undisturbed, mature forest with small, subalpine grass-forb openings and bare rock. About 75 percent of the forest was classed as ponderosa pine, with Douglas-fir the main associated species. Thickets of dense lodgepole pine occurred on wetter sites at higher elevations. Important understory species included bitterbrush, snowbrush ceanothus, pinegrass, and numerous forbs. Fifteen years after the fire, the vegetation consists of a mosaic of shrub fields intermixed with planted pine and fir, and dense, young stands of naturally-established lodgepole pine. Scattered remnants of unburned old-growth forest occur on rocky ridges and outcrops.

The original research plan for the experimental watersheds was to develop baseline information on climate and hydrology under natural conditions, then test for changes following the construction of roads and implementation of several timber harvest practices. The collection of this information and the preparation of harvest plans were nearly complete when the watersheds burned.

Fire is a common occurrence in this forest, hence research objectives were quickly changed to utilize the preburn data to evaluate effects of fire on the environment and the alteration of those effects by the re-establishment of forest vegetation. Initial postfire studies provided land managers, resource specialists, and scientists with a better understanding of: the hydrologic response of burned watershed including water yield and physical water quality, chemical water quality and site productivity in response to wildfire and erosion control fertilization; natural vegetation recovery and the effectiveness of erosion control seeding and fertilization treatments; soil and water responses to several methods of timber salvage; and effects of a large wildfire on local and regional economics.



10. WATER

a. Overview

The Wenatchee National Forest is an extremely important source of high quality water for all types of uses. The water produced on the Forest maintains components of the natural ecosystem, including vegetation, fish, and wildlife. Water also serves the administrative needs of the Forest Service and is used both on and off Forest for domestic, municipal and industrial purposes, stock watering, irrigation, power generation, and recreation.

The majority of the Forest lies within four sub-basins of the Columbia River Basin: the Chelan, Entiat, Wenatchee, and Yakima Rivers. There are an estimated 3,600 miles of perennial streams on the Forest, with 806 miles and 963 miles of Class I and II streams, respectively. The Forest contains hundreds of lakes, ponds, and springs that receive a variety of uses. There are an estimated 57,000 acres of lakes and reservoirs on the Forest. The following table lists the 25 major watersheds on the Forest and the sub-basins to which they belong.

**TABLE III-35
WATERSHEDS OF THE WENATCHEE NATIONAL FOREST**

SUB-BASIN	WATERSHED	TOTAL ACRES	PRIVATE ACRES	WILDERNESS ACRES (NET)
Chelan	Stehekin River	91,097	0	91,097
Chelan	Lake Chelan	285,079	7,462	110,517
Entiat	Entiat River	174,202	9,095	25,398
Wenatchee	Chiwawa River	119,188	4,918	37,652
Wenatchee	White, Little Wenatchee R.	173,354	5,745	105,407
Wenatchee	Nason Creek	68,752	14,904	19,335
Wenatchee	Wenatchee River	160,676	45,771	30,337
Entiat	Mad River	61,035	5,851	0
Wenatchee	Icicle Creek	135,236	16,939	100,701
Yakima	Cle Elum River	126,650	24,762	56,393
Yakima	Upper Yakima River	128,282	51,962	14,056
Yakima	Teanaway River	78,420	14,840	0
Wenatchee	Peshastin Creek	78,992	14,459	23,129
Wenatchee	Mission Creek	40,959	3,201	0
Columbia River	Columbia R. Minor Tribs.	44,245	7,081	0
Yakima	Swauk-Naneum Creeks	81,748	8,183	0
Yakima	Manastash-Taneum Creeks	54,485	19,038	0
Yakima	Little Naches River	94,023	11,151	22,112
Yakima	American River	50,838	212	39,708
Yakima	Bumping River	71,529	148	53,743
Yakima	Naches River Minor Tribs.	74,413	8,353	0
Yakima	Wenas Creek	11,109	3,010	0
Yakima	Rattlesnake Creek	75,430	0	48,972
Yakima	Upper Tieton River	122,347	6,551	52,937
Yakima	Lower Tieton River	55,290	9,964	6,296

b. Supply

The Forest annually contributes approximately 4.455 million acre-feet of high quality water to area streams, rivers, lakes, reservoirs, and ground-water aquifers. Runoff is orderly in most years with two annual peak flows--the highest in late May and a secondary peak in July. Maximum peak flood volumes historically occur in December, often associated with temperature inversions and rain-on-snow events.

Unregulated runoff during low flow periods is sustained by the gradual melting of the winter snow pack. Since a high percentage of the Forest's terrain averages greater than 3,500 feet in elevation, there is a significant contribution from melting snows throughout the summer.

Water benefits and utilization are enhanced through regulation facilities such as reservoirs operated by the Bureau of Reclamation. Summer streamflows are enhanced in several areas on the Forest through releases of stored water from six major reservoirs for irrigation and power production. Table III-36 lists these six reservoirs and their usable storage capacity. The mean annual storage for these impoundments over the 10 year period between 1967 and 1977 was 1,360,800 acre feet.

Water yield increases result from vegetation manipulation, such as timber harvest. However, these increases are only temporary unless the land use changes, as with a conversion of timber to pasture land. Yield increases due to timber harvesting are masked by the large magnitude and variability of natural water yield.

TABLE III-36

RESERVOIRS AND THEIR CAPACITY

Reservoirs	Sub-Basin	Usable Capacity (1000 Acre Feet)
Keechelus Lake	Yakima	157.8
Kachess Lake	Yakima	239.0
Lake Cle Elum	Yakima	436.9
Bumping Lake	Yakima	33.7
Rimrock Lake	Yakima	198.0
Lake Chelan	Chelan	676.1
	Total	1,741.5

Sampling of water quality to monitor background levels and effects of management activities began on the Forest in 1966. Monitoring of the Forest's 25 major watersheds between 1967-1980 involved nearly 20,000 samples. The water quality data in Table III-37 are the results of baseline and some project level monitoring between 1967 and 1980. The tabulation is a cross section of the water quality data collected throughout the Forest over this 13 year period. Several key parameters representing Class AA Washington State Water Quality Standards have been listed.

Mean values in the table suggest that the Forest has been complying with State Water Quality Standards; however, values describing the range indicate some measurements lying outside of these Standards. Refer to the Forest Water Quality Data Summary (in preparation) for details regarding the values and ranges displayed in this table. The Forest's water quality data base is located in STORET, a computerized data base system maintained by the U.S. Environmental Protection Agency (EPA).

The goal of project planning and implementation on the Forest has been to meet or exceed standards set forth in the State's Forest Practices Act.

Regional recertification of Forest Service management practices is needed in order to evaluate compliance of these practices with the recent major revisions of the Washington State Forest Practices Rules and Regulations.

The U.S. Environmental Protection Agency (EPA) and the U.S. Forest Service sampled twenty-seven lakes on the Wenatchee National Forest during the fall of 1985. Twenty-two of the lakes were within designated wilderness areas. The survey on the Wenatchee is part of the National Surface Water Survey, which is an effort to evaluate the extent of aquatic resources sensitive to acidic deposition. It will also assess the environmental effects on these resources. Results are being used to describe, by extrapolation, the overall status of lakes within each potentially sensitive region of the United States. This determination will establish a baseline from which future trends can be monitored on both a Regional and Forest perspective.

The Forest Watershed Improvement Program is designed to improve conditions in degraded areas. Refer to the discussion of this program under the soil resource section of this chapter for further details.

**TABLE III-37
WENATCHEE NATIONAL FOREST WATER QUALITY DATA 5/**

No. of Samples	Parameter	Mean Value	Maximum Value	Minimum Value	Washington State Water Quality Stds.
2,806	Water temperature	48.6°F	79°F	32.0°F	60.8°F shall not be exceeded due to mgmt. activity.
843	Air temperature	59.4°F	91°F	6.0°F	-----
3,132	Turbidity 1/	1.12	990	.05	5 NTU over bkgd.
1,369	Conductivity 2/	102	956	6.0	-----
445	Dissolved Oxygen 3/	11.12	17.0	7.1	9.5 (minimum)
1,669	pH	7.34	11.0	5.0	6.5-8.5
1,026	Fecal Coliform 4/	31.99	2400	0.00	50 (maximum)

1/ Nephelometric Turbidity Units

2/ Micro-ohms

3/ Milligram/liter

4/ Organisms per 100 milliliters

5/ Values in this table reflect the water and temperature conditions at the time of sampling. Refer to the Forest Water Quality Data Summary (in preparation) for details regarding the values and ranges displayed in this table

c. Demand

Water has a primary importance for all types of uses, both on and off the Forest. The water on the Forest is essential for maintaining components of natural ecosystems, including vegetation, fish, and wildlife. High water quality is important for a healthy aquatic environment necessary for maintaining populations of resident and anadromous fish on the Forest. Many streams on the Forest are used by salmon and steelhead to complete their life cycle.

Many recreational activities such as fishing, boating, camping, and sight-seeing, are directly, or indirectly, water-based. Streams and lakes on the Forest are heavily used for sport fishing. The Cascades are famous for the aesthetic qualities of clean, clear, mountain streams and lake. Maintaining these qualities is what the public expects.

When it comes to irrigated agriculture, water is "king." Forest watersheds provide 95 percent of the water used for irrigation and domestic water systems in Chelan, Kittitas, and Yakima Counties. This region has a long growing season with productive soils upon which many potentially valuable crops are grown.

The downstream use of water flowing from the Forest has continued to increase dramatically over the past two decades. The Yakima Basin irrigators diverted 2.4 million acre-feet of water to produce a crop value of \$234,500,000 from 225,225 acres in 1981. (Source: 1981, Crop Production Reports--Yakima and Columbia Basin, Bureau of Reclamation).

Existing and foreseeable water shortages in the lower Yakima River are being identified through the on-going water rights adjudication in that sub-basin. It is improbable that potential irrigation water requirements on the Yakima Indian Nation Lands will be met with existing water storage facilities. Additional storage development would be required to produce an additional 200,000 acre-feet annually. Most of this development would occur on the Forest, affecting a wide range of other resources.

Forest watersheds provide domestic water for cities, small communities, organization sites, special use summer homes, and recreation areas. Municipal watersheds on the Forest are managed for the

complete range of multiple use activities. Water flowing from these drainages must be suitable for domestic use with cost effective treatment procedures. The public expects clean water from the Forest and management activities are directed toward supplying these needs.

In most cases, the application of multiple-use management will provide the needed protection of water quality in municipal watersheds without the use of agreements. The Forest has been negotiating with the City of Roslyn to reach a mutual land management philosophy on the Domerie Creek Watershed. Currently, neither a formal nor an informal agreement has been executed by either party. An executive order was issued by President Harding in 1923 to protect those lands lying within the Rattlesnake and Little Rattlesnake Watersheds for the water supply of the City of Yakima.

Instream flows within the National Forest boundary have not been a critical issue. The Forest currently has sufficient stream discharge flowing from unregulated water sources so that requirements for instream or minimum flows on the Forest are not anticipated in the short term.

There has been some concern regarding the potential impact of proposed small hydroelectric projects. These may reduce streamflows to a volume that could adversely affect channel maintenance processes and aquatic habitat. The Forest monitors this potential situation through the environmental analysis process for specific proposals in cooperation with other State and Federal agencies. This coordination also exists when support is needed to assure adequate flows to support anadromous fish passage.

Prior to the mid-1970's, the Forest Service enjoyed reserved water rights for all Forest-oriented water uses under the long standing Reservation Principle. A Supreme Court decision changed this unencumbered right, restricting reserved water privileges to those uses necessary for timber management activities and watershed protection.

Current Forest resource management activities require water use at nearly 825 designated points of use. All non-Reserved Forest water uses have Certificates of Water Rights or have applications pending with Washington State's Department of Ecology.

d. Cumulative Effects

Cumulative effects are the impacts resulting from a series of management activities occurring within a defined watershed over a span of time. These "activities" could be nearly any kind of project on any land, regardless of ownership. The current primary issue regarding cumulative effects on water is the potential impact of timber harvest and road construction occurring in drainages of mixed ownership. There can also be cumulative effects in drainages of solid National Forest System lands, as well as effects felt downstream of the Forest boundary.

In "checkerboard" ownership areas within the Forest boundary, the private landowners are generally large, industrial forest companies. State ownership is the Washington Department of Wildlife and the Department of Natural Resources. The principal owners of private lands are Burlington Northern Railroad (Plum Creek Timber Company), Longview Fibre Company and Boise Cascade Corporation. These landowners manage their lands primarily for the production of timber. Their management goals can dictate a much faster rate of harvest of the existing mature timber than is occurring on the adjacent National Forest lands.

TABLE III-38

CUMULATIVE EFFECTS ON WATER WITHIN DIFFERENT SUB-BASINS OF THE WENATCHEE NATIONAL FOREST

EFFECTS OF MANAGEMENT ACTIVITIES ON THE FOLLOWING	SUB-BASINS			
	CHELAN	ENTIAT	WENATCHEE	YAKIMA
Water Temperature				
National Forest	None Known	Possible 2a/	None Known	None Known
W/Intermingled Owners	None Known	None Known	None Known	Possible 4a/
Off-Forest (downstream)	None Known	None Known	None Known	None Known
Accelerated Delivered Sediment				
National Forest	None Known	None Known	None Known	None Known
W/Intermingled Owners	None Known	None Known	Possible 3a/	Yes 4b/
Off-Forest (downstream)	None Known	None Known	Possible 3a/	Possible 4c/
Heavy Metals and Toxic Wastes				
National Forest	None Known	None Known	None Known	None Known
W/Intermingled Owners	None Known	None Known	None Known	None Known
Off-Forest (downstream)	Possible 1/	None Known	None Known	Possible 4d/
Turbidity (Accelerated)				
National Forest	None Known	None Known	None Known	None Known
W/Intermingled Owners	None Known	None Known	None Known	None Known
Off-Forest (downstream)	None Known	None Known	None Known	None Known
Timing of Runoff				
National Forest	None Known	Yes 2b/	None Known	Possible 3b/
W/Intermingled Owners	None Known	None Known	Possible 3b/	Possible 3b/
Off-Forest (downstream)	None Known	Yes 2b/	None Known	None Known
Instream Flows				
National Forest	None Known	None Known	None Known	None Known
W/Intermingled Owners	None Known	None Known	None Known	None Known
Off-Forest (downstream)	None Known	None Known	None Known	None Known

At present the management objective of the two largest landowners within the Forest (Plum Creek and Longview Fibre) is to harvest their old growth timber in the next 10 years. Harvest of these "checkerboard" lands is currently in progress with current or potential cumulative effects on certain watersheds already identified. Neither the Forest nor any state agency has jurisdiction over the rate of harvest of these private lands within any given watershed as long as State standards are being met.

Table III-38 briefly addresses the cumulative effects topic within the four major sub-basins on the Forest. The matrix shows whether there has been, is, or may be in the future a cumulative effect due to more harvest activity. Where "none known" is written in the matrix it is considered that no known cumulative effects exist. Where any other statement is listed, a brief discussion of the situation is provided in a numbered section in the following narrative. Refer to the cumulative effects sections for the soil and fish habitat resources in this chapter for additional information.

Description of Effects Indicated in Matrix

1. Mining operations occurred within the Railroad Creek drainage between 1938 and 1957. During this 20-year period, piles containing millions of cubic yards of mine tailings were deposited on National Forest lands. The mine tailings cover approximately 80 acres adjacent to Railroad and Copper Creeks.

Water quality monitoring in Railroad Creek was ongoing from the early 1970's through 1981. The tailings contain some very toxic levels of arsenic, copper, lead, zinc, and cyanide. In addition, the possibility exists that a major flood event could cause the scouring and undercutting of the tailings and subsequent bank slough and erosion of these materials directly into Railroad Creek. A major rehabilitation effort is currently underway at this site.

2a. In the early 1970's, hot wildfires burned large portions of the Entiat watershed. Riparian vegetation has been slow to reestablish on certain tributaries. Water temperatures during low flow conditions on these tributaries have been affected. No formal water quality sampling has been done since 1977. No significant temperature problem is currently known to exist in the Entiat River itself because of the small volume of flow contributed by tributaries affected by the fires.

2b. The Entiat River basin is suspected of having had its flow regime changed because of the large wildfires in the early 1970's. Watershed condition in the affected tributaries has improved since this disturbance, and no significant problem with runoff timing is thought to exist at this time.

3a. The Wenatchee River basin may have a problem with accelerated sediment delivery because of the impacts of timber harvest and road construction in intermingled ownerships. This is primarily a concern in specific sub-drainages of the Wenatchee River. For example, Mission Creek has long been a management concern due to its high percentage of sensitive soils and sediment contributions to the mainstem.

3b. Timing of runoff may be affected by timber removal. The possible runoff effect was identified because of the past and future logging in the Upper Yakima River basin on Plum Creek Timber land, and in the Wenatchee River basin on Longview Fibre's Company land in conjunction with logging activities on the Forest.

4a. Cabin, Log, and Meadow Creeks, in the upper part of the Yakima drainage, have been heavily logged down to the stream channels. Major flood events triggered by rain-on-snow have also contributed to the removal of riparian vegetation. As a result, streamside shade has been significantly reduced along major sections of these stream channels. Warm water temperature during low flow periods could be a problem; however, no current water temperature data exists for these tributaries.

4b. An accelerated sedimentation problem currently exists in Cabin, Log, and Meadow Creeks in the upper part of the Yakima drainage. These channels are still in a condition that promotes sediment delivery.

There are a lot of intermingled private lands in the northern half of the Little Naches drainage. Both Plum Creek Timber Company and the Forest Service are currently logging in this area. The potential for a cumulative effect on sediment yield exists due to the erodibility of some of the soil types in the area, the stability of some of the landforms in the area, and the rate of harvest on private lands in conjunction with activities on National Forest System lands.

4c. Based on the level of activity on lands of all ownerships in this drainage, the potential exists for downstream damage from a major flood event.

4d. No problem currently exists but many mining claims are active on a small scale in the Yakima Basin. If a major strike was made, or if the many small claims were consolidated, a toxic by-product of gold processing (such as from cyanide treatment) could cause concern in the future.

Mercury claims also exist in the Wildcat watershed of the Tieton Basin. Toxic by-products of recovery could possibly be a problem in the future if large scale mining and mercury extraction processes were used.

11. SOILS

a. Overview

The National Forest Management Act of 1976 (NFMA) requires the Forest Service to maintain or enhance soil productivity. Soil is a basic environmental component. It is essentially a non-renewable resource, because soil formation occurs very slowly over long periods of time. Soil loss or damage (e.g., erosion, compaction) can have a significant effect on soil productivity, thus minimizing these kinds of impacts is essential.

One of the more important roles of forest soils is their ability to absorb and store water, then release it slowly over time. The slow release of stored soil water is especially important for late summer stream flows, which can affect fish habitat, as well as the availability of water for irrigation and other uses.

The Wenatchee National Forest is a large forest and has within its boundary more than 200 different kinds of soils (see: "Soil Resource," Snoqualmie National Forest (Eastside), published in April 1973; and "Soil Resource Inventory" (SRI), Wenatchee National Forest, published in 1976). Soil formation is dependent on five factors: parent material; topography; climate; organisms; and time. The reason that the Forest has so many different kinds of soils is because it has a wide range of parent materials (more than 30 different geologic formations), wide ranges in elevations (800 to 9,500+ feet), wide ranges in precipitation (9-120+ inches), dramatic topographic variations, several different sets of transported (ice, water, wind) soils, and finally a range in time during which soil formation has been taking place.

The Soil Resource Inventories (SRI's) are reconnaissance type surveys, intended for broad planning purposes (e.g. The Forest Plan). They have been used in planning to identify unstable soil areas, as well as some soils that could have regeneration problems. Soil information was also used to some degree in the development of the management prescriptions for the Forest Plan.

Reconnaissance type surveys are not detailed enough for project level work. Therefore, the Forest entered into a cooperative soil survey agreement with the Soil Conservation Service (SCS) in 1980 to make a more intensive soil survey on the National Forest lands in Kittitas and Chelan Counties. The soil survey in Kittitas County was completed in the fall of 1981, with Chelan County completed in the spring of 1989. A similar arrangement was made with the SCS to update the soil survey in Yakima County (Naches Ranger District) with the field work starting in June of 1989.

A degraded acre inventory was conducted on the Forest from 1978 through 1980. The purpose of the inventory was to identify areas that have significant soil or water problems, and are eroding or causing other management problems. During the 3 year inventory period, 143 degraded sites were identified. The inventory data sheets were reviewed again by the ranger districts in the spring of 1989 to see if these sites were still a problem, to remove those that had been rehabilitated, and to

make up a data sheet for any sites that should be added to the list. After completing this, the districts were asked to prioritize their lists. Finally, a priority list for the Forest was developed for the most important sites.

b. Cumulative Effects

Soil productivity and mass wasting are the principal areas of concern on the Wenatchee National Forest, because they can both be affected by management activities. Timber harvest, road construction, road reconstruction, and residue treatment have the most potential to impact the soil resource.

Soil erosion is the origin of most of the delivered sediment. And it is the delivered sediment that can have a negative effect on water quality and fish habitat. Overland flow, either from spring runoff or from a high intensity storm, is the cause of most of the sediment. Without overland flow, there is very little erosion. Wind erosion may occur on some of the ash soils, if the surface soil is exposed and left unprotected.

Soil compaction can significantly reduce soil productivity, therefore, it is important to prevent unnecessary compaction. Compaction often occurs as a result of management activities (timber harvest, machine slash piling, campgrounds, trails, etc.), thus it is important to stay within acceptable standards in order to minimize the overall effect.

Some soil materials are more easily compacted than others, and most soil materials are more easily compacted when moist than when dry. Compaction in forestry operations most often occurs as a result of the use of ground skidding equipment, or equipment (tractors) used to pile the residue after timber harvest. Each trip across a particular location with a piece of machinery or log will cause some compaction. With each succeeding trip, compaction effects become cumulative. Soil compaction in some places on this Forest is known to have lasted more than 17 years.

Not all soil compaction is bad, in fact soil compaction is desirable in road construction. However, because it reduces soil productivity in terms of the amount of timber and forage the land can produce, it is not desirable for the Forest in general.

Nutrient losses are of concern because if nutrient levels are allowed to decline very far, then the productivity of the site is reduced. These losses most often occur in two ways: first, by erosion losses of the surface horizon; and second, by volatilization by fire. Nutrient losses occur slowly over time, so the effects are hard to measure, but the cumulative effect is considered to be negative.

Mass wasting includes slump-earth flows, debris avalanches, and debris torrents. They can either be triggered by natural events or by management related activities. They become significant when they are 50 cubic yards or larger, and directly impact a live stream or lake, or when they are 200 cubic yards or larger and present a threat to capital investments (e.g., roads). All failures can be a threat to human life.

There are four major river basins on this Forest--the Chelan, Entiat, Wenatchee, and Yakima. Analysis of these river basins is one way to group soils in order to evaluate the cumulative effects of applied prescriptions.

Cumulative Effects Matrix

The units of measure for comparing cumulative effects are: YES, POSSIBLE, and NONE KNOWN. YES, means that the activity (whatever it is) has a significant impact and there are negative cumulative effects. POSSIBLE ("poss" in the table) means that the activity may have a significant impact but possible negative effects can be avoided. NONE KNOWN ("none kn" in the table) means that the activity will not have a significant impact and it will probably not have a significant cumulative effect. Some of the ratings were made on the basis of professional judgment and experience, and others were made on the basis of monitoring and/or research information.

There are three location categories for classifying cumulative effects. They are: 1) NATIONAL FOREST; 2) WITH/INTERMINGLED OWNERS; and 3) OFF-FOREST (down stream). These three groupings were used because the location of the particular effect can have a bearing on future management decisions.

Description of Effects Indicated in the Matrix

1. In the Chelan River basin, the Holden tailings present a major hazard for erosion or mass failure, because the protective cribbing at the base of the piles is very old and is now in a deteriorated condition.

The Chelan River basin is subject to periodic high intensity storms (convective storm events). Most of the soils have developed in volcanic ash and pumice. These soils are non-cohesive and tend to be easily displaced when the protective surface vegetation has been removed. Slumps and debris torrents are also an ever present risk.

2. Many of the soils in the Chelan, Entiat, and Wenatchee River basins are subject to soil compaction. Most soils that occur on slopes flatter than 40 percent will probably be managed with some type of ground skidding equipment. The cumulative effects of compaction generally show up over time after repeated entries into a particular timber stand. Compaction does not discriminate; it can occur on privately owned lands just as easily as it does on National Forest lands.

TABLE III-39

MATRIX OF CUMULATIVE EFFECTS ON THE SOIL

SOIL PRODUCTIVITY	<u>RIVER BASINS</u>			
	CHELAN	ENTIAT	WENATCHEE	YAKIMA
Soil Erosion				
National Forest	poss (1)	poss (5)	poss (7)	poss (9)
W/Intermingled Owners	none kn	none kn	poss (7)	poss (9)
Off-Forest (downstream)	none kn	poss (5)	poss (7)	poss (9)
Soil Compaction				
National Forest	poss (2)	poss (2)	poss (2)	poss (10)
W/Intermingled Owners	none kn	none kn	poss (2)	poss (10)
Off-Forest (downstream)	none kn	none kn	none kn	none kn
Nutrient loss				
National Forest	poss (3)	poss (3)	poss (3)	poss (3)
W/Intermingled Owners	none kn	none kn	poss (3)	poss (3)
Off-Forest (downstream)	none kn	none kn	none kn	none kn
Mass Wasting				
National Forest	poss (4)	poss (6)	poss (8)	poss (11)
W/Intermingled Owners	poss (4)	poss (6)	poss (8)	poss (11)
Off-Forest (downstream)	poss (4)	poss (6)	poss (8)	poss (11)

Soil compaction reduces water infiltration rates, thereby increasing the probability of overland flow and soil erosion. Also, it can have a negative effect on root development, because it affects soil porosity (makes the soil more dense), soil permeability, and the water holding capacity of a soil. The end result is that soil compaction can reduce soil productivity. Breaking down the compacted layers in any soil occurs very slowly, so will take a long time for this to happen if the process takes place naturally. There are some management practices available (e.g., tillage, special plant mixes, etc.) that can speed up the breakdown of the compacted layers; however, some of them are expensive and their effectiveness may be limited by local site conditions. There are no effects off-Forest, other than perhaps increased runoff.

3. Nutrient losses in the Chelan, Entiat, Yakima, and Wenatchee River basins can occur via soil erosion, because many of the soils have a thin "A" horizon, which generally contains most of the available nutrients. Nutrient losses often occur as a result of fire, either wildfire or prescribed burning, since most of the nutrients in forest residues are located in the needles, twigs, and small branches. These fine materials are the ones that are usually totally consumed by fire. Hot fires also tend to volatilize some nutrients, so that they are lost to the atmosphere. Furthermore, hot fires can create a hydrophobic condition (non-wettability quality) in the surface of some soils. When this condition exists, the affected soils become very erosive, particularly during high intensity storm events. Nutrient cycling and organic matter maintenance is also very important and is becoming a major consideration in project design and contract administration. Nutrient losses can be cumulative over time, so the soils need to be monitored.

The management strategies used by private owners on the intermingled lands can also have an effect upon the overall nutrient levels in any given sub-drainage. In some places, the private land owners do not burn the logging slash.

4. Mass wasting (slumps, slides, and debris torrents) in the Chelan River Basin has occurred in the past. Most of these events have been debris torrents, some of which have had very dramatic local effects. All of these events have occurred after a watershed has been denuded by wildfire.

5. The Entiat River basin is subject to periodic high intensity storms (convective storm events). Many of the soils formed in volcanic ash and pumice are very erosive once the surface vegetation has been removed. They also seem to be subject to a lot of debris torrents. Most of these events have occurred after a watershed has been denuded by wildfire with some of these events having had some very dramatic downstream effects. The Preston Creek event killed four people and demolished several cabins at the mouth of the canyon. The Crum Canyon floods (two separate events) caused over one million dollars in property damage to both public and private property, including the interruption of both highway and rail travel, as well as blockage of the Entiat River for a short time. The effects of these kinds of events can be very expensive, as well as long lasting. Slumps in this drainage are less common, but they can have some very significant effects, such as closing roads, etc.. Examples are: Kloochman Gulch and Tillicum Creek that have had some major slumps and earth flows in the past. Debris torrents in other cases have caused serious damage off-Forest.

The effects of erosion has shown up off-Forest by the abrasive nature of the volcanic ash that has caused excessive wear to irrigation pumps and sprinkler heads.

There are so few intermingled owners that the cumulative effects are insignificant.

6. Kloochman Gulch and Tillicum Creek, in the Entiat River Basin, have had some major slumps and earth flows in the past. The ones in Tillicum Creek have on several occasions blocked Forest roads, and have contributed large amounts of sediment into Tillicum Creek. The entire river basin is subject to high intensity storms and debris torrents which in some cases have caused a great deal of damage off Forest. Examples of this are the Preston Creek and Crum Canyon floods. The effects of these kinds of events can be very expensive, and can also have a long-term effect. Most of the debris torrents have occurred after a large wildfire has denuded a watershed.

7. In the Wenatchee River basin, the most erosive soils are those that have formed in Chumstick sandstone materials. These soils are the major source of delivered sediment into the Wenatchee

River. Mission Creek is possibly the most sensitive, and has the potential of having the greatest off-Forest effect, because the city of Cashmere is located at the mouth of the Mission Creek drainage.

The Wenatchee River basin has a large number of privately owned sections of land that are intermingled with National Forest sections ("checkerboard" pattern). The effect of management activities that occur on the privately owned lands when added to the effects of management activities taking place on the National Forest lands can result in a cumulative effect for each sub-drainage affected.

8. In the past, mass failures have occurred in the Little Wenatchee River drainage, along Pole Ridge, and in Coulter Creek. There are landforms in other parts of this river basin that show evidence of old slumps but are now stable. High intensity storms and rain on snow events are not uncommon to this area, and either kind of event can trigger a debris torrent, or a slump or a slide. The risk of a high intensity storm occurrence is greater in the eastern part, whereas, a rain on snow event is more likely to occur in the western part of this basin.

9. The Yakima River basin is very large because it includes several smaller river basins (Cle Elum, Teanaway, Naches, American, Little Naches, and Tieton). There are many different kinds of soils in it, and many of them are fine textured (i.e. contain a high content of silt and clay). A common characteristic of clay type soils is that once the silts and clays have become suspended in water (erosion), they tend to stay in suspension and can travel for long distances. Because of this, the suspended sediments can affect many off-Forest facilities, such as the filtration system for the City of Yakima.

The upper part of the Yakima River basin contains a lot of intermingled private lands ("checkerboard"), so the effects of management activities on the private lands when added to the management activities on the National Forest lands can have a cumulative effect on the total amount of delivered sediment from any given watershed (the Cabin and Log Creek drainages are examples of this).

10. Many of the soils in the Yakima River basin are subject to soil compaction. Most soils that occur on slopes flatter than 40 percent will probably be managed with some type of ground skidding equipment. Soils that have formed in Chumstick sandstone, basalt, or pyroclastic materials are all easily compacted. The cumulative effects of compaction generally show up over time after repeated entries into a particular timber stand. Restoration occurs very slowly over time, if allowed to take place naturally. Compaction can also occur on privately owned lands and the effects are much the same as those found on National Forest lands. Soil compaction reduces water infiltration rate, thereby increasing the probability of overland flow and erosion. It also makes the soil more dense so that root development is affected. Furthermore, it usually reduces soil porosity, soil permeability, and the water holding capacity of the soil. Because of these factors, soil compaction often reduces soil productivity. There are no effects off-Forest.

11. Mass failures are common in some parts of the Yakima River basin. Areas that have large amounts of pyroclastic materials generally have the greatest number of slumps and slides. These particular pyroclastic materials generally weather into clays that have high shrink/swell characteristics (montmorillonitic clays). Many of the soils in the southern part of this basin have significant amounts of clay in the subsoil. When the clays erode, they become suspended in the water, and will generally stay in suspension and travel for great distances. This can affect domestic water supplies, irrigation systems, and fish habitat in some cases.

Debris torrents can and do occur in this river basin but most often they will occur on southwest, south, and southeast aspects. Rain-on-snow events are fairly common along the western part of the river basin in the higher precipitation zones near the crest of the Cascades. Off-Forest interests can be affected by either debris torrents or rain on snow events. The intermingled private lands are also subject to the same hazards and risks as are the National Forest lands.

12. AIR

Air is both an essential component of all forest ecosystems and an aesthetic resource. The impacts of our culture's activities on this resource have not been well measured or documented on the Wenatchee National Forest. Historical data describing the air quality is very sparse and primarily limited to visibility. Documentation exists of impairment to visibility resulting from the smoke generated by either wildfires or prescribed fires. However, data concerning the chemical composition of the atmosphere over the Wenatchee National Forest is essentially non-existent.

By comparison to the more densely populated areas that surround the Forest, the air quality within the Forest boundary could normally be described as "good". Measureable quantities of those substances commonly considered pollutants such as sulfur dioxide, ozone, and the oxides of nitrogen have not been found above National Forest lands. Pollution levels measured in the Puget Sound area west of the Mt. Baker-Snoqualmie National Forest are, with the exception of ozone, normally well within the state and federal ambient air quality standards. The concentration of ozone at times, does exceed the established standards. The areas of highest known ozone concentration remain well to the west of both the Mt. Baker-Snoqualmie and Wenatchee National Forests. Detrimental impacts on the forest resources from ozone concentrations have not been documented.

Suspended particulates are of concern due primarily to their impact on visibility. Forest management activities which create smoke or generate dust are the primary contributors to the degradation of visibility. Prescribed fire is the land management activity on the Forest which generates the largest quantity of suspended particulates with a resultant decrease in visibility.

In an attempt to reduce the impacts on air quality created by prescribed fire, several actions have been initiated. Increased utilization of wood fiber for a variety of products has reduced the amount of material considered debris and subject to disposal by prescribed fire. At the same time, the use of predictive models to replicate both atmospheric and fuelbed conditions have allowed land managers to decrease the consumption of fuels not in need of disposal and to ensure rapid dispersion of the resultant smoke. The Washington State Implementation Plan is a document outlining the objectives and procedures utilized in the State of Washington to comply with the Clean Air Act of 1974. Compliance with the Washington State Implementation Plan is mandatory whenever prescribed fire is utilized as a land management tool.

The Forest also administers three federally designated Class I airsheds in conjunction with the Glacier Peak, Alpine Lakes, and Goat Rocks Wilderness Areas. The Clean Air Act mandates that federal land managers protect the air quality related values in these areas. This protection includes ensuring that smoke intrusions from prescribed fires do not occur and, in conjunction with the Washington State Department of Ecology, reviewing all applications which propose major pollutant emitting facilities with the potential to adversely impact a Class I area.

The airshed associated with the Alpine Lakes Wilderness has been selected to be the first Wilderness in the Pacific Northwest Region for which a formal Air Resource Monitoring Plan will be developed. The first quantitative data regarding the chemical composition of the airshed should be collected in 1989, with a goal of establishing baseline values early in the next decade.

The quality of the air resource on the Wenatchee National Forest can be described as "good" in comparison to the more populated areas which surround the Forest. The managers of the Forest recognize their responsibility to manage this resource and are moving ahead toward implementing procedures to improve the quality of the data available and to establish baseline values for quantifying the quality of our air resource.

13. MINERALS

a. Overview

The Forest Service recognizes that minerals are fundamental to the Nation's well being, and, as policy, it encourages and facilitates the exploration for and development of the mineral resources it manages. Its objective is to manage for exploration, development, and production activities in a timely manner, while insuring those activities are integrated with the use, conservation, and protection of all other resources. In summary, the minerals program policy of the Forest Service, including the Wenatchee National Forest, is as follows:

1. Encourage and facilitate the orderly exploration, development, and production of mineral and energy resources within the National Forest System in order to maintain a viable, healthy minerals industry and to promote self-sufficiency in those mineral and energy resources necessary for economic growth and the national defense.

2. Ensure that exploration, development, and production of mineral and energy resources are conducted in an environmentally sound manner and that these activities are integrated with the planning and management of other National Forest resources.

3. Ensure that lands disturbed by mineral and energy activities are reclaimed for other productive uses.

Mineral commodities are classified by law into three distinct groups; locatables, leasables, and salables. The manner in which each is managed and the authority of the Forest Service to control the exploration for and development of each commodity varies considerably.

Locatable minerals are those minerals which, when found in valuable deposits, can be acquired under the General Mining Laws of 1872, as amended. Examples of locatable minerals occurring on the Wenatchee National Forest include, but are not limited to, copper, gold, molybdenum, iron, chromite, nickel, zinc, silver, lead, and uncommon varieties of limestone, gemstones, and other minerals having unique and special values.

**TABLE III-40
MINERAL DISPOSAL AND ACTIVITY RESPONSIBILITIES**

Commodity	Public Domain - Administered by the FS	Acquired Lands - Administered by the FS	Preliminary Prospecting Permits
Oil and Gas	BLM requests FS consent for leasing	BLM requests FS consent to lease and FS concur-	FS has authority to issue a permit
Coal	BLM requests FS consent to lease and permit to operate	BLM requests FS consent to lease and permit to operate	FS permit specifically prohibited
Hardrock Minerals	Locatable--Nondiscretionary	BLM requests FS consent to issue a prospecting permit, to lease and to operate	FS has authority to issue a permit
Geothermal	BLM requests FS consent to lease and to operate	BLM requests FS consent to lease and to operate	FS has authority to issue a permit

BLM - Bureau of Land Management
FS - Forest Service

Citizens and those who have declared their intent to become citizens of the U.S., have a statutory right to explore vacant unwithdrawn public land for these minerals. Upon discovering a valuable deposit, they have a right to locate, mine, and remove the minerals. Forest Service control of these activities is limited to minimizing impacts on surface resources. This is accomplished by reviewing plans of operation to ensure environmental protection standards are established and met. This includes, in addition to many others, standards for air, water, cultural resources, and threatened and endangered species. Assuring prompt reclamation or restoration of disturbed lands is accomplished as part of the operating plan process.

Designated wilderness areas, wild segments classified under the Wild and Scenic Rivers Act, and other withdrawn areas are not open to mining claim location. However, these areas are subject to any valid existing rights perfected prior to the date the area was withdrawn. Acquired lands are not subject to the location of mining claims under the 1872 Mining Law, but are subject to mineral leasing under the Acquired Lands Leasing Act.

Leasable minerals are those mineral commodities which may be acquired under the Mineral Leasing Act of 1920, as amended. On the Wenatchee National Forest, they include coal, oil, gas, and geothermal resources, as well as all minerals except salables when occurring on acquired lands. These minerals are subject to exploration and development under leases, permits, or licenses which are issued by the Secretary of Interior upon receiving consent to lease from the Forest Service. Since leasing is a discretionary action requiring Forest Service consent, its control of prospecting and development activities is considerably stronger than it is for locatable minerals. Although the Forest Service has more control on their activities, its management objective is still to encourage and facilitate leasable mineral activities. Table III-40 summarizes Forest Service mineral leasing responsibilities for the public land it administers.

Recommendations concerning the availability of lands for mineral leasing are based on whether development activities could be conducted in a manner which is compatible with land management objectives in the Forest's land management plan.

The policy and procedures by which mineral use authorizations for federally owned leasable minerals are to be processed are being established in compliance with the Federal Onshore Oil and Gas Leasing Reform Act of 1987. It is presently assumed that an assessment of oil and gas resource potential will be made and a National Environmental Policy Act (NEPA) evaluation will be completed. Based upon that evaluation, lands will be selected for leasing by a competitive or over-the-counter system. Once leases are issued, on-the-ground activities will be managed in keeping with the Interagency Agreement between the Forest Service and the Bureau of Land Management (BLM) dated June 19, 1984. In summary, the agreement calls for the Forest Service to participate with the BLM in the formulation of site-specific terms and conditions in the operating plans. The plans must provide appropriate mitigation measures to insure that adverse impacts on surface resources will not exceed applicable environmental protection standards.

Salable minerals are common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay. In general, these minerals are of widespread occurrence, of relatively low unit value, and are generally used for construction materials or for road building purposes. These minerals are disposed of under the authority of the Materials Act of July 31, 1947, as amended by the Act of July 23, 1955. Disposal of salable minerals from public lands administered by the Forest Service is totally at the discretion of the Forest Service (see regulations in 36 CFR part 228). Management of operations on permit areas is similar to the management of leasable mineral activities.

b. Geologic Setting

The Wenatchee National Forest lays along the east side of the crest of the Cascade Mountains. This mountain range consists of a core of crystalline metamorphic rocks intruded by dominantly granitic to dioritic stocks and batholiths. Relatively recent volcanic activity resulted in extensive andesitic flows in the southwest part of the Forest. Tertiary coal-bearing sandstones and shales are distributed throughout the east-central and southeast parts of the Forest. Metallic mineral deposits are generally related to the

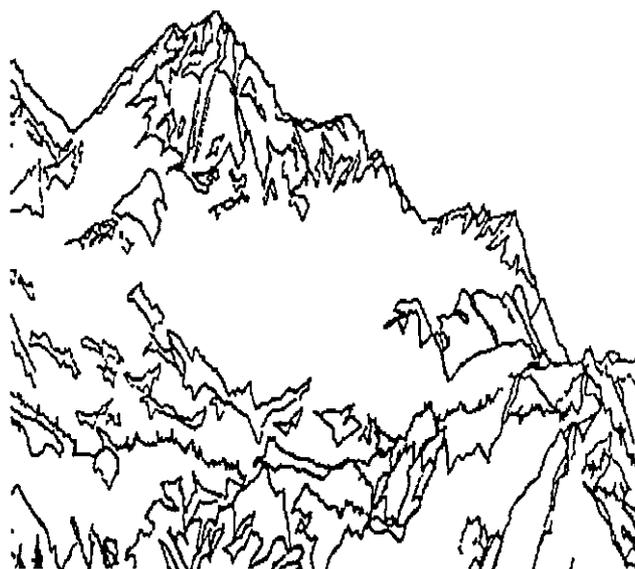
igneous/metamorphic complex, however, gold is also found in silicified zones within Tertiary sandstones in the east-central part of the Forest. The geothermal potential is controlled by the location of recent volcanic activity. The coal, oil, and gas potential is limited to folded sediments in the flanks of the Columbia River basin. Common variety minerals occur throughout the Forest, whereas mineral collecting for recreation purposes is generally limited to about nine areas.

c. Recreational Minerals

Although there are about twenty types of minerals recreationally collected on the Forest, placer gold, agate, quartz crystals, garnet, talc or soapstone, olivine, rhyolite, pyrite, rhodenite, and actinolite appear to be the main targets of collectors. The areas experiencing the most activity of this nature are located on the Cle Elum and Leavenworth Ranger Districts. The type of activity involved in collecting generally includes pick and shovel work, but panning, sluicing, and suction dredging have also become increasingly popular.

Those collectable minerals of a "locatable" nature are removed from valid mining claims under the authority of the Mining Law of 1872 as amended, whereas removal of more than nominal amounts of the common variety minerals requires that a permit be issued. In either case, if significant surface resource disturbance might be caused, a notice of intent or plan of operation must be filed and approved. If suction dredging or stream alteration is involved, a hydraulic project approval must also be obtained from the State. Since managing this type of activity in the past has not been a significant problem and it is not anticipated to become a problem in the future, current management practices will continue.

There does appear to be some interest in the opportunity to allocate lands specifically for rockhounding and mineral collecting purposes. Other than for those areas identified in the Alpine Lakes Management Plan (Redtop Mountain area and portions of Peshastin, Negro, and Ruby Creeks), no areas will be withdrawn and specifically managed for this type of recreational activity. However, recreational panning, sluicing, dredging, and collecting will be encouraged and facilitated whenever these activities can be conducted in a manner compatible with the land management objectives and legal status of the land.



d. Locatable Minerals

A mineral resource overview has been prepared to assess the present and future potential for the development of locatable mineral resources on the Wenatchee National Forest. It indicates, on a relative scale, the odds for successfully finding mineral resources which can be profitably developed. Table III-41, along with Figure III-10, depict the areas on the Forest which appear to have potential for the occurrence of mineral resources.

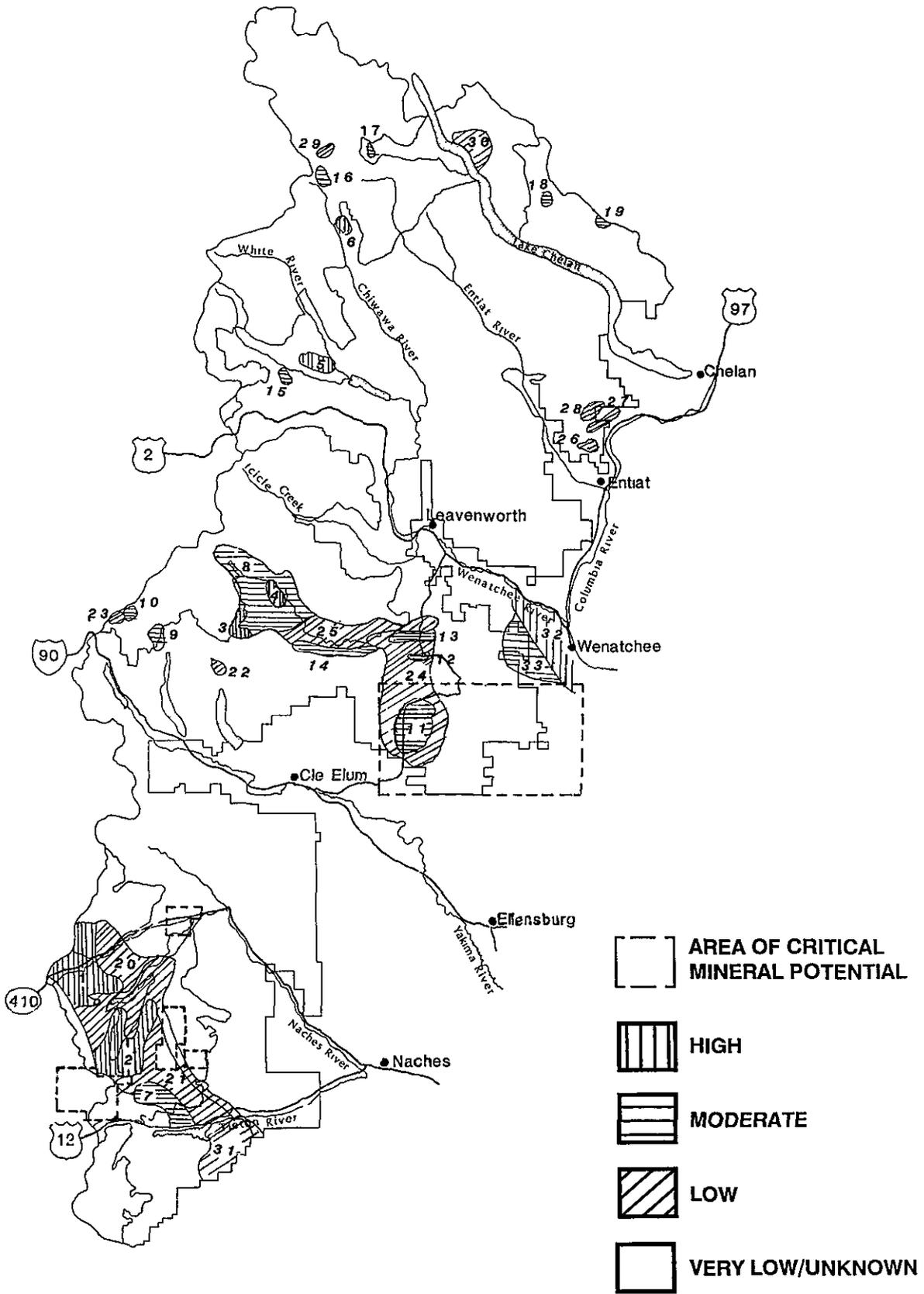
As Table III-41 indicates, the Forest contains a potential for significant occurrences of copper*, gold, molybdenum, silver*, lead*, zinc*, tungsten*, iron*, chromium*, nickel*, mercury*, and manganese*, in approximate decreasing order of importance. (*Commodities are identified as critical or strategic minerals.) The Forest also contains potentially commercial deposits of bentonite, feldspar, limestone, and garnet. The other nonmetallic minerals reported either have no apparent commercial potential or are of interest only to collectors.

The Wenatchee National Forest has a long history of mining dating back to 1860, and numerous claims have been located and maintained since the 1870's. Available information indicated that, excluding the Holden Mine, the Forest has had a modest past production record. That record is fragmentary but it is the best data available and is summarized in Table III-43.

Exploration has been carried out intermittently throughout the Forest since the late 1800's. Recently, following the Cannon mine discovery made near Wenatchee in 1983, more than 7,000 mining claims were located in the Liberty or Swauk Creek area, in the Culver Gulch area, and in a 10 to 12 mile wide belt lying west of Wenatchee. As an additional response of that discovery, mining activity in the State during 1984 was dominated by the activities in Chelan, Douglas, and Kittitas Counties, and that activity has continued through 1989.

Although the Forest has approximately 11,000 mining claims covering 200,000 acres properly recorded as being located within it, present mineral activity on Forest Service lands is relatively minor in scope. As a consequence, it is assumed that mineral resources on the Forest presently play a limited role in National, Regional, and State-wide social and economic structures. However, the economic and, to some extent, the social characteristics of southern Chelan County and northern Kittitas County may be significantly impacted over the next ten years by the new mining industry centered in Wenatchee. As depositional models are extrapolated to other areas and new exploration targets are identified, Forest Service lands may also be affected by this activity. Confidence in this projection decreases toward the end of the planning period because future activities will actually depend upon the technical results of the exploration and development conducted during 1984-85. It also depends on the volatile nature of the minerals market.

FIGURE III-11
POTENTIAL FOR THE OCCURRENCE OF LOCATABLE MINERAL RESOURCES
OF ECONOMIC SIGNIFICANCE



**TABLE III-41
LOCATABLE MINERAL POTENTIAL OF THE WENATCHEE NATIONAL FOREST**

MINERAL POTENTIAL 1/	MAP NO.	NAME	MINERAL COMMODITY 2/
HIGH	1	Morse Creek-American Ridge	Cu, Mo, Au, Ag
	2.	Copper City-Deep Creek	Cu, Mo, Wo, Zn, Au, Ag
	3.	Cle Elum Nickel-Iron	Fe, Cr, Ni
	4.	Van Epps	Cu, Mo, Au
	5.	Wenatchee Ridge	Feldspar
	6.	Phelps Creek	Cu, Mo, Ag
	32	Wenatchee	Au, Ag
MODERATE	7.	Wild Cat-Indian Creek	Hg, Mn
	8.	Fortune Creek	Cu, Au, Cr, Ag
	9.	Mineral Creek	Cu, Mo
	10.	Gold Creek	Cu, Mo, Au
	11.	Liberty	Au
	12.	Blewett Iron	Fe, Cr, Ni
	13.	Blewett Gold	Au, Cu
	14.	Teanaway	Fe, Cr, Ni
	15.	Soda Springs	Limestone
	16	Copper Point	Cu, Mo
	17.	Holden	Cu, Ag, Pb, Zn, Au
	18.	Miners Basin	Cu, Mo, Au
	19.	Grade Creek	Zn, Ag
	33	Horse Lake Mountain	Au, Ag
LOW/UNKNOWN	20.	Bumping Lake	Cu, Au, Wo
	21.	Rattlesnake	Cu, Au, Wo
	22.	Red Mountain	Cu, Mo
	23.	Gold Creek	Cu, Mo, Au
	24.	Swauk-Peshastin	Au
	25.	Ingalls Creek	Cu, Au
	26.	Pangborn	Au
	27.	Oklahoma Gulch	Cu, Ni
	28.	Goman Peak	Cu, Ni
	29.	Lyman	Cu, Ag
	30.	Meadow Creek	Ag, Pb, Zn
31.	Rimrock Lake	Bentonite	

1/ Refer to Table III-42 for definition.

2/	Au-Gold	Fe-Iron	Ni-Nickel
	Ag-Silver	Hg-Mercury	Pb-Lead
	Cr-Chromium	Mo-Molybdenum	Wo-Tungsten
	Cu-Copper	Mn-Manganese	Zn-Zinc

TABLE III-42

CRITERIA/PARAMETERS FOR ECONOMIC MINERAL EVALUATION

Potential for exploration/development/production within 50 years	HIGH		MODERATE	LOW	VERY LOW/ UNKNOWN
Current activity level	Mining or development in progress or pending investment decision	Comprehensive exploration, development likely	Sampling, geophysical surveying, geological investigation, reconnaissance level drilling, etc	Sporadic threshold, some site specific intense	Superficial reconnaissance
Land position	Long term maintenance of claims or leases	Long term	Intermittent	Short term site-specific	Sporadic
Geology	Favorable, establishes parameters for extrapolation	Favorable on own merits or by extrapolation	Some favorable characteristics by extrapolation or inference	Unassessed, some favorability by inference	Favorable characteristics mostly lacking negative characteristics
RESOURCE PARAMETERS					
Mineralogy	Known	Known	Indicated	Inferred	Unknown
Quantity	Known adequate to sustain continuous production exclusive of other parameters	Known but not susceptible to estimation	Inferred	Unknown	Unknown
Quality (Grade)	Marginal economic to commercial	Paramarginal (large resource inferred) to commercial (small resource inferred)	Inferential, from isolated "bits"	Unknown, some isolated "bits"	Unknown



TABLE III-43
PAST PRODUCTION STATISTICS
METALLIC MINERALS

Potential Area	Mine Name	Value of Production	Approx. Period	Chief Commodities 1/
Holden	Holden	\$68,000,000	1936-1957	Cu, Au, Zn, Ag
Phelps Creek	Red Mountain	24,000	1937-1938	Cu, Ag
Pangborn	Rex	185,000	1910-1930	Au
Swauk-Peshastin	placers	1,000,000	1860-1940	Au
Blewett	lodes	539,000	1874-1907	Au
Liberty	lodes	882,000	1873-1940	Au
Total		\$70,630,000		
Tons				
Fortune Creek	Burke, Mt. Hawkins	45	1918, 1942	Chromium
Van Epps	Pickwick	13	1917	Cu, Au
Lyman	Crown Point	Unknown	1897-1902 1918-1926	Cu, Au, Ag, Pb, Zn
Fortune Creek	Dolphin	5	1917	Cu
Mineral Creek	Copper Queen	20	1917	Cu
Morse Creek-American Ridge	Hidden Treasure	21	1941	Cu, Ag
Copper City-Deep Creek	Pasco, etc.	11+	1907, 1938 1941	Cu, Au, Ag, Wo
Fortune Creek	Aurora	Unknown	Unknown	Au
Wild Cat-Indian Creek	Red Spur	Unknown	Unknown	Hg
Meadow Creek	Sunday Morning	Unknown	Unknown	Ag
Fortune Creek	Camp Creek	Unknown	Unknown	Au, Ag
1/	Au-Gold Ag-Silver Cr-Chromium Cu-Copper	Fe-Iron Hg-Mercury Mo-Molybdenum Mn-Manganese	Ni-Nickel Pb-Lead Wo-Tungsten Zn-Zinc	

The areas most likely to be explored for gold within the next few years include the Horse Lake Mountain and Blewett areas on the Leavenworth Ranger District and the Swauk Creek area on the Cle Elum Ranger District. The Horse Lake Mountain activity probably will expand northerly along the Entiat Ridge approaching the Lake Wenatchee Ranger District. The Swauk Creek activity will expand westerly and northwesterly across Red Top Mountain and along the south flank of the Mt. Stuart batholith, possibly as far west as the Cle Elum River.

Silver-based metal mineral resources with one exception, appear to be of low grade and of small volume relative to grade. These probably will require supply constraints and significant price increases in order for development to take place. Targets of this type include Trinity, where current exploration and development is expected to continue, and Van Epps Pass, where renewed interest and claim staking began in 1984. The exception is the Chelan-Sawtooth area where evidence is emerging of medium to high-grade silver deposits with associated lead and zinc.

Precious metal exploration and development has dominated the mineral activity over the past couple of years. However, base metal deposits (copper, lead, zinc, tungsten, iron, and chromium) will remain targets of future exploration activities. The extent and grade of the nickel-chromium-iron deposits in the Cle Elum Nickel-Iron, Blewett-Iron, and Teanaway areas are well established. However, the cost of mining, international market competition, market conditions, and difficult extractive metallurgy make the future development of these commodities unlikely in the absence of a national emergency.

Nonmetallic mineral resources of a possibly locatable nature include feldspar, garnet, and bentonite deposits. Of these, the Wenatchee Ridge feldspar deposits appear to have the most potential for future development. Actual development of any of the three commodities will depend more upon processing technology, commodity research, and the establishment of markets, than on exploration and development activities.

e. Leasable Minerals

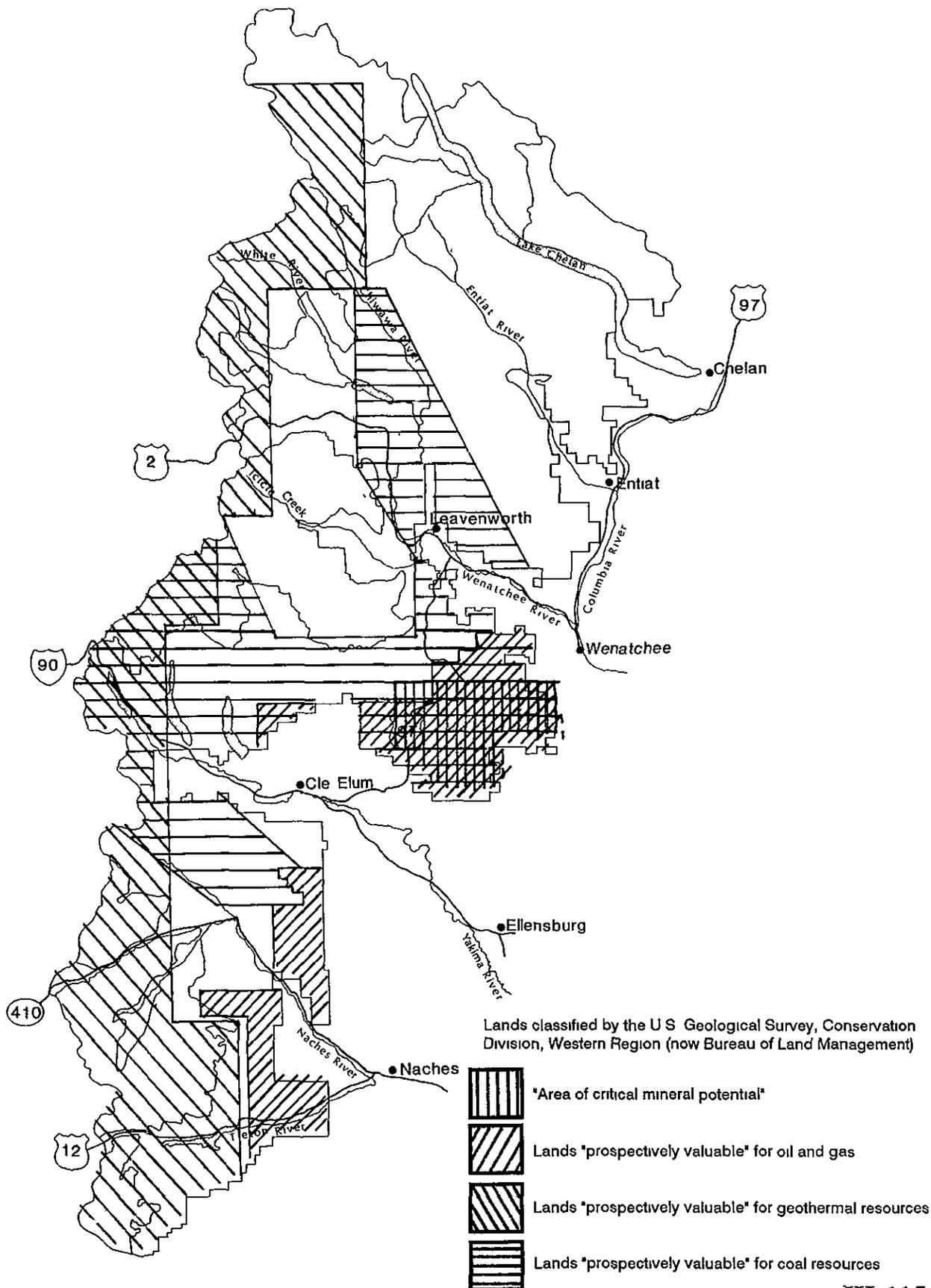
Leasable mineral potential has not been assessed in the same manner as have the locatable mineral resources. Portions of the Forest, however, have been classified by the Bureau of Land Management as being "prospectively valuable" for oil, gas, coal, and geothermal resources (see Figure III-12). Areas classified "prospectively valuable" for leasable minerals are considered to have at least a "moderate mineral potential until proven otherwise." Also shown on Figure III-12 is an area of critical mineral potential which may or may not be for its oil and gas potential.

Statistics updated to November 1988 report that 22 oil and gas leases covering 64,113 acres have been issued on the Forest. The leasing cycle is in a downturn mode and, without some important discovery, it is expected to remain below 200,000 acres for the foreseeable future. Revenue produced from mineral leasing on the Wenatchee National Forest during Fiscal Year 85 was \$215,676 of which \$107,838 was returned to the State. This has declined to approximately \$64,000 this year. This represents rental returns only. Should production begin, royalties would increase this revenue substantially.

Based on available data, oil, gas, and geothermal resources are not known to occur on the Forest in commercial quantities. Barring any significant discoveries, off-Forest short-term activities are expected to remain low and will be dominated by exploration. In the case of geothermal, relatively small scale direct use development is possible, but no large scale development is anticipated.

Although a large portion of the Forest has been classified "prospectively valuable" for coal resources and a smaller area near Cle Elum has been classified as a "coal resource area", it does not appear that their development is likely as long as the more favorable Roslyn field remains available. In response to changing energy demands, however, considerable attention has recently been focused on the production of methane from unmined and unminable coal seams in Washington. This type of development does represent a potential for future use of the coal though it is unlikely to occur within the next ten years.

**FIGURE III-12
PROSPECTIVELY VALUABLE LANDS FOR COAL, OIL, GAS AND GEOTHERMAL**



Disposal of "hard rock" minerals on acquired lands is subject to permit and lease under the Mineral Leasing Act for Acquired Minerals. Presently, only one application has been filed for a prospecting permit on acquired lands, and the Forest has recommended it be issued. Existing permits and this new application lie in areas with "moderate" potential for the occurrence of gold deposits. Pending lease issuance and exploration activities, projecting development of these areas would be speculative at best.

f. Salable Minerals

The Forest maintains a detailed inventory of rock sources which is available at Ranger District offices. It indicates that there are numerous occurrences of various types of rock commodities. Of most interest are the sedimentary rocks. However, there is also considerable interest in the volcanic rocks of the area, especially pumicite.

Although the quality of pumicite is inferior to alternative sources closer to the established markets, several thousand cubic yards are produced annually under permit. The traditional market for pumicite as a lightweight aggregate for casting building blocks is now being augmented by a developing demand for use in preparing potting soils and certain types of insulation. Recent sales indicate a significant upturn in demand in the short-term future. Future sales will continue to be supported by detailed resource inventory and evaluation. The pumicite on the Forest is widely distributed to permit selection of favorably situated mine sites with appropriate regard for environmental factors.

Production of sedimentary-type rocks has dominated the common variety mineral activity over the past few years. The total production of sand and gravel and stone during the period from 1973 to 1980 was approximately 3 million tons with a value of \$6,400,000. The annual average is 365,000 tons valued at \$800,000. Approximately 90 percent of the production was stone. The overwhelming bulk of supply of common minerals is for construction materials in support of Forest Service timber management and State highway construction. In the immediate future, the demand for this resource is expected to lessen in response to reduced road construction activities

associated with timber harvest activities. The demand for county and State highway construction is significant locally, but highly variable in the long term. Future demand for pumicite will depend upon market development in areas not presently satisfied by sources elsewhere. Demand for building stone is almost insignificant, and is not expected to increase significantly because of the inferior quality of the resource and low level of demand for construction purposes.

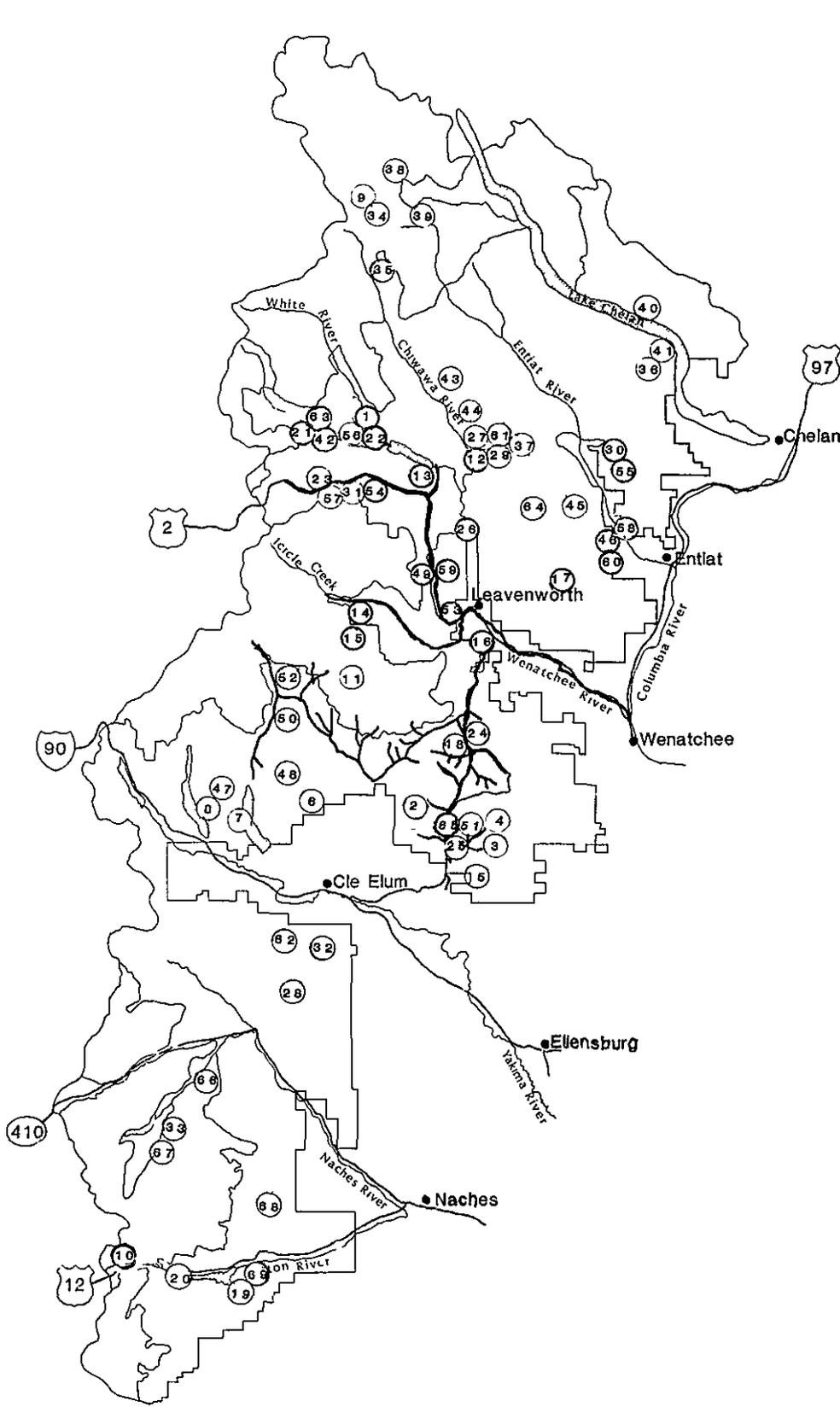
g. Recreational Minerals

(panning, sluicing, dredging, and collecting)

As with the other mineral commodities, recreational type minerals have not been inventoried in detail, nor have panning, sluicing, dredging, and collecting activities been closely monitored. We do know that such activities are continually being conducted, and the level of activity appears to be increasing. We do not know how much material is being removed, nor do we know the value of that material. The activity, which is usually done for non-commercial purposes, does appear to be an important outdoor recreational activity as indicated by the number of participants, the apparent investment in equipment and supplies, and the impact it has on the local economies. Figure III-13 portrays some of the known collecting and gold panning areas (Meschter and Boeing Employees Prospectors Association).

As indicated above, recreational minerals are either removed under the guise of the mining law (mining claims) as a form of prospecting, or, if more than a nominal amount of material is desired or the area is not subject to the removal of minerals under the 1872 mining law, a permit for the removal of such minerals may be issued. Presently, no areas have been set aside to be managed primarily for this type of activity because it is assumed that it can be conducted in a manner consistent with other recreational type activities. However, mining claim conflicts and withdrawals may be a concern because removal of even small amounts of minerals from unpatented mining claims or areas withdrawn from entry under the mining law can be considered trespass. As a consequence, those conducting this type of activity should ensure that the status of the land allows the removal of those minerals in which they have an interest.

**FIGURE III-13
RECREATION MINING AND NONMETALLIC MINERALS**



- Actinolite, crystal
 - 1 Wenatchee Ridge
- Agate
 - 2 Red Top
 - 3 Liberty
 - 4 Lion Top
 - 5 Crystal Mountain
 - 6 Yellow Hill
 - 7 Cle Elum Lake
 - 8 Kachess Fidge
 - 9 Crown Point
 - 10 Dog Lake
- Andesite, platy
 - 11 Mt. Stuart
- Asbestos
 - 12 Goose Creek
 - 13 Nason Ridge
 - 14 Trout Creek
 - 15 Trout Lake
 - 16 Hill Creek
 - 17 Chumstick Mountain
 - 18 Peshastin Creek
- Bentonite
 - 19 Tieton
 - 20 Russell Ridge
- Beryl
 - 21 Lake Creek
- Feldspar
 - 22 Wenatchee Ridge
- Garnet
 - 23 Gaynor
- Placer Gold
 - 24 Peshastin Creek
 - 25 Swauk Creek
 - 26 Wenatchee River
 - 27 Deep Creek
 - 28 Manastash Creek
- Graphite
 - 29 Wenatchee Lake
 - 30 Potato Creek
 - 31 Nason Creek
 - 32 Taneum Creek
 - 33 Bumping Lake
- Kyanite
 - 34 Railroad Creek
 - 35 Royal Development
 - 36 Twenty Five Mile Creek
 - 37 Mad River
- Limestone
 - 38 Martin Peak
 - 39 Buckskin Mountain
 - 40 Deer Point
 - 41 South Point
 - 42 Soda Springs
 - 43 Marble Creek
 - 44 Chickamin Creek
 - 45 Gold Fidge
 - 46 Entiat
 - 47 French Cabin Creek
 - 48 Teanaway
- Mica, flake
 - 49 Tumwater Canyon
- Olivene
 - 50 Boulder Creek
- Pumicite
 - Entiat-Chiwawa Areas
- Sandstone, Decorative
 - 51 Lion Gulch
- Silica
 - 52 Silver Creek
 - 53 Leavenworth
 - 54 Merritt
 - 55 Harris Creek
- Soapstone
 - 56 Wenatchee Ridge
 - 57 Ruth
 - 58 Entiat
 - 59 Tumwater
 - 60 Raging Creek
 - 61 Maverick Saddle
- Thulite
 - 62 Taneum
- Mineral Water
 - 63 Little Wenatchee
 - 64 Medicine Springs
 - 65 Mineral Springs
 - 66 Bumping River
 - 67 Indian Springs
 - 68 Little Rattlesnake
 - 69 Goose Egg

h. Supply/Demand Summary

According to U.S. Bureau of Mines data, Washington State ranked 33 out of the 50 states in annual mineral production during 1984 and, in 1987, ranked 20th in non-fuel mineral production. Most of this can be attributed to the increase in precious metal output at the Cannon Mine and in the Republic unit. As a consequence, Washington is ranked 6th in the nation for gold production and 10th for silver production. The Wenatchee National Forest's contribution to that production was minor. Of the minerals produced in Washington, sand and gravel and industrial minerals far exceeded any of the other commodities. Production in the future, however, may reflect a change as several new gold mining operations come on line, including the Cannon Mine near Wenatchee.

Bureau of Mines data indicates the demand for mineral resources will increase at an annual rate of 1.0 to 2.2 percent. As a consequence, locatable mineral related activities (claim staking and maintenance, exploration, development, panning, sluicing, suction dredging, and rockhounding) is expected to remain at a relatively high level through the next 10 years. Should exploration activities being conducted on the Wenatchee National Forest prove positive and mineralization similar to that at the Cannon Mine be identified elsewhere on the Forest, locatable mineral activity will increase significantly. Leasable mineral activities on the Forest are expected to decline somewhat, but exploration for geothermal, oil, and gas resources may increase. Considering the political environment around foreign sources of oil, it is highly likely that those sources could unexpectedly be curtailed. A result of such curtailment would be a significant increase in the oil and gas exploration activity on the Forest. This may also be accompanied by more geothermal and coal activity, since these energy minerals provide alternatives to the use of oil and gas. While the demand for common variety minerals is expected to continue or possibly increase slightly, the Forest Service demand itself is expected to decrease slightly over the next ten years.

i. Land Status

Land status changes (exchanges, disposal, withdrawal) have the potential to affect the availability of mineral resources for future production. The effect of a change in ownership is usually minor, since valuable mineral deposits will generally be developed whether in public or private ownership. Land exchanges do have a potential for removing mineral resources from the benefits of public ownership. However, when land exchanges or disposal actions are proposed, regulations require that mineral potential and appraisal evaluations be completed and the results be considered when determining if the disposal action is really in the interest of the public. The effect of withdrawing lands from mineral entry, on the other hand, can be significant. In the past, withdrawals have been encouraged with little regard for their cumulative effect. The location of withdrawals relative to the location of important mineral deposits and the cumulative effect of withdrawals on the availability of mineral resources in general is of importance to the public's welfare and is of utmost concern to the mining industry.

The Wilderness Act of 1964 authorizes prospecting. However, as of January 1, 1984, or as of the date of the Washington State Wilderness Act of 1984 (July 3, 1984), the minerals in lands designated as wilderness are withdrawn from all forms of appropriation under the mining laws. Valid mining claims perfected prior to those dates may still be operated. As of August 1983, wilderness areas on the Wenatchee Forest had 103 unpatented mining claims. The new wilderness areas established in 1984 include unpatented mining claims as well. Claimants may conduct mining or mining-related activities on valid mining or mill site claims within wilderness areas subject to operating plan requirements. Forest Service objectives would be to ensure that any development project would have as little impact on wilderness resources as possible. There are no mineral leases issued for wilderness areas on the Wenatchee and no new leases will be issued.

The Wenatchee National Forest has additional areas withdrawn from mineral entry for other than wilderness reasons. According to a Bureau of Land Management inventory conducted as of August 17, 1982, the following withdrawals were in effect:

**TABLE III-44
MINERAL WITHDRAWALS OTHER THAN WILDERNESS**

Benefiting Agency	Number	Acres	% of Forest
Federal Energy Regulatory Commission (F.E.R.C.)	20	17,636	0.82
Forest Service	22	7,627	0.35
Geological Survey	9	46,572	2.15
Bureau of Reclamation	5	3,443	0.16
Wilderness (includes lands within the Washington State Wilderness Act of 1984. Does not include the North Cascades N.P., or the Lake Chelan/Ross Lake N.R.A.'s which are managed by the National Park Service)	7	841,034	38.86
TOTAL	63	916,312	42.34

These withdrawals have been implemented for several reasons. The F.E.R.C., Geological Survey, and Bureau of Reclamation withdrawals are usually made to protect reclamation projects or powersite and transmission projects. The Forest Service withdrawals, however, have been made to protect sensitive resources (scenic corridors, research natural areas, special interest areas) or to protect substantial investments made in the land (campgrounds, telecommunication sites, administration sites, etc.).

Review of withdrawals outstanding as of October 21, 1976, is mandated by Section 204 of the Federal Land Management and Policy Act of 1976. This required review is not a part of the current planning process, but all existing withdrawals will be reviewed prior to 1991. Recommendation for retention, revocation, or partial revocation will be made based upon an analysis of the resources being protected and on an analysis of the mineral potential of the area. Where adequate protection is provided by other means or a withdrawal is no longer necessary, it will be revoked or reduced in size. Requests for any new withdrawals will be processed according to Bureau of Land Management regulations and Forest Service guidelines.

j. Reserved and Outstanding Mineral Rights

The Forest includes approximately 3,360 acres (0.15 percent) of reserved minerals, 19,560 acres (0.9 percent) of outstanding minerals, and 10,920 acres (0.5 percent) of acquired minerals. The location of these lands can be obtained from land status plats maintained at Forest Service or BLM offices.

Reserved mineral, which involves those situations where the surface estate was conveyed but the mineral estate was reserved to the United States, generally are subject to the location of mining claims and normal mineral leasing procedures.

Outstanding minerals, which involve those situations where the Forest Service acquired the surface estate but not the mineral estate, are not subject to location or leasing under the Federal mining laws. The Forest Service assumes the role of any other surface owner. Based upon past practice, the surface estate will be managed consistent with the principles of the surface management regulations (36 CFR 228).

k. Access Requirements

Reasonable access is essential to mineral exploration and development. In general, existing forest roads and trails are adequate to satisfy the access requirements for the level of exploration activity conducted during the past 10 years. With several notable exceptions in wilderness, all of the potential mineral areas are served either by existing passable roads or by roads and trails impassable only due to natural deterioration as a result of non-use and lack of maintenance. The exceptions are the Gold Creek, Copper Point, Meadow Creek, and Lyman Lake areas entirely within wilderness areas; and the parts of the Mineral Creek, Fortune Creek, Ingalls Creek, Phelps Creek, Morse Creek-American Ridge, Copper City-Deep Creek, Bumping Lake, and Rattlesnake areas in wilderness.

Otherwise, there are no identifiable major needs for access to any of the inventoried mineral potential areas. Local access needs within areas will be authorized in connection with site-specific activities to be proposed in operating plans.

14. ROADS

a. Overview

About 1905 saw the beginning of railroad logging on the Wenatchee National Forest. The railroad replaced animal and water transport of logs in such places as the Teanaway, the Swauk, and the Wenatchee drainages. Log trucks began to compete with the railroads in the 1920's and, by 1944, railroad logging had ended. Since the 1940's, the majority of Forest road construction has been in support of timber management activities. Today, the harvest of timber puts approximately 127,000 vehicles on the Forest road system annually.

After World War II, the availability of dependable and relatively economical automobiles, easy access to gasoline, and a growing population with increased leisure time, contributed to the growth of motorized forms of recreation. The ownership of private automobiles in Washington State increased from one, in 1900, to over 2,800,000 private cars and trucks today. This has had its effect on the growth and management of the Forest road system.

Through the 1950's and 1960's, the primary road systems were improved and extended in response to the demands of an increasingly mobile public. In the 1970's, concern over the environmental impact of roads, the impact of recreational use on land so easily accessed, and the desire to conserve or preserve the remaining unroaded areas, has all but stopped the growth in mileage of the major Forest roads. The demand on the existing systems is, however, expected to continue.

The automobile is the principal means of travel for most Americans. The Federal Highway Administration has found that 93 percent of the person miles traveled in outdoor recreation are by auto. Other systems (bus, rail, air, etc.) do not have the capacity or flexibility of owner-operated automobiles.

The "National Transportation Trends and Choices of the Year 2000" by the U.S. Department of Transportation 1977, gave a strong indication that automobile use will continue. As the cost of energy increases, people shift to more efficient automobiles. In 1978, 68 percent of new car registrations in Washington were either small or imported cars. According to the Wenatchee Recreation Inventory data, driving for pleasure comprises 12 percent of the total recreation visitor days. This is the second largest recreation activity on the Forest.

Section 10 of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) and Section 8 of the National Forest Management Act of 1976 (NFMA) require a "Forest Development Road System Plan." The national direction requires a Forest Development Transportation Plan that consists of a Transportation Inventory System (T.I.S.) and a map. In addition, the National Forests in Oregon and Washington are required to have a Road Management Plan. This plan includes multi-year development plans, traffic management plans, maintenance plans, and interagency road plans. As these plans total 1,400 pages and some 120 maps, they are not reproduced in this document but are available for review at the Forest Supervisor's Office in Wenatchee.

Approximately 33 percent of the total Forest and 53 percent of the non-wilderness acres are considered roaded. In the roaded areas, there are approximately 3.75 miles of road for each square mile of land. Within these sections, the roads actually occupy about 3 to 4 percent of the land area.

In 1988 there were an estimated 5,110 miles of Forest Service roads on the Forest. About 18 percent of this total are classified as arterial and collector roads. Forest arterial and collector roads access large or popular land areas and usually connect with State and County roads to form an integrated network of primary and secondary travel routes. This system is currently 98 percent complete.

Improvements and repairs are needed on the existing Forest road system. Chronic sediment sources need to be corrected, such as the Bethel Ridge Road from the Timber Wolf Road to Cash Prairie. Safe joint use must be provided for the public and timber haulers, particularly along Shady Pass to Halfway Springs, and along the Chiwawa Road to Rock Creek. Improved access to planned development sites is needed to make roads compatible with the sites' development level. Examples are the Icicle Road to Rock Island Campground and the Entiat Valley Road to Cottonwood. Asphalt pavement on some aggregate surfaced roads would reduce the costs of maintenance and dust abatement, such as the Van Creek and the South Fork of the Tieton roads.

About 82 percent of the total system are local roads. These facilities are usually intended to provide access for a specific resource utilization or protection activity, such as a timber sale, a recreation site, or a firebreak. These roads are normally shorter and serve smaller areas of land. Resource service, rather than travel efficiency, is emphasized in their location, design and operation. The analysis of the management situation indicates that the local road system is about 76 percent complete. Ground slopes influence the choice of logging systems and the logging system determines the local road location and density. Typical permanent road densities (miles/Section), necessary to harvest timber in unroaded areas on the Wenatchee National Forest, are 3.12 miles for gentle slopes, 2.64 miles for moderate slopes, and

1.10 miles for steep slopes. Approximately 0.4 mile of additional road construction or reconstruction per million board feet is necessary for subsequent entries. There are approximately 80 to 100 miles of road that are constructed or reconstructed annually.

Bridges

The analysis of the current management situation has identified approximately 35 bridges that will need replacement or reconstruction in the next 10-15 years. These are log bridges that are more than 15 years old, treated timber bridges more than 25 years old, steel or concrete bridges more than 35 years old, bridges whose capacity is significantly (75 percent) less than current legal loads, and bridges where inspection reports indicate significant damage, corrosion, or decay.

Forest Road Management

The National Forest Management Act of 1976, Sec. 8, states that: "roads constructed on National Forest System Lands shall be designed to standards appropriate for their intended uses, considering safety, cost of transportation and impacts on land and resources". The Act implies that no one factor necessarily outweighs the other. Standards must be found for each road section that are appropriate for the intended use and that meet the resource management objectives. Road management objectives for all existing roads have been identified and stored in the Transportation Inventory System. A system has been developed to identify the resource objectives and the appropriate standard and management of all proposed roads.

The current traffic service levels for the arterial and collector systems are shown in Table III-45. Exhibit 1, following, defines the four different traffic service levels for Forest Service Roads. Traffic service levels describe the characteristics that are significant in the selection of road design criteria. They also describe the operating conditions and management strategy that the public can expect to encounter on an individual Forest road. The proposed traffic service levels for the arterials and collectors by alternative are found in Chapter IV.

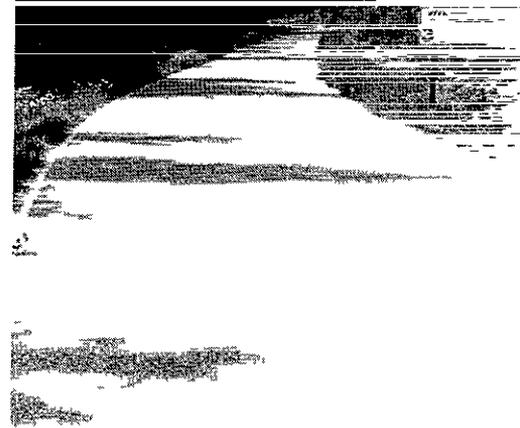
Traffic Service Levels



Free flowing with adequate passing facilities.
Road surface stable and smooth with little or no dust.



Service Level - B



Flow congested during heavy traffic.
Periodic dust control.



Limited passing facilities.
Surface rutting, roughness, and dust may be present.



Service Level - D

Flow is slow or may be blocked
by an activity.
Rutting and dusting controlled
only for soil and water.

**TABLE III-45
TRAFFIC SERVICE LEVELS FOR EXISTING ARTERIALS AND COLLECTORS**

Road Name	Road Number	Road Miles	Current Service Level ^{1/}
Entiat Valley	51	10.1	A
Entiat Valley	5100	5.1	D
Entiat Summit	5200	35.9	D
Tyee Ridge	5700	15.8	C
French Corral	5800	9.0	C
Shady Pass	5900	24.1	D
Lower Chiwawa	6100	4.1	C
Deep Creek	6101	3.1	C
Deep Creek	6101	2.6	D
Chiwawa	62	8.4	A
Chiwawa	6200	1.5	B
Chiwawa	6200	11.5	D
Big Meadow Creek	6300	9.7	C
West Chiwawa	6306	7.6	D
White River	6400	4.0	D
Little Wenatchee	65	6.9	B
Little Wenatchee	6500	5.2	C
Little Wenatchee	6500	2.4	D
Rainy Creek	6700	13.5	C
Labyrinth Mountain	6701	4.6	C
Mission Creek	7100	12.7	D
Camas Land	7200	5.8	C
Mountain Home Ranch	7300	11.0	D
Blewett Road	7320	6.0	B
Van Creek	7520	5.9	C
Icicle	76	8.6	A
Icicle	7600	5.8	C
Cooper Mountain	8020	21.1	D
Antoine	8140	10.6	C
Grade Creek	8200	39.1	D
Liberty-Beehive	9712	16.7	C
Liberty-Beehive	9712	16.3	D
Tieton	12	17.4	A
Naches Pass	19	14.7	A
Naches Pass	19	1.6	C
N.F. Tieton	1207	5.2	C
Wildcat	1306	0.7	B
Wildcat	1306	3.1	C
Oak Creek	1400	12.8	C
Bethel Ridge	1500	7.7	B
Bethel Ridge	1500	18.0	C
Bethel Ridge	1500	3.0	D
S.F. Tieton	1000	13.5	C
Lost Lake	1201	4.9	B
Lost Lake	1201	2.6	C
Devil's Canyon	1503	3.4	B
Devil's Canyon	1503	4.4	C
Bumping Lake	18	10.9	A
Bumping Lake	18	6.9	C
Little Rattlesnake	1501	5.5	B
Little Rattlesnake	1501	4.8	C
Milk Creek	1708	8.1	C
Devil Creek	1709	8.6	C

^{1/} See Exhibit 1 for definitions

TABLE III-45 (continued)
TRAFFIC SERVICE LEVELS FOR EXISTING ARTERIALS AND COLLECTORS

Road Name	Road Number	Road Miles	Current Service Level 1/
Nile Loop	1600	18.5	C
Rock Creek	1702	11.8	C
Swamp Creek	1706	9.2	C
Right Hand	1720	5.2	C
Raven's Roost	1902	15.8	C
Manastash Dr.	3100	10.5	B
Manastash Dr.	3100	2.3	D
Manastash Dr.	3100	2.2	C
Manastash Dr.	3100	4.0	D
Taneum	3300	6.8	B
Taneum	3300	1.4	A
Taneum	3300	12.4	C
Cabin Creek	4100	13.4	B
Stampede Pass	5400	4.8	B
Kachess	4900	2.0	A
Cooper	4600	4.8	B
Cooper	4600	4.8	C
Table Mountain	3500	9.0	B
Table Mountain	3500	3.1	C
Table Mountain	3500	4.2	D
Cow Camp	3111	3.6	C
Cow Camp	3111	3.0	D
Tamarack Sprs.	3120	6.4	C
Tamarack Sprs.	3120	0.2	D
Gnat Flat	3330	8.5	D
S Cle Elum Ridge	3350	11.1	C
Log Creek	4110	11.3	C
Log Creek	4110	0.4	D
Yakima Pass	5480	1.7	B
Yakima Pass	5480	5.7	C
Cold Creek	9070	5.6	C
Keechelus Frontage	4832	2.0	A
Keechelus Frontage	4832	7.5	C
Keechelus Ridge	4934	9.3	C
Gale Creek	4948	6.7	C
Box Canyon	4930	4.1	C
Box Canyon	4930	1.6	D
Thetis Creek	4936	4.0	C
Thetis Creek	4936	0.4	D
East Kachess	4818	6.8	D
French Cabin	4308	7.4	C
French Cabin	4308	2.0	D
Little Salmon LaSac	4315	5.3	C
Stave Creek	4613	5.7	C
Cle Elum Valley	4330	0.2	B
Cle Elum Valley	4330	13.0	C
N Fork Teanaway	9737	10.0	C
Blue Creek	9738	7.0	B
Blue Creek	9738	7.6	C
Blewett	7320	4.1	B
Hurley Creek	9711	6.6	C
Cougar Gulch	9718	5.7	C
Swauk Meadows	9716	3.8	C
Pole Patch	3507	6.7	B
Tacoma Pass	4112	1.3	C

b. State Highway System

The Washington State Department of Transportation (W.S.D.O.T.) is responsible for planning, designing, constructing, and perpetuating the public highways of the State highway system for the safe use and benefit of the public. Also, from time to time, the State is responsible for the construction of projects on a county road. The Forest Service Regional Forester has entered into a memorandum of understanding with Washington State. This memorandum establishes procedures for coordinating location, construction, maintenance, signing, avalanche control, drainage control, hazard tree removal, access and other matters related to State highway and Forest highway use and occupancy of National Forest lands. This memorandum is also designed to encompass road construction by the Federal Highway Administration. This memorandum and related maps that display the Forest Highway Systems are primarily for administrative use and are not reproduced in this document. They are available for review at the Forest Supervisor's Office in Wenatchee.

In 1977, the Washington Legislature directed the Transportation Commission to develop a State Transportation Plan (Section 7 (c) and 25, Chapter 151). A copy of this three-volume plan is available for review at the Forest Supervisor's Office. The Washington "Scenic and Recreational Highway Act of 1967" (RCW 47.39) is intended to provide for open space and to protect historic, geologic and scenic resources along transportation corridors. In recognition of those values, all the principle State Highways leading to or within the Wenatchee National Forest have been designated by the State as Scenic and Recreational Highways. They are also identified as State-wide Bicycle Corridors. Following is a brief description of those highways.

Snoqualmie Pass (Interstate 90)

Interstate 90 (I-90) is the major east-west route across the State. There are approximately 17 miles of 4-lane divided highway within the Forest boundary. In 1980, the Forest Service estimated that National Forest activities generated from 4 percent to 8 percent of the total traffic between Snoqualmie Pass and the Cle Elum area. Sea-

sonal traffic fluctuations caused by weekend skiing, hunting, and holidays can cause temporary congestion. The winding alignment and long steep grades near Hyak contribute to this congestion. About 21 percent of the total traffic is truck traffic. Annually, trucks carrying 31 to 50 million board feet of timber from the National Forest enter I-90 between Easton and Cle Elum. Future improvements will include resurfacing, minor widening, bridge repair or replacement, intersection improvements, and other actions to enhance safety.

Stevens Pass (U.S. 2)

Stevens Pass (U.S. 2) is mostly a 2-lane undivided highway. There are approximately 35 miles of U.S. 2 within the Forest boundary. Approximately 21 to 41 percent of the average daily traffic is generated by National Forest activities. Annually, between 16 to 30 million board feet of timber from the National Forest enters the highway on logging trucks in the vicinity of Cole's Corner. About 10 percent of the total traffic on U.S. 2 is truck traffic. Currently the State is planning improvements, including passing lanes.

Blewett Pass (Highway 97)

For the most part, this north-south corridor is located outside the Forest boundary. However, Highway 97 provides essential access (in conjunction with the county road systems) to such popular areas as the Teanaway drainage, Swauk Pass, the Entiat River Valley, Twenty-five Mile Creek drainage, and Lake Chelan. Highway 97 is mostly a 2-lane undivided highway. Approximately 30 miles are within the Forest boundary. In this area, known as Blewett Pass, approximately 5 to 10 percent of the average daily traffic is generated by National Forest users. This route is mainly used for inter-regional travel, and about 18 percent of the total use is truck traffic. Annually, about 9 to 15 million board feet of timber from the National Forest is hauled by truck from the area on trucks around Scotty Creek and the Old Blewett Road. Currently, the Washington State Department of Transportation is constructing passing lanes in the vicinity of Tronson Creek and Bonanza Campground.

Chinook Pass (Highway 410)

Highway 410 is a 2-lane undivided highway. There are approximately 32 miles of Chinook Pass Highway within the Forest boundary. Because of deep snow and potential avalanche hazard, the highway is not maintained for through traffic during the winter. About 18 percent to 36 percent of the average daily traffic is generated by National Forest activities. Annually, about 16 to 30 million board feet of timber from National Forest lands is trucked on Highway 410 in the area around Little Naches and another 15 million board feet between there and the Nile area. Approximately 2 percent of the traffic on Chinook Pass is truck traffic. Commercial truck haul is prohibited to the west at the Mt. Rainier National Park boundary. Currently, the Washington State Department of Transportation, in cooperation with the Federal Highway Administration, is beginning a project to reconstruct the Chinook Pass Highway. The reconstruction will include bridge replacement, guard rails, the addition of passing lanes and the construction of several parking areas and trailheads. Lands adjacent to Chinook Pass Highway have been designated by the Secretary of Agriculture as the Mather Memorial Parkway "for the use and the enjoyment of general public for scenic and recreation purposes..."

White Pass (U.S. 12)

White Pass is a 2-lane undivided highway. There are approximately 29 miles within the Forest boundary. The Forest Service estimates that from 9 percent to 18 percent of the total traffic is generated by activities on the National Forest. Approximately 5 percent of the total traffic on White Pass is truck traffic. Annually, from 16 to 30 million board feet of timber from the National Forest is hauled on White Pass. The majority of this enters between the Tieton Road and Oak Creek. Currently, the Washington State Department of Transportation does not plan any major construction or reconstruction on U.S. 12.

c. County Road System

County road systems are essential for the management of the Wenatchee National Forest. When the county or the Forest Service construct or reconstruct roads adjacent to or within the Forest boundary, the improved access can encourage development on private lands. The residents may bring pressure on the County to provide all-weather access and services that, on a per capita basis, can be prohibitively expensive. These residents may also bring pressure on the Forest Service to manage the adjacent public lands in manner that protects the values and life style that may have originally attracted them to the area.

The legal definition (Forest Service Handbook 7709.16) of a public road is one that is under the jurisdiction of a public authority and open to public travel. In the context of this definition, the Forest Service is not a public road authority and Forest Service roads are not public roads. Forest development roads are roads under the jurisdiction of the Forest Service which are necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources (Title 23 USC 101, as amended by the Surface Transportation Act of 1978).

Forest development roads can normally accommodate incidental public service traffic. However, the majority of the use may eventually be comprised of traffic from commercial or residential development, or the road may be used for mail, school, or other local government purposes. In such cases, the Forest Service will actively negotiate and encourage the transfer of its jurisdiction to the appropriate public road agency, usually a county.

The Counties and the Forest Service recognize that it is in the public interest to cooperate and to share in the cost of the construction, reconstruction, improvement, and maintenance of certain Forest development roads and county roads.

Chelan County roads provide access to such popular areas as the Icicle, Entiat, and Chiwawa drainages and the Mission Ridge area. The Forest Service and Chelan County have a cooperative agreement that covers some 50 different roads and provides for consultation, maintenance plans, project agreements, rights-of-way, etc.

ROADS

Yakima County and the Forest Service have a maintenance agreement to cover the Tieton Reservoir Road, the Bumping River Road, and the Fontaine Road. The Wenas and Nile Roads are Yakima County roads that provide access to National Forest land.

Kittitas County roads provide access to, among others, Reecer Creek, Manastash Creek, the Te-anaway area, and Lake Kachess. Although there is no formal agreement, the Forest Service maintains the Cle Elum River Road from Salmon La Sac to Tucquala Meadows. The Federal Highway Administration, the Forest Service, and the County are considering reconstructing the Kittitas County road along Cle Elum Lake for some 7 miles to Salmon La Sac.

Title 36 of the Revised Code of Washington (RCW) contains the authorities and direction to the Counties. Those RCW's most appropriate to County roads within the National Forest are:

36.75.070	Highways Worked Seven Years.
36.75.080	Highways Used Ten Years.
36.75.090	Abandoned State Highways
36.75.300	Primitive Roads - classification and designation.

Each County in the State is required to prepare and adopt a comprehensive six-year road program (RCW 36.81.121).

No major construction or reconstruction is planned by Yakima, Kittitas, or Chelan county on roads within or leading to the Forest on the six-year program.

d. Private Road System

Whenever possible or feasible, the Forest Service avoids duplicating existing or planned road systems by negotiating agreements with interested parties to share in the costs of a single system to serve all tributary ownerships.

Currently, the Wenatchee National Forest has share cost agreements with Plum Creek, Boise Cascade Corp., Idaho Pine, Longview Fibre Co., and the Washington State Department of Natural Resources. These agreements cover some 716 miles of road, worth approximately \$27,438,000.

Because of the checkerboard ownership pattern, it is often necessary for the Forest Service or the intermingled landowners to acquire easements or rights-of-way across each other's land. Currently, some 10 percent of the Forest Development Road System is on land managed or owned by others. The acts of June 8, 1897 (16 USC 478) and December 2, 1980 (16 USC 3210) provide for access to non-Federally owned land within the boundaries of the National Forest system. This gives private landowners the right to cross National Forest lands to reach and utilize their property, subject to compliance with applicable rules and regulations. Forest Service regulation 36 CFR 212.8 directs the Forest Service, as promptly as feasible, to grant appropriate access across National Forest land to intermingled or adjacent landowners. Under some circumstances, an environmental analysis is necessary.

15. FIRE

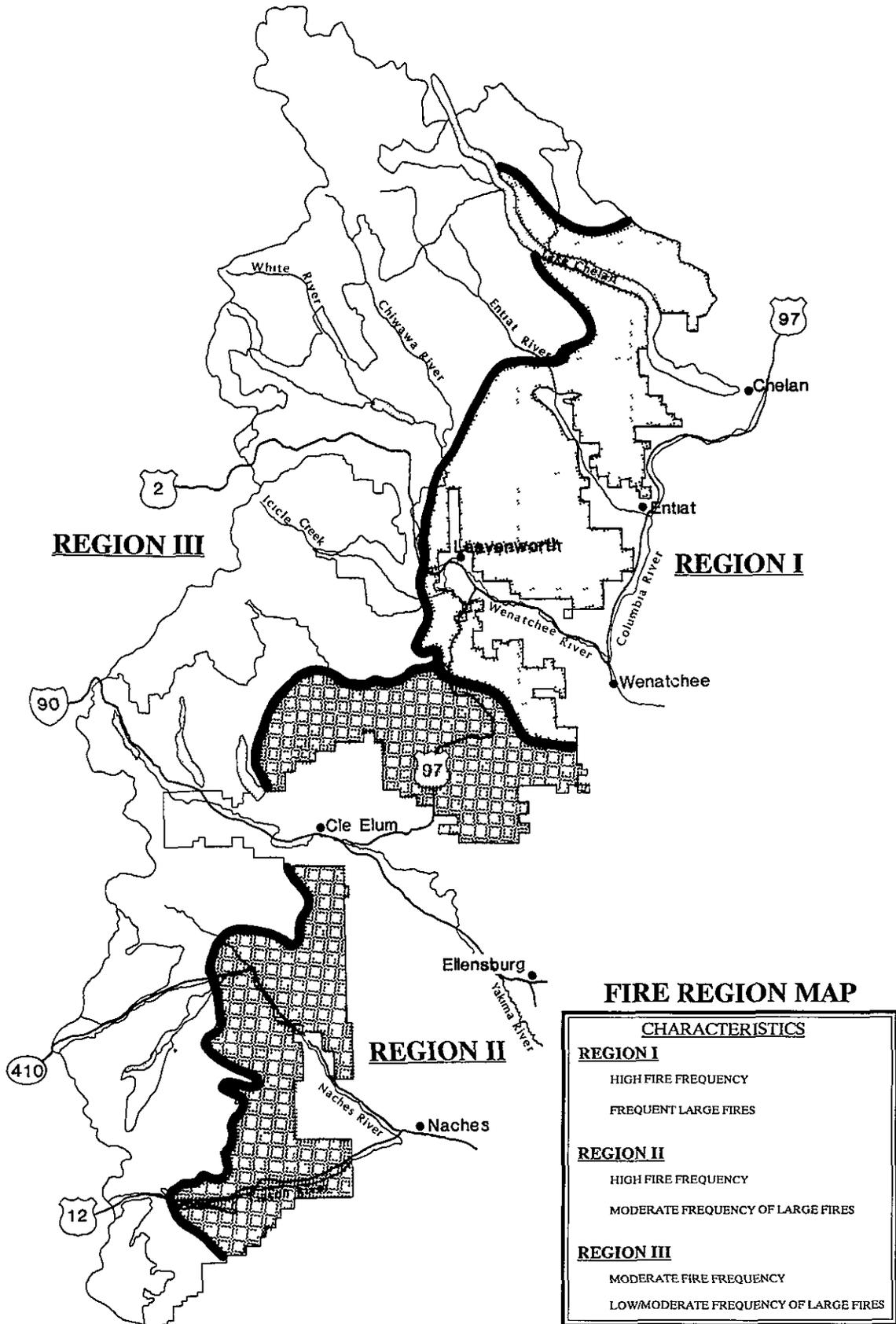
a. Fire as an Ecological Event

Fire is an event that has played an important role in the many ecosystems found on the Wenatchee National Forest. It is an event that varies in frequency, extent, and intensity and is dependent on the climatic, topographic, and vegetative conditions occurring at the point and time of ignition.

The Wenatchee National Forest has a very complex pattern of historic fire occurrence. For purposes of general comparison, dividing the Forest into three regions is helpful in attempting to understand the relative impact of fire on the ecosystems. (See Figure III-14).

Region I can generally be described as the north-east portion of the Forest. The area is located north of Mission Ridge and encompasses the eastern portions of the Wenatchee, Entiat, and Chelan River drainages. Region I has a history of more large fires than the rest of the Forest. Steep topography, extended dry periods, and strong westerly winds have contributed to the occurrence of many large fires in this area.

FIGURE III-14
FIRE OCCURRENCE MAP



Region II is located south of Mission Ridge and lies along the eastern boundary of the Forest in Kittitas and Yakima counties. In this area, the frequency of wildfire ignitions remains relatively high but the average size of the fires is much smaller than in Region I. In Region II, the area is also very dry but the topography is less severe and there are fewer wind-driven fires when compared to Region I.

Region III runs along the entire eastern side of the Cascade Crest. The area exhibits a moderate number of ignitions but, generally, these fires remain small due to the influence of wetter weather from west of the mountains. In this region, there are a variety of topographic features affecting fire behavior, but the moist climatic conditions tend to be the dominant influence on fire behavior.

These general statements about the frequency and size of fires in each region are based on the information available from long-term observations. Within each Region, when climatic conditions are appropriate, the occurrence of multiple fires, or a single large fire is possible. There are no clearly definable boundaries between these regions and the influence of fire in each area has been modified by human activity and resource management practices.

Another contrast that can be drawn between the fires which historically occurred on the Forest can be seen in their effects on the ecosystem. In one instance, a fire will burn very intensely and kill and consume nearly all the vegetation within the perimeter of the fire. This type of fire is referred to as a "Stand-Replacing Fire". On the Wenatchee National Forest, these types of fire generally occur in areas near the Cascade Crest in the true fir, subalpine fir, and lodgepole pine communities. These fires also occur along the eastern fringe of the Forest in the sagebrush, bitterbrush and grass communities.

The second type of fire which occurs is described as a "Stand-Maintaining Fire". This type of fire does not kill all of the vegetation within the perimeter and serves to "clean up" the Forest by removing the build-up of organic debris. Some trees and other plants survive these types of fire and continue to grow and prosper. These fires

occur primarily in the ponderosa pine, Douglas-fir, and larch stands which exist in various locations around the Forest.

Several studies show that the average frequency of fire visiting a specific site ranges from 7-12 years in some of the Leavenworth and Entiat drainages, to well over 300 years in many of the wetter locations near the Cascade crest. Lightning is the only significant natural cause of fires on the Wenatchee National Forest.

b. Human Influence on the Natural Fire Cycle

The influence of human activities on the natural fire cycle on the Forest varies depending on the culture that inhabit the area at the time. When interpreting the frequency of natural fire, the impacts of the Indian culture prior to the mid-19th century must be considered. Before the influence of the European Culture, the Yakima, Wenatchi, and other Indian Nations used fire to enhance their use of the resources. The Indians' huckleberry patches and hunting areas were maintained and improved by removing encroaching vegetation with the use of fire.

With the exploration and colonization of the region by European explorers, a rapid change began to take place. With increased utilization of the timber resource and the establishment of permanent dwellings a period of fire suppression began. Starting in the early 1900's, the Forest Service began an aggressive policy of suppressing all fires. In 1935, a Forest Service policy statement was issued which directed the fire management activities on the National Forests. It stated:

"Fire suppression will be fast, energetic, thorough, and conducted with a high degree of regard for personal safety.... When first attack fails,.... organize and activate sufficient strength to control every fire within the first work period. If the fire is not controlled in the first work period, the attack each succeeding day will be planned and executed to obtain control before 10 o'clock the next morning."

FIRE

In 1972, additional fire planning instructions were issued which specified that suppression capabilities be planned to control fires at 10 acres or less on 90% of the days during fire season.

In 1977, Forest Service Chief John McGuire met with the Regional Foresters to review the National Forest fire policy. A revised fire policy was issued which became effective in February, 1978 and stated:

“The basic fire management policy on National Forest System lands is to provide well planned and executed fire protection and fire use programs that are cost-effective and responsive to land and resource management goals and objectives, and supportive of the 1974 Forest and Rangeland Renewable Resources Planning Act resource outputs.”

Fire policies and the effectiveness of the implementation have varied over time, but the overall effect has been to change the frequency and distribution of naturally occurring fires. The significance of this change depends on the frequency of fire occurrence prior to human intervention. In areas where the fire frequency has been high (less than 20 years), the impacts of human actions have significantly affected the vegetative conditions in the Forest.

Human activity has also increased the number of unwanted ignitions. Man-caused fires now result from a variety of sources ranging from powerline failures to abandoned campfires. Table III-46 displays the fire occurrence on the Wenatchee National Forest from 1957-1985. Table III-47 depicts fires which have exceeded 100 acres for the same period. Both tables show that fire remains a frequent event on the Forest during the typical long, dry, summer season.

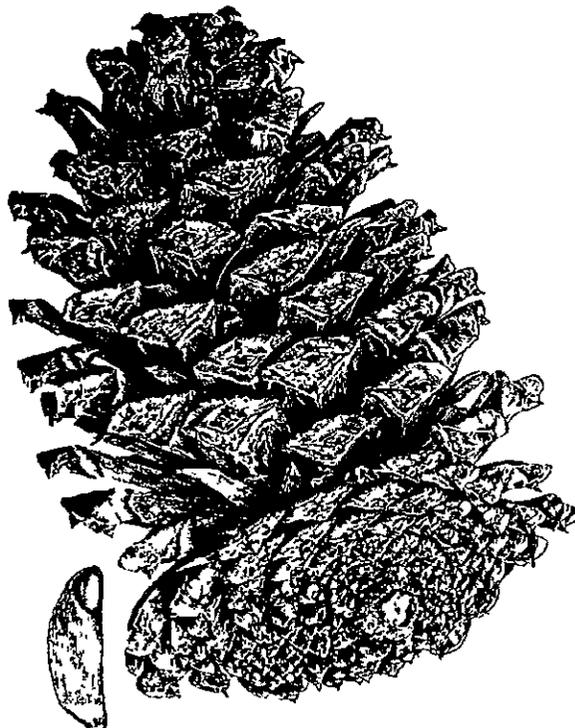


TABLE III-46

**ANNUAL FIRE OCCURRENCES BY ACRES AND CAUSE
1957 - 1985**

Year	Lightning Caused (Fires)	Human Caused (Fires)	TOTAL (Fires)	Lightning Caused (Acres)	Human Caused (Acres)	TOTAL (Acres)
1957	21	60	81	Unknown		92
1958	111	51	162	Unknown		10,927
1959	7	50	57	Unknown		206
1960	13	111	124	---	1,084	1,084
1961	189	83	272	---	5,773	5,773
1962	63	74	137	388	294	682
1963	132	91	223	185	3,645	3,830
1964	13	67	80	2	2,280	2,280
1965	128	100	223	7	205	212
1966	37	102	139	1,520	124	1,644
1967	8	91	99	---	676	676
1968	18	69	87	10	28,484	28,494
1969	18	113	131	3	213	216
1970	176	255	431	130,407	1,017	131,424
1971	27	132	159	322	45	367
1972	23	90	113	1	59	60
1973	11	191	202	1	183	184
1974	8	175	183	1	845	846
1975	108	88	196	51	145	200
1976	10	145	155	6	10,762	10,768
1977	165	135	300	102	1,087	1,189
1979	59	128	187	83	2,133	2,216
1980	61	74	135	10	246	256
1981	117	56	173	36	7	43
1982	99	49	148	154	35	189
1983	30	61	91	5	7	12
1984	77	45	122	17	31	48
1985	14	58	72	91	1,512	1,603

TABLE III-47
WENATCHEE NATIONAL FOREST -- HISTORY OF LARGE FIRES (1960-1985)

Date	Name of Fire	Ranger District	Cause	Fuel Type	Acres
07/18/60	No 2 Canyon	Leavenworth	Smoking	Grass/Brush	610
06/21/60	Birch Mtn.	Leavenworth	Debris	Grass/Brush	299
06/29/61	Tenas George	Entiat	Equipment	Grass/Brush	3,750
08/11/61	Eagle Creek	Leavenworth	Smoking	Brush/Pine	750
10/01/61	Nahahum	Leavenworth	Children	Grass/Brush	525
08/16/61	Swakane #2	Entiat	Lightning	Brush/Pine	125
07/31/61	Mud Creek	Entiat	Lightning	Pine	150
08/25/62	Skyline Dr.	Leavenworth	Smoking	Grass/Brush	178
07/27/62	Forest Mtn.	Entiat	Lightning	Pine	520
08/07/63	Cashmere RR	Leavenworth	Railroad	Grass/Brush	120
08/25/63	Bear Mtn.	Chelan	Lightning	Brush/Pine	114
09/06/63	River Road	Leavenworth	Railroad	Pine	161
09/22/63	Monitor	Leavenworth	Lightning	Grass/Brush	118
10/21/63	Chelan Butte	Chelan	Powerline	Grass/Brush	3,097
08/08/64	Willow Tree	Chelan	Equipment	Grass/Brush	2,370
08/26/66	Hornet Creek	Entiat	Lightning	Mixed Conifer	1,520
07/06/68	Dry Gulch	Leavenworth	Equipment	Grass/Brush	2,000
08/04/68	4th of July Mtn.	Chelan	Unknown	Brush/Pine	27,120
08/05/68	Ardenvoir	Entiat	Burn. Bldg	Brush/Pine	1,210
08/14/69	Chumstick	Leavenworth	Railroad	Brush/Pine	160
07/07/70	Mills Canyon	Entiat	Children	Brush/Pine	933
08/24/70	White Pine	Lake Wenatchee	Lightning	Timber	124
08/24/70	Hansel Creek	Leavenworth	Lightning	Timber	170
08/24/70	Falls Creek	Lake Wenatchee	Lightning	Timber	500
08/24/70	Shady Pass	Entiat	Lightning	Timber	1,950
08/24/70	Mid Slope	Lake Wenatchee	Lightning	Timber	120
08/24/70	Airport	Lake Wenatchee	Lightning	Timber	3,571
08/24/70	Cold Ridge	Entiat	Lightning	Timber	14,360
07/16/70	Safety Harbor	Chelan	Lightning	Timber	15,715
08/24/70	Mitchell Creek	Chelan	Lightning	Timber	42,280
08/24/70	Slide Ridge	Chelan	Lightning	Timber	7,100
08/23/70	Boulder Ridge	Leavenworth	Lightning	Timber	788
08/24/70	Cougar Mtn.	Entiat	Lightning	Timber	190
08/24/70	Entiat Zone	Entiat	Lightning	Timber	43,118
08/10/71	Goat Mtn.	Chelan	Lightning	Timber	322
08/06/74	Eight Mile	Leavenworth	Equipment	Timber	500
08/30/74	Mineral Springs	Cle Elum	Equipment	Brush/Pine	143
08/02/75	Grade Creek	Chelan	Campfire	Grass/Brush	135
07/24/76	Crum Canyon	Entiat	Equipment	Brush/Pine	9,000
07/26/76	Ingalls Creek	Leavenworth	Campfire	Timber	650
07/14/77	Box Canyon	Chelan	Campfire	Brush/Pine	512
07/15/77	Bear Mtn.	Chelan	Burn Vehicle	Brush/Pine	110
07/31/79	Slide Ridge	Chelan	Fireworks	Brush/Pine	866
08/12/79	Spring Water	Leavenworth	Debris	Grass/Brush	340
10/08/79	Nahahum Canyon	Leavenworth	Debris	Brush/Pine	1,050
07/16/80	Silica	Chelan	Campfire	Brush/Pine	210
06/27/85	Cascade	Chelan	Misc	Brush/Pine	450
07/04/85	Devils Ridge	Naches	Equipment	Slash/Timber	120
07/25/85	Forth of July	Chelan	Misc	Brush/Pine	740
07/25/85	Lost Lake	Cle Elum	Equipment	Slash/Timber	750
07/28/85	Five-Mile	Leavenworth	Debris	Slash	500
09/03/85	Blewett Pass	Cle Elum	Lightning	Slash/Timber	90

c. **Forest Management/Fire Management**

National Forest managers continue to adjust the approach to managing fire to provide a variety of resources and recreational experiences. One approach is the involvement of the Forest in an active, prescribed fire program. Fire is an excellent management tool when appropriately applied to achieve well defined objectives. On the Wenatchee National Forest, this ranges from the use of fire to replicate the natural fire cycle within the Alpine Lakes Wilderness, to the disposal of logging residues in preparation for reforestation activities. Significant projects have also been implemented to enhance mule deer winter range and to decrease the buildup of organic debris in an attempt to reduce the risk of a wildfire.

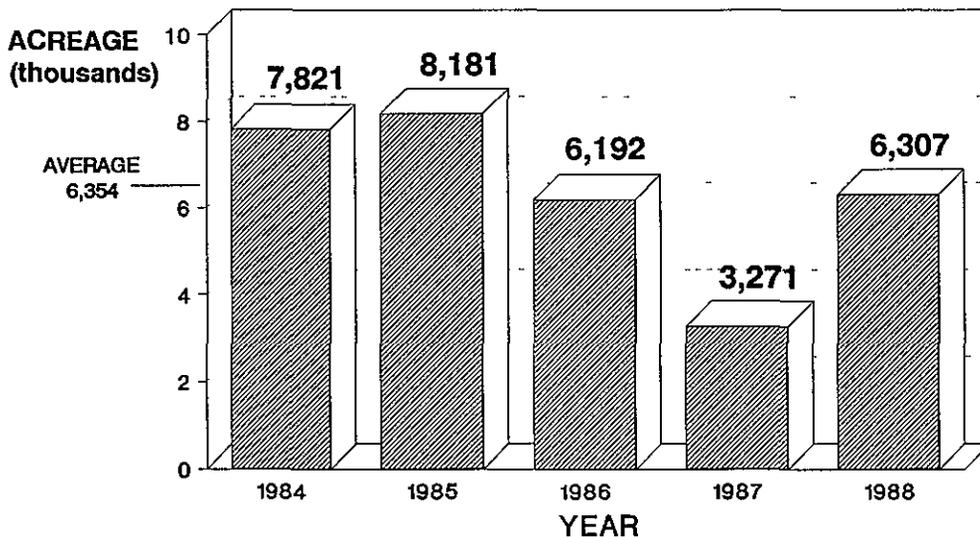
The following chart depicts the number of acres treated by prescribed fire during the past five years.

The second approach to fire management on the Forest involves the suppression of wildfires which are damaging to the resources. The revised fire policy for the Wenatchee National Forest, which was implemented in 1984, mandates that all wildfires be suppressed in the most cost efficient manner. This requires the manager to evaluate

the values at risk and the costs associated with suppression, and to implement a strategy which is most efficient. The development of various computerized models, such as the National Fire Management Analysis System and The National Fire Danger Rating System, have provided additional information on which to base decisions. In addition, the Forest has expanded its reciprocal and cooperative agreements with County, State, and Federal agencies in an attempt to utilize the skills and equipment of all fire suppression agencies in the most efficient manner.

The priorities for fire suppression actions have remained Life, Property, and Forest Resources throughout the century. The major change now influencing our fire suppression efforts is the increased urbanization of wildland environments. This change has made the fire suppression task much more complex and has increased the need for all agencies to participate in Interagency Suppression Activities.

**FIGURE III-15
WENATCHEE N.F. FUELS TREATMENT**



16. SOCIAL/ECONOMIC

a. Social Effects

Community stability is not only an important consideration in selecting a land and resource allocation alternative, it is also a difficult element to describe accurately. Jobs, incomes, receipts, multipliers, etc., are useful but do not portray the total picture, particularly the quality of life aspects.

Communities within and adjacent to the Forest are concerned about a balance of natural and human-related resource activities. Many of the residents of the communities in the area of the Forest derive their livelihood from forest-related activities and many participate in a wide variety of forest recreational activities. These residents have a keen interest in the management of the Wenatchee National Forest.

The recreational activities and environmental amenities offered by the Forest are important components of life in the small rural recreational and residential communities located in and around the Forest. Examples include the Lake Wenatchee area, Leavenworth, and Chelan. Because the economic base of these communities depends on tourism, they are affected by changes

in the pattern of recreational opportunities on the Forest. They are also affected by changes in environmental quality, and benefit from opportunities for free and easy access to forest resources and products. Firewood, fish, game and water are among forest resources important to local communities. The preservation of these Forest qualities is of great importance to these communities.

Rural communities whose economic life is tied to logging, sawmills, and related transportation and construction are also affected by changes in the supply of timber from the Forest. The productive use of resources and products is an important value of Forest management.

Chelan, Kittitas, and Yakima Counties are directly influenced the most by the Forest. Figures III-16 and III-17 portray the relationship of the Forest to the land areas of the counties

In addition to the residents of the three-county area, Forest management affects out-of-area recreationists who live in the metropolitan areas of Washington State. These people enjoy the many recreational benefits of the Forest and are concerned about recreational and visual quality, wilderness, road access, and hunting opportunities.

Figure III-16
Land Area Relationship of Wenatchee National Forest to Counties

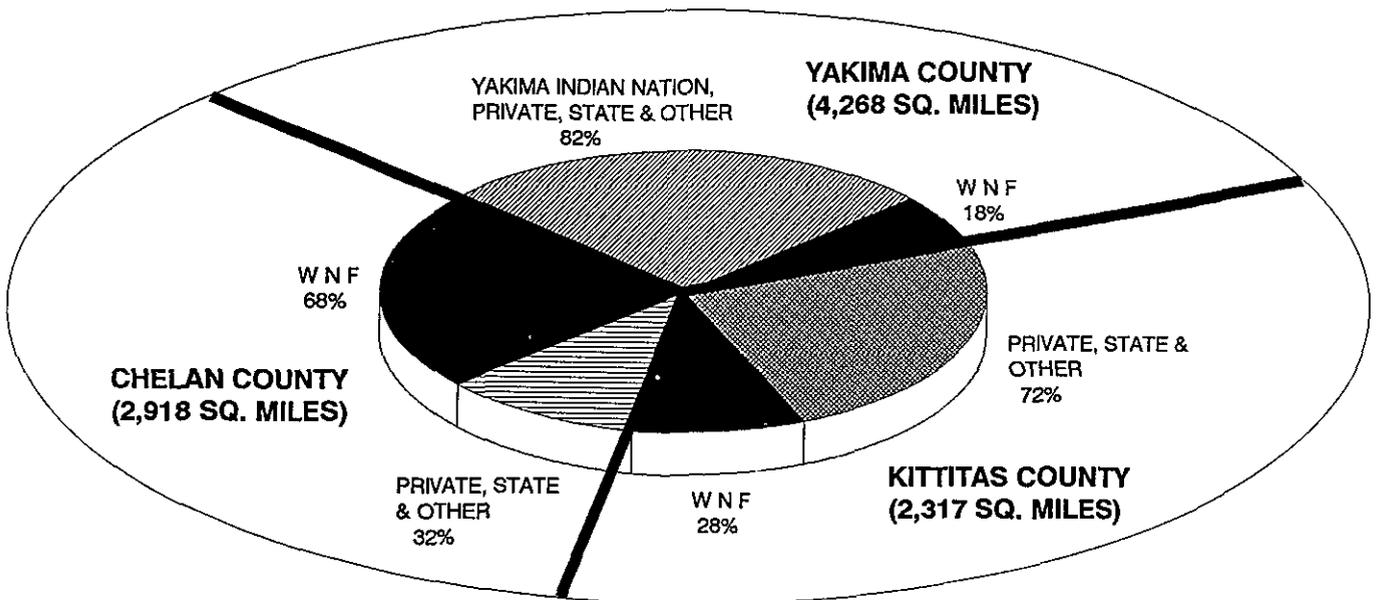
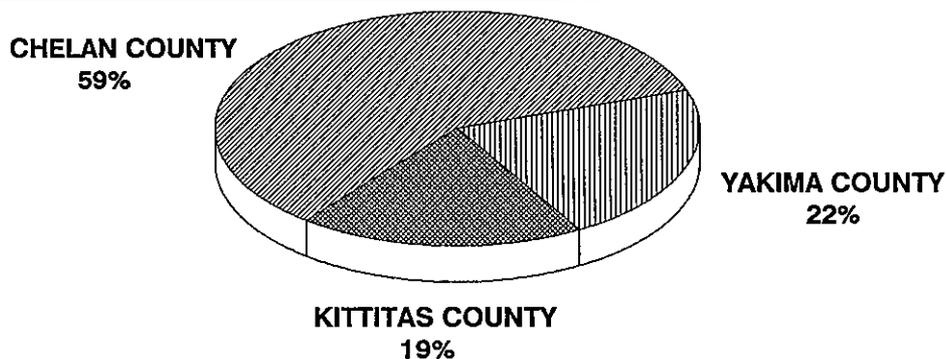


Figure III-17
Physical Location of the Wenatchee National Forest By Counties



A Socio-Economic Overview of the Wenatchee National Forest, updated in 1984, was prepared by the Envirosphere Company of Bellevue, Washington. The overview contains an analysis of the social and economic environment of central and western Washington as it relates to the Wenatchee National Forest. It also presents the analysis framework used, outlines the demography of the region, and presents the economic and social characteristics of the area. The final section portrays the role of the Forest in the zone of influence. The socio-economic overview is available for review at the Wenatchee National Forest Supervisor's Office in Wenatchee. For more information on social/economic analysis, refer to Appendix B.

b. Population

The three counties have an area of 9,503 square miles and a population of almost 250,000 people (see Table III-48). Yakima County is the most densely populated (40 people per square mile) while Kittitas County has the least population density (11 people per square mile). Most people live in the larger towns and cities scattered along the east side of the mountains, especially Wenatchee, Ellensburg, and Yakima. About 90 percent of the people in the three counties live in the agricultural valleys. Residents in the eastside communities are affected by the Forest through availability of recreation, the payments to county governments from Forest receipts, production of market goods such as lumber and beef, and other amenities such as enjoyment of the visual character of the Forest.

TABLE III-48
1983 POPULATION DATA

	Washington	Chelan County	Kittitas County	Yakima County
1983 Population	4,285,100	46,500	24,900	177,000
Percent Urban Population (incorporated areas)		52%	63%	50%
Percent Rural Population (unincorporated areas)		48%	37%	50%
Cities with Population of 1,000 persons or more (in rank order decreasing size)		Wenatchee Chelan Cashmere Leavenworth	Ellensburg Cle Elum	Yakima Sunnyside Toppenish Grandview Selah Wapato Union Gap Granger Zillah Mabton

Source: 1983 Population Trends for Washington State

c. **Economy**

Economic activities in Chelan, Kittitas, and Yakima Counties are tied to the activities of the Wenatchee National Forest. A large proportion of the residents of this area rely on the commodity and amenity resources of the Forest. Economic activities affecting local individuals include logging, sawmill operations, commercial livestock operations, tourism, and various recreational pursuits. Residents of the study area have the opportunity to participate in nearby Forest recreation activities such as hunting, fishing, hiking, and a range of winter sports. These opportunities generate demand for recreation-related goods and services.

The service, government, agriculture, forest products, and construction industries are all important in Central Washington. Because the make-up of the service-related and government sectors is influenced to a large extent by the composition and relative influence of the primary (agriculture and forestry) and secondary (manufacturing and processing) sectors, emphasis is placed on describing the importance of these latter industries in the region.

Employment and income data on Central Washington's economy are presented in the following sections. Additional information is provided on the agricultural sector, the region's most important, forest industries, an important sector that is highly influenced by the Wenatchee National Forest; and the local tourist industry, which is related to the recreation influence of the Forest.

In 1984, 1,575,314 individuals were employed in Washington State. Combined employment for Chelan, Kittitas, and Yakima Counties of 83,872 represented five percent of the State's total work force. Employment data for major industrial sectors in the State and Central Washington counties are presented in Table III-49.

The unemployment rate is an important indicator of the health of a local economy. Due to the relative shortage of jobs in the Forest Influence Zone, the unemployment rates in Chelan, Kittitas, and Yakima Counties were consistently higher than the unemployment rate State-wide (Table III-50). (These data on unemployment are recorded by county of residence, not by county of work place. Data on Chelan and Douglas Counties have been aggregated because these two counties represent one labor market.)

TABLE III-49
EMPLOYMENT BY STATE AND SELECTED COUNTIES (NUMBER OF PERSONS)
MARCH, 1984

	Washington State	Chelan and Douglas County	Kittitas County	Yakima County
Total Employment	1,575,314	20,649	7,216	56,007
Agriculture, Forestry and Fishing	34,865	2,241	---	8,017
Mining	2,426	43	---	52
Construction	69,606	740	128	1,764
Manufacturing	277,895	2,552	531	6,708
Lumber and Wood Products	40,585	325	82	1,145
Food and Kindred Products	28,224	644	284	2,530
Transportation and Public Utilities	80,363	562	288	2,328
Wholesale Trade	97,192	2,194	370	4,982
Retail Trade	286,083	3,636	1,629	9,856
Finance, Insurance, Real Estate	90,878	945	200	1,741
Services	317,938	4,276	1,167	11,226
Federal Government	66,972	438	114	983
State Government	83,801	841	1,406	1,946
Local Government	167,197	2,181	1,214	6,404

Source Washington Employment Security Department 1985 Employment and Payrolls in Washington State by County and Industry First Quarter 1984, No 150

TABLE III-50
UNEMPLOYMENT RATES 1970, 1975, 1979, 1981, 1983, 1984
(in percent)

Year	Washington	Chelan-Douglas Counties	Kittitas County	Yakima County
1970	9.1	10.9	9.5	10.7
1975	9.6	10.8	10.5	10.4
1979	6.8	10.5	9.0	9.7
1981	9.5	12.8	12.7	12.0
1983	11.2	14.5	13.1	14.9
1984	9.5	12.3	13.0	14.4

Source: Washington Employment Security Department (ESD), Research and Statistics Section. 1980, 1981, 1983, 1984 Personal Communication.

In 1984, National Forests in Chelan, Kittitas, and Yakima Counties contributed \$3,593,366 to the Counties for roads and schools (see Table III-51). Of this, \$3,337,750 came from Wenatchee National Forest administered lands.

TABLE III-51
SOURCE OF COUNTY REVENUES - 1984
(In Dollars)

County	1984 Property Tax Revenue Levies	Wenatchee N.F.	25 Percent Funds Given to Counties Based on National Forest Receipts ^{1/}		
			Mt. Baker ^{2/} Snoqualmie N.F.	Gifford Pinchot N.F.	Total National Forest Payments to Counties
Chelan	17,390,291	1,337,183			1,337,183
Kittitas	6,938,570	334,059	176,479		510,538
Yakima	43,938,061		1,490,029	255,616	1,745,645
Totals	68,266,922	1,671,242	1,666,508	255,616	3,593,366

^{1/} 25 percent funds are based on proclaimed National Forest boundaries. This is for Fiscal Year 1984 (October 1983-September 1984)

^{2/} Administered by the Wenatchee National Forest, but the 25 percent funds are based on Mt. Baker-Snoqualmie National Forest receipts

Sources: Chelan, Kittitas, and Yakima County Assessor's Offices, Personal Communication. April 15, 1985
 U.S. Department of Agriculture, Forest Service, Wenatchee National Forest, 1984. File Data

SOCIAL/ECONOMIC

Per capita personal income data are available for 1970 and 1978 from the Bureau of Economic Analysis (U.S. Department of Commerce, Bureau of Economic Analysis 1980). In 1970, the per capita income in Washington was \$3,997. Personal income in the Forest Influence Zone was lower. Chelan County ranked highest at \$3,665. The 1970 Kittitas County figure was well below this at \$2,975.

Since 1970, per capita personal income Statewide increased by 178 percent to \$11,110 in 1981. The rank order among the three counties has remained constant, but all three registered larger percentage increases than the State. Personal income increased at a rate of 195 percent in Chelan and Kittitas counties, 192 percent in Yakima County. Table III-52 contains data on per capita income for the years 1970, 1978, and 1981.

TABLE III-52

PER CAPITA PERSONAL INCOME
(Dollars)

Year	Washington	Chelan County	Kittitas County	Yakima County
1970	3,997	3,665	2,975	3,248
1978	8,553	9,181	6,454	7,628
1981	11,110	10,826	8,773	9,482
Percent Change 1970-1981	178%	195%	195%	192%

Source: U.S. Department of Commerce, Bureau of Economic Analysis, 1980. Regional Economics Information System. Washington State Data Book, 1983.

The economy in the area east of the Wenatchee National Forest rests heavily on agricultural production. Yakima County is the State's leading agricultural county with a diversified farm base. Its principal products include apples and soft fruit, cattle, hops, potatoes, and wheat. The economy of Chelan County depends primarily upon deciduous orchard crops, with apples being the predominant crop. Kittitas is primarily an agricultural county producing crops and livestock.

The Central Washington area is important to the State's economy because of its agricultural base. These counties support 36 percent of the State's agricultural employment with Yakima County alone supporting 27 percent (ESD, 1984).

The agricultural sector will remain the dominant force in the economy of Central Washington. The strong demand for agricultural products abroad as well as the anticipated strength of

domestic demand will, if anything, increase the importance of agriculture in Central Washington. This trend should continue at least through 1990 and may become even more pronounced in the future.

The lumber and wood products industry in the three-county area represented 3.7 percent of the State's employment for that industry in 1983 (ESD, 1984). Yakima County has the largest lumber and wood products work force among the Central Washington counties, with 1,048 workers in 1983. This represented 17 percent of manufacturing employment in the county, and 2 percent of total employment. Chelan County's lumber and wood products industry employed 293 workers in 1983, for respective manufacturing and total county employment shares of 14 percent and 1.5 percent. The lumber and wood products work force of 72 in Kittitas County was much smaller in absolute terms, but still accounted for 17 percent of all manufacturing jobs in the county and 1.1 percent of total employment.

Industries in the three counties accounted for eight percent of the State's timber consumption. Specifically, seven percent of all timber used in the Washington lumber industry was consumed by the seven sawmills located in Chelan, Kittitas, and Yakima Counties. The veneer and plywood industry has a relatively small economic importance in the study area since one mill each is located in Kittitas and Yakima Counties.

The forest products sector of the economy will likely decrease in importance in the future. The extent of this decline, however, will be influenced by several factors. Most notably, the reduction in timber available from private land may cause an overall slump in timber production in the region, and could very likely contribute to a reduction in capacity or closure of local mills. This reduction could lead to further pressure for increasing the harvest from National Forest System lands. This pressure should become particularly intense in the 1990's or earlier should housing demand rebound substantially from its low levels in the early 1980's.

Visitors to the Wenatchee National Forest have an impact on the local economy because of expenditures they make for goods and services. Data on the number of retail trade establishments

are available from the U.S. Census Bureau for States and counties. The variables selected as indicators of local economic dependency on recreational use include the following: 1) hotels, motels, and recreational vehicle parks; and 2) eating and drinking establishments. While these components of the services industry receive a significant amount of business from non-tourists, trends in these two service industries reflect growth or decline in the tourist industry.

In Chelan County, there were 44 hotels and motels and 108 eating and drinking establishments in 1972. In 1983, the number of restaurants increased by 16 percent to 125 and the number of hotels/motels increased by 6 percent to 45 establishments. Most growth has been concentrated in the Wenatchee area. Collectively, these establishments supported about 1,890 jobs, or about 10 percent of total employment in the county. Most of the additions include larger motels and restaurants employing more personnel than in 1972. There were only 1,400 jobs in these categories in 1978.

In Kittitas County, the number of eating/drinking establishments decreased during the 1972 to 1983 period, from 78 to 67 establishments in 1983. The number of hotels/motels decreased from 27 to 19. Total employment supported by these retail and service outlets was approximately 1,020 jobs, up from 900 in 1978, or nearly 13 percent of all Kittitas County employment.

In Yakima County, the number of eating and drinking establishments decreased from 1972 to 1983. There were 44 hotels and motels and 309 eating and drinking establishments in 1983. This decrease is misleading, however, because a number of facilities have expanded their capacity. This is particularly true in the City of Yakima where increased capacity has resulted from attempts to increase convention activity.

A particularly active sector of the regional economy will be the tourism sector. An increase in summer and winter recreation activities, particularly along the major travel routes, is expected. The greatest recreational demand will be near the transportation corridors leading from Puget Sound area population centers. Recreational demand will be greatest in those areas closest to the Everett-Seattle-Tacoma metropolitan area.

d. Social Structure

The social system surrounding the Wenatchee National Forest is characterized by its complexity and propensity for change. The complexity is due to the size of the Forest and its proximity to a major metropolitan area in the Puget Sound region, diverse manufacturing and agricultural communities in the Central Washington region, and recent non-metropolitan growth in the immediate vicinity of the Forest. Change is attributable to rapid metropolitan and non-metropolitan population growth in the Puget Sound region and localized growth in non-metropolitan areas and towns in the Central Washington region.

Intermixed ("checkerboard") land ownership patterns on the Wenatchee National Forest could increasingly become a source of conflict. The expanding set of public goods assigned to National Forest lands by an advanced industrial/social system will be increasingly inconsistent with intensive forest management on adjacent private lands. Forest users and interest groups are likely to become increasingly concerned with inconsistent land uses along these ownership boundaries.

The original migrants to Washington were drawn by opportunities in extractive industries associated with ranching, mining, agriculture, and wood production, as well as the transportation, trade, and service industries which facilitated resource extraction and industrial development (Johansen and Gates, 1957). Farming, ranching, wood production, and some mining provided the primary economic base for the formation of towns along the eastern base of the Cascades. Communities such as Ellensburg, Yakima, Wenatchee, Cle Elum, and Chelan grew in response to markets for basic materials that could be produced from an abundant stock of fertile soils, forage, wood, and coal or minerals.

The populations of these small communities fluctuated with the viability of extraction-based economies. Farming and ranching were relatively stable. Early population growth based upon timber and mining on private land subsided when demand for these resources decreased.

The Yakima River Project brought about the development of irrigation and hydroelectric power beginning early in this century, and may have been the single most important factor in the growth of the region. The economic base established by the Yakima Project and other agricultural development provided the basis for long-term population growth in the region. As agricultural production increased, creating additional activity in processing, distribution and services, small towns such as Yakima and Wenatchee grew into regional manufacturing and service centers. Expanding trade, facilitated by rail and water transport, provided better access to markets for farm products and other regional exports.

Over the last century, the proportion of employment in the primary extractive industries, such as timber harvest and mining, has declined sharply in contrast with the service sector of the economy. The shift in emphasis from resource extraction to services has made recreation and tourism a new economic base for some communities. This shift also places increasing emphasis on public goods such as recreation resources, clean air and water, scenery, and wilderness preservation.

e. Human and Community Resources

The Forest is committed to a nation-wide program of human and community development, which has as its primary goal helping people and communities to help themselves. The program includes activities that provide work and learning experiences for youth, adult employment, training opportunities, and technical assistance to individuals and communities.

The Forest has been actively engaged in a wide variety of manpower and youth training programs. The *Youth Conservation Corps (YCC)* Program provides employees between the ages of 15 and 18 with employment and experience in a natural resources environment. The *Senior Community Service Employment Program (SCSEP)* provides part-time employment for senior citizens whose incomes are within poverty levels. Other programs the Forest has been active in include: The *Comprehensive Employment Training Act (CETA)*, *College Work Study*, and the *Young Adult Conservation Corps (YACC)* Programs.

The Volunteers in the National Forest Program has become increasingly important as funding levels decrease for some of the above programs. This program, authorized in 1972, has been used extensively to accomplish necessary resource activities such as campground host work, trail construction, wilderness patrol, and many other jobs. Many volunteers are highly qualified individuals who are retired or young people unable to find jobs in their profession, trade, or area of interest because of current economic conditions and the lack of employment opportunities. Volunteer programs are expected to increase.

The Forest has the ability to utilize Human Resource Programs to accomplish many forest projects. For example, there is a continuing need to buildings, campgrounds, and trails, to improve young timber stands through thinning and pruning; and to accomplish soil and water improvement programs. Although there is a backlog of projects that can be accomplished, the funding for these programs varies from year to year because of National budget priorities. Because of this, these programs are not always available when needed.

In 1984, the Forest had the following enrollment in these programs:

	Person Years
YCC	2.11
Campground Hosts	1.85
Volunteers	20.72
SCSEP	10.32
	35.00

In the future, these programs are expected to continue at about this same level.

Various programs have been implemented for minorities and women to benefit both the Forest and the individuals. This effort is reflected in Forest Service hiring, supervisory, and contracting procedures.

CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

A. INTRODUCTION

This chapter provides the scientific and analytic basis for the comparison of alternatives presented in Chapter II. The narrative here will discuss the reasons for and results of the environmental effects of the alternatives. It will also present the important effect on interrelationships between resources, land uses, and environmental conditions as a result of the alternatives. In addition, the discussion here will indicate the basis or source of some estimates, and direct the reader to other places in the document where more information on the topic is available.

The net public benefits from the Wenatchee National Forest are obtained from resources with market and assignable prices as well as resources and conditions for which prices cannot be determined. Nonpriced benefits include both quantifiable and qualitative outputs and effects. Quantified and qualitative outputs and effects are both

crucial in understanding the complete picture of environmental consequences and the net benefits to the public. They are discussed here and in the comparison of alternatives in Chapter II. The material in this chapter will explain the relationships between resource outputs and environmental qualities and consequences. It includes, where relevant, the ties between quantitative and qualitative aspects of the information.

Chapter IV is the essential link between Chapter's II and III. In Chapter II the alternatives are presented. The environment those alternatives affect is described in Chapter III. Now in this chapter the consequences of the alternatives on the affected environmental components can be discussed.

This Chapter has six sections:

A. Introduction

1. Changes Between Draft and Final

B. Environmental Consequences of the Alternatives, including:

1. Environmental Consequences of the Alternatives on Each of the Environmental Components

- a. Direct and Indirect Effects of Each Alternative on the Environmental Component
- b. Cumulative Effects of Each Alternative
- c. Alternatives' Conflicts With Other Agency Plans and Policies
- d. Mitigation Measures

C. A Summary of the Relationships Between Short-term and Long-term Productivity

D. A Summary of Irreversible and Irrecoverable Commitment of Resources

E. A Summary of Probable Adverse Environmental Effects that Cannot be Avoided

F. Environmental Conditions Unchanged by the Alternatives

1. Changes Between Draft and Final

The changes between the Draft and Final EIS have been described in each of the previous chapters. These changes have been primarily as a result of public input as well as other agency input.

In discussing the environmental consequences, major changes have been made in the Wild and Scenic Rivers, Wildlife, Fisheries, Soil and Water, and Vegetation components. Roadless Areas and Old Growth have also been treated in the FEIS as

separate environmental components. In addition, the consequences of a new alternative, Alternative J, have been included throughout each environmental component section.

The subject of Wild and Scenic Rivers dominated most of the public input to the Supplement to the DEIS. As a result, several of the preliminary administrative recommendations have been changed.

The Management Requirements (MR's) for old growth/mature dependent species have been considerably changed. Additionally, an expanded section on effects on threatened and endangered wildlife species has been added.

Fisheries is another component revised noticeably, mostly as a result of other agency input.

The relationship of soils and water are so interdependent that they have been combined into a single discussion instead of two separate components.

The topic of biodiversity as it relates to the vegetation component has been expanded substantially in response to public interest in this issue.

Finally, the resource interactions section that had been presented in Chapter III of the Draft has been incorporated into the "Direct and Indirect Effects" section of Chapter IV, under each environmental component.



B. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

This section discusses the direct, indirect, and cumulative environmental consequences of the alternatives on each environmental component. The conflicts between alternatives' consequences and other agency plans are then described. Finally, mitigation measures will be indicated. Detailed mitigative measures are contained in the Forest-wide and Management Area Standards and Guidelines in Chapter IV of the Forest Plan. In addition, various laws, regulations, and Forest Service direction also provide numerous mitigation measures for National Forest activities.

1. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON THE RECREATION SETTING

The Wenatchee National Forest has an extremely wide range of outdoor recreation opportunities in both summer and winter recreation. These opportunities are available in a variety of forested settings which significantly contribute to the quality of the recreation experiences available to the public. For reasons of both the availability of opportunities and the proximity to large population centers, the Forest receives very high interest and high recreation visitor use.

The Forest Service has initiated a new recreation strategy that places high emphasis on recreation values and opportunities. In all alternatives, recreation has been given major emphasis, and direction has been included in the standards and guidelines to maintain and enhance recreation opportunities as well as to maintain the integrity of the recreation settings.

The recreation setting is the environmental component described within the Recreation Opportunity Spectrum (ROS) classification system. Each ROS class has specific physical, social, and managerial standards which define the recreation setting for that class. Road and trail access, mode of travel, and vegetative alteration through such activities as timber harvest, are the primary factors that affect or change a particular recreation setting.

In each alternative, land use or development activities result in some change in the recreation setting. In addition to timber harvest and road building, the following programs also can result in changes in the recreation setting qualities. mineral and energy development, water impoundment, wildlife and fisheries management, livestock grazing, fire management, timber stand improvement, and recreation developments. Timber harvesting has the potential to create the most dramatic changes in the setting and generally is the principle focus when evaluating the effects of the alternatives on the recreation setting.

Since the degree or extent of an activity varies in each alternative, there is a corresponding variation in the degree of change in the recreation setting. The most dramatic changes are those that go from an unroaded, natural-appearing condition to a roaded, natural or roaded, modified condition. Further development and higher levels of visitor use result in a change to a more rural setting. The number of acres in each ROS class varies by alternative depending on the land allocation emphasis of each alternative.

a. Direct and Indirect Effects of Each Alternative on the Recreation Setting

1) Effects of Recreation Visitor Use on Recreation Setting

The recreation setting, particularly the social component, and recreation opportunities are directly affected by recreation visitor use. As recreation use of a site or area increases, the social setting changes along with the recreation experience available to the users. Some people are not concerned with the changes, others are displaced and seek other less crowded areas on the Forest or in other recreation areas off the Forest. Crowding and over-capacity use levels result in increased social interaction and conflicts, excessive noise, dust and congestion, law enforcement problems and excessive demands on the sanitation and water systems. All of these conditions are key to the quality of the recreation setting.

The alternatives that generate the greatest capacity and opportunities for recreation use will likely have the lowest levels of concentration of users, social interaction and conflict. The recreation sites that tend to be prone to the most social interaction and conflicts are the developed sites and the highly popular, roaded, dispersed areas and associated trails.

Alternatives B, C, D, F, G, I, and J all provide a high level of developed site capacity that exceeds estimated demand and will result in low level impacts on the recreation social setting. Alternatives A/NFMA, E and H also provide for capacity above expected demand. However, some overcrowding and social setting impacts will occur in very popular, high use, developed sites. The capacity for roaded, dispersed recreation greatly exceeds the demand in all alternatives. Social setting changes will only occur in highly popular areas during peak use times such as hunting seasons.

One of the greatest potentials for conflicts between users occurs as a consequence of motorized versus non-motorized use, particularly in the unroaded areas. For some people, ORV use is a disruption of their recreation experience; they feel it creates noise, dust, and impacts to soils, vegetation and wildlife. Others feel the recreation setting should accommodate ORV use, at present or increased levels, and that the impacts are not significant.

Alternatives E and F would offer the highest ratio of non-motorized opportunities, with 16 and 13 percent of the Forest, respectively, allocated in unroaded areas to non-motorized use, and seven percent to motorized use. At the other end of the spectrum is Alternative G, with 13 percent of the roadless areas on the Forest allocated to motorized use, and five percent to non-motorized. Alternatives H, A/NFMA and NC would also provide a higher proportion of motorized than non-motorized use opportunities, with there being no allocation to unroaded, non-motorized use in Alternative NC. In Alternatives B, C, D, I and J there would only be a two percent difference between the motorized and non-motorized use of unroaded areas, with slightly more capacity being offered for both in Alternatives C and I.

2) Effects of Scenery on Recreation Setting

Scenic qualities are a vital part of the recreation setting. A change from an unroaded, natural-appearing landscape to a roaded, heavily altered one, has a direct effect on the recreation setting. The amount of change in the visual quality condition and the Recreation Opportunity Spectrum classes are the best measure of the effects. See Chapter II of this document for the visual quality objectives and Recreation Opportunity Spectrum classes by acreage for each alternative.

The management of viewsheds under Alternatives A/NFMA, C, G, H and I would have similar effects on the recreation setting in different drainages and travelways (see the Scenery section of Chapter IV). Some land allocations prescribing vegetative management would result in an altered to heavily altered setting. Overall, there would be a moderate change in scenery and a reduction of acres providing a semi-primitive setting and natural-appearing condition in these alternatives. Alternatives NC, B, D and J would result in the most change from an unroaded, natural-appearing setting to a roaded, modified setting. Natural-appearing settings would not be retained in most viewsheds. Alternatives E and F would result in the least change in the visual quality condition, and hence to the recreation setting.

3) Effects of Timber Management on Recreation Setting

Timber Management activities have a high potential to alter the recreation setting and the associated recreation use. Timber harvest, site preparation and timber stand thinning or other stand treatments tend to give the Forest a cultured look as opposed to a natural appearance. These activities reduce the wild, primitive and remote feeling for many recreationists and change their overall recreation experience. On the other hand, harvesting of dangerous, decadent or diseased trees in campgrounds and at other recreation sites through timber sales improves safety within the setting. Timber sale activities may be designed to improve trailheads and trail locations, achieve vegetative diversity, and provide openings for viewing scenic panoramas.

Alternatives NC, B, D, and J, which emphasize timber production or commodity outputs, have the largest number of acres in the General Forest allocation and will result in the greatest change in the recreation setting. Alternatives A/NFMA, C, H and I have a more balanced program between commodity and amenity values and fewer acres in the General Forest allocation. These alternatives would result in moderate change in the recreation setting, while providing opportunities for enhancing areas for recreation use. Alternatives E, F and G provide the least acres in the General Forest allocation and thus have the least change in the recreation setting.

4) Effects of Roads on Recreation Setting

The presence of roads has a major influence on the recreation setting and the recreation opportunities available in a specific area. A roaded or unroaded condition strongly influences the use of an area and the means of transportation, the primary recreation activities that are possible, and the number of recreation visitors that are likely to be present. There are some variations in use patterns depending on whether the roads are open or closed to public use. For some Forest users the presence of a road bisecting a trail or being visible from a viewpoint is a reduction in the natural qualities of the recreation setting. For others, a road network enhances the dispersed recreation opportunities by providing motorized access for hunting, for the collection of such forest products as firewood, berries and Christmas trees, or for camping or hiking experiences. The greatest changes in the recreation setting will occur in those alternatives where the most miles of roads are constructed for timber harvest, these being NC, B, H, I and J. Alternatives A/NFMA, C and D will result in a moderate degree of change due to fewer miles of construction, and Alternatives E, F and G which emphasize unroaded recreation, will result in a low degree of change.

b. Cumulative Effects of Each Alternative

The Wenatchee National Forest has a broad diversity of recreation settings and opportunities, with recreation occurring in almost all areas of the Forest at some time through the summer and winter seasons. Because of the proximity of the Forest to large population areas, recreation is a major Forest program. The quality of the recreation setting is an extremely valuable amenity and the maintenance of a variety of settings is very important to the public. The recreation setting is easily managed and is not, for the most part, subject to permanent degradation. However, major changes due to a combination of factors, including road construction, alteration of vegetation, construction of facilities and the effects of fire, insects and disease in forested areas, can produce long term impacts requiring up to 50 or 100 years to repair. The scope of these effects includes all lands in the Forest boundary.

Cumulative effects on the recreation setting can be analyzed on the basis of change in the visual qualities of an area, both foreground and background, the feeling of remoteness or wildness of the area, the natural-appearing qualities of the area and the social conditions. The social conditions include the presence or absence of other people, the interaction or conflicts between users and the type of facilities and developments provided for users. The alternatives which emphasize development of the Forest resources and have the greatest number of acres assigned to intensive management allocations are NC, B, D and J. These alternatives may substantially alter the environment, present a risk of long term modification of the recreation setting and may have a cumulative impact. Alternatives A/NFMA, C, H and I present a moderate risk of long term effects and may also have cumulative effects. In Alternatives E, F and G, the lower acreages in intensive management present the least potential for cumulative effects on the recreation setting.

c. Alternatives' Conflicts with Other Agency Plans and Policies

Washington State Off-Road Vehicle Plan

All alternatives basically support the objective of the State off-road vehicle plan. Alternatives vary only slightly in the acres available for unroaded, motorized recreation, except for Alternative G which emphasizes unroaded, motorized recreation. The roaded recreation setting also provides extensive opportunities in nearly all alternatives. Potential conflict between the motorized trail system and timber harvest will be avoided through measures to protect trails wherever possible.

U.S. Bureau of Reclamation

Any proposed raising of reservoir levels by the U.S. Bureau of Reclamation may conflict with existing or potential recreation developments because of the higher water levels. Scenic objectives of the Forest could be affected by draw-down areas for irrigation or power production. Each proposal will be fully evaluated with regard to the recreation setting. At the present time, none of the alternatives would conflict with U.S. Bureau of Reclamation plans.

d. Mitigation Measures for the Recreation Setting

There is a variety of management actions and practices to apply in mitigation of impacts to the recreation setting. Mitigation can be in the form of implementation guidelines and project design that are to be followed in ground disturbing activities or in projects that manipulate vegetation. In addition, management programs can strongly influence how much impact the recreation users themselves have on the recreation setting. More specific mitigation actions are as follows:

1. Apply the Recreation Opportunity Spectrum Class criteria in all project planning.

Objective: To retain the existing condition of the ROS Classes and to assure that management areas are not degraded to a class more tolerant of change or modification.

2. Design facilities and improvements to conform with setting criteria.

Objective: To prevent high standard facilities from being built in a setting where more rustic facilities would be appropriate.

3. Protect from obliteration dispersed campsites and other specific sites that currently receive repeated recreation use.

Objective: To retain small sites and areas that have significance to specific recreation users.

4. Provide strong public information programs on problems of litter, sanitation, water pollution and damage to soil and vegetation in recreation areas.

Objective: To gain public support and participation in protection of the recreation setting.

5. Provide effective programs in use administration and law enforcement.

Objective: To reduce user conflicts and social impacts on the recreation setting.

Of these management activities, application of the Recreation Opportunity Spectrum and the appropriate design of facilities will provide the greatest benefits to the recreation setting. These mitigation measures should be equally effective in all alternatives.

2. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON UNROADED AREAS

The Forest has twenty-three inventoried, unroaded areas totaling 556,272 acres. This figure includes four unroaded areas that are included in the Alpine Lakes Area Management Plan. The management direction for these four areas is given in this latter plan. However, the 145,476 acres within these areas will be included in the analysis so as to provide a better reflection of the unroaded areas of the entire Forest.

The areas to remain unroaded in the preferred alternative will be managed under one or a combination of the following prescriptions or land allocations:

- RE-2 Dispersed Recreation, Unroaded, Motorized
- RE-3 Dispersed Recreation, Unroaded, Non-Motorized
- RE-4 Dispersed Recreation, Unroaded Timber Harvest
- EW-3 Key Big Game Habitat, Unroaded
- SI-1 Classified Special Interest Areas - Scenic and/or Recreation

The current, unroaded areas proposed for road-ing may be managed under any of the prescrip-tions except RE-2, RE-3, RE-4 and EW-3. The prescription allocation for each area by alterna-tive is based on its resource capabilities and the emphasis of each alternative.

a. Direct and Indirect Effects of Each Alterna-tive on Unroaded Areas

The most dramatic effect of the alternatives on unroaded areas is the construction of roads into these areas for management purposes related to the emphasis of each alternative. The effects will be more or less intensive depending on the acres of the unroaded area accessed and managed for commodity production, and the type of manage-ment prescriptions assigned.

The allocation of unroaded areas by acres for each alternative is as follows:

Alternatives B, D and J result in the largest allocation of unroaded to roaded prescriptions, and consequently generate the greatest effect on unroaded resource conditions. These alternatives place emphasis on commodity production and have high levels of road construction, vegetative manipulation, timber harvest and the greatest change in the ROS classification from Semi-Primitive to Roaded Natural or Roaded Modified (refer to Chapter II, Table II-1).

Alternatives NC, A/NFMA, C, H and I result in reduced change in unroaded resource conditions but still have moderate levels of roading for commodity production. In Alternatives C and I, 54% of the unroaded areas will remain unroaded. The acres accessed will experience the effects of road construction, vegetative manipulation, timber harvest, and other management activities through the life of the Forest Plan.

Alternatives E, F and G place more emphasis on retaining unroaded environmental conditions and unroaded recreation opportunities. The physical, biological and social conditions will vary between alternatives to some degree. Alternative E provides the greatest retention of unroaded acres. Emphasis is on scenery, wildlife and fisheries. Alternative F emphasizes unroaded recreation which will result in more recreation visits or use in both roaded and unroaded. The motorized emphasis of Alternative G would result in greater changes in the social environment in unroaded areas, due to the corresponding increase in noise, traffic and concentration of users that tends to accompany motorized trail use.

**TABLE IV-1
ALLOCATION OF UNROADED AREAS TO ROADED AND UNROADED ACRES**

ALTERNATIVE	NC	A/NFMA	B	C	D	E	F	G	H	I	J
ROADED ACRES	218,022	306,918	327,227	258,157	327,227	106,947	122,263	172,658	306,918	258,157	347,112
UNROADED ACRES	337,250	249,354	229,045	298,115	229,045	449,947	434,009	383,614	249,354	298,115	206,160

1) Effects of Timber Management on Unroaded Areas

Intensive timber management practices in portions of the unroaded areas that are allocated to roaded prescriptions will affect the natural condition of the current unroaded areas. These effects will not be permanent changes, but the altered appearance of managed timber stands will be apparent at least through the life of the managed stands. Changes from natural vegetative growth to managed timber stands will be greatest in Alternatives B, D and J where 327,227 acres to 347,112 acres will be allocated to some degree of timber harvest. Alternatives NC, A/NFMA, C, H and I will have from 218,022 acres to 306,918 acres allocated to some degree of timber harvest and vegetative manipulation.

2) Effects of Roads on Unroaded Areas

The construction of roads will have a high level of impact on unroaded areas. Once roading and prescribed management activities occur the physical, biological and social resource conditions will likely be permanently changed. Even with roads closed to public use, or rehabilitated after management practices are completed, the evidence of human activity will be apparent through the five-decade planning period and probably for much longer.

The following table shows the rate of entry into the unroaded areas. It lists the acres remaining unroaded at the end of first, second and fifth decades:

The rate of entry for road construction and timber harvest will determine the magnitude of the effects in the first decade. These effects generally include:

1. Rapid change in the recreation setting in unroaded areas across the Forest.
2. Increase in heavy traffic and large vehicles on back country portions of the road systems as road construction occurs in unroaded areas.
3. Disruption of recreation activities in unroaded areas and a displacement of users into wilderness or into other recreation areas.

Alternatives B, C, H, I and J all plan entry into a large number of unroaded acres during the first decade. Alternatives B and J have the largest entry at 208,037 acres and 191,862 acres respectively. The effects of entry will be accelerated in these alternatives. Alternatives C, H and I, with an anticipated entry of about 170,000 acres, will have fewer impacts in the first decade than Alternatives B and J.

Alternatives A/NFMA and D, with nearly 140,000 acres entered in the first decade, will be moderate in effect when compared to Alternatives B and J. Alternatives E and G will enter about 110,000 acres in the first decade and Alternatives NC and F have the lowest levels of entry in the first decade, with fewer than 90,000 acres affected.

**TABLE IV-2
ACRES OF UNROADED AREAS REMAINING UNROADED, BY DECADE**

ALTERNATIVE	NC	A/NFMA	B	C	D	E	F	G	H	I	J
1ST DECADE	462,009	417,254	364,410	387,763	410,841	449,325	488,270	438,501	380,707	386,537	348,235
2ND DECADE	417,845	300,698	229,045	298,115	229,085	449,325	434,009	383,614	249,354	298,115	209,160
3RD DECADE	388,250	249,354	229,045	298,115	229,045	449,325	434,009	383,614	249,354	298,115	209,160

For more specific details regarding the consequences of the alternatives on individual, unroaded areas refer to the unroaded area analysis in Appendix C.

b. Cumulative Effects of Each Alternative

Once portions of the unroaded areas are accessed for more intensive land management practices, many activities will follow. Cumulative effects are possible as a result of these repeated activities. Following initial road construction, entries will be made for timber harvest, logging slash treatment, reforestation and timber stand improvement. Other administrative activities will also occur such as fire suppression, timber small sale programs, wildlife or fisheries enhancement projects, public firewood cutting, recreation use (if roads are not closed) and some level of road maintenance. All of these activities may magnify the initial changes resulting from first entry.

The degree or extent of the change can be described in terms of acres converted from unroaded to roaded management, and the emphasis of the alternative which generates the changes. Alternatives B, D and J result in the largest number of acres accessed and all emphasize timber harvest and commodity production. Under this emphasis, there is a high potential for cumulative effects.

Alternatives NC, A/NFMA, C, H and I also prescribe a level of commodity emphasis that will increase management activity on accessed acres. However, there are fewer acres accessed in these alternatives. Although the risk of cumulative effects may be equally high in those areas that are roaded, the area of risk will be smaller than in Alternatives B, D and J.

For the reasons just explained, Alternatives E, F and G do possess a certain degree of risk of cumulative effects, but on even fewer acres of the current unroaded areas. The fact that the emphasis of Alternatives E, F and G are on amenity values and unroaded recreation may result in only a moderate risk of cumulative effects.

c. Alternatives' Conflicts With Other Agency Plans and Policies

Region III State Department of Wildlife

Construction of roads into unroaded areas has an impact on the habitat effectiveness for Big Game animals. Increased access for recreation and hunting may put additional pressure on big game animals and reduce the quality of the hunting experience. These factors could conflict with Department Objectives for the Management of Big Game populations.

d. Mitigation Measures for Unroaded Areas

Mitigation measures for the roading and development of unroaded areas are very limited. The decision to enter unroaded areas for intensive management is a major commitment of resources that will have far reaching and enduring effects.

The primary opportunities for mitigation are centered on how the work is done rather than on the steps to be taken after entry into unroaded areas. However, once roads are constructed, road management can be an important mitigation tool. Closing roads to public use and limiting administrative access to essential visits only, may reduce impacts on soil, water and wildlife resources. Roads could also be rehabilitated or obliterated after use to reduce the effects of entry, although once a road is built, the administrative benefits of continued service are numerous in terms of time and dollars.

High quality transportation planning can be an important mitigation measure in ensuring that road locations and road standards are appropriate for the intended purpose of the road and minimize the associated resource impacts.

In timber sale planning the use of aerial logging systems may eliminate the need for certain roads, thus avoiding the effects of road construction in some areas.

3. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON WILD, SCENIC AND RECREATIONAL RIVERS.

A total of thirty-three rivers and creeks on the Forest were evaluated to determine their eligibility for inclusion in the Wild and Scenic River System. Of these, the American, Cle Elum, Chiwawa, Entiat, Icicle, Little Wenatchee, Napeequa, Wapatus, Wenatchee, and White Rivers were found to be eligible or to have segments that are eligible for inclusion.

Although these rivers possess characteristics that would qualify them for designation, a second aspect to consider in the recommendation for inclusion is the suitability of each river for designation. The suitability would vary by alternative, depending upon the land allocations and potential uses proposed for each of these river corridors, and the degree to which these uses are curtailed or foreclosed by river designation. This analysis might result in some eligible rivers or river segments not being recommended for inclusion, or being recommended at less than the highest potential classification, in different alternatives. In turn, certain river values, such as the visual setting of the corridor, the nature or intensity of recreation use, or the free-flowing characteristics of the river channel could be altered or diminished, depending upon the specific land allocations and treatment of that corridor in each alternative.

a. Direct and Indirect Effects of Each Alternative on Wild, Scenic and Recreational Rivers.

Timber harvest and the related road construction activities would have the greatest effect on the quality of the river corridors. To a lesser degree, recreation development and use may also have an impact. In part, these effects are the direct consequence of land allocations within and along the river corridors, but they may also indirectly result from the designation of a river as Wild and Scenic. These effects are presented in more detail below.

Other factors that could affect river values within the corridors are relatively minor, with little change between alternatives. These include the management of cultural resources, wilderness, wildlife, fisheries, water, soil and fire. However, the impacts created by other activities on these latter resources may have an indirect effect on river attributes through such changes as a reduction in water quality, soil productivity, and available fish habitat; through stream bank degradation; and through a loss of historic or cultural values. Refer to the specific environmental component section of each of these resources for a full description and treatment of the effects.

1) Effects of Recreation on Wild and Scenic Rivers

Water-oriented environments are a strong attraction to Forest visitors, with water-related activities such as boating, tubing, fishing or general water play drawing large numbers of people to these areas. Because of this, river corridors tend to be an intensively managed recreation setting. Developed and dispersed opportunities are maximized, with campgrounds, trails and other facilities often being constructed, upgraded or expanded along the shorelines, and with scenery frequently being maintained to enhance the recreation experience.

For the most part, recreation does not create a direct effect on the values recognized through Wild and Scenic designation. In fact, the recreation setting is often an attribute recognized when determining Wild and Scenic eligibility. Facility development, such as campgrounds, picnic areas, interpretive centers, or administrative buildings could affect the level of classification of a river or river segment if out of scale with the surroundings, but this effect would not vary by alternative. These same developments might also enhance the recreation values of the Wild and Scenic River in cases where recreation has been identified as an outstandingly remarkable characteristic of the waterway.

Of more significance are the indirect effects that might occur as a consequence of public use. Eligible rivers possess attributes that would particularly invite recreation visitors: outstanding scenery, unique natural features, specific recreational opportunities, and oftentimes, an attractive sports fishery. These attributes exist and are managed regardless of whether the river is formally designated or not, but designation tends to increase the recreation use of the particular river corridor. Impacts that can occur as a consequence are conflicts between different types of users, trampling of riparian vegetation, degradation of river or stream banks, an increase in the fecal coliform levels in the rivers or streams, littering, and trespassing on private property. These impacts, in turn, could conflict with the expectations of visitors drawn to the corridors because of the Wild and Scenic designation.

There are no rivers recommended for designation in Alternatives NC, B, D and J. Recreation development and use would probably remain comparable along the eligible rivers through these four alternatives. User impacts would be moderate, and in fact, there might be a decrease in visitors to the corridors because of alteration of the recreation setting by other management activities, especially along the Wenatchee, Chiwawa and Entiat Rivers.

In Alternatives A/NFMA and G, the Wenatchee, Chiwawa and White Rivers are recommended for designation, with 72% of the total river mileage proposed at a Recreational level of classification. A full range of recreation development would be permitted within the Recreational segments, with a correspondingly higher potential for user impacts in these areas.

Alternatives C, H and I recommend nine of the ten eligible rivers for designation, although Alternative H does not include segments with substantial private holdings. Impacts from recreation use, especially as a result of visitors drawn to the area by river designation, could be high. However, there might be fewer conflicts in Alternative H between recreation users and private landowners because of the elimination of private land in this alternative from inclusion in the Wild and Scenic River System.

In Alternatives E and F, all ten of the eligible rivers are recommended for designation as Wild and Scenic Rivers, at their highest level of classification. The effects would be similar to those identified for Alternatives C, H and I, but with the addition of the Little Wenatchee River. Recreation use of the eligible segment of this latter river is currently moderate to low. Designation could increase the number of recreation visitors along the eligible stretch of the Little Wenatchee to a level that might create new and undesirable impacts, if unmanaged.

2) Effects of Timber Management on Wild and Scenic Rivers

Timber management activities can result in a variety of effects to Wild and Scenic River corridors, the most significant being the effect of vegetative management on scenery. Scenery is often one of the outstandingly remarkable values that contributes to the eligibility of a river as Wild and Scenic. It is also an important element in the recreation setting of the river. Through alteration of the landscape by removal of vegetation and construction of associated roads, the natural appearance of this setting can be substantially modified. Loss of large areas of tree cover and vegetative screening, disturbance of soils, and the increased visibility of roads and fire lines may result.

Timber harvest may also indirectly affect Wild and Scenic Rivers through impacts on water quality, fish, wildlife, cultural resources and sensitive ecological values, which, like scenery, are specially recognized values of Wild and Scenic Rivers. These effects are discussed under the individual environmental components elsewhere in this chapter.

The following Table IV-3 indicates the allocations within the corridors of each eligible river for each alternative.

**TABLE IV-3
ALLOCATIONS BY ALTERNATIVE WITHIN THE RIVER CORRIDORS**

River	NC	A/NFMA	B	^{Preferred} C	D	E	F	G	H	I	J
AMERICAN-Above Wilderness Bdy	Wilderness	Wilderness	Wilderness	Wild River	Wilderness	Wild River	Wild River	Wilderness	Wild River	Wild River	Wilderness
AMERICAN-Below Wilderness Bdy	Mather Memorial Highway	Scenic Travel Retention	Scenic Travel Retention	Scenic River	Scenic Travel Retention	Scenic River	Scenic River	Scenic Travel Retention	Scenic River	Scenic River	Scenic Travel Partial Retention
CHIWAWA-Above Wilderness Bdy	Wilderness	Wild River	Wilderness	Wild River	Wilderness	Wild River	Wild River	Wild River	Wild River	Wild River	Wilderness
CHIWAWA-Wilderness Bdy To Goose Creek	Stream Side Mgt Unit	Recreational River	General Forest above Huckleberry Ford, Scenic Travel Partial Retention Below	Recreational River	General Forest above Huckleberry Ford, Scenic Travel Partial Retention Below	Scenic River	Scenic River	Recreational River	Recreational River	Recreational River	General Forest above Huckleberry Ford, Scenic Travel Partial Retention Below
CHIWAWA-Goose Creek To Wenatchee River	Stream Side Mgt Unit	Recreational River	Scenic Travel Partial Retention	Recreational River	Scenic Travel Partial Retention	Recreational River	Recreational River	Recreational River	Scenic Travel Retention	Recreational River	Scenic Travel Partial Retention
CLE ELUM-Above Wilderness Bdy	Wilderness	Wilderness	Wilderness	Wild River	Wilderness	Wild River	Wild River	Wilderness	Wild River	Wild River	Wilderness
CLE ELUM-Wilderness Bdy To Lk Tucquala	Stream Side Mgt Unit	Scenic Travel Retention	Scenic Travel Retention	Scenic River	Scenic Travel Retention	Scenic River	Scenic River	Scenic Travel Retention	Scenic River	Scenic River	Scenic Travel Retention
CLE ELUM-Lk Tucquala To Salmon La Sac	Stream Side Mgt Unit	Scenic Travel Retention	Scenic Travel Retention	Recreational River	Scenic Travel Retention	Scenic River	Scenic River	Scenic Travel Retention	Scenic Travel Retention	Recreational River	Scenic Travel Retention
CLE ELUM-Salmon La Sac To Cle Elum Lk	Stream Side Mgt Unit	Scenic Travel Retention	Scenic Travel Retention	Recreational River	Scenic Travel Retention	Recreational River	Recreational River	Scenic Travel Retention	Scenic Travel Retention	Recreational River	Scenic Travel Retention
ENTIAT-Above Wilderness Bdy	Wilderness	Wilderness	Wilderness	Wild River	Wilderness	Wild River	Wild River	Wilderness	Wild River	Wild River	Wilderness
ENTIAT-Wilderness Bdy To Cottonwood Trailhead	Stream Side Mgt Unit	Dispersed Recreation Unroaded Motorized	General Forest	Scenic River	Dispersed Recreation Unroaded Motorized	Wild River	Wild River	Dispersed Recreation Unroaded	Scenic River	Scenic River	General Forest
ENTIAT-Cottonwood Trailhead To Above Burns Creek	Stream Side Mgt Unit	Scenic Travel Retention	General Forest to Silver Falls, Scenic Travel Partial Retention Below	Recreational River	General Forest to Silver Falls, Scenic Travel Partial Retention Below	Scenic River	Scenic River	Scenic Travel Retention	Recreational River	Recreational River	General Forest to Silver Falls, Scenic Travel Partial Retention
ICICLE-Above Wilderness Bdy	Wilderness	Wilderness	Wilderness	Wild River	Wilderness	Wild River	Wild River	Wilderness	Wild River	Wild River	Wilderness

TABLE IV-3 (continued)
ALLOCATIONS BY ALTERNATIVE WITHIN THE RIVER CORRIDORS

River	NC	A/NFMA	B	Preferred C	D	E	F	G	H	I	J
ICICLE-Wilderness Bdy To Leavenworth Water Intake	Stream Side Mgt Unit	Scenic Travel Retention	Scenic Travel Retention	Recreational River	Scenic Travel Retention	Scenic River	Scenic River	Scenic Travel Retention	Scenic Travel Retention	Recreational River	Scenic Travel Retention
LITTLE WEN - Below Little Wenatchee Falls	Stream Side Mgt. Unit	Scenic Travel Retention	General Forest	Scenic Travel Retention	General Forest	Scenic River	Scenic River	Scenic Travel Retention	Scenic Travel Retention	Scenic Travel Retention	General Forest
NAPEEQUA-Above Wilderness Bdy	Wilderness	Wilderness	Wilderness	Wild River	Wilderness	Wild River	Wild River	Wilderness	Wild River	Wild River	Wilderness
NAPEEQUA-Below Wilderness Bdy	Private Land	Private Land	Private Land	Recreational River	Private Land	Recreational River	Recreational River	Private Land	Private Land	Recreational River	Private Land
WAPTUS-Above Wilderness Bdy	Wilderness	Wilderness	Wilderness	Wild River	Wilderness	Wild River	Wild River	Wilderness	Wild River	Wild River	Wilderness
WAPTUS-Below Wilderness Bdy	Stream Side Mgt Unit	Scenic Travel Retention /Partial Retention South; Dispersed Recreation, Unroaded, Nonmotorized, North	Scenic Travel Retention /Partial Retention South, Dispersed Recreation, Unroaded, Nonmotorized, North	Wild River	Scenic Travel Retention /Partial Retention South, Dispersed Recreation, Unroaded, Nonmotorized, North	Wild River	Wild River	Scenic Travel Retention /Partial Retention South, Dispersed Recreation, Unroaded, Nonmotorized, North	Wild River	Wild River	Scenic Travel Retention /Partial Retention South, Dispersed Recreation, Unroaded, Nonmotorized, North
WENATCHEE-Lake Wenatchee To Tumwater Campground	Stream Side Mgt. Unit	Recreational River	Scenic Travel Partial Retention Upper 1/3 Some General Forest Middle	Recreational River	Scenic Travel Partial Retention Upper 1/3 Some General Forest Middle	Recreational River	Recreational River	Recreational River	Scenic Travel Retention	Recreational River	Scenic Travel Partial Retention Upper 1/3 Some General Forest Middle
WENATCHEE-Tumwater Campground To Forest Bdy	Stream Side Mgt. Unit	Recreational River	Special Interest Recreation	Recreational River	Special Interest Recreation	Recreational River	Recreational River	Recreational River	Recreational River	Recreational River	Special Interest Recreation
WHITE-Above Wilderness Bdy	Wilderness	Wild River	Wilderness	Wild River	Wilderness	Wild River	Wild River	Wild River	Wild River	Wild River	Wilderness
WHITE-Wilderness Bdy To Above Tall Timbers Ranch	Stream Side Mgt Unit	Scenic River	Scenic Travel Partial Retention	Scenic River	Scenic Travel Partial Retention	Scenic River	Scenic River	Scenic River	Scenic River	Scenic River	Scenic Travel Partial Retention
WHITE-Above Tall Timbers Ranch to Lake Wenatchee	Stream Side Mgt Unit	Recreational River	Scenic Travel Partial Retention	Recreational River	Scenic Travel Partial Retention	Scenic River	Scenic River	Recreational River	Scenic Travel Retention	Recreational River	Scenic Travel Partial Retention

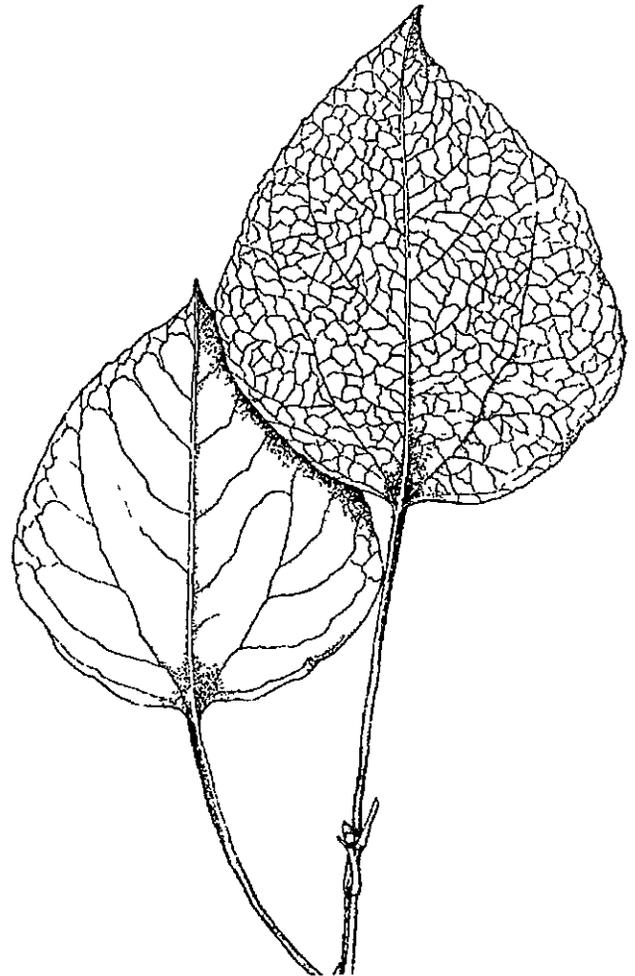
In Alternatives NC, B and D, the scenic values along the American, Cle Elum, Little Wenatchee, Wapatus and Icicle Rivers, which are allocated to a Scenic Travel, Retention prescription below the wilderness boundaries, would be maintained. Segments within wilderness would be subject to the protective restrictions of wilderness designation. However, there could be noticeable modification of the outstandingly remarkable scenic values within the Chiwawa, Entiat, Wenatchee and White Rivers, where portions of the corridors below the wilderness boundary are allocated to Partial Retention and General Forest.

The White, Chiwawa and Wenatchee Rivers are recommended for designation in Alternatives A/NFMA and G, with some segments proposed at less than their highest potential classification. All river values would be fully protected within these corridors. The remaining eligible river corridors below wilderness would be managed for Scenic Travel, Retention, with very little difference in effects on river values from timber management, when compared to those corridors proposed for designation.

Alternatives C, H and I recommend all of the eligible rivers but the Little Wenatchee for inclusion in the Wild and Scenic River System. Values in the Little Wenatchee corridor would be protected through a combination of the EW-1 riparian prescription and a Scenic Travel, Retention land allocation. There would be no significant effects to river values through timber harvest in any of the eligible river corridors.

Alternatives E and F recommend all ten eligible rivers at their highest level of classification. These two alternatives would provide the greatest protection of the outstandingly remarkable values identified in the eligible river corridors.

Another aspect of the relationship between Wild and Scenic Rivers and timber management, is in the tradeoff of timber volume unharvested if river designation takes place. This, more than any other resource allocation, has influenced the suitability by alternative of a river corridor for inclusion in the Wild and Scenic River System. Table IV-4 displays the total timber volume and projected allowable sale quantity (ASQ) by river and by alternative.



**TABLE IV-4
COMPARISON OF ASQ BY ALTERNATIVE
WITH AND WITHOUT WILD AND SCENIC DESIGNATION**

River	MMBF ¹	NC	A/NFMA	B	C	D	E	F	G	H	I	J
AMERICAN												
Total Timber Volume	49.6											
Potential Harvest with Legal Requirements	.76											
Designated as Wild and Scenic	.60											
Potential Harvest by Alternative		.62	.62	.62	0.0	.62	0.0	0.0	.62	.60	0.0	.68
CHIWAWA												
Total Timber Volume	166											
Potential Harvest with Legal Requirements	2.6											
Designated as Wild and Scenic	2.0											
Potential Harvest by Alternative		2.6	2.0	2.5	2.0	2.5	2.0	2.0	2.0	2.04	2.0	2.5
CLE ELUM												
Total Timber Volume	60.8											
Potential Harvest with Legal Requirements	.97											
Designated as Wild and Scenic	.73											
Potential Harvest by Alternative		.97	.76	.76	.73	.76	.73	.73	.76	.75	.73	.76
ENTIAT												
Total Timber Volume	121.6											
Designated as Wild and Scenic	1.15											
Potential Harvest with Legal Requirements	1.93											

TABLE IV-4 (continued)
COMPARISON OF ASQ BY ALTERNATIVE
WITH AND WITHOUT WILD AND SCENIC DESIGNATION

River	MMBF ¹	NC	A/NFMA	B	C	D	E	F	G	H	I	J
Potential Harvest by Alternative		1.93	1.2	1.82	1.15	1.82	1.15	1.15	1.2	1.15	1.15	1.82
ICICLE Total Timber Volume	51.2											
		←-----ASQ in MMBF----->										
Potential Harvest with Legal Requirements	.76											
Designated as Wild and Scenic	.58											
Potential Harvest by Alternative		.76	.6	.6	.58	.6	.58	.58	.6	.6	.58	.6
LITTLE WENATCHEE Total Timber Volume	35.2											
		←-----ASQ in MMBF----->										
Potential Harvest with Legal Requirements	.56											
Designated as Wild and Scenic	.42											
Potential Harvest by Alternative		.56	.44	.56	.44	.56	.42	.42	.44	.44	.44	.56
NAPEEQUA Total Timber Volume	0.0											
		←-----ASQ in MMBF----->										
Potential Harvest with Legal Requirements	0.0											
Designated as Wild and Scenic	0.0											
Potential Harvest by Alternative		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE IV-4 (continued)
COMPARISON OF ASQ BY ALTERNATIVE
WITH AND WITHOUT WILD AND SCENIC DESIGNATION

River	MMBF ¹	NC	A/NFMA	B	C	D	E	F	G	H	I	J
WAPTUS												
Total Timber Volume	6.4											
		←-----ASQ in MMBF----->										
Potential Harvest with Legal Requirements	.10											
Designated as Wild and Scenic	0.0											
Potential Harvest by Alternative		.10	.04	.04	0.0	.04	0.0	0.0	.04	0.0	0.0	.04
WENATCHEE												
Total Timber Volume	88.1											
		←-----ASQ in MMBF----->										
Potential Harvest with Legal Requirements	1.38											
Designated as Wild and Scenic	.72											
Potential Harvest by Alternative		1.38	.72	.87	.72	.87	.72	.72	.72	.75	.72	.89
WHITE												
Total Timber Volume	73.6											
		←-----ASQ in MMBF----->										
Potential Harvest with Legal Requirements	1.16											
Designated as Wild and Scenic	.88											
Potential Harvest by Alternative		1.16	.88	1.0	.88	1.0	.88	.88	.88	.90	.88	1.0

¹ Timber volume and harvest numbers are an average to show the relationship between the alternatives

3) Effects of Lands on Wild and Scenic Rivers

The types of land uses on the Forest that are authorized for private individuals or public agencies are described in Chapter 3. Few of these would affect Wild and Scenic River designation, and none vary by alternative. However, in the sense that certain of these uses could preclude future designation of eligible rivers, these are discussed as part of the consequences of the alternatives.

One of the factors that contributes to the eligibility of a river, as discussed in Appendix E, is its free-flowing characteristics. Although existing low dams, diversion works, riprap and other minor structures are allowed, the waterway must remain generally natural in appearance and unimpeded in flow to be eligible. New structures are prohibited, particularly the development of hydroelectric power facilities.

In Alternatives NC, B, D and J, no eligible rivers are recommended for designation. Impoundments, diversions or river bank modifications could be permitted that would threaten or alter the free-flowing characteristics and natural riverine environment of the eligible rivers.

Alternatives A/NFMA and G recommend the Wenatchee, Chiwawa and White Rivers for inclusion in the Wild and Scenic River System. Existing structures, such as the Wenatchee-Chiwawa Irrigation Ditch, the Tumwater Dam, and stretches of riprap would be recognized and permitted, but the rivers would be protected from future threats of impoundment or hydroelectric development. However, the remaining seven eligible rivers would not experience this same level of protection.

Alternatives C, H and I recommend nine of the ten eligible rivers. The free-flowing characteristics of all but the Little Wenatchee would be protected. In Alternative H, those segments of the rivers with substantial private holdings would not be recommended for designation, in order to avoid potential conflicts with the private landowners. This would include portions of the Chiwawa, Cle Elum, Icicle, Napeequa, Wenatchee and White Rivers. There would be a higher risk of impoundment or substantial alteration of the river bank in these segments, under Alternative H.

All ten of the eligible rivers would be preserved in their natural, free-flowing condition in Alternatives E and F.

b. Cumulative Effects of Each Alternative

Those rivers selected by Congress for inclusion in the Wild and Scenic River System would be fully protected in all alternatives, with little likelihood for the occurrence of cumulative effects. However, in eligible river corridors not designated as Wild and Scenic, the land allocations prescribed in the selected alternative would be implemented. The nature, intensity and timing of the management activities to be carried out, the overlap of one activity with another, and the effects of activities carried out on intermingled private lands would determine the degree to which cumulative effects might occur, and the specific river values that could be affected. A discussion of the kinds of cumulative effects that might result can be found in the resource component sections for Recreation, Scenery, Fish, Wildlife, Cultural Resources and Vegetation.

In Alternatives NC, B, D and J, the cumulative effects might involve noticeable landscape modifications, including those resulting from intensive timber harvest, the construction of roads and other facilities, and the potential impoundment of the rivers within several of the corridors (the Chiwawa, Entiat, Little Wenatchee, Wenatchee and White Rivers). Over the life of the Forest Plan, the cumulative effects of these modifications could alter the scenic and natural river values to the extent that the affected river corridors would not remain eligible for future consideration under the Wild and Scenic Rivers Act.

Because of the nature of the land allocations within the eligible river or river segment corridors not proposed for designation in Alternatives A/NFMA, G and H (see Table IV-3), cumulative effects are expected to be minimal. In Alternatives C, E, F and I, in which all or nearly all of the eligible rivers are proposed for designation, cumulative effects are unlikely to occur.

c. Alternatives' Conflicts With Other Agency Plans and Policies

The State of Washington is currently conducting an assessment of eighteen rivers in the State which possess the natural, cultural and recreational values that will make them suitable additions to the Washington State Scenic Rivers System. Among these eighteen is the Wenatchee River, from its outlet at Lake Wenatchee to its confluence with the Columbia River. Alternatives NC, B, D and J do not recommend the Wenatchee River above the Forest boundary for designation. Proposed land allocations in the corridor above Tumwater Canyon in these alternatives prescribe Scenic Travel, Partial Retention and General Forest. Modifications to the scenic values along this stretch of the Wenatchee River could directly conflict with the State of Washington objectives for management of the river. In Alternative H, the upper segment is not recommended for inclusion in the Wild and Scenic River system, but the Scenic Travel, Retention allocation of the corridor here would offer nearly the same level of protection to resource values.

d. Mitigation Measures for Wild and Scenic Rivers

The special values for which the ten rivers on the Wenatchee National Forest have been determined eligible for inclusion in the Wild and Scenic River System, will be protected until such time as formal designation is authorized by Congress, or until the rivers are released from further consideration (which, for some river segments, may occur after approval of the Wenatchee National Forest FEIS). The protection zone extends to the adjacent Forest lands, approximately 1/4 mile on each side of each river. Management activities on National Forest lands within these study corridors will be designed to ensure that neither the river nor the corridor are modified to the degree that eligibility or classification would be affected.

Nearly all of the eligible river segments with extensive stretches of private ownership are proposed for designation as Recreational rivers. Present County and State controls should be adequate to protect river values at this level of classification. However, activities will be moni-

tored during the study phase, to avoid direct or cumulative effects to the outstandingly remarkable values or free-flowing characteristics of the rivers.

Measures that would protect outstandingly remarkable river values and reduce conflicts within those corridors designated as Wild and Scenic include:

1. Development of a comprehensive management plan for the river corridor. The plan would address the location and intensity of permitted management activities, the nature and scale of facilities needed, and the kinds, amount and distribution of public use permitted.
2. Monitoring the effectiveness of local laws and regulations of activities on private land within the river corridors against the values for which the various rivers or river segments are designated. In the event that local controls do not appear to provide the necessary protection, initiate discussions with County and/or State agencies to determine the action needed to obtain necessary protection.

These measures would be equally effective for all alternatives where rivers are recommended for designation.

Measures that could be used to protect the significant river values in those corridors outside wilderness that are eligible but not recommended for designation in some alternatives include:

1. The application of management prescriptions which restrict changes in the vegetative and scenic values, so as to preserve these characteristics. This would include locating and designing harvest units to blend with the natural landscape to the extent practicable; designing and blending structural elements (buildings, utility lines, culverts, bridges and so forth) into the landscape to meet visual quality objectives; and designing roads and trails at a level consistent with the adopted Recreation Opportunity Spectrum class and visual quality objectives.
2. Minimize alteration of the streambanks through use of natural materials in riprapping, and by restricting bank stabilization to those

instances where it is necessary for the preservation and protection of existing investments.

3. Evaluate existing developed and dispersed recreation sites to determine if they meet present and future public needs and desires, and if they have the resource capability of sustaining present or future levels of visitor use. Locate new facilities so as to protect the values of popular areas from the impacts of public use.

4. Ensure that recreation facility development or improvement planning is consistent with the applicable Recreation Opportunity Spectrum (ROS) class criteria in terms of the level and scale of development, setting, experience level and social interaction.

5. Monitor or prohibit motorized travel where necessary to protect significant river values.

These measures could be effectively implemented in the American, Cle Elum, Icicle, Napeequa and Waptus Rivers, and in certain segments of the Entiat and the Wenatchee in all but the NC Alternative. Due to General Forest and Partial Retention land allocations in Alternatives NC, B, D and J for the Chiwawa, Little Wenatchee, and White Rivers, and certain segments of the Entiat and the Wenatchee, it would be very difficult to mitigate impacts to the scenic values. At the very least, alterations of the natural landscape in these alternatives might result in a lowering of the potential classification levels of the rivers, if they were to be reconsidered for designation in the future. There is also a possibility that without effective mitigation measures, the outstandingly remarkable values identified in these corridors would be lost.



4. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON CULTURAL RESOURCES

Cultural resources are a unique, fragile and nonrenewable feature of the environment. As such, they are recognized by a special set of historic preservation laws, regulations and policies. Consequently, efforts will be made in every alternative to identify, protect, interpret and manage the significant cultural resources of the Forest.

In addition to the Forest-wide Standards and Guidelines, the SI-2 management prescription will offer protection to most significant cultural resources. However, in order to consider the consequences of the alternatives, all cultural resources have been grouped according to the type of management area allocation surrounding them. The assumption is that these allocations will affect the overall environmental setting surrounding the cultural resources and may impact currently unidentified subsurface materials.

Allocations will also have an effect on management options for future uses of these sites. The SI-2 prescription will not be applied to sites that are ineligible for the National Register of Historic Places. As a result, the nature and distribution of management areas will also affect the total number of cultural resources that are carried into the future.

In all alternatives, the ultimate decision as to whether to practice site avoidance or to carry out mitigation measures in lieu of avoidance will be based on both the nature and uniqueness of the cultural values at the site, and the costs of the desired treatment (avoidance or mitigation).

a. Direct and Indirect Effects of Each Alternative on Cultural Resources

Effects to cultural resources range from disturbance, destruction or loss of part or all of the resource, to modification of the environmental setting around the site such that its basic sense of association, feeling, or place is altered or destroyed. The greater the number of known or

potential cultural sites or use areas that fall within management areas that may create a high level of modification, the greater is the risk of adversely impacting cultural resources.

The alternatives fall into three groupings with respect to similarities in their consequences on cultural resources. A summary of these consequences is displayed in Figure IV-1. These groupings are based on the location and number of acres within each type of management area (by alternative) and on the type of effect that any particular management area allocation is likely to have on cultural resources.

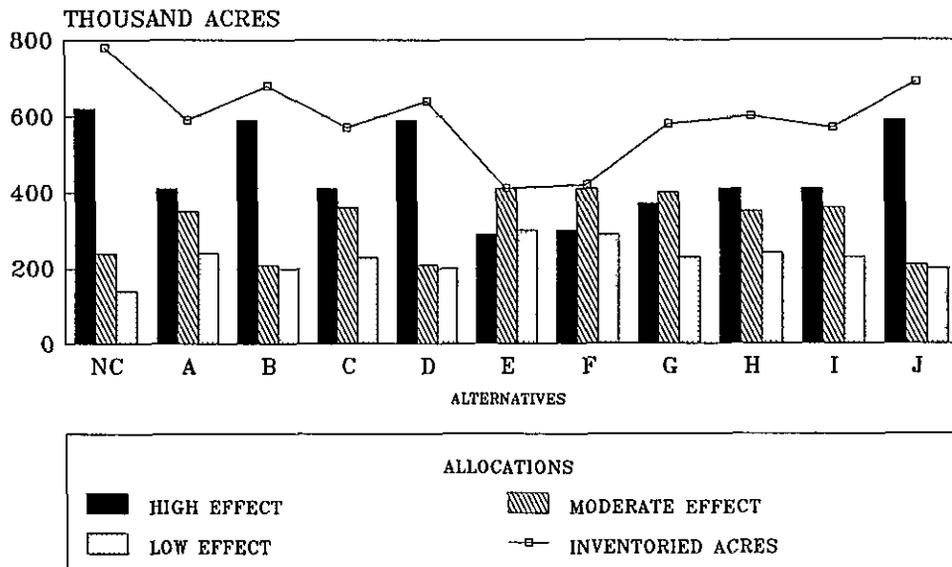
Alternatives E, F, and G overall involve moderate levels of modification to the landscape. The average proportion of known cultural sites and potential or reported cultural use areas that occur within the high impact management allocation areas is relatively low--about 30 percent. However, the heavier emphasis on motorized trail use in the Taneum-Manastash area under these alternatives will create some conflicts with archaeological sites. Although efforts are made to identify existing sites in advance of new trail construction or reconstruction, it is possible to miss subsurface materials that have no surface indications. These sites may later be exposed through ground disturbance or the combination of vehicular passage and subsequent erosion. Once exposed, artifacts and features may be subject not only to breakage or weathering, but also to theft or vandalism.

Other management activities in these alternatives could easily avoid non-significant sites. Visual settings around significant cultural resources would be maintained in a near-natural appearing state, including the area along the historic Naches Trail corridor. Because cultural sites could be managed in place, there would also be available a wide range of interpretive opportunities in the future under Alternatives E, F, and G.

The second grouping of Alternatives is A/NFMA, C, H, and I. Under these alternatives, approximately 40 percent of the known and potential cultural resources occur within management area allocations that may have a high level of impact. Visual settings around some significant sites might experience modification apparent to the viewer, particularly in the historic mining area east of the Liberty Townsite (a National Register Historic District) and near the historic Naches Trail. The long range status of non-significant sites under these alternatives is uncertain. Avoidance in some situations may be impossible. Under Alternatives A/NFMA and C, a majority of significant cultural sites would be managed in place, hence providing for a wide range of interpretive opportunities in the future.

Alternatives NC, B, D, and J, the third grouping, have a considerable potential for affecting cultural resources. Generally, 60 percent of all known cultural sites and potential or reported use areas occur within possible high impact manage-

FIGURE IV-1
CONSEQUENCES ON CULTURAL RESOURCES



ment area allocations. There probably will be noticeable modification of the visual settings around several significant sites, particularly in the historic mining area east of the Liberty Townsite and along the historic Naches Trail corridor. Under these alternatives, it will be impossible to avoid many of the non-significant sites. There may be continuing conflicts between the desire for the protection of cultural resources and other resource management activities, with the corresponding emphasis more on mitigation of cultural resource values than preservation in place. The following discussion addresses those environmental components which may significantly affect cultural resources. These factors will have a direct influence on some management activities, as are described below. There are unlikely to be substantial variations by alternative in the interrelationships and corresponding effects between cultural resources and wilderness, wildlife, fisheries, water, air, minerals, fire, or the social-economic aspects of the environment.

1) Effects of Recreation on Cultural Resources

Where there is an overlap between developed sites and significant cultural resources, there is potential for compaction and displacement of cultural-bearing sediments, as well as loss of cultural resources due to possible vandalism and relic collection. Based on the number of acres allocated to developed recreation in Alternatives A/NFMA, E, and H, these alternatives would have a moderate to low potential for impact. Alternatives NC, B, D, G, and J present the greatest likelihood of impact; Alternatives C, F, and I would have a moderate to high potential for impact. In all situations, the probability of impact would depend upon the nature of the development and its site specific location.

Concurrently, because of the need to protect cultural resources, the development of new recreational sites or reconstruction of existing sites may require advance data recovery, or other mitigation measures. These provisions will probably add to the costs of the recreational developments. Based on the number of acres allocated to developed recreation, the location of these acres, and the nature of the recreational development, the potential for some type of

mitigation is greatest in Alternatives NC, B, D, and J. There would also be a moderate to high potential for cultural resource mitigation work in Alternatives C, F, G, and I, and a moderate to low potential in Alternatives A/NFMA, E, and H. At the same time, several opportunities for historic interpretation in conjunction with developed sites exist. A prime example is Salmon La Sac Guard Station adjacent to the Salmon La Sac Campground on the Cle Elum Ranger District. Interpretation can add significantly to the recreational experience of the user and may ultimately increase the number of visitors to the Forest.

With respect to dispersed recreation and particularly trail construction and use, potential conflicts with significant cultural resources are predominantly associated with those trail systems that are motorized. This is especially true where these overlap with heavier concentrations of cultural sites. In Alternative G the high intensity of motorized trail use may create conflicts with cultural resources. Although there is some potential for the degradation of unrecognized cultural resources, these alternatives will more likely result in the need for an investment in time and funding for cultural resource inventory work, followup site protection or mitigation, and possible relocation or redesign of certain trail segments. This is especially true of those trail segments south of Snoqualmie Pass. In Alternatives C and I the likelihood of mitigation work being required is moderate to high, and in Alternatives A/NFMA, B, D, H, and J it is low to moderate. Only in Alternatives NC, E and F is there little likelihood of recreational trail effects on cultural resources, with the possible exception of motorized trails in the Taneum-Manastash area. Alternatives A, C, G, H, and I will increase public access, dispersed use, and opportunities for interpreting cultural sites to the motorized trail user.

2) Effects of Wild and Scenic River Recommendations on Cultural Resources

The proposed Wild, Scenic, and Recreational River designations in Alternatives A/NFMA, C, E, F, G, H, and I would benefit cultural resources through protection of the visual setting of the river corridors so designated, and by minimizing the extent of ground disturbing activities. These areas tend to support especially dense concentra-

tions of cultural sites. Impacts created by an increase in public use due to the river classification are expected to be minimal. Since there would be no proposed river designations under Alternatives NC, B, D, and J, the benefits to cultural resources that are mentioned above would not be available in these alternatives.

3) Effects of Scenery on Cultural Resources

Since the visual setting around a cultural resource may be a vital component of its significance, alterations of the natural landscape may impact cultural resource values.

Alternatives A/NFMA, E, F, G, and H protect or enhance the majority of the important visual areas on the Forest. This would directly benefit cultural resource values and provide for more compatible management of the visual settings around the significant cultural sites and historic districts.

In Alternatives NC, B, D, and J there will be substantial modification of the landscape. Management activities, such as timber harvest units and roads, will be visible in many areas, detracting from the scenic qualities at those localities. The loss of scenic values will particularly affect cultural resources in the vicinity of the historic townsite of Liberty, along the historic Naches Trail, in the Little Naches, Little Rattlesnake and Rattlesnake drainages, in the Railroad Creek drainage, and in the Chiwawa, Little Wenatchee and White River drainages.

In Alternatives C and I, there would be several viewsheds where the natural-appearing character would be modified. Of concern for cultural resources would be loss of scenic values in the areas adjacent to the historic townsite of Liberty, near the historic Naches Trail, and in the Little Rattlesnake Creek and Little Naches River drainages.

The SI-2 Prescription may be applied to significant cultural sites. Since this prescription prohibits regulated timber harvest, management of some significant cultural sites may help to preserve the visual setting in some scattered locations on the Forest.

4) Effects of Timber Management on Cultural Resources

In Alternative G, 37 percent of the known cultural sites are within high intensity, vegetative management allocations which concentrate on such activities as timber harvesting and regeneration. Potential conflicts with cultural resources would be low to moderate. Obvious alteration of the environmental setting would be minimal for two-thirds of the known sites. Significant sites could frequently be avoided, thereby reducing the potential costs of mitigation or project restrictions.

In Alternatives A/NFMA, C, H, and I, 41 percent of the known sites fall within management allocations specifying intensive vegetative management. Overall, effects would be similar to those identified in Alternatives B and D described below but at a reduced level. This would be due to the scenic classifications along the Little Naches River, along the historic Naches Trail corridor, in the Cougar and Lion Gulch areas, and along the Chiwawa River. The added costs of sale modification, special restrictions or mitigation measures, and more extended consultation would be moderate. Avoidance of significant cultural sites may be possible without major alteration in the timber sale designs.

In Alternatives NC, B, D, and J about 60 percent of the known sites fall within high intensity timber management allocations. Effects requiring mitigation may occur where site avoidance is not possible. These mitigation costs may be substantial, particularly in areas of dense concentrations of archaeological sites such as occurs in the Cle Elum, Lake Wenatchee, and Naches Ranger Districts. There may also be some delay in the timing of vegetative management activities due to the potential for more lengthy consultation with the appropriate historic preservation agencies. The necessity for sale redesign and special restrictive measures may affect a number of the timber sale projects.

In addition, the harvesting of timber under Alternatives NC, B, D, and J might alter the environmental setting of a number of significant cultural resources. Culturally sensitive localities

in the Little Naches drainage, in the Clemans and Bald Mountain area, in the upper Rattlesnake and Nile Creek drainages, in the Taneum-Manastash watersheds, in the Cougar Gulch and Snowshoe Ridge area, and in the upper Chiwawa River Valley could possibly all be affected. A positive benefit of these alternatives would be the potential identification of a large number of cultural resources due to accelerated inventory efforts. Sites that might otherwise deteriorate naturally if unrecognized might have some opportunity for preservation and protection, or at least documentation and recovery of available data.

In Alternatives E and F, less than 30 percent of the known cultural resources are within management area allocations that would have high levels of effect. There would be few conflicts between the management of cultural resources and timber harvest activities. With the emphasis on scenic values in these alternatives, protection of the environmental setting around significant sites would be likely. Costs of consultation, mitigation, and/or project monitoring would be minimal, as would be the likelihood of timber sale restrictions or modifications due to possible adverse effects on cultural resources. The goals of cultural resource management and those of vegetative management are generally compatible in these alternatives.

5) Effects of Range Management on Cultural Resources

Although the supply of forage and the number of structural improvements are anticipated to change by alternative, it is unlikely that the consequences of range management on cultural resources will vary. With the exception of Alternatives NC and A/NFMA, in which the permitted livestock use is predicted to drop, the increase in actual permitted grazing does not vary significantly between Alternatives B, D, E, G, H, I, and J. However, permitted livestock use will remain relatively constant in Alternatives C and F. Since only a small number of structural improvements are likely to conflict with cultural resources, the need for mitigation is expected to be minimal in any alternative.

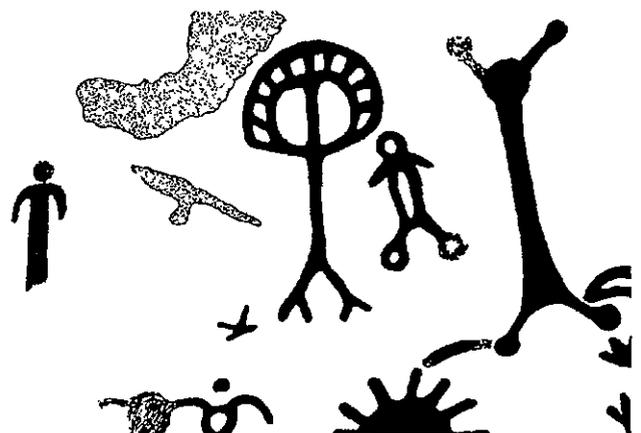
6) Effects of Soils on Cultural Resources

Accelerated soil erosion and/or compaction due to intensive vegetative management may have an effect on cultural resources. Alterations in soil characteristics brought on by timber harvesting and road construction may cause artifacts to be displaced, their contextual relationship lost, and the cultural materials left exposed to weathering agents. Important information concerning past environments associated with the cultural resources in subsurface strata (pollen, seeds, or certain soil constituents or types) is also easily destroyed by processes that degrade the soils. Soil erosion may weaken the structural stability of historic buildings and result in the "sluffing away" of linear features, such as ditches, roads, flumes, and railroad grades.

The consequences to cultural resources due to changes in soils under Alternatives A/NFMA, C, H, and I are difficult to predict, but are not expected to vary substantially from the present situation.

Alternatives NC, B, D and J have the highest likelihood of affecting cultural resources through impacts to soils. This is because of the greater number of acres allocated to soil-disturbing activities within these alternatives. Because erosion is particularly detrimental to archaeological materials, the effects of these alternatives would be most pronounced in the Little Naches and Tieton drainages.

Alternatives E, F, and G will have a minimal effect on cultural resources with respect to soils, because of the limited amount of land allocated to ground disturbing management activities.



7) Effects of Roads on Cultural Resources

The consequences of road construction on cultural resources can be predicted, in part, on the basis of the total miles of construction anticipated under each alternative. However, because roads can frequently be designed to avoid cultural sites, the actual road locations are more crucial in estimating effects than the miles of new construction. Indirect impacts such as increased public access (with the corresponding rise in the potential for vandalism or relic collecting) are probably tied equally to the location of the road and the total miles of road available for use. A positive effect is that roads provide access to carry out cultural resource inventories and can serve as a transportation route to those historic sites and areas that are interpreted and managed for public use.

Potential impacts to significant cultural sites may require more lengthy consultation with the appropriate historic preservation agencies, possible road relocation or redesign, mitigation measures, and monitoring of road construction.

In Alternatives B and J, the high level of road construction increases the likelihood of conflicts with cultural resource values (although the location of the road is the critical factor). Mitigation costs may be high and there may be frequent need for modification of the road design or location, particularly on the Naches Ranger District and in areas east of the historic Townsite of Liberty. Access would be excellent, but the threat of indirect impacts would also be high.

Under Alternatives NC, A/NFMA, C, D, G, H, and I potential conflicts with cultural resources could probably be avoided, keeping project modification and mitigation costs at a moderate to low level. However, the intensity of road construction in any particular area would be the determining factor in how well this could be achieved. Access would be good, and indirect impacts to cultural resources moderate.

The planned level of road construction in Alternatives E and F would be compatible with cultural resource management objectives. Since potential conflicts would be minimal, the necessity of project modification or mitigation would be very infrequent and the resulting costs to the road construction program low.

b. Cumulative Effects of Each Alternative

Many of the cultural resources of the Wenatchee National Forest are unique. They may provide the sole record of a former environment or past way of life. In several instances, the cultural sites of the Forest are also part of a larger complex of past cultures which once extended eastward to the Columbia Plateau and westward to Puget Sound. Each site within this whole is a vital link to the others in interpreting patterns of human use through time.

However, these same sites are also part of a rapidly diminishing, non-renewable resource base. The combination of impacts from past landscape modifications, private developments, natural deterioration, and major hydroelectric projects have destroyed much of this record in central Washington. The exact extent of the loss and the range of site types affected cannot be determined since there was no cultural resource inventory or recordation preceding many of these activities. There are likewise few opportunities today to mitigate the cumulative effects of the past. Once destroyed, a cultural resource cannot be resurrected. This points to the need for even more careful consideration of cultural resource values in the future.

Within the Forest, cumulative effects can be analyzed on the basis of impacts of activities to the visual settings surrounding the cultural resources. Activities may create alterations in above-ground objects, features, and structures, and in the spatial relationships between these; and activities may have impacts on subsurface cultural deposits. The scope of the effects includes all lands within the Forest boundary, including the areas of intermingled ownership, as well as lands within the greater Columbia River watershed. Areas of particular concern include those forested localities where the landowners have clearcut large blocks of land (such as in the upper Yakima drainage) or where landowners anticipate an accelerated period of timber harvest (such as on the Longview Fibre lands in the Stevens Pass Highway corridor and Plum Creek lands within the Cle Elum Ranger District).

The existing cultural resource compliance review process incorporates the consideration of cumulative effects to cultural resources of any proposed action taking place on National Forest land. These effects are subsequently avoided or mitigated through a variety of measures (see the section on mitigation below). However, there is no adequate compensation for the physical loss of some sites. These are resources which, in part, are aesthetically significant - that convey, by their existence in place, a special human link with the historic past - and which are rare because of their tremendous depletion in the past. Since Alternatives NC, B, D, and J have the greatest number of acres assigned to management area allocations that may substantially alter the environment, these alternatives present a risk to these irreplaceable resources. In that sense, these alternatives may have a cumulative impact on cultural resources.

Cumulative effects are less likely in Alternatives A/NFMA, C, H, and I, where the majority of significant sites can be managed in place. Since Alternatives E, F, and G present few conflicts between significant cultural resources and other management activities, they have the least potential for cumulative impacts on cultural resources.

c. Alternatives' Conflicts With Other Agency Plans and Policies

The Washington State Office of Archaeology and Historic Preservation (SHPO) is presently preparing a State-wide Preservation Plan for cultural resources. Since it is in the preliminary stages, potential conflicts between the effects of the Forest management alternatives and the objectives of the plan cannot be determined.

Representatives of the Yakima Indian Nation and the Confederated Tribes of the Colville Reservation have expressed a continuing concern for and interest in the Forest management of cultural sites. This particularly includes those sites which represent traditional use areas or to which members of the tribes have ancestral ties. In every alternative, there would be coordination of proposed project actions with the American Indian community to try to resolve any potential conflicts that might arise.

d. Mitigation Measures for Cultural Resources

Mitigation most often involves the use of methods or techniques that will minimize disturbance to cultural resources and their environmental setting. A variety of potential mitigation measures exist. These may range from special project design criteria to be followed during ground disturbing activities, to protective enclosures or exclosures around significant cultural sites, to systematic monitoring of project activities. Each would require further consultation with the SHPO and the Advisory Council on Historic Preservation if the resource is determined eligible for the National Register of Historic Places. The most desirable measures, of course, are those which effectively protect the cultural resources in place, are economically prudent, and are compatible with other resource management needs.

Some of the more commonly used mitigation measures include:

1) Adjustment of project boundaries to completely avoid cultural resources and minimize alteration of the environmental setting.

The most important step in preservation and protection is systematic inventory well in advance of Forest management activities. Proposed roads, trails, timber sale units, and other project boundaries can generally be adjusted without additional cost or inconvenience, if the need is determined during the very early planning stages of the project. This eliminates impacts or threats to cultural sites while encouraging "business as usual" with respect to other management activities.

2) Adoption of methods or techniques that will minimize disturbance to cultural resources and their environmental settings.

Frequently, activities may be carried out around a cultural site with minimal disturbance through creation of a protective buffer zone, through use of special technologies, or through reduction of the actual area of ground disturbance. Since the most common interaction of cultural resources with other management activities on the Wenatchee National Forest is with timber harvesting, a series of examples of this type of mitigation measure as it pertains to timber management follow:

a) Use of an aerial or full suspension yarding system.

Full suspension substantially reduces or avoids disturbance to the ground surface (Marvin, 1982). This has been an effective procedure on the Forest, although there are some visual effects created by the skyline corridors. Full suspension of the logs in combination with directional felling of trees away from the cultural site, and monitoring of the harvest activities by trained cultural resource technicians, can afford nearly full protection to the cultural resource. The nature of the timber sale design will determine the degree of effect on the visual setting of the site. Careful planning and a clear understanding of visual quality objectives around the cultural resource will minimize adverse impacts.

b) Where tractor logging is necessary, restriction of the overall number of skid trails and designation of a planned system of trails to reduce impacts. In previously harvested areas, reuse of existing skid trails wherever possible.

These measures could be applied to avoid cultural sites, although obviously there would be an effect on the visual setting. The concept of designated skid trails has been successfully tested in soil compaction studies (Froelich et al., 1981), but the concept is likewise applicable to cultural resources.

c) Use of a buffer between equipment and the ground surface.

This measure may be suitable where there are no above ground structural remains. Recent studies on the Winema National Forest have tested the concept of logging over snow as an effective method of protecting cultural resources (Philipek,

1985). The results indicate some success as long as the soil characteristics, snow depth and moisture content, slope, and air temperature meet certain criteria. The location of the landings, the method of subsequent slash piling, and careful administration of the timber sale contract to see that specialized criteria are met, are crucial to the success of this technique.

Frequently it is necessary to construct or reconstruct roads to access the timber sale areas and to provide suitable haul routes for the logging traffic. On occasion, it is impossible or economically unrealistic to completely avoid a cultural site. If environmental circumstances allow for flexibility in the road design, disturbance might be minimized by avoiding excavation of the road bed and instead providing a layer of plastic filter cloth and fill between the road surface and the ground surface. Trees removed within the right-of-way might be flush cut and the stumps left in place, to further minimize soil disturbance. This method was used on the Mt. Baker-Snoqualmie National Forest in 1981 during reconstruction of the Huckleberry Mountain Road 195C on the White River Ranger District, and was well received by the Advisory Council on Historic Preservation during the compliance review consultations (Hanna, 1980). Future test excavations below the road surface will be necessary to determine just how successful this method was in protecting the subsurface cultural deposits.

This concept of protective capping of a cultural site (where there are no above ground structural features or remnants) by crushed aggregate or other materials may apply as a mitigation measure to a wide range of management activities.

3) Removal of the cultural (historic) property to another appropriate location (if physically possible) after adequate documentation of the property and provisions for protection of its historic values and integrity.

The first consideration in moving a property is to find an alternate and similar locality on the Ranger District or Forest in which the cultural resource occurs. Alternatively, the resource could be transferred to private ownership for future protection. This method of mitigation has not been common in Region 6, but was successfully carried out on the Rogue River National Forest

with the McCredie House. That site was a National Register property, originally situated within the J. Herbert Stone Nursery, but sold with protective covenants and moved to private land in April 1985.

4) Mapping, photo documentation and scaled drawings of the cultural resource (historic properties only) before proceeding with project implementation (and loss of the resource).

In this situation, loss of a cultural site can be mitigated through recovery of as much of the information contained in the property as is appropriate, considering the nature of the resource and the impacting activity. Normally, this documentation is done to the standards of the Historic American Building Survey (HABS) or the Historic American Engineering Record (HAER), whichever is applicable. This may involve historic research, mapping, photo documentation, and measured drawings. This process was successfully used by the Wenatchee National Forest in advance of the sale of the historic Liberty Townsite to private ownership in 1981, and is one of the more common mitigation measures preceding the removal of historic properties. In the case of linear features, such as historic ditches, wagon roads, highways, railroad grades, and so forth, a combination of thorough documentation of the feature with preservation of a designated segment might be acceptable.

5) Excavation of archaeological resources utilizing a professionally sound research design in keeping with the State-wide Preservation Plan.

Such excavation would be undertaken through an outside contract that has a research design approved by the State Historic Preservation Office and the Advisory Council on Historic Preservation. When determining whether this is an appropriate mitigation measure, four criteria should be considered:

a) Does the significance of the property lie primarily in the data it contains? In the case of archaeological sites, consideration of the cultural/religious concerns of the American Indian community is vital to the decision.

b) Would preservation in place be more costly or less practical than data recovery?

c) What is the scope of the proposed project or undertaking in relation to the size and nature of the cultural property (i.e., is all of the site, or just a small portion of it, involved)?

d) Would the cultural property be subject to other agents of degradation or disturbance, such as vandalism or uncontrollable erosion, regardless of any proposed undertaking which might affect it?

In addition, it must be determined whether the data contained in the site can be used productively to address valuable research questions, and whether the available time, funding, technology, and expertise are adequate to recover the significant information. As to how much data recovery is sufficient, there is no standard. The nature of the data recovery effort, its scope, and its boundaries must be determined on a case-by-case basis.

The specific mitigation measure chosen to avoid or lessen project impacts will depend on the nature of the cultural site and the project activities proposed. Some of these measures may also be used in combination.

5. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON SCENERY

a. Direct and Indirect Effects of Each Alternative on Scenery

Resource components and management activities that have a similar effect on scenery in all alternatives include the development of structures and facilities, air quality, and wildfire. Structures of all kinds create visual dominance within the natural, forested environment. The placement, size, and number of structures and the degree of contrast creates changes in form, line, color, and texture. Structures can occur in many areas. They may be utility lines and corridors, fish ladders, small dams, walls and riprap, buildings, microwave towers, ski areas, signs, and facilities in campgrounds and at trailheads.

Clean, smoke-free air will provide a crisper depth of perception, and allow for visually appealing, natural forest viewing along travelways and at vista points. Wildfire can create large acres of blackened forested landscape in contrast to the green texture of an unburned landscape. Associated with wildfire is smoke, haze, dust and other particulate matter, which reduces visual perception.

The effects of specific resource management activities on scenery which vary by alternative are vegetative manipulation for wildlife, timber management and the associated road building, prescribed fire and shaded fuelbreaks, and forage for range management.

1) Effects of Wildlife Management on Scenery

Vegetative manipulation of wildlife habitat to achieve a forage-to-cover ration of 60/40 for deer and elk increases openings that will dominate the naturally-established landscapes. The openings create new form and rearrange the landscape to an altered appearance. Wildlife viewing may increase as a result of the change. The more land allocated to this activity, the greater the alteration of the landscape.

Alternatives that will have the least to most visual impacts to scenery as a result of wildlife management are listed below. Alternatives E and F allocate approximately 40,000 acres to Big Game habitat followed by C and I with approximately 48,000 acres. H and J allocate approximately 52,000 acres, with Alternative A/NFMA allocating 54,000 acres and B and D being the biggest impact with approximately 58,000 acres.

2) Effects of Timber Management on Scenery

Timber harvest levels, especially those resulting in clearcuts, have the greatest effect on scenery. The more vegetative manipulation that takes place for timber harvest, the greater is the size and amount of disturbance that could create visual alteration to the landscape. The contrast of form, line, color, and texture patterns created by timber harvest can change the natural-appearing landscape to an altered or heavily altered one.

In addition, the more intensive the management of timber for commodity production, the greater

potential there is for smoke from burning and for haze, dust, and other particulate matter to reduce visual quality.

Steep slopes, soil color contrast (light colored soils), and low soil productivity have the biggest effects on the visual absorption capacity (VAC) rating because this combination of factors would produce a low VAC rating. The effects vary by alternative because the intensity of ground disturbing activities, particularly those resulting from timber harvest, vary by alternative. The more ground disturbance there is within an alternative, the bigger the effect will be on the scenery resource.

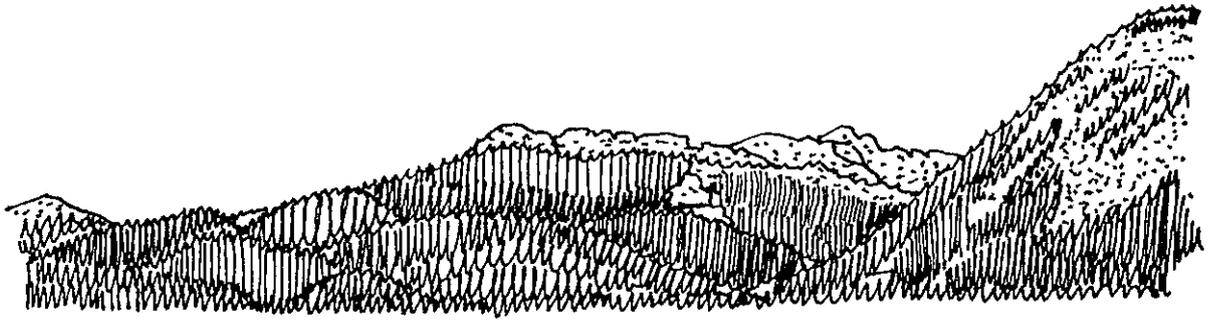
Roads can create scars on the landscape. The more miles of roads built to accommodate timber management activities, the more severe is the visual alteration to the landscape. Roads create horizontal form, line and color contrast usually associated with timber harvest areas and the adjacent landscape. Also associated with roads are gravel borrow sources. Gravel sources also create form and color contrast upon the landscape by removing the material permanently from its natural setting.

Prescribed fire following timber harvest blackens earth and woody debris left on the ground, and scorches trees and needles. Fire results in stark color contrasts of brownish black against the green textured, forested surroundings. Shaded fuel breaks produce a linear, open to broken, canopied effect on the landscape as compared to a naturally textured landscape.

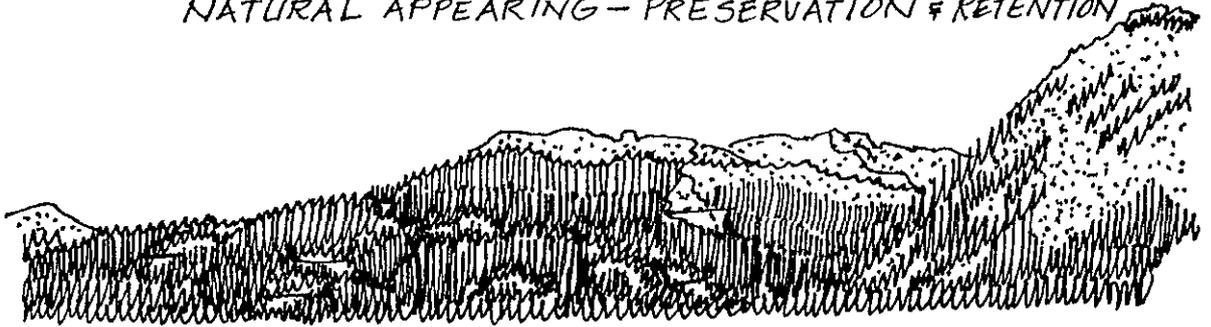
The amenity-oriented alternatives will have a greater number of acres allocated to prescriptions with a visual quality objective of Preservation, Retention or Partial Retention. These would provide for higher scenic quality and a more natural-appearing landscape (see Figure IV-2). Conversely, the commodity-oriented alternatives have higher levels of timber harvest and allocate more acres to Modification and Maximum Modification visual quality objectives, resulting in a more pronounced alteration of the landscape and a greater visual impact (see Figure IV-2).

Tables IV-5 and IV-6 describe the visual condition of the viewsheds and major lakes on the Forest by area and by alternative.

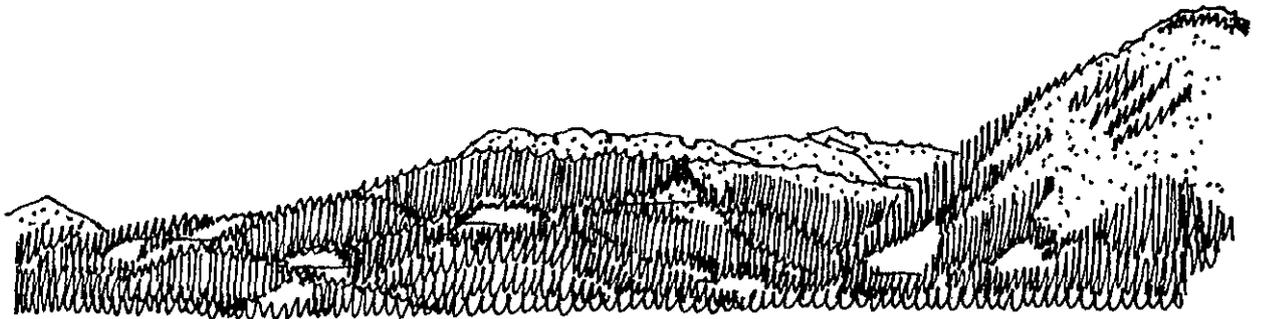
FIGURE IV-2
ILLUSTRATION OF VISUAL CONDITION



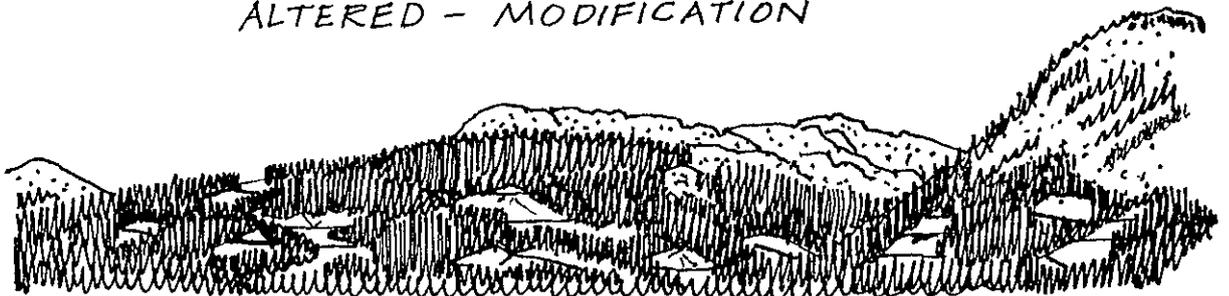
NATURAL APPEARING - PRESERVATION & RETENTION



SLIGHTLY ALTERED - PARTIAL RETENTION



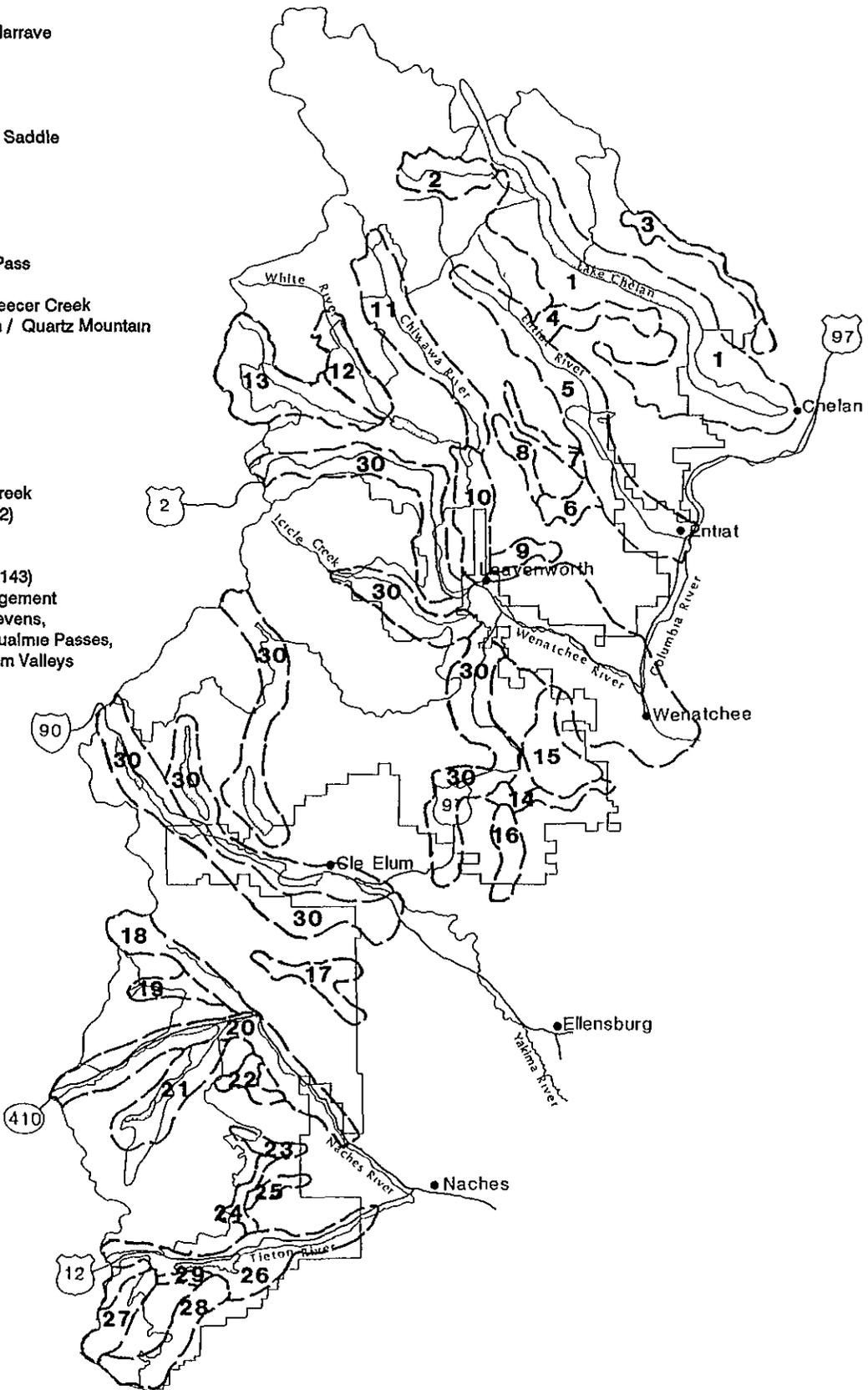
ALTERED - MODIFICATION



HEAVILY ALTERED - MAXIMUM MODIFICATION

**FIGURE IV-3
INVENTORIED VIEWSHEDS AND LOCATIONS**

- 1 Lake Chelan
- 2 Railroad Creek
- 3 Cooper Mtn to S. Narrave
- 4 Shady Pass
- 5 Entiat Valley
- 6 French Corral
- 7 Mad River
- 8 Sugarloaf-Mavenck Saddle
- 9 Eagle Creek
- 10 Chumstick-Plain
- 11 Chiwawa River
- 12 White River
- 13 Little Wenatchee
- 14 Beehive to Swauk Pass
- 15 Mission Creek
- 16 Table Mountain / Reecer Creek
- 17. Taneum-Manastash / Quartz Mountain
- 18 Little Naches
- 19 Ravensroost
- 20 Mather Memorial
- 21 Bumping Lake
- 22 Little Bald
- 23 Rattlesnake
- 24 Cash Prairie
- 25 Little Rattlesnake Creek
- 26 White Pass (Hwy. 12)
- 27. North Fork Tieton
- 28 South Fork Tieton
- 29 Tieton Road (Rd #143)
- 30 Alpine Lakes Management Plan (includes Stevens, Swauk and Snoqualmie Passes, Icicle and Cle Elum Valleys)



**TABLE IV-5
VISUAL CONDITION OF VIEWSHEDS**

VIEWSHED OR TRAVEL ROUTES	PRESENT INVENTORIES		FUTURE ESTIMATED LONG TERM CUMULATIVE EFFECTS						
	EXISTING VISUAL CONDITION	NC	A&H	B&D	C&I	E	F	G	J
Lake Chelan	Natural Appearing	Altered	Natural Appearing	Slightly Altered	Natural Appearing	Natural Appearing	Natural Appearing	Natural Appearing	Natural Altered
Railroad Creek	Appearing	Altered	Appearing	Altered	Appearing	Appearing	Appearing	Appearing	Altered
Cooper Mtn To S Narrave	Altered	Heavily Altered	Slightly Altered	Heavily Altered	Altered	Slightly Altered	Altered	Slightly Altered	Heavily Altered
Shady Pass	Natural Appearing	Heavily Altered	Slightly Altered	Heavily Altered	Altered	Natural Appearing	Slightly Altered	Slightly Altered	Heavily Altered
Entiat Valley	Natural Appearing	Altered	Slightly Altered	Heavily Altered	Slightly Altered	Slightly Altered	Slightly Altered	Slightly Altered	Heavily Altered
French Corral	Altered	Heavily Altered	Slightly Altered	Heavily Altered	Slightly Altered	Slightly Altered	Natural Altered	Natural Altered	Altered
Mad River	Natural Appearing	Altered	Slightly Altered	Heavily Altered	Slightly Altered	Slightly Altered	Natural Appearing	Natural Appearing	Altered
Sugarloaf-Maverick Saddle	Slightly Altered	Altered	Slightly Altered	Heavily Altered	Slightly Altered	Natural Appearing	Natural Appearing	Slightly Altered	Heavily Altered
Eagle Creek	Slightly Altered	Altered	Slightly Altered	Heavily Altered	Slightly Altered	Natural Appearing	Natural Appearing	Natural Appearing	Altered
Churnstic-Plan Rd 209	Natural Appearing	Altered	Slightly Altered	Heavily Altered	Slightly Altered	Natural Appearing	Natural Appearing	Natural Appearing	Altered
Chiwawa River	Natural Appearing	Altered	Natural Appearing	Heavily Altered	Natural Appearing	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
White River	Slightly Altered	Altered	Natural Appearing	Heavily Altered	Natural Appearing	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
Little Wenatchee	Slightly Altered	Altered	Natural Appearing	Heavily Altered	Natural Appearing	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
Beehive to Swauk Pass	Natural Appearing	Heavily Altered	Slightly Altered	Heavily Altered	Slightly Altered	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
Mission Creek	Natural Appearing	Heavily Altered	Slightly Altered	Heavily Altered	Slightly Altered	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
Table Mountain	Slightly Altered	Heavily Altered	Slightly Altered	Heavily Altered	Natural Appearing	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
Reecer Creek	Altered	Altered	Altered	Altered	Altered	Altered	Altered	Altered	Altered
Taneum-Manastash	Slightly Altered	Heavily Altered	Slightly Altered	Heavily Altered	Slightly Altered	Natural Appearing	Natural Appearing	Natural Altered	Heavily Altered
Quartz Mountain	Altered	Altered	Altered	Altered	Altered	Altered	Altered	Altered	Altered
Little Naches	Slightly Altered	Heavily Altered	Slightly Altered	Heavily Altered	Slightly Altered	Natural Altered	Slightly Altered	Slightly Altered	Heavily Altered
Raven Roost	Slightly Altered	Heavily Altered	Slightly Altered	Heavily Altered	Slightly Altered	Natural Altered	Slightly Altered	Slightly Altered	Heavily Altered
Mather Memorial (Hwy 410)	Natural Appearing	Slightly Altered	Natural Appearing	Slightly Altered	Natural Appearing	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
Bumping Lakes	Natural Appearing	Altered	Natural Appearing	Altered	Natural Appearing	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
Little Bald	Altered	Heavily Altered	Altered	Heavily Altered	Slightly Altered	Altered	Altered	Altered	Heavily Altered
Rattlesnake Creek	Slightly Altered	Altered	Slightly Altered	Heavily Altered	Slightly Altered	Natural Appearing	Natural Appearing	Slightly Altered	Altered
Cash Prairie	Slightly Altered	Heavily Altered	Slightly Altered	Heavily Altered	Altered	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
Little Rattlesnake Creek	Slightly Altered	Heavily Altered	Slightly Altered	Heavily Altered	Altered	Slightly Altered	Slightly Altered	Heavily Altered	Heavily Altered
White Pass (Hwy 12)	Natural Appearing	Heavily Altered	Natural Appearing	Altered	Natural Appearing	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
North Fork Tieton	Altered	Altered	Slightly Altered	Altered	Slightly Altered	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
South Fork Tieton	Slightly Altered	Altered	Slightly Altered	Heavily Altered	Altered	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered
Tieton Road	Natural Appearing	Altered	Natural Appearing	Altered	Natural Appearing	Natural Appearing	Natural Appearing	Natural Appearing	Heavily Altered

Alpine Lakes
Mangement Plan
Viewsheds Includes

Stevens Pass (Hwy 2), Swauk Pass (Hwy 97), Snoqualamie Pass (I-90), Icicle, Cle Elum Valley

All alternatives except the NC alternative would treat the major travel routes in a high visual quality

**TABLE IV-6
VISUAL CONDITION OF LAKES**

PRESENT INVENTORIES		FUTURE ESTIMATED LONG TERM CUMULATIVE EFFECTS							
LAKES AND SURROUNDING LANDSCAPE	EXISTING VISUAL CONDITION	ALTERNATIVE							
		NC	A&H	B&D	C&I	E	F	G	J
Antilon Lake	Altered	Heavily Altered	Natural Appearing	Heavily Altered	Altered	Natural Appearing	Altered	Altered	Heavily Altered
	Natural	Natural	Natural	Natural	Natural	Natural	Natural	Natural	Natural
Domke Lake	Appearing	Appearing	Appearing	Appearing	Appearing	Appearing	Appearing	Appearing	Appearing
	Slightly	Natural	Natural	Slightly	Natural	Natural	Natural	Natural	Natural
Fish Lake	Altered	Altered	Appearing	Altered	Appearing	Appearing	Appearing	Appearing	Altered
	Natural	Heavily	Natural	Slightly	Natural	Natural	Natural	Natural	Heavily
Lake Wenatchee	Appearing	Altered	Appearing	Altered	Appearing	Appearing	Appearing	Appearing	Altered
	Heavily	Natural	Natural	Slightly	Natural	Natural	Natural	Natural	Heavily
Beehive	Altered	Altered	Appearing	Altered	Altered	Appearing	Appearing	Appearing	Altered
	Natural	Heavily	Natural	Heavily	Natural	Natural	Natural	Natural	Heavily
Manastash Lake	Appearing	Altered	Appearing	Altered	Appearing	Appearing	Appearing	Appearing	Altered
	Natural	Heavily	Natural	Natural	Natural	Natural	Natural	Natural	Heavily
Bumping Lake	Appearing	Altered	Appearing	Altered	Appearing	Appearing	Appearing	Appearing	Altered
	Natural	Heavily	Natural	Natural	Slightly	Natural	Natural	Natural	Heavily
Granite Lake	Appearing	Altered	Appearing	Appearing	Altered	Appearing	Appearing	Appearing	Altered
	Slightly	Slightly	Natural	Natural	Natural	Natural	Natural	Natural	Natural
Leech Lake	Altered	Altered	Appearing	Appearing	Appearing	Appearing	Appearing	Appearing	Altered
	Natural	Slightly	Natural	Slightly	Natural	Natural	Natural	Natural	Natural
Dog Lake	Appearing	Altered	Appearing	Altered	Appearing	Appearing	Appearing	Appearing	Altered
	Natural	Natural	Natural	Natural	Natural	Natural	Natural	Natural	Heavily
Clear Lake	Appearing	Altered	Appearing	Altered	Appearing	Appearing	Appearing	Appearing	Altered
	Natural	Heavily	Natural	Natural	Natural	Natural	Natural	Natural	Heavily
Rimrock Lake	Appearing	Altered	Appearing	Altered	Appearing	Appearing	Appearing	Appearing	Altered
	Slightly	Heavily	Slightly	Heavily	Natural	Natural	Natural	Natural	Heavily
McDaniel Lake	Altered	Altered	Altered	Altered	Altered	Appearing	Appearing	Appearing	Altered
	Natural	Heavily	Slightly	Heavily	Slightly	Natural	Natural	Natural	Heavily
Bear Lake	Appearing	Altered	Altered	Altered	Altered	Altered	Appearing	Appearing	Altered
	Natural	Heavily	Slightly	Heavily	Slightly	Slightly	Slightly	Slightly	Heavily
Lost Lake	Appearing	Altered	Altered	Altered	Altered	Altered	Altered	Altered	Altered

Alpine lakes management plan lakes includes
Cooper Lake
Cle Elum Lake
Kachess Lake

All alternatives except the NC alternative would treat the lakes and surrounding landscape in a high visual quality

The number of acres allocated to General Forest and the number of viewsheds allocated to prescriptions resulting in a natural-appearing or slightly altered condition, indicates the likelihood of effects to scenic values, by alternative.

Alternative E allocates approximately 154,000 acres to General Forest and retains 33 of 34 viewsheds in scenic management.

Alternative F allocates approximately 202,000 acres to General Forest and retains 32 of 34 viewsheds in scenic management.

Alternative G allocates approximately 224,000 acres to General Forest and retains 32 of 34 viewsheds in scenic management.

Alternatives A/NFMA and H allocate approximately 393,000 acres to General Forest and retain 33 of 34 viewsheds in scenic management, but 18 of the viewsheds will be in a slightly altered condition.

Alternatives C and I allocate approximately 389,000 acres to General Forest and retain 27 of 34 viewsheds in scenic management.

Alternatives B and D allocate approximately 613,000 acres to General Forest and retain 2 of 34 viewsheds in scenic management.

Alternative J allocates approximately 615,000 acres to General Forest and retains no viewsheds in scenic management.

Alternative NC allocates approximately 1,000,000 acres to General Forest and retains 1 of 34 viewsheds in scenic management

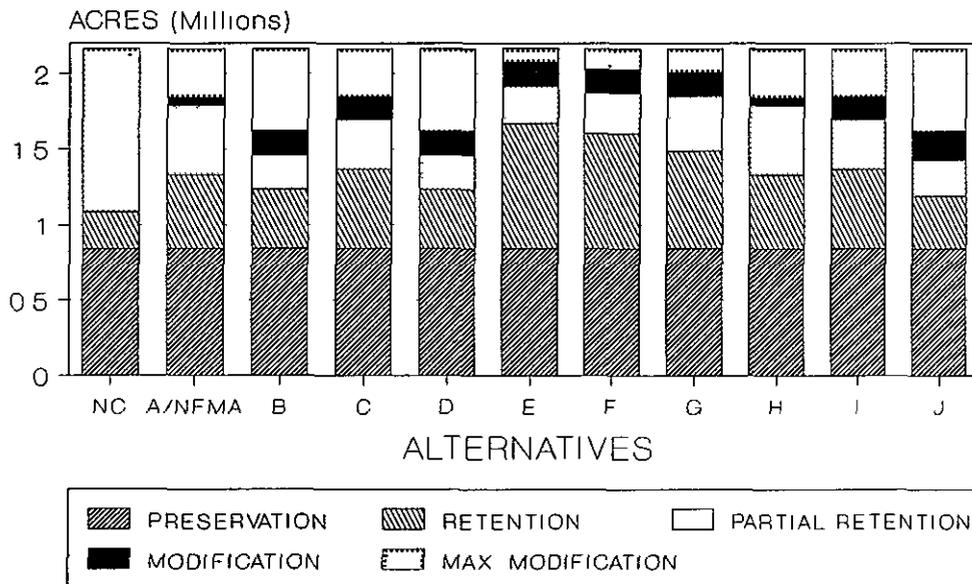
In summary, the ranking by alternatives based upon the acres allocated to General Forest and viewsheds managed for scenic management from highest (greatest protection for scenic values) to lowest are E, F, G, A/NFMA and H, C and I, B and D, J and NC (see Figure IV-4).

3) Effects of Range Management on Scenery

The management of forage for livestock range creates textural and color contrast from a natural-appearing grasslands to one that may be depleted of grasses, brown in color and may present a trampled-appearing, open space landscape. Valley bottom landscapes are very vulnerable to potentially heavy use by livestock. The amount of grazing, time of year, frequency of use and the management of the allotments can determine the degree of visual alteration of the land.

Alternatives E, F and G have approximately 7,000 acres allocated to Modification, C and I have approximately 18,000 acres, Alternatives A/NFMA and H have 34,000 acres, J has 62,000 and B and D have 82,000 acres in Modification.

**FIGURE IV-4
VISUAL QUALITY OBJECTIVES BY ALTERNATIVE**



b. Cumulative Effects of Each Alternative

The rate, distribution, scale, and type of timber harvest methods will determine the cumulative effects upon a natural-appearing, forested landscape. Form changes occur when clearcutting is done. When an area or viewshed is rapidly being cut the cumulative visual effects will be the greatest. How the timber management activities are distributed on the landscape in relationship to the viewer causes perception of a natural-appearing to heavily altered landscape. The closer the management activity to the viewer, the more apparent the visual perception. The scale of vegetative management activities creates visual impacts. When the units appear as openings, the activity is more visible.

The discussion and prediction of visual condition refers only to the National Forest land within the viewsheds. In reality, the viewsheds along some of the Forest's sensitive viewing locations are a mixture of ownerships. Timber management activities on private land seldom meet the visual quality objectives recommended by the visual management system. There will likely be heavily altered areas within viewsheds where the Forest is trying to achieve a more natural appearance. Where this occurs, the cumulative effect on the visual condition of the viewshed as a whole will be to create a more heavily altered appearance than predicted in Tables IV-5 and 6. Careful design and scheduling of harvest units can mitigate the effect of cutting on private land by eliminating straight lines and square corners, thus creating a cumulative effect which is less detrimental than the effect of private land activities alone.

The alternatives that have the highest number of viewsheds in a natural-appearing and slightly altered landscape will have the highest degree of scenic protection against cumulative effects. These viewsheds can be altered to heavily altered by increased yearly entries for vegetative manipulation.

Alternatives with the highest level of visual quality prescriptions and the lowest level of vegetative manipulation will have the best chance of maintaining scenic quality.

Alternatives E, F, and G offer the greatest protection to the viewsheds, with A/NFMA, C and I having reduced scenic protection, and NC, B, D, and J having the lowest protection from cumulative effects. In every alternative the potential for cumulative effects are present. However, NC, B, D, and J will alter, to heavily alter the landscape through modification of the viewsheds and through allocation of a large number of acres to timber, range and wildlife management prescriptions.

c. Alternatives' Conflicts With Other Agency Plans and Policies

A conflict between the effects of the alternatives and other plans and policies is the Washington State Scenic Travel route designation on White Pass Highway 12. In Alternatives B, J and NC, the highway will not be managed to compliment the Washington State Scenic Travel designation.

The Alpine Lakes Management Plan provides direction for the management of the visual resource in a high quality manner, except in the NC Alternative.

The Mather Memorial Parkway (Highway 410) has been designated as a scenic resource, with primary emphasis on use of the area for recreation purposes in all but Alternative J.

Management of the Pacific Crest National Scenic Trail that crosses the Forest emphasizes the retention of high levels of visual quality, except where intermingled ownership is present.

The Chelan County Land Use Plan designates the Icicle drainage as a Design Review Overlay District. This district is intended to provide for design and environmental review in conjunction with the standards and requirements of the underlying zoning. The goal within the Icicle Valley is to "encourage retention of the scenic character and environmental quality of the Icicle Valley". The Forest Service management of the Icicle is compatible with the Design Review Overlay District in all alternatives except NC.

Areas of non-federal “checkerboard” lands throughout the Forest have different land management policies. Even with coordination with these owners in the checkerboard areas, it is difficult to maintain scenic quality. The historic trend of heavily altered vegetation is likely to continue.

d. Mitigation Measures for Scenery

Mitigation measure for scenery are found in several published visual resource handbook guides. These guides are kept in the National, Regional, Supervisor’s, and District offices of the U.S. Forest Service. The Standards and Guidelines in the Plan will provide data to reduce the negative effects upon the landscape. The amount of vegetation management will be kept in small scale units, and disturbances will be kept to a minimum in the scenic and special areas.

In scenic viewsheds, timber harvest areas will be shaped to blend with the terrain and to minimize contrast with the character of the existing landscape. Uneven age or partial cutting techniques will be utilized more than contrasting form (clearcut) type units. Along critical roads, trails, streams, lakes and dispersed sites, timber harvest units may be restricted in size. Roads will be designed to a minimum standard or will be screened by vegetation, and will be seeded along steep cutbanks.

Screening units with vegetation, designing smaller scale units, limiting the size, distribution and intensity of the management activities, using sophisticated logging systems (such as helicopter logging versus skyline), screening roads or limiting the number of visible roads in timber harvest units are ways to provide adequate mitigation of timber harvest and road construction activities.

Recreational settings are managed with visual objectives that reflect the concerns of recreational users and expected levels of recreation use. Developed sites have the potential to contrast dramatically with their surroundings; these potential contrasts are partially mitigated through the use of professional site planning and landscape design as well as through the use of native or natural-appearing materials and use of “earth

tone colors” for paints and stains. Use of an architectural style that blends with the landscape character and use of non-reflective material, vegetative screens, and dispersed or buried facilities may also mitigate the effects of recreation site development.

The mitigation measures require planning and design, using an interdisciplinary approach with an emphasis on the design arts. Their level of effectiveness is determined by the land allocation within the particular landscape character type. Activities on steep, highly visible landscapes with open to broken canopies are less easily mitigated than those on flatter and even-textured landscapes. In addition, the economic factor in meeting the cost of logging with sophisticated systems will make these measures the most difficult to accomplish.

Mitigation measures for protecting scenery would be more effective in those alternatives that provide an emphasis on high scenic values, and that have a greater number of acres allocated to Preservation, Retention and Partial Retention visual quality objectives. These would be harder to achieve in those alternatives with a high level of intensive management allocations, such as in Alternatives NC, B, D and J.

When visual resource mitigation measures are used, the end result usually will be a pleasing, natural looking landscape. Structures will blend better with the scenery. The Highway 12, White Pass viewshed is an example of the application of visual resource management principles for the past 15 years

6. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON WILDERNESS

The Wenatchee National Forest has a portion of seven designated wilderness areas that comprise the main backbone and high ridge systems of the Cascade Mountain Range. Management of these wilderness areas is shared with adjoining National Forests. The total area on this Forest is 841,034 acres. A thorough description of each wilderness is located in Chapter III of the FEIS.

Wilderness is generally considered to have physical, biological, and social resource values. The physical and biological resources are intended by the Wilderness Act to exist in a natural state, unimpaired by the actions of people and free to change under natural actions. Social resource values are intended to allow recreation visitors freedom, a feeling of solitude and the opportunity to face the challenge of a natural environment. These resource values are subject to change or negative impact by the management of the National Forest and the actions of recreation visitors in wilderness.

The acres of designated wilderness do not change by alternative and no new acres of wilderness are recommended in the final Forest Plan.

a. Direct and Indirect Effects of the Alternatives on Wilderness

The management of wilderness areas does not vary by alternative. However, the type and intensity of resource management adjacent to the wilderness, and the type and degree of access afforded does vary. This could cause a change in the Wilderness Recreation Opportunity Spectrum (WROS) classes within the wilderness where the boundary is shared with non-wilderness lands. This could affect both solitude and the overall quality of the recreation experience.

The higher the intensity of resource management activities which take place adjacent to the wilderness, and the greater the ease of access, the greater the effect upon the wilderness experience. These will also mean an increasing need for management controls within the wilderness in

order to maintain the social attributes needed to provide the experience level consistent with the WROS class.

The primary effects of activities adjacent to wilderness boundaries are as follows:

1. Road construction, timber harvest and other commodity management activities will be visible from areas inside wilderness, detracting from the quality of the experience.
2. Noise, dust and smoke will be audible or visible from areas inside wilderness, which will also detract from the quality of the wilderness experience.
3. New road construction will tend to increase access to wilderness or make access easier, resulting in an increase in visitors to certain areas. Increase in visitor use can be detrimental to wilderness resources in many locations.
4. New road construction and development activity may impact the view and recreation setting on trails leading into wilderness.
5. A decrease in unroaded areas adjacent to wilderness will likely tend to displace users seeking unroaded recreation, into wilderness. This may result in increased human impacts on wilderness resources.

Table IV-7, which follows, indicates the relationship of unroaded and roaded recreation setting allocations adjacent to each wilderness boundary for each alternative. It also indicates the approximate amount of the unroaded setting that is motorized and non-motorized.

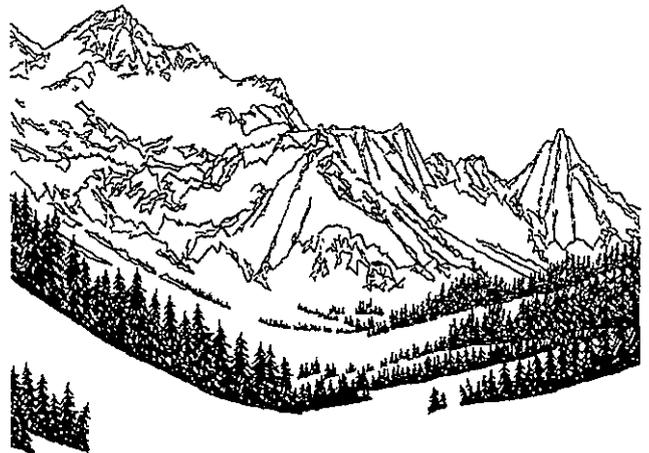


Table IV-7
ESTIMATED PERCENT OF EACH RECREATION SETTING ALLOCATED
ADJACENT TO EACH WILDERNESS BOUNDARY

	ALTERNATIVE									
	A/NFMA	B	C	D	E	F	G	H	I	J
<u>Lake Chelan-Sawtooth 1/</u>										
Unroaded Motorized	100	90	90	90	100	100	90	100	90	90
Unroaded Nonmotorized	0	0	0	0	0	87	0	0	0	0
Roaded	0	10	10	10	0	13	10	0	10	10
<u>Glacier Peak</u>										
Unroaded Motorized	45	5	11	5	6	0	15	45	11	5
Unroaded Nonmotorized	36	62	64	62	73	78	58	36	64	62
Roaded	19	33	25	33	21	22	27	19	25	33
<u>Henry M. Jackson</u>										
Unroaded Motorized	0	0	0	0	0	0	0	0	0	0
Unroaded Nonmotorized	10	11	30	11	92	92	27	10	30	11
Roaded	90	89	70	89	8	8	73	90	70	89
<u>Alpine Lakes</u>										
Unroaded Motorized	25	25	25	25	25	25	25	25	25	25
Unroaded Nonmotorized	47	47	47	47	47	47	47	47	47	47
Roaded	28	28	28	28	28	28	28	28	28	28
<u>Norse Peak</u>										
Unroaded Motorized	0	0	0	0	0	0	25	0	0	0
Unroaded Nonmotorized	0	0	0	0	53	25	0	0	0	0
Roaded	100	100	100	100	47	75	75	100	100	100
<u>William O. Douglas</u>										
Unroaded Motorized	0	0	0	0	3	0	1	0	0	0
Unroaded Nonmotorized	0	0	0	0	38	3	1	0	0	0
Roaded	100	100	100	100	59	97	98	100	100	100
<u>Goat Rocks</u>										
Unroaded Motorized	0	0	0	0	0	0	0	0	0	0
Unroaded Nonmotorized	21	0	0	0	49	13	13	21	0	0
Roaded	79	100	100	100	51	87	87	79	100	100

1/ As water is not "allocated," the boundaries adjacent to Lake Chelan are not included. Lake Chelan does have motorized boat traffic

2/ Figures are not available for Alternative NC.

In all but Alternatives E, F and G the allocation of unroaded areas adjacent to wilderness boundaries are very similar. The Henry M. Jackson Wilderness has 30% of the boundary unroaded in Alternatives C and I. Other than this, effects from management activities adjacent to wilderness boundaries will not vary a great deal.

There is a noticeable difference in Alternatives E, F and G due to the amenity and unroaded recreation emphasis of these alternatives. The effects of activities adjacent to wilderness boundaries will be less distinguishable. Alternative E will have the least effects of all the alternatives.

b. Cumulative Effects of Each Alternative

Since management of wilderness is constant in all alternatives, the potential for cumulative effects exists as a consequence of the effects of the alternatives on lands adjacent to wilderness boundaries. The greatest potential for any cumulative effects will result from alternatives that allocate the greatest number of acres adjacent to wilderness boundaries to intensive, roaded management.

There are three potential cumulative effects on wilderness from management of adjacent lands.

1. Impacts on visual qualities and the qualities of the wilderness experience resulting from successive episodes of road construction and timber harvest that are visible from wilderness.
2. The resource impacts resulting from increased visitor use, over time, that may be a result of improved access to specific locations and of users displaced into wilderness.
3. Effects of air quality and air quality-related values from a combination of activities outside wilderness.

Alternatives B, D, and J have the highest potential for these impacts to occur due to the number of acres of roaded allocations adjacent to wilderness, and due to the emphasis of these alternatives. Alternatives NC, A/NFMA, C, H and I also

have a high potential for these cumulative effects to occur, but somewhat less than Alternatives B, D and J.

Alternatives E, F and G have the least potential for the described cumulative effects to occur, with Alternative E being the very least.

c. Alternatives' Conflicts With Other Agency Plans and Policies

The Forest Service wilderness philosophy, which remains unchanged by each alternative, may conflict with policies of other agencies such as the U.S. Geological Survey for taking mineral samples, the Environmental Protection Agency for taking water samples, and the Soil Conservation Service for taking snow surveys. It may also conflict with the Washington State Department of Game fish stocking program.

d. Mitigation Measures for Wilderness

Mitigation measures for wilderness that would reduce or eliminate the effects of the alternatives are primarily oriented to how development occurs. Transportation planning before road systems are designed and located, can emphasize locating roads to minimize the visual impacts as viewed from wilderness. Timber sale planning can emphasize unit shaping to reduce visibility and contrast as seen from wilderness trails and commonly used areas. Management activities that produce noise, dust or smoke can be scheduled for periods of low visitor use early or late in the season. Roads can be closed to public travel to prevent the easy access to wilderness that might be provided by the road locations. Trailheads and trails can be relocated to reduce ease of access in some situations.

The effects of visitor use and management activities outside wilderness that impact wilderness resources, will be monitored. See Appendix E of the Forest Plan for a more detailed description of the management actions that may be implemented to reduce impacts on wilderness resources.

**7(A) ENVIRONMENTAL
CONSEQUENCES OF THE
ALTERNATIVES ON WILDLIFE
(MANAGEMENT INDICATOR SPECIES)**

The issues for wildlife are ensuring that populations of all species remain viable throughout their ranges, meeting the demand for recreation use of wildlife, and ensuring a diversity of animal communities across the Forest. The environmental consequences of the alternatives on wildlife are described in terms of the effects on management indicator species (MIS) and their habitats.

a. Direct and Indirect Effects of the Alternatives on Wildlife

Management indicator species represent an entire group of species that utilize similar habitats. Selected species include threatened and endangered species, species with special habitat needs that may be influenced significantly by management activities, species commonly hunted, fished, or trapped, and species whose population changes indicate effects of management activities on other species of a major biological community or on water quality (36 CFR 219.12) (See Chapter III of the FEIS for selection of the MIS).

In order to assess effects of the proposed alternatives, the following discussion is organized into habitat groups. The following species were selected to represent each habitat group:

<u>Habitat Groups</u>	<u>Species</u>
Big Game Habitat	Mule Deer, Rocky Mountain Elk, Mountain Goats
Primary Cavity Excavator Habitat	Downy Woodpecker, White headed Woodpecker, Hairy Woodpecker, etc
Mature and Old Growth Habitat	Spotted Owl, Pileated Woodpecker, Marten, Northern Three Toed Woodpecker
Riparian Habitat	Beaver, Ruffed Grouse

Management activities that have major effects on wildlife and wildlife habitat are timber, recreation, and range. The discussion for timber and recreation will include associated road management. This discussion of environmental consequences will involve a comparison of the alternatives to the first decade outputs of Alternative A/NFMA, current direction.

Big Game Habitat

Mule deer, Rocky Mountain elk, and mountain goats are the management indicator species for big game habitat. Mule deer are found throughout the Forest whereas elk are found primarily in the southern half of the Forest. Mountain goats are found in small populations throughout the Forest. Due to the complexity of habitat requirements and effects of management activities on these three species, and the general nature of the Forest FEIS, this discussion is limited to Forest-wide consequences. During the implementation of the Land and Resource Management Plan an analysis of site specific effects will be conducted for proposed management activities.

1) Effects of Recreation on Big Game

Recreation management activities that can affect big game and big game habitat include construction and use of developed sites and trails, use of dispersed camp sites, off highway vehicle use, and use of open road systems. These activities have an adverse effect by displacing animals at the site of recreation use and by making adjacent areas less desirable for animal use due to disturbance associated with movement and noise. Experience on the Forest indicates that the greatest impact of recreation on big game is use associated with open road systems. Alternatives with the most miles of open roads would have the most impact on big game.

All alternatives provide for recreation use that would reduce big game use in some areas. Alternatives with fewer unroaded, motorized recreation allocations (RE-2a and 2b), more road closures, and more unroaded, non-motorized allocations (RE-3) would have less impact on big game. These alternatives include C, E, F, and I. Alternatives NC, A/NFMA, B, D, G, H, and J would tend to have a greater impact on big game due to the nature of the recreation allocations.

2) Effects of Timber Management and Roads on Big Game

Activities associated with timber management that have a significant effect on big game and their habitat include road construction and use, even-age harvest methods, and reforestation. Road construction has the direct effect of eliminating habitat, and road use has an indirect effect of reducing big game use in adjacent areas. Even-age harvest methods (clearcut, select, and seed tree) alter habitat components by changing the distribution, amounts, and arrangement of cover and forage; such changes can be beneficial or detrimental depending on current habitat conditions. The intensity of reforestation of harvested units will also determine effects on big game habitat. *Intensive reforestation decreases the amount of time a unit will produce forage while increasing the restoration of hiding and thermal cover.* In areas where forage is limited, intensive reforestation can have an adverse effect on big game.

The general effect of timber management on big game for each alternative can be determined by the amount of land allocated to the General Forest (GF) prescription, which emphasizes timber production. The influence of timber management on forage/cover requirements and the impacts from associated road use may increase or decrease overall habitat effectiveness for big game. Alternatives A/NFMA, C, H, and I have similar GF allocations and would have moderate effects on big game summer range habitat conditions. Alternatives NC, B, D, and J have high allocations to GF with a correspondingly high potential for impacts; and Alternatives E, F, and G have low allocations to GF and therefore, low impacts to big game.

3) Effects of Range Management on Big Game

Range management activities that affect big game and their habitat include structural range improvements (water developments and fences), non-structural improvements (weed and brush control and forage enhancement), and forage utilization. Water developments and forage enhancement projects tend to have a positive effect on big game while fence construction tends to impede the movement of big game. Forage

utilization by livestock can have both a beneficial and adverse effect on the availability of forage for big game. Properly implemented, livestock grazing on select plant species can maintain desired forage conditions for big game.

All alternatives would continue to allow livestock grazing in designated grazing allotments. In most cases, within big game summer range there would be little or no effect of range management on big game habitat. An exception is the Colockum elk herd summer range where forage is a limiting factor.

All alternatives would allow grazing on big game winter ranges within grazing allotments. The effect of this grazing on big game winter range conditions would be dependent on the management objectives established in allotment grazing plans.

Alternatives with large allocations to the Intensive Range Management (RM-1) prescription, such as A/NFMA, B, D, and H, would have a greater effect on big game winter range than other alternatives with fewer acres allocated to that prescription. Alternative C would have little or no effect on both summer and winter range due to the goal of the range program to provide other resource outputs.

Management Areas EW-1 and EW-3 were developed to provide specific management strategies for the maintenance and/or improvement of key big game habitats on both summer and winter ranges. Alternatives with high allocations to these prescriptions would benefit big game more than those with little or no allocations. Alternatives C, E, F, G, I, and J would all have in excess of 100,000 acres allocated to EW-1 and/or EW-3. Alternative NC would have no allocation to these prescriptions and the other alternatives would have allocations of less than 78,000 acres.

Primary Cavity Excavator Habitat

The primary cavity excavator habitat is represented by species such as the downy woodpecker, white headed woodpecker, and hairy woodpecker. These species represent approximately 85 species of birds and mammals that require standing dead trees during all or a portion of their life cycle.

The unit of measure for this habitat component is referred to as the "percent snag level" - that is, the number of snags in each decay class, per a selected number of acres, which meet the minimum size requirements to maintain a specified percentage of the population of primary cavity excavators.

1) Effects of Timber Management on Primary Cavity Excavator Habitat

Management activities that have a significant impact on the snag habitat component include timber harvest and the associated road construction, and firewood cutting. Intensive timber management not only reduces the abundance of existing and future snags it also reduces the size class of snags in future stands. Short rotation management strategies would create smaller snags. Thomas (1979) lists 62 species that require snags for nesting; 58 of those species require snags with a diameter greater than 10 inches and 12 require snags greater than 20 inches in diameter. Road construction has the direct effect of eliminating snags and an indirect effect of increasing access for firewood cutters which also eliminate snags in areas where they are easy to reach.

All alternatives have standards for snag management that would meet or exceed that needed to maintain minimum viability levels. Alternative NC, while not including the requirements of NFMA, has Regional direction to maintain snag habitat at the 40 percent level.

The Forest-wide standard for primary cavity excavator habitat provides for an average snag level of 40 percent in a sub basin and no less than 20 percent within a forty acre unit. Land allocations that do not allow timber harvest would have snag levels at or near natural conditions. Land allocations that allow timber harvest but emphasize other resource objectives would have a snag level of 60 percent or more. While all alternatives would meet or exceed the viability requirements, those that have the lower allowable sale quantity levels would have the least impact on snag habitat. Alternatives E, F, and G would have the least impact on primary cavity excavator habitat, A/NFMA, C, D, H, and I would have a moderate impact, and NC, B, and J would have the most impact.

Mature and Old Growth Habitat

Management indicator species for mature and old growth habitats are northern spotted owl, pileated woodpecker, pine marten, and northern three-toed woodpecker. These species are used as a group to provide a measure of mature and old growth habitat for all species dependent upon late seral stage forest stands. An important relationship to keep in mind when evaluating the effects on the MIS is that while a spotted owl management area would provide habitat conditions for the pileated woodpecker and/or pine marten, the reverse is not true. Two habitat factors can limit the populations of species that depend on mature and old growth habitats - the amount of suitable habitat in a given area and the distribution between suitable habitat areas. For the more mobile species like the spotted owl the distance between areas can be 6 to 12 miles, however, for species that are less mobile (i.e. mice and voles) the distance needs to be shorter, such as that established for pine marten and northern three-toed woodpeckers.



1) Effects of Timber Management on Mature and Old Growth Habitat

Timber management has a significant impact on mature and old growth habitat, particularly through the use of Forest practices that require intensive management with a short rotation. This can eliminate mature and old growth habitat altogether. Those alternatives that have the most acres allocated to the GF prescription would have the greatest effect. Road construction also eliminates the old growth characteristics by removing trees that constitute mature or old

growth habitat. However, all alternatives except NC have provisions to meet or exceed the requirements for species viability.

Alternatives E, F, and G would provide the greatest amount of mature and old growth habitat and have the least number of acres allocated to the General Forest prescription, the effects of timber management on mature and old growth habitat would be small. Alternatives A/NFMA, B, C, D, H, I, and J would have a moderate effect on the distribution and abundance of mature and old growth habitats. Alternative NC would have the greatest effects on mature and old growth habitats; management under this alternative would threaten the viability of some species due to a decrease in the distribution and abundance of suitable habitats.

Riparian Habitat

The management indicator species for riparian habitats are beaver and ruffed grouse. These species represent an estimated 260 species that utilize riparian habitats, of which 24 are dependent upon riparian habitat for survival. Most of the riparian habitats on the Forest are linear in nature and found along streams and rivers; the remainder are found around lakes, reservoirs, and wet areas. Riparian habitats make up less than one percent of the Forest land base. Wildlife use of riparian ecosystems is much greater than that of adjacent areas. These habitats provide unique micro-climates which are created through increased humidity, increased air movement, higher rates of transpiration, and more shade. Riparian habitats provide travel corridors for a variety of species and also provide natural edge effects with upland plant communities.

Riparian habitats are affected by virtually all forest management activities. These areas have traditionally been the sites of road construction, mineral exploration, recreation use and development, livestock grazing, water diversions and hydro electric development, and timber harvest. The management activities that continue to have significant effects on riparian habitat and on the species that utilize them are timber, recreation, road construction, and range. Riparian habitats are affected by activities in adjacent up-slope areas as well as those in the riparian zone itself.

1) Effects of Recreation, Timber Management, Range Management and Road Construction on Riparian Habitat

Timber harvest in riparian zones can result in impacts such as removal of shade, soil compaction and displacement, and a change in plant species. These effects lead to changes in structural habitat diversity, micro-climates, travel routes, and in the animal species that utilize the riparian habitats. Recreational use in the riparian zones have little effect on the riparian habitats but can have an adverse effect on species of wildlife that prefer solitude. Developed recreation sites in and adjacent to riparian habitat have a direct effect of destroying productive habitat and an indirect effect of concentrating more people in the riparian zone. Road construction has a direct effect of eliminating habitat, use of roads has an indirect effect of reducing habitat values in adjacent areas for species that prefer solitude. Livestock grazing, when kept within proper utilization levels, can have minimal impact on riparian resources, however, over grazing can have an adverse effect on riparian habitat.

The Riparian-Aquatic Habitat Protection Zone (EW-2) prescription was developed by the Forest to ensure that riparian dependent resources would be adequately protected in each alternative except NC. Alternative NC would follow current direction to give preferential consideration to riparian-dependent resources where resource management conflicts arise. This direction is not as protective of the riparian dependent resources as the direction provided in the EW-2 prescription. Alternatives A/NFMA, B, C, D, E, F, G, H, I, and J would either protect the riparian habitats under the EW-2 allocation or through other, even more restrictive allocations. However, Alternative C specifies more road closures than the other alternatives and, therefore, would have less of an impact on the riparian habitats.

b. Cumulative Effects of Each Alternative

Big Game Habitat

The cumulative effects of the alternatives on big game include a combination of the effects of the above mentioned management activities and land allocations with the effects of other factors such as wildfires and the activities of other landowners.

The impact of wildfires on big game habitat can be dramatic due to the ability of a fire to alter large areas of habitat in a relatively short time period. Where important cover is lost, the effects can be long lasting. The loss of forage and browse, while a short term effect, can have an impact on wintering herds on key winter range for the first few years following the fire. The Forest has a long history of large fires which have had impacts on big game populations, however, due to the unpredictability of the occurrence of large wildfires an assessment of future effects cannot be made. This point is raised here to remind the reader that wildfires do play an important role in the production of big game populations on the Forest.

The effects of other landowners on big game comes primarily from impacts to big game winter range. Approximately 60 percent of the big game animals that summer on the Forest, winter off the Forest. Winter range that is in other public ownership is either managed as winter range or has a management strategy that does not adversely impact the winter range values. However, those winter range areas that are in private ownership are being altered to a point where the winter range values are being lost. Agricultural, commercial, and residential development have all had an impact on traditional wintering areas; this loss of winter range places more importance on the management of winter range on the National Forest. Alternatives that place more emphasis on winter range values would help mitigate the loss of winter range habitats on private lands.

The cumulative effects on big game cannot be determined only by comparing the number of acres allocated to the various prescriptions in each alternative. The relationships of the allocations can be more important than the amount. The discussion and display below reveal the consequences of the proposed alternatives on big game. These consequences are a result of the direct, indirect, and cumulative effects.

Alternative A/NFMA would result in no significant change in big game populations for the first decade. When compared to Alternative A/NFMA the other alternatives would result in the following variations in big game numbers during the first decade (the numbers in Table IV-8 are to facilitate comparison between alternatives only, and are not intended to be used as precise counts).



TABLE IV-8
CHANGES IN BIG GAME POPULATIONS BY ALTERNATIVE

Alternative	Deer	Percent Change	Elk	Percent Change	Mountain Goat
A/NFMA	25,200* 9,700**	0 0	12,500* 5,400**	0 0	1,600
NC	23,200 9,600	-8 -1	11,400 5,400	-9 0	1,600
B	24,100 9,900	-4 +2	12,000 5,600	-4 +4	1,600
C	25,100 10,100	0 +4	12,500 5,600	0 +4	1,600
D	24,100 9,900	-4 +2	12,000 5,600	-4 +4	1,600
E	26,000 10,200	+3 +5	12,900 5,700	+3 +6	1,600
F	25,800 10,200	+2 +5	12,800 5,700	+2 +6	1,600
G	25,800 10,200	+2 +5	12,800 5,700	+2 +6	1,600
H	25,200 9,700	0 0	12,800 5,400	0 0	1,600
I	24,300 10,100	-4 +4	12,100 5,600	-3 +4	1,600
J	24,200 10,000	-4 +3	12,000 5,600	-4 +4	1,600

* Summer range

** Winter range

The long term trend in big game numbers that would result from implementing each of the alternatives can be determined from the data in Table II-3a in Chapter II. Alternatives NC, B, D, I, and J would result in a significant decrease (greater than 20 percent) in big game numbers by the fifth decade. The decreases would be the results of diminished habitat conditions on summer and/or winter ranges. Alternatives A/NFMA and H would both result in a 14 percent decrease in big game numbers. Alternatives E, F, and G would result in an 11 to 13 percent increase in big game numbers. Alternative C is the only alternative that would have no significant long term effect on big game numbers.

Primary Cavity Excavators

The cumulative effects on primary cavity excavator habitat can only be meaningful if determined on a subbasin level, with an analysis of the distribution, abundance, and size of the snags for the indicator species included. In general, the effects of activities on private land have little impact on the habitat of primary cavity excavators on the Forest due to the distribution requirements of the indicator species. As with big game, wildfires can have a pronounced effect on snag habitat - first by creating large acreages of snags in a short time period and second by eliminating trees that would provide future snags.

Mature and Old Growth Habitats

The cumulative effects on species that depend on mature and old growth habitats can be determined by analyzing those management activities that have an effect on the habitats. Of the various management activities on the Forest, timber management is the most likely to impact the late seral stage habitats. Wildfires can also eliminate large acreages of suitable mature and old growth habitat; an example would be the eastern portions of the Chelan and Entiat Ranger Districts that were exposed to several large wildfires over the past 20 years. Forest management practices on adjacent lands (other public and private ownerships) have had an effect on the distribution of suitable habitats off the Forest. In most cases the lands outside of the National Forest are not managed to maintain viable populations of species that depend on mature and old growth

habitats. Some suitable habitats outside the Forest are protected in Congressionally-designated areas such as National Parks and Recreation Areas.

The populations of species dependent upon mature and old growth habitat will decrease in all alternatives. The outputs predicted for mature and old growth habitat consider the direct and indirect effects of proposed management activities and to a minor extent the effects of impacts from other ownerships. The trends for Table IV-9 are the result of the predictions made in Table II-3a.

TABLE IV-9
TRENDS OF POPULATIONS
OF INDICATOR SPECIES FOR MATURE AND
OLD GROWTH HABITAT

Alternatives	Percent Change
NC	decrease 45%
B	decrease 25%
D	decrease 25%
J	decrease 25%
A/NFMA	decrease 25%
C	decrease 25%
H	decrease 25%
I	decrease 25%
G	decrease 20-25%
F	decrease 20%
E	decrease 20%

Riparian Habitat

The cumulative effects on riparian habitats are a result of a combination of the direct and indirect effects discussed above with the effects of wildfires and to some extent effects from other landowners. Wildfires impact riparian habitat by significantly altering the plant community structure and plant composition in and adjacent to the riparian zone. In most cases the ground cover and understory vegetation recover within a few years of a fire. However, the recovery of overstory trees that provide shade as well as nesting sites

takes much longer. Management activities on adjacent lands have little effect on the riparian habitats on the Forest.

c. Alternatives' Conflicts With Other Agency Plans and Policies

The Washington State Department of Wildlife has developed a plan for managing Washington's wildlife through the year 1995. This Plan, titled "Strategies for Washington's Wildlife, 1982 to 1995", identified state-wide goals for wildlife population levels. The State plan directs each Department of Wildlife region to develop a more specific plan for wildlife found within that region.

The Wenatchee National Forest lies within Department of Wildlife Region III, which has a completed plan for managing wildlife. The management goals of the Washington Department of Wildlife are:

- a. To increase elk populations by 10% on public lands. Only Alternative E, which has the highest number of elk, meets this goal for both summer and winter range. Alternatives F and G meet this increase in winter range only.
- b. To maintain mule deer at the ten year average population level for the period between 1970 and 1979. The Forest would meet this goal by maintaining or increasing deer numbers in both summer and winter range in Alternatives E, F and G.
- c. To maintain huntable population levels of mountain goats. The proposed management direction would maintain or increase mountain goat habitat in all alternatives.
- d. To increase bighorn sheep populations in three areas adjacent to the Forest. Presently two of those areas have established populations and the third area has a growing population. The Intensive Range Management (RM 1) allocations in Alternatives B and D could adversely affect this goal.
- e. To increase populations of ruffed grouse. This goal would be met in Alternatives A/NFMA, C, E, F, G, H, and I.

The Yakima and Colville Indian Tribes have the right to harvest deer and elk on the Forest. Even though neither of the Tribes have identified a specific number of animals for subsistence, both desire to maintain or increase the big game populations on the Forest. Alternatives E, F and G would best meet this need.

d. Mitigation Measures For Wildlife

The degree to which direct, indirect and cumulative effects are realized is a function of many variables, including the magnitude of proposed management activities, and the level of success in project design and implementation. A critical step in the process is the identification and successful application of mitigation measures. Mitigation measures are defined as actions to avoid, minimize, reduce, eliminate, or rectify adverse impacts of management practices. Mitigation measures for wildlife are designed to 1) ensure viability of all species, 2) recover listed species, and 3) maintain or improve habitat conditions for management indicator species.

The Forest is providing for mitigation of potential effects to wildlife in two ways. First is the development of management area prescriptions that emphasize wildlife habitat objectives. These management areas are Key Deer and Elk Habitat (EW-1), Riparian-Aquatic Habitat Protection Zone (EW-2), Key Big Game Habitat/Unroaded (EW-3), Old Growth Management (OG-1), Mature Habitat (OG-2), and Research Natural Areas (RN-1). The second method of providing mitigation is through the establishment of Forest-wide standards and guidelines as well as specific standards in each of the other management area prescriptions.

The mitigation measures listed below are common to all alternatives except NC. For more specific details see Chapter IV of the Forest Plan.

- a) Areas allocated to the Old Growth and Mature Habitat Management prescriptions are designed to provide a viable network and distribution of habitat for spotted owls, pine marten, northern three-toed woodpecker, and pileated woodpecker.

b) Forest-wide standards and guidelines have been established to maintain habitat around active nest sites of spotted owls outside the established spotted owl habitat areas. As these non-network areas are abandoned they could become available for timber harvest.

c) Range management in all alternatives is designed to maintain or increase outputs for other resource components except in the Intensive Range Management prescription (RM-1). Deer and elk forage would increase from this direction on both summer and winter ranges.

d) Mitigation for primary cavity excavator habitat varies by prescription and alternative. All alternatives would maintain viable populations of primary cavity excavators.

e) The effects of human activities on deer and elk populations in summer and winter range would be partially mitigated by closing most of the new roads built to harvest timber. See the Forest-wide standards and guidelines for road management in the Chapter IV of the Forest Plan.

7(B) ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON PROPOSED, ENDANGERED, THREATENED, AND SENSITIVE SPECIES

The issues for proposed, endangered, threatened, and sensitive species are the recovery of Federally listed species and the assurance that sensitive species will not become listed. All of the species in these categories are of concern to the Forest.

In order to assess the effects of the proposed alternatives, the following discussion is organized into groups of species that have similar management requirements.

a. Direct and Indirect Effects of the Alternatives on Proposed, Endangered, Threatened and Sensitive Species

Species With Recovery Goals

The Pacific Bald Eagle Recovery Plan established a recovery objective of 20 breeding pairs for Recovery Zone 6 (Cascade Mountains), which includes the Wenatchee National Forest. The Forest portion of this objective is eight breeding pairs.

All alternatives would meet the bald eagle recovery objective of eight breeding pairs, and would provide for the number of roosting, perching and wintering sites needed to meet bald eagle recovery objectives. Timber harvest and human activity near bald eagle nest and roost sites can have an adverse effect through alteration of the habitat and disturbance of the birds, particularly during the nesting season. Potential bald eagle habitats outside of that needed for recovery could be adversely impacted in areas allocated to the GF prescription. Alternatives NC, B, D, and J would have the highest amount of land allocated to GF, therefore, would have the highest potential of affecting those habitats. Alternatives A/NFMA, C, H, and I would have a moderate impact on these habitats due to a lower level of GF allocations. Alternatives E, F, and G would have the lowest amounts of GF allocation and, therefore, the lowest impacts to habitats.

<u>Management Groups</u>	<u>Species</u>
Species with recovery goals	Bald eagle and peregrine falcon
Species without recovery goals	Grizzly bear and gray wolf
Species proposed for listing	Northern spotted owl
Forest Service sensitive species	Bighorn sheep, Townsend's big-eared bat, Canadian lynx, California wolverine, ferruginous hawk, Swainson's hawk, and long-billed curlew.

Recreation management activities that can affect bald eagle habitat include construction and use of developed sites, use of dispersed campsites, and use of open road systems. These activities have an impact through disturbance of the bald eagles at the site of recreation use, through reduction of the areas available for feeding and use as preferred perch sites, and by providing access to bald eagle nesting areas. All alternatives provide for recreation use that could affect the bald eagle populations in some areas. Alternatives with fewer unroaded, motorized recreation allocations (RE-2a and 2b), more road closures, more unroaded, non-motorized allocations (RE-3), and less intensive levels of developed recreation would have a correspondingly smaller impact on bald eagles. These alternatives include C, E, F and I. Alternatives NC, A/NFMA, B, D, G, H and J would tend to have a higher likelihood of affecting bald eagles and bald eagle habitat due to the nature of the recreation allocations in these alternatives.

The Pacific Coast Recovery Plan for the American Peregrine Falcon has established a recovery objective of 30 breeding pairs for Washington state. A specific goal for the Forest has not been set.

All alternatives would contribute to the recovery of the peregrine falcon by protecting nests sites as they are located and through identification of potential sites for future introductions of the bird. Due to the location of peregrine falcon nest sites on cliffs and rock outcrops, timber management practices tend to have little effect on the falcon unless activities occur during the breeding and nesting period. The protection standards in all alternatives include operational limits during the breeding and nesting season. In effect there is no difference between the alternatives in the impacts that timber management would have on peregrine falcons.

The effects of recreation on the peregrine falcon, and their variation by alternative, would be similar to those identified for the bald eagle.

Species Without Recovery Goals

The grizzly bear and gray wolf are threatened species that were once found on the Forest. At the present time there are no established recovery goals for either of these species on the Forest.

Management activities that have the potential to affect gray wolves and grizzly bears and their habitats are road construction which increases access into former isolated habitats; livestock grazing which can lead to conflicts with these large predators; recreation use that tends to displace these animals but that can also lead to confrontations; and timber harvest that can change habitats and thus the food sources for the animals. Both of these species prefer and do well in large undisturbed areas where there is little or no contact with humans.

Alternatives that provide the most acres of the unroaded, non-motorized allocation (RE-3) and the fewest acres of GF would have the lowest impacts on the gray wolf and grizzly bear. Because of this, Alternatives E, F, and G would have the lowest impact on these species and their habitats. Alternatives A/NFMA, C, H, and I would have a moderate impact and Alternatives NC, B, D, and J would have the highest impact.

Species Proposed for Listing

The northern spotted owl is the only species in this category. The Forest provides suitable habitat in all alternatives but NC to meet the standards and guidelines of the Final Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide. The US Fish and Wildlife Service is currently drafting new standards for the management of spotted owl habitat. When those standards are final the Forest will make the appropriate adjustments to implement them. For a discussion of effects of the proposed alternatives on spotted owl see the Wildlife Section, Mature and Old Growth Habitats. Also refer to the Northern Spotted Owl discussion in Appendix I of the FEIS.

Forest Service Sensitive Species

The sensitive species on the Forest are bighorn sheep, Townsend's big-eared bat, Canadian lynx, California wolverine, ferruginous hawk, Swainson's hawk, and long-billed curlew. There are no inventories for these species and the direction for management is general. Through the NEPA process all projects will involve site specific habitat inventories and biological evaluations to assess the potential effects of proposed activities on sensitive species. Species management plans will be developed for each sensitive species.

With respect to the wolverine, the combination of the WI-1 (wilderness) and RE-3 (unroaded, nonmotorized) land allocations will maintain sufficient habitat to ensure viable population levels. Alternatives E and F, with the largest number of acres allocated to these prescriptions, would provide the greatest protection, followed by Alternatives C, I and G. Alternatives B and D, with fewer acres in these prescriptions, would provide less protection for the potential habitat, with Alternatives NC, A/NFMA and H offering the least.

Due to the lack of data for the other species on the Forest and a lack of scientific information on the relationship of Forest management activities to these species, a determination of the potential effects of the alternatives cannot be made at this time. However, the lack of this information is not essential to a reasoned choice among the alternatives. In addition, with the application of mitigation measures contained in the Management Prescriptions combined with the strategy for collecting this information that is outlined in the Forest-wide Standards and Guidelines for Endangered, Threatened or Sensitive Species (see Chapter IV of the Plan), no foreseeable significant impacts to these species should occur.

b. Cumulative Effects of Each Alternative

With the exception of the northern spotted owl, there is a lack of specific information for the proposed, endangered, threatened and sensitive species and their habitats. As a consequence, a cumulative effects assessment cannot be made at this time. However, as noted above, this lack of

information is not essential to a reasoned choice among the alternatives. For a discussion on the northern spotted owl refer to the Wildlife Section, Mature and Old Growth Habitats and Appendix I.

c. Alternatives' Conflicts with Other Agency Plans and Policies

The U.S. Fish and Wildlife Service and the Washington State Department of Wildlife are responsible for establishing standards to ensure the viability of wildlife populations. The U.S. Fish and Wildlife Service has developed recovery plans for the bald eagle and the peregrine falcon. After consultation with this agency, the Forest has incorporated modifications that would ensure conformance with the recovery objectives of those plans in every alternative.

d. Mitigation Measures For Proposed , Endangered ,Threatened, and Sensitive Species

Specific mitigation measures common to all alternatives that would ensure the recovery and protection of the proposed, threatened, endangered and sensitive species on the Forest include:

- a) Implementation of Forest-wide Standards and Guidelines which state the direction necessary to provide habitat for these species. The development of a Species Management Guide for each sensitive species will provide more detailed information on habitat needs.
- b) Maintaining snag standards that meet or exceed the management requirement level of 20 percent.
- c) Constraining the timing of activities near nest sites of birds of prey to avoid disturbance during the nesting season (FSM 2405.14, R-6 Supp. 319).
- d) Authorization of road closures to improve habitat effectiveness for big game, to reduce impacts to snags, and to reduce human disturbances near nest sites
- e) Establishment of potential bald eagle nesting areas to meet recovery objectives,

For a more detailed description of standards and guidelines that address threatened, endangered and sensitive species, see Chapter IV of the Forest Plan.

8. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON FISHERIES

The Wenatchee National Forest manages fish habitat for commercially and recreationally valuable species including spring and summer chinook salmon, sockeye salmon, summer steelhead trout and several resident trout species. The fish habitat management objective for the Wenatchee National Forest is to at least maintain current habitat conditions, and show improving trends in habitat capability overtime. The success at meeting fish habitat objectives is dependent upon maintaining water quality, maintaining or improving access to available habitat; and providing for instream cover, pool quality, stream channel stability and high quality spawning habitat.

Anadromous fish runs to streams within the Wenatchee National Forest are depressed compared to historic levels and many streams are considered to be underseeded. Depletion of the runs has occurred due to many factors outside the influence of the Forest, including losses at main-stream Columbia River dams, water diversions downstream of the National Forest and overharvest.

Loss of habitat within the Forest due to past land management activities, such as logging and roading, has probably also contributed to the loss of fish production. While much of the reduction in anadromous fish produced within the Forest has occurred downstream, and much of the future production of anadromous fish will depend upon the success of downstream improvement projects, such as those currently being implemented through the Northwest Power Planning Council's Columbia River Fish and Wildlife Program, management of anadromous fish habitat within the Forest will be an important factor in meeting production objectives in the Yakima, Wenatchee and Entiat Sub-basins.

Fish habitat capability and production are expected to increase under all alternatives except NC through the life of the Plan. Long-term fish habitat capability may decrease under Alternative NC. Fish outputs displayed in the document are estimates and actual outputs will depend upon the success of a variety of programs both on and off the Forest. Fish habitat capability is also an estimate and will need to be better quantified through implementation of the Forest Plan, including the stream survey program and the monitoring program. For a relative comparison of the outputs and trends expected by alternative, the reader is referred to Table II-3b in Chapter II of this document. Improvements in habitat capability are expected to occur due to habitat improvement projects, implementation of Best Management Practices (BMP's), and Forest Plan Standards and Guidelines. How successful these improvements will be at meeting fish habitat objectives also will be monitored and adjustments made as new information becomes available. This chapter will include a discussion of the relative risks associated with alternatives at meeting fish habitat objectives.

The demand for fish is high and expected to increase over time. Anadromous fish runs in the Columbia River have been estimated to have been five times greater than present. Fisheries are currently restricted due to the excess demand. Fishing for resident trout is also very popular and interest in sport fishing is expected to increase substantially in Washington over the next 50 years. Due to the high demand for fish, the maintenance and rehabilitation of fish habitat is of great concern to the public, the Indian Tribes and Federal, State and local agencies.

a. Direct and Indirect Effects of Each Alternative on Fisheries

Management of fish habitat interacts with nearly all resource management activities on the Wenatchee National Forest. Nearly all management activities can also produce potential effects on fish and fish habitat. Land management activities felt to have the highest probability of affecting fish habitat capability are timber harvest, roading, mineral activity, grazing, recreation, Wild and Scenic River status and fish habitat improvement projects.

1) Effects of Recreation on Fisheries

Sport fishing for anadromous and resident fish produced on the Wenatchee National Forest is a popular recreational activity. While improvements in fish habitat may result in more fishing opportunities, recreational use of the Forest can negatively impact the fish resources. Development of roads increases the access to fish resources which can result in increased fishing opportunity and over-exploitation of wild stocks if not administratively controlled. Both dispersed and developed recreation can increase trampling of riparian vegetation, compaction of riparian soils and sedimentation from trails.

Forest-wide Riparian Standards and Guidelines are designed to reduce adverse impacts to fish habitat and allow natural stream processes important for maintaining fish habitat to function. However, as more land is allocated to developed and roaded recreation, the risk of impacts increases.

Semi-primitive recreation allocations protect fish habitat from most forms of man-caused impacts except those related to motorized use, helicopter logging, mining or similar activities.

Alternatives with the most acres in non-motorized, semi-primitive allocations such as Alternative E (320,038 acres) and F (259,088 acres) would provide the most protection and have the least potential for impacts to fish habitat from recreation. Alternatives C and I (116,092 acres) and G (100,362 acres) would have somewhat greater risk of damage to fish resources than Alternatives E and F, while alternatives with the least land allocated to semi-primitive unroaded allocation, Alternatives B, D, J, H, A/NFMA and NC would have the greatest potential risk of adverse fish habitat impacts. Alternative NC would pose the greatest risk because Forest-wide riparian standards would not apply.

2) Effect of Wild and Scenic River Recommendations on Fisheries

Wild and Scenic River recommendations increase the likelihood that natural functions of fish habitat are protected during future planning. Wild River status would allow the least develop-

ment in stream corridors and thus provide the most protection to natural stream processes. A Scenic River designation provides somewhat less protection than a Wild River, while Recreational River classification allows the most development and thus relatively less protection than either Wild or Scenic designation.

Wild and Scenic River designation would provide the most protection to fish habitat under Alternatives C, E, F, H and I as these alternatives propose the greatest number of rivers for Wild, Scenic and Recreational River management as well as have the most acreage managed as Wild River. Alternatives A/NFMA and G recommend fewer river miles for Wild, Scenic and Recreational River management. This would provide somewhat less opportunity for protection of natural stream processes. Alternatives B, D, J and NC would provide no additional protection to any streams as there are no rivers proposed for designation.

3) Effects of Fish Habitat Improvement Projects on Fisheries

Fish habitat improvement projects are designed to rehabilitate fish habitat degraded by past man-related activities or in some cases natural events or conditions. Projects could include correcting passage at culverts or falls blocking access to usable habitat, addition of large wood or rock structures to improve instream habitat, or projects to reduce sediment input. These projects are most beneficial when they are used to rehabilitate current conditions and not to mitigate the effects of further resource development. Although the intent is to improve or restore stream channel and riparian habitat conditions, damage could result or full potential benefits not be realized. This could be due to administrative error, poorly planned and/or implemented projects, or excessive reliance on improvement projects to mitigate effects of resource developments

It is the objective of all alternatives to maintain fish habitat at existing levels and use habitat improvement projects to rehabilitate conditions created by past land management activities. For this discussion, habitat improvement funds are assumed to be generated from two sources, appropriated monies (P&M) or Knutson-Vandenberg (KV) funds. Alternatives with greater

timber harvest and resource development carry relatively more risk, as discussed in the timber harvest effects, so greater habitat improvement funds will be needed to mitigate effects of resource development.

**TABLE IV-10
HABITAT IMPROVEMENT FUNDS BY ALTERNATIVES AND FUNDING SOURCE**

	A/NFMA	B	C	D	E	F	G	H	I	J	NC
P&M	36,945	17,000	188,840	0	680,000	340,000	17,000	6,800	85,000	45,000	36,945
KV	24,630	418,200	246,300	295,800	166,600	197,000	244,800	244,800	367,200	418,200	24,630
TOTAL	61,575	435,200	435,140	295,800	846,600	537,200	261,800	251,600	452,200	463,200	61,575

Alternatives E and F provide the greatest potential benefit to fish habitat due to habitat improvement as they would allocate the most dollars and have the least resource development. Alternatives B, C, I and J show similar expenditures for fish habitat improvement but under Alternatives B, I and J, a relatively large portion of the funds are KV monies tied to greater timber harvest levels compared to Alternative C. With Alternatives B, I and J there is greater risk that full potential benefits would not be achieved. This is because these alternatives have a greater amount of resource development, therefore a greater risk exists that habitat improvement funds will be needed to mitigate resource management activities. Alternative NC poses the greatest risk of not achieving habitat improvement objectives because Forest-wide Riparian Standards would not apply. Thus, under this alternative, there is the greatest risk that habitat improvement work would be directed towards mitigation.

4) Effects of Timber Management on Fisheries

Large trees and woody material are very important to fish habitat. Tree canopies provide shade in the summer and insulation in winter, moderating changes in stream temperature. Trees and their root systems help stabilize unstable slopes reducing the frequency of mass soil movement. Trees and other vegetation also protect surface soils from eroding, and filter surface soil movement which reduces accelerated sediment input to channels. Stream channel stability also is often dependent upon trees and their root systems to anchor banks.

Probably the most important interaction between trees and fish habitat occurs as the trees and large woody material enter channels. In-stream woody debris helps create a complex aquatic habitat by forming pools, providing low velocity refuge areas and cover, trapping spawning gravel, adding nutrients to the stream and regulating the routing of sediment.

Removal of timber along streams can reduce the availability of large wood input to channels resulting in a reduction in stream habitat complexity and quality, more rapid degrading (down-cutting) of channels and increases in stream temperatures.

Removal of trees on hillsides can result in an increase in the frequency of surface erosion and mass wasting. In addition, logging practices such as ground skidding can compact and expose soils thereby increasing erosion potential. Stream flow regimes may also be altered by timber harvest, depending on the harvest intensity in a drainage.

The riparian management prescription and Best Management Practices (BMP's) are designed to reduce adverse impacts to fish habitat. However, the more area harvested the greater the chance of adverse impacts occurring due to administrative error and uncertainty of the effectiveness of Forest Plan Standards and BMP's.

A potential benefit of timber harvest to fisheries is the use of Knutson-Vandenberg (KV) funds collected on sales to implement fish habitat improvements and other projects benefitting the condition of the watershed. Alternatives with greater timber harvest will provide greater potential to collect KV monies, but as previously discussed, there is also a greater risk of habitat degradation. Therefore, the funds may be needed to mitigate the adverse impacts and not necessarily result in an overall improvement in habitat capability.

All alternatives have an objective to maintain and improve fish habitat capability. Alternative NC would continue timber management activities as prescribed in the old Timber Management plans. The fish and riparian standards and guidelines included with other alternatives would not apply. Protection of riparian and fish habitat would include only those measures necessary to meet minimum conditions of the Washington State Forest Practice Rules. The Forest Plan Riparian Standards are more restrictive than the State Forest Practice rules, therefore Alternative NC would have the highest risk of not meeting fish habitat objectives. With approximately 791,899 suitable acres available for timber management allocations, Alternatives B and J harvest the most timber, have the most land (approximately 77%) allocated to General Forest and therefore exhibit a relatively high risk of impacts to fisheries from timber harvest. Alternative D also has 77 percent of the land allocated to timber management, but harvests at a slower rate and therefore would have somewhat less risk than Alternatives B and J. Alternatives A/NFMA, C, H and I have a relatively moderate risk of impacts with approximately 49 percent allocated to General Forest. Of these four, Alternative I would have a somewhat higher risk because it is a departure alternative and would enter more acres in the first decade. Finally, Alternatives E, F, and G carry the least risk with 19 percent, 26 percent and 28 percent (respectively) of the available land allocated to timber production. Within an alternative, the greatest risk of effects on fish habitat are in those watersheds with most land allocated to intensive timber management. For a discussion of watersheds with the greatest risk of effects, refer to the Soil and Water Cumulative Effects section in this chapter.

5) Effects of Range Management on Fisheries

Livestock grazing can produce adverse impacts on fish habitat by reducing cover for fish, altering stream temperature, causing a decrease in low stream flow due to alteration of stream bank storage capacity, altering stream chemistry, trampling banks and increasing sediment deposition. Riparian habitat standards designed to protect fish habitat would apply to grazing allotments under all alternatives except Alternative NC. Fishery budgets for all alternatives also include monies to monitor riparian habitat in allotments and coordinate with the range program. As with other land management activities though, generally the greater the grazing use, the greater the potential for adverse fishery impacts.

Alternatives NC and A/NFMA have a progressive reduction in permitted livestock use due to range budget constraints which would mean that improvements would not be replaced in order to increase permitted use. Permitted use would also have to be reduced to mitigate adverse environmental effects. Grazing under Alternative A/NFMA, will be restricted to existing allotments on approximately 10 percent of the Forest. However, risk of adverse impacts is relatively high as reductions would be based on resource damage.

Alternatives B, D, E, G, H, I and J would allow an increase in grazing over more acres. These alternatives would increase the risk of impacts to fisheries but due to increased range administration funds needed for implementation, these alternatives may actually be less risky than Alternative A/NFMA.

Alternatives C and F are less risky because the number of acres allocated to grazing would remain the same as the current situation with only a small increase in permitted use over the life of the Plan. Under all alternatives, use in the first decade would remain at the present level.

6) Effects of Mineral Activity on Fisheries

In general terms, mineral resources have little interaction with fisheries until they are explored and developed. When exploration and develop-

ment occurs, it usually involves surface or stream-gravel disturbing activities. Those activities which have the most influence on the fishery resource are suction dredging, access road construction, vegetation removal, mineral extraction and processing, waste disposal, increases in human population, and reclamation. Even though claimants holding a valid mining claim have a statutory right to mine, any activity which uses, diverts, obstructs or changes the natural flow or bed of any river or stream, or utilizes materials from stream beds, requires that a Hydraulic Project Approval Permit be obtained from the Washington Department of Fisheries or Wildlife. The Forest Service is cooperating with the State in implementing the permit process.

The effects that mineral activities will have on fishery resources cannot be determined until the location, type and timing of the proposed activity is known. As a consequence, the effects that mining would have on fishery resources as well as any differences between alternatives cannot be estimated. In relative terms, it appears that the potential for mining to cause adverse effects on fishery resources is inversely proportional to the amount of land managed as roadless area or under highly restrictive management prescriptions. Actual effects will depend upon mineral prices and subsequent activities.

7) Effects of Roads on Fisheries

Road construction is probably the greatest potential sediment source of all land management activities. In addition, improperly constructed stream crossings can block fish passage. Roads constructed in riparian areas can constrict the floodplain and channel, resulting in changes in channel morphology and associated habitat. Roads also increase recreation access and fishing opportunities but the increase in fishing pressure can result in potential over-harvest of wild stocks.

Potential impacts of roading are mitigated through design, Forest-wide Standards and Guidelines and road management (e.g. closing new roads).

Other than Alternative NC, Alternatives B and J construct the most roads and therefore have the greatest potential risk of impacts. Alternatives E

and F construct the least number of new roads and have the least potential for impact. The remaining alternatives ranked from most potential for impact from roads to the least potential are Alternatives D, H, I, C, A/NFMA and G

b. Cumulative Effects of Each Alternative

Cumulative effects on the fisheries resource resulting from implementation of an alternative could be of either a positive or negative nature. The primary positive effect is the potential for increased fish production due to the renewed emphasis on fisheries. The negative cumulative effects, and the ones of particular concern, are the potential reductions in the capability of the habitat to produce fish due to man's activities. For a discussion of the potential cumulative effects due to implementation of alternatives, see the Cumulative Effects section in the discussion for Soil and Water.

In addition to the potential for cumulative effects of land management activities impacting fish resources on the Wenatchee National Forest, changes in fish production on the Forest combines in a cumulative nature with the effects of other Forest Plans and management activities within the Columbia Basin. For a discussion of the cumulative effect of implementing Forest Plans on Columbia River fisheries, see Forest Plan Aggregate Outputs and Effects, Staff Paper for the Regional Forester, Region 6 (Draft August 5, 1988). This report is updated as Forest plans are completed.

c. Conflicts With Other Agency Plans and Policies

An objective of the Wenatchee National Forest Plan is to manage fish and riparian habitat so as to at least maintain current fish habitat capability and to improve habitat over time. This objective is consistent with the objectives of fish management agencies and Tribes for fish production in the lakes and streams on the Forest. Currently, the Northwest Power Planning Council is exploring ways to increase anadromous fish production in the Columbia Basin, with a goal of doubling current production levels. The Forest-wide Fish

and Riparian Standards and the EW-2 Prescription are established to protect existing habitat and provide the conditions and programs necessary to improve habitat capability.

All alternatives should result in improved habitat. Actual fish production increases will also depend upon the success of programs implemented by other agencies to improve downstream habitat conditions. As discussed in this chapter and in the discussion of alternatives in Chapter II of this document different alternatives include different levels of risk associated with maintaining and improving habitat. A summary of the relative risk associated with alternatives is displayed in Table II-1.

d. Mitigation Measures for Fisheries

Two mitigation measures designed to maintain and improve fish habitat are common to all alternatives except Alternative NC: Forest-wide Riparian Standards and the EW-2 Prescription, and the Best Management Practices (BMP's). The Riparian Standards would not apply to Alternative NC since they are not contained in the current Timber Management Plans. Under Alternative NC, streamside or riparian area management would only include those actions necessary to meet the minimum conditions established by the Washington State Forest Practice Rules and Regulations.

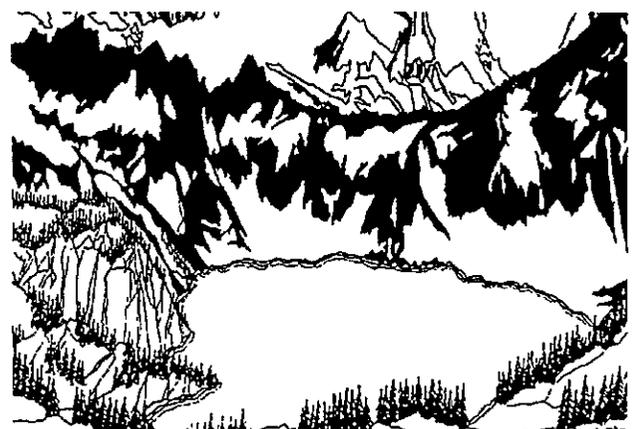
Riparian Standards and EW-2 Prescription

Forest-wide riparian standards and guidelines are developed to manage riparian areas to provide habitat conditions necessary for production of riparian-dependent resources, including fish habitat. The standards are developed to recognize the unique values of riparian resources and give preferential treatment to riparian dependent resources where management conflicts exist. Measurable standards have been established for habitat components that are felt to be the most important in maintaining fish habitat capability, including temperature, sediment, large wood and pool habitat and riparian vegetation. These standards apply to all of the Forest and management activities. In addition, standards have been developed to guide management activities adjacent to non-fish-bearing perennial and intermit-

tent streams, to minimize potential adverse impacts on downstream fish habitat.

There is currently no special land designation or standards for managing riparian areas other than manual direction and the Washington Forest Practice Rules and Regulations. A common mitigation measure now used is to work with project design to avoid or minimize impacts to riparian resources. For example, timber harvest units are often established so trees are maintained for stream shading or bank stability and a bridge may be constructed in lieu of a culvert to allow fish passage. The effectiveness of these mitigation measures often depends upon the amount of input available during project planning. Implementation of the Riparian Standards and EW-2 Prescription should help managers better design activities to minimize/avoid impacts based upon not only the site but also sub-drainage conditions. The actual effectiveness of the standards and prescription will need to be monitored as the Plan is implemented and adjustments made as monitoring results are compiled.

Best Management Practices (BMP's) A Best Management Practices Appendix (Appendix J) has been added for all alternatives except NC. Best Management Practices are practices designed to meet the Clean Water Act and reduce the potential for non-point source pollution entering stream channels. The BMP Appendix provides a guide for conducting land management activities. Actual BMP's to be incorporated into any activity will need to be developed based upon the individual project and site conditions. For further discussion of BMP's and watershed mitigation, refer to the Soil and Water mitigation section in this chapter.



9. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON VEGETATION

Under this general "Vegetation" heading, a number of topics will be addressed including: (a) Trees, (b) Old Growth, (c) Forage, (d) Unique Ecosystems, (e) Threatened, Endangered and Sensitive Plants and, (f) Research Natural Areas. Related effects on biological diversity will be discussed under each of these headings. Diversity is really an issue that encompasses all of the vegetation issues listed above. Nowhere is this more true than with old growth. Consequently, within the old growth section below, the main consequences of the alternatives on diversity will be presented.

Vegetated areas that do not change by alternative include the Entiat Experimental Forest, Tumwater Botanical Area, wilderness, existing Research Natural Areas, and biologically unsuitable, forested areas. These occupy approximately 45% of the forested acres.

9(A) ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON VEGETATION - TREES

a. Direct and Indirect Effects of Each Alternative on Vegetation - Trees

1) Effects of Recreation on Vegetation - Trees

The primary effect of recreation on trees and the timber program is through allocation of land to maintain or enhance the recreation setting. Developed campgrounds and ski areas are managed for long term sustained yield of industrial wood. Trees within these areas are harvested and some are used for sawlogs, others for firewood. However, these trees are not part of the allowable sale quantity. They are included in the timber sale programed quantity. There is little difference between alternatives in the effect of recreation on trees. Related effects of unroaded recreation and scenery do change significantly by alternative.

2) Effects of Unroaded Areas on Vegetation - Trees

Unroaded area prescriptions vary in the amount of harvest allowable, from planned but expensive in the RE-4, to not allowed in RE-3.

In all unroaded prescriptions periodic fires, insect epidemics, and disease attacks are expected to be more common and extensive than in areas of less restrictive harvest and roading.

The inventoried roadless areas encompass 26 percent of the Forest (556,000 acres). This is in addition to the 841,000 acres (39%) of the Forest in wilderness.

The amount of roadless area with restricted or no harvest is one of the primary differences between alternatives. It has a dramatic effect on harvest level. The amount of inventoried roadless area assigned to unroaded management prescriptions varies from 36,397 in Alternative NC to nearly 500,000 acres in Alternative E (See Table II-3a for the other alternatives). Alternatives J, B, D, A/NFMA and H have less than 250,000 acres assigned to unroaded, which is less than 50 percent of Alternative E. Alternatives C and I are intermediate with approximately 300,000 acres. Alternatives F and G although less than E, still allocate 78 and 69 percent respectively of the inventoried roadless to non-scheduled harvest allocations.

3) Effects of Scenery on Vegetation - Trees

Retaining the scenic qualities on the Forest has an impact on the allowable sale quantity, the average tree size, and species selection. Approximately 70 percent of the Forest has visual quality objectives that have an influence on harvest level.

Where partial retention or retention standards are applied, decreased yields and increased costs usually occur. Yield losses result from maintaining trees past their maximum growth potential and from increased disease and insect damage.

The scenic travel corridor prescriptions allow for clearcutting, especially where disease and insect problems are severe. More commonly, seed trees of the preferred species that are not diseased can

be left. Due to their resistance to decay and longevity, the preferred species are ponderosa pine and western larch. Less desirable species are lodgepole pine, grand fir, western hemlock and Engleman spruce because of their thin bark or susceptibility to disease, insects or wind throw.

Acres allocated to retention and partial retention harvest prescriptions by alternative are shown below in thousands of acres.



**TABLE IV-11
ACRES ALLOCATED TO RETENTION AND PARTIAL RETENTION**

Alternative	A/NFMA	B	C	D	E	F	G	H	I	J
M Acres	313	174	326	121	293	391	304	310	326	120

As can be seen from this chart, Alternatives J, D, and B are least affected by scenery allocations. Alternative F has the largest effect on tree management due to scenery constraints, and the remaining alternatives are intermediate.

4) Effects of Wildlife on Vegetation - Trees

There is some minor direct effect on trees from wildlife browsing and trampling. The primary damaging animals are pocket gophers, porcupines, and ungulates. On a Forest-wide basis, their effect is minor and is somewhat offset by the positive effects of browsing on competing vegetation, especially by deer and elk.

The indirect effect of the allocation of land and wildlife trees is more significant. A two percent reduction in allowable sale quantity (ASQ) due to wildlife trees was applied to all alternatives.

In addition the 2,200 acre dedicated Spotted Owl Habitat Areas (SOHA's) are not planned for harvest. Pine marten, piliated woodpecker and three-toed woodpecker areas are proposed for harvest, but at a level that will maintain mature habitat while producing a reduced yield of wood. This will mean larger trees, longer rotations, and greater snag levels than in General Forest. It may also mean increased risk of fire, insect and disease losses.

Although there is some variation in the effect by alternative, it is not significant when compared to other issues.

5) Effect of Fisheries on Vegetation - Trees

The management of fish habitat creates an indirect effect on trees through prescriptions that propose larger trees, longer rotations, less clearcutting, and a bottom line reduction in tree utilization for wood products. The vegetative effect will be to increase the number of shade-tolerant tree species, especially western red cedar, western hemlock, and true firs. The expected long term effect will be a reduction of ponderosa pine, Douglas-fir, and other species that respond well to full sunlight.

There is little difference between the alternatives in the actual effect of fish and riparian management on trees, as all streams, lakes and ponds will receive consideration in all alternatives.

6) Effects of Timber Management on Vegetation - Trees

As discussed in Chapter III, the tree-covered lands can be separated into at least two general classifications. These are (1) dry forest, and (2) moist forest ecotypes. The timber inventory originally contained a third category of less than 5,000 acres, the lodgepole pine/mountain hemlock ecotype. Only one inventory plot was lo-

cated within it. Because of the small size and lack of information concerning this latter category, it was combined with the moist ecotype, where it was found to be suitable for long term, sustained yield of commercial industrial wood production.

Both even and uneven-aged silvicultural systems are planned for use in all ecotypes. However, past attempts on the Forest with selective systems has resulted in many acres of "high graded" stands of small diameter, low value species with unacceptable growth rates and high mortality.

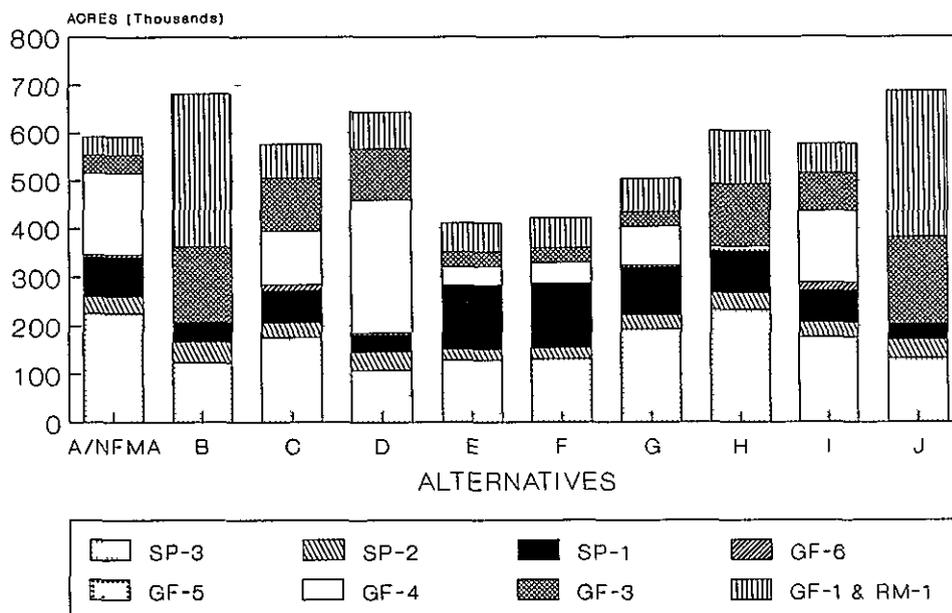
No alternative was drafted specifically to address uneven versus even-aged management. The Forest instead selected an intermediate system, referred to as extended shelterwood, that combines the constant tree cover protection of riparian areas, scenery, and wildlife benefits of uneven-aged management with the desirable characteristics of even-aged management. The

desirable characteristics of even-aged management that are deemed important are a definite regeneration check point, control of species, and reduced harvest entries. The lower number of harvest entries reduces logging costs, as well as soil, water, and wildlife impacts.

The percent of the harvest coming from areas where this type of management is the preferred option is shown below. The actual silvicultural prescription applied to a given acre will depend on site specific evaluation criteria developed during the environmental analysis and documented by a certified silviculturist

The amount and the objectives of vegetative manipulation will vary between alternatives. This is shown in Figure IV-5. The bar length for each alternative shows that portion of the forested acres suitable for timber harvest under each alternative and how these acres are allocated.

FIGURE IV-5
ACRES BY TIMBER YIELD TABLES

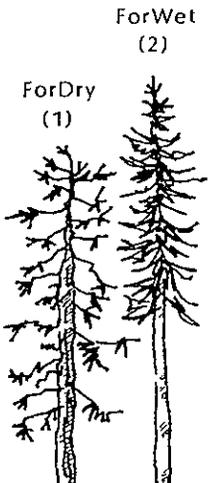
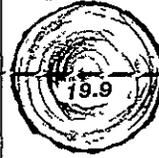
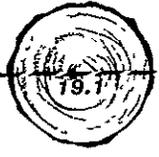


The General Forest (GF) Yield tables include three levels of intensity of management. These options or intensities are:

1)GF-1 - Highest intensity option. Includes precommercial thinning and release if needed, two commercial thinnings, and final harvest generally at culmination of mean annual increment. Final harvest is assumed to be clearcut unless shelterwood is needed to assure regeneration within five years.

2)RM-1 - This option is identical to GF-1 except that forage is to be managed in addition to trees. This may decrease tree growth during the first 10 years. Because relatively few acres are allocated to this option, it is combined with GF-1 in the preceding Figure IV-5.

FIGURE IV-6
TIMBER YIELD TABLES - GENERAL FOREST

		GF-1		GF-3		GF-4		GF-5		GF-6	
	Average Annual Growth at Culmination (CMAI)	52.3	60.3	51	58.1	44	57	49.7	61.6	42.3	55.1
	Cubic Feet / Acre / Year	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Diameter at Breast Height at CMAI	ForDry (1)										
	ForWet (2)										
Natural Regeneration		10%		10%		10%		60%		40%	
Plant		90%		90%		90%		40%		60%	
Pre-Commercial Thin		✓		✓		0		✓		0	
Commercial Thin		age 70-90		0		0		age 70-90		0	
Shelterwood		0		0		0		✓		✓	
Clearcut		✓		✓		✓		0		0	
Cost Most (4)→Least(1)		4		4		3		2		1	
# of Trees per Acre		58	54	227	201	305	400	58	53	305	369
CMAI - Age		120	110	70	100	100	110	124	164	104	124

3)GF-3 - Moderate intensity option. Includes precommercial thinning and release if needed, but no commercial thinning. Final harvest generally at culmination of mean annual increment is assumed to be clearcut unless shelterwood is needed to assure regeneration within five years.

4)GF-4 - Low intensity option Includes no planned thinnings. Final harvest generally at culmination of mean annual increment is assumed to be clearcut unless shelterwood is needed to assure regeneration within five years.

5)GF-5 - Identical to GF-1 except that this option uses shelterwood harvests to reduce planting costs. This option is selected only in Alternatives B and H.

6)GF-6 - Lowest intensity option. Identical to GF-4 except that this option uses shelterwood harvest to reduce planting costs. This option is selected in all alternatives except G and H, but on relatively few acres.

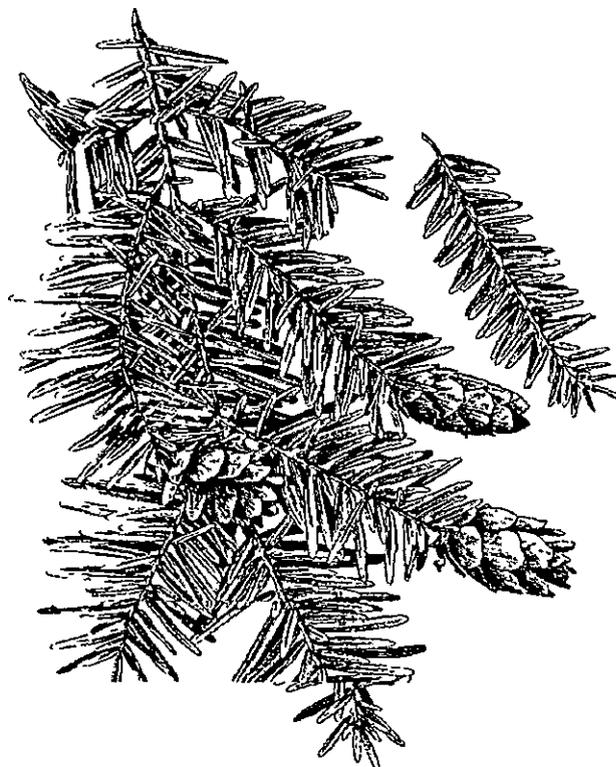
It should be noted that shelterwood harvests may be used in all alternatives and on additional acres if needed to assure regeneration within five years. This determination will be made by certified silviculturists, as called for by the National Forest Management Act of 1976, based on biological rather than economic considerations. For each intensity level, see Figure IV-6 for details on expected yields in cubic feet, tree sizes, amount of planting, commercial thinning ages if appropriate, number of trees per acre, and approximate rotation age at final harvest.

The Special Prescription (SP) Yield table includes three variations in timber yield associated with other resource emphasis allocations.

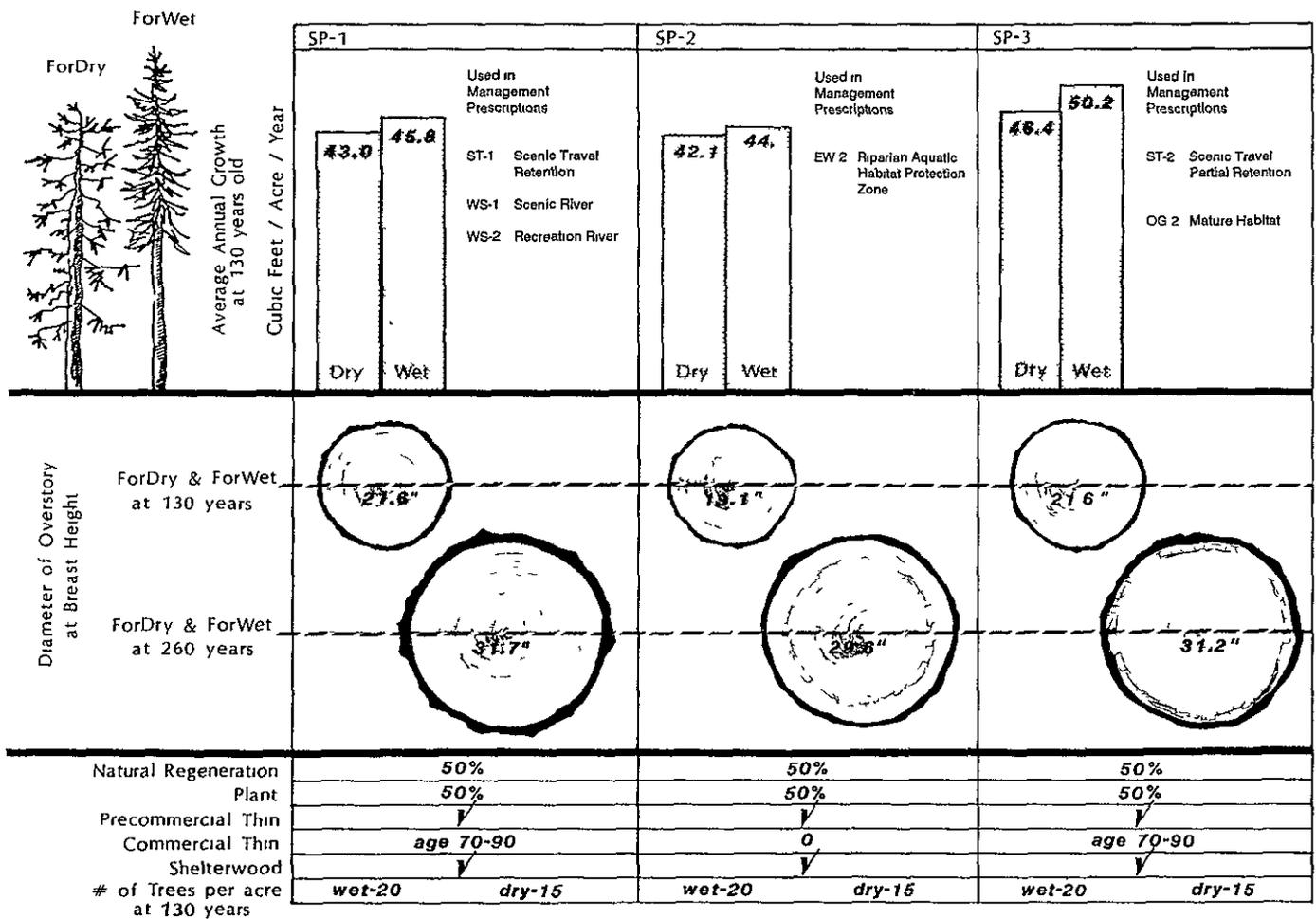
1)SP-1 - Calls for long rotations of up to 260 years to produce large trees (24 to 36 inches in diameter). As shown in Figure IV-7, this yield table is used in management prescriptions for old growth, scenic travel retention, as well as Scenic and Recreational rivers. See Scenery, Figure IV-2 for a visual description of this prescription.

2)SP-2 - Calls for long rotations of up to 260 years. Large trees for cavity nesters, spotted owls, and big game habitat in dry areas are desired. However, disturbing the site once large trees are established is judged undesirable. Therefore, precommercial thinning is called for to help trees grow larger, but no commercial thinning of the cover-creating trees is planned. On the riparian and aquatic habitat areas this allows tree management, but reduces disturbance caused by logging.

3)SP-3 - Calls for long rotations of 180 to 260 years to produce 24 to 28 inch diameter trees. This yield table is used to simulate management for partial retention along travel corridors and to produce key big game habitat in wet ecotypes. See Scenery, Figure IV-2 for a visual description of this prescription.



**FIGURE IV-7
TIMBER YIELD TABLES - SPECIAL**



The major differences in alternatives as these relate to trees result from acres proposed for harvest, acres planned for timber stand improvement, and acres of full yield versus modified yield. Acres proposed for harvest vary from a high of 787,751 acres for the No Change Alternative to a low of 410,395 for Alternative E. As a percentage of tentatively suitable lands this ranges from a high of approximately 99 percent to a low of 52 percent. Table IV-12 below shows how this varies by alternative.

**TABLE IV-12
PERCENTAGE OF TENTATIVELY SUITABLE LAND AVAILABLE FOR HARVEST**

Alternative	N/C	A/NFMA	B	C	D	E	F	G	H	I	J
Percentage	99	75	86	73	81	52	53	64	76	73	87

The acres planned for stand improvement (i.e. thinning, spacing, weeding or release from other vegetation competition) will vary according to the objectives of each alternative. The environmental effect of increased stand improvement on trees is increased tree vigor, diameter, and disease resistance. Tree numbers, insect losses and long term fuel loadings are decreased by thinning. Short term risk of losses due to fire is increased because of the flammability of the trees and brush cut or killed by herbicides. Precommercial thinning can double the average tree size, but reduces tree numbers by an average of 50 percent. The end result is net increase in merchantable tree volume.

Those alternatives that maximize timber outputs also maximize timber stand improvements. Those that maximize PNV decrease investment in stand improvement. The lowest stand improvement acreages are in those alternatives that allocate larger acres to unroaded recreation, especially Alternatives E and F. For acres planned for stand improvement see Table II-3a in Chapter II of this document.

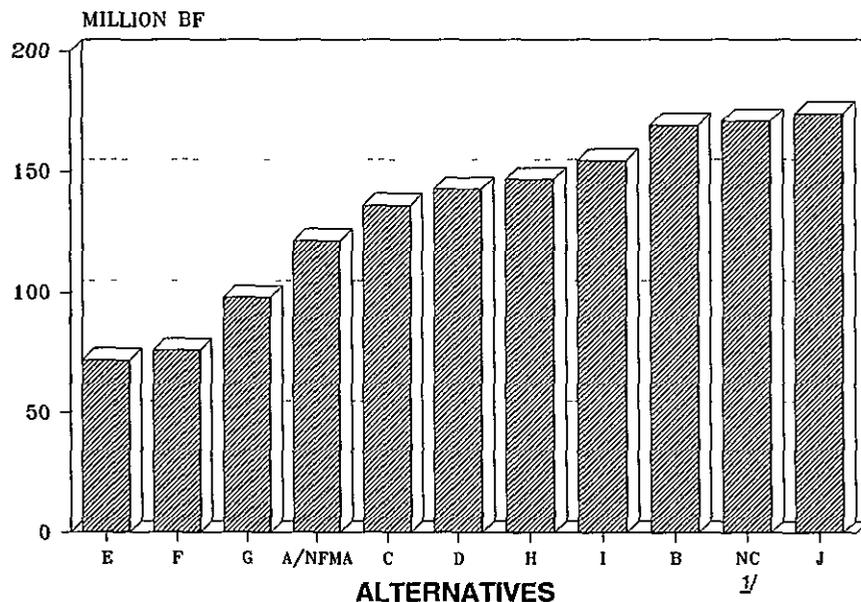
b. Cumulative Effects of Each Alternative

As discussed in the previous section, recreation, unroaded areas, scenery, wildlife, and fish concerns all affect the vegetation-trees component, and especially the allowable sale quantity, by significant amounts. Additional minor but cumulative effects on the ASQ are caused by the designation of Wild and Scenic Rivers, cultural resources, biodiversity, unique ecosystems and social concerns. All tend to reduce the potential area or ability to harvest trees.

The old growth spotted owl controversy is probably the largest single impact during the first decade as it affects the heaviest volume and most valuable stands proposed for harvest. This controversy has already changed the demand and supply picture for not only Wenatchee National Forest timber, but for the entire Region. This cumulative effect will increase costs, but should also increase the future stumpage values by at least the one percent used for modeling. This increased value results in increased management intensity that can mitigate losses in the high harvest alternatives (B and J).

The cumulative effect on the allowable sale quantity (ASQ) as compared to current sell and cut levels is shown in Figure IV-8.

**FIGURE IV-8
COMPARISON OF ALLOWABLE SALE QUANTITY**



^{1/}Current cut and sell level includes the 14 MMBF temporary inflation of the harvest

Although ASQ in all alternatives except B and I will be reduced by the cumulative effects of other resource concerns, productivity will increase on the remaining harvest acres as shown below in Table IV-13.

TABLE IV-13
TIMBER PRODUCTIVITY PER ACRE 1/

	A/NFMA	B	C	D	E	F	G	H	I	J
Productivity by year 2030 in cubic feet	26	36	29	30	24	25	21	26	31	37
Increase in Growth in percent between 1st and 5th decade.	14	46	12	14	3	7	22	47	24	75

1/ No figures are available for the NC Alternative

c. Alternatives' Conflicts With Other Agency Plans and Policies

There would be little if any conflict in tree management under any of the alternatives. The Forest is a cooperater in tree improvement with the Department of Natural Resources and Plum Creek Timber Company. This would continue under all alternatives.

Alternative B with its increase in harvest level could have a slightly depressive effect on timber values on State, private, and Yakima Indian lands. The alternatives that reduce the Forest harvest level, especially Alternatives E, F, and G, could increase timber purchasers' interest in other land-owner timber sales.

Alternatives E, F, and G would have an impact on State and local government incomes. This could affect their ability to maintain current road and school programs in Chelan, Kittitas, and Yakima Counties. See Table II-3a for the payments to Counties by alternative.

The requirement that created openings be less than 40 acres can cause scheduling problems for proposed sales near other ownerships. If the adjacent owner harvests areas larger than 40 acres, trees must be re-established and 4.5 feet tall before contiguous openings can be created on the National Forest lands.

Those alternatives with the highest harvest levels (Alternatives B, D, and I) would create the most problems with the Forest's ability to schedule sales that do not add to created openings on adjacent private lands.

d. Mitigation Measures for Vegetation: Trees

The effects of other resource activities on Vegetation - Trees and especially on the allowable sale quantity can be mitigated through intensive management.

Selection of genetically superior trees and properly matching species to individual site conditions is the first step in intensive management. Proper spacing of trees and selection of trees with good growth, disease resistance and longevity can mitigate the effects of the longer rotations called for in the scenic travel corridors, recreation use sites, and riparian areas

Wildlife damage can be mitigated through avoidance of the problems or by direct control of the animals. Leaving seed trees to replace damaged trees with new seedlings through natural regeneration can mitigate gopher and porcupine damage.

Wildlife tree impacts on harvest levels can be reduced if the trees left are those too defective to be a part of the ASQ.

As was described in Chapter III, the Wenatchee National Forest has 16 species of conifer trees. The combination of these with the variables of soil type, aspect, rainfall, and elevation create the need for a wide range of silvicultural options. Therefore, from a pure tree management standpoint, those alternatives with a mix of treatment opportunities provide the most flexibility to fit specific site needs with silvicultural prescriptions.

The complicating factor that strongly influences the selection of silvicultural prescriptions is economics. By making maximum PNV based on average costs and values the overriding objective, as in Alternatives A/NFMA, G, D, E, F, and I, few acres are allocated to high intensity management. The other extremes that select almost all management intensities that involve thinning the stands are Alternatives B and J. Neither of these approaches to selection of appropriate tree management intensities provide for the optimum level of forest management from a silvicultural perspective.

Some of the biological considerations not accounted for completely in the FORPLAN modeling are the effects of (1) mountain pine beetle, (2) variations in species reactions to density, and (3) thinning interactions with root rot and stem diseases.

Perhaps some specific examples of when thinning is particularly important will help. One example is pine pole stands. Without thinning to improve growth, trees over eight inches in diameter become susceptible to beetle attack (Sartwell 1975). With the exception of some use for firewood or chip material, there is little market for beetle-killed pine species in the local area.

Under Alternatives A/NFMA, C, D, E, F, and I, a potential mitigating measure might be to use more intensive timber management practices than those which maximize present net value. This would reflect biological factors not presently incorporated into these alternatives.

For each acre of intensive management (GF-1) versus intensive management with no thinning (GF-4) there is a calculated increase of 420 cubic feet, or 2,289 board feet, of wood production. The value of this additional volume per acre based on the 1982 stumpage value for the Wenatchee of \$94.00 per thousand (M) board feet is \$215.00 per acre (2.29 M Board feet x 94.00 = \$215.00). Due to the increased size of the trees, the value is even greater than shown by this calculation, which only recognizes average stumpage values rather than value by tree size.

A more detailed cost analysis including actual expected thinning costs, a four percent interest rate, and a one percent inflation of stumpage values was prepared for the 18,000 acres of thinning needed in the 15 year old Entiat-Chelan burn areas. This analysis found about 12,000 (or two-thirds) of the acres to be economically feasible for thinning. Only those acres on steep skyline ground needing road access, or having extremely dense, high cost thinning, were not economical.

Alternative B proposes to thin more acres than is biologically sound or economically optimum. For example, thinning should not be planned for areas of Phellinus weirii root rot. Precommercial thinning of Douglas-fir plantations is not recommended when Phellinus is present (Hanson 1975). As this disease is very common on the Wenatchee, any alternative that proposes to thin essentially all acres is not biologically defensible. A mitigation measure would be to recognize this factor and reduce the proposed acres of intensive management in Alternative B and increase the acres of GF-4 prescription.

An attempt to model an approach between the maximum PNV and the maximum timber harvest is used in Alternative G. As shown by Figure IV-5, Alternative H also has a distribution of treatment prescriptions that is in between the extremes of Alternative B and those that maximize PNV.

Under all alternatives planting will be done with a mixture of species. All species have their application or specific niche in the Forest ecosystem. Mixed species planting, as well as planting with trees from the best parent trees of each species, will help to mitigate any tendency toward monocultures that could be destroyed by insects or diseases.

Fertilization can be used in all alternatives, also. Past trials on the Forest have shown it to be an effective method of increasing growth. It could be used as a mitigation measure if harvest, site preparation, or other treatments cause a reduction in fertility.

Thinning may be used along with release from brush competition to improve the size, quality, and growth rate of young stands. Over zealous planting or natural seeding can create stands too thick for proper growth. As the National Forest Management Act of 1976 calls for optimum rates of growth, thinning or release can be used to achieve these rates if overstocking or other vegetative competition is the problem.

Shelterwood harvest rather than clearcutting is often prescribed where amelioration of temperature, solar radiation or wind is needed to assure reforestation. This mitigation measure is also used in special harvest allocation areas to protect scenic values, provide soil and water protection, or provide wildlife habitat.

Dead trees or snags will be left for wildlife in all alternatives. Both standing and fallen trees are a storage place for nutrients and habitat for vertebrate and non-vertebrate animals. Snags also provide perches for raptors that prey on rodents that eat tree seeds and seedlings.

The above mitigation methods apply to all alternatives. However, the mitigation for effects on the ASQ is least effective where more acres are removed from the suitable commercial land base.

9(B) ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON VEGETATION - OLD GROWTH

a. Direct and Indirect Effects of the Alternatives on Vegetation: Old Growth

The variation in the effects of the alternatives on old growth relates directly to the number of activities that manipulate the old growth ecosystem. Very little disturbance is required in an old growth ecosystem to cause a change sufficient to modify its function. Ground-disturbing activities obviously disrupt the normal functioning of the old growth ecosystem and must be considered a major effect. Major effects also result from any activities that significantly change the structure and composition of the old growth vegetation.

There are many indirect effects of man's activities on vegetation. It is relatively easy to establish that increases in direct physical activity like road building will result in vegetation change. However, the long term indirect effects of lack of activity in non-commodity alternatives will not necessarily assure the maintenance of more natural stand conditions over time. Unnatural buildup of woody debris (from fire suppression and lack of prescribed fire) leads to increased incidence of insect and disease outbreaks and a greater likelihood of catastrophic fire. The extent of these types of indirect changes are very difficult to predict. They are likely to be substantial

Effects of management activities on old growth may also significantly affect biodiversity. Old growth is a component of biodiversity, and is limited in abundance and distribution. Consequently, the maintenance of old growth is important to the maintenance of diversity. For this reason, diversity will also be included in the following discussion.

1) Effects of Recreation on Vegetation - Old Growth

Recreational use of the Wenatchee National Forest is ever increasing. Greater numbers of people on the landscape, and the development of campgrounds and access roads to accommodate the increase in numbers, will result in direct modifica-

tion of the vegetation. Old growth is affected by this. Generally, human caused vegetative modification will result in unnatural plants and plant communities. Site disturbance will retard or change succession.

Vegetation composition of highly used areas will change as a result of trampling, compaction and vehicular use, and noxious weeds will increase due to disturbance and the introduction of weed seeds. Old growth stands often are the target of intense recreational pressure because of the aesthetic qualities to be found there. As a result, recreational use does result in some loss of the biological attributes of old growth, although the stand may still be considered aesthetically as "old growth".

Forest-wide standards and guidelines for old growth and diversity are designed to maintain adequate amounts of old growth for its own intrinsic values and as components of biological diversity. Increased recreational use will increase the risk of detrimental impacts to old growth.

Semi-primitive recreation management protects vegetation from at least widespread, human-caused impacts. Generally, negative impacts are fairly restricted in nature. As more land is allocated to developed and roaded recreation, however, the risk of substantive impacts increases.

Alternatives with the most acres in non-motorized, semi-primitive allocations such as E (320,038 acres) and F (259,088 acres) would result in the least potential for adverse impacts to old growth from recreation. Alternatives C and I (116,092 acres) and G (100,362 acres) would have somewhat greater risk of damage to the old growth resource than E and F, while alternatives with the least land allocated to semi-primitive, unroaded allocations (B, D, J, H, A/NFMA and NC) would have the greatest potential risk of adverse impacts to old growth. Alternative NC would pose the greatest risk because Forest-wide standards and guidelines for old growth, diversity and recreation management would not apply.

2) Effects of Timber Management on Vegetation - Old Growth

Timber harvest is the primary means of manipulating vegetation on the Forest to achieve the desired management objectives for timber, range, recreation, wildlife, and visual resources. There are a number of related activities associated with the establishment, tending, harvest, and marketing of forest stands including: road construction and maintenance, logging operations, treatment of slash, site preparation, reforestation and control of stand composition and density. All these types of activities affect the vegetation resource.

At this time, it is felt that any significant harvest activities in old growth stands essentially eliminates those stands from the designation of "old growth". Consequently, the amount of old growth Forest within each alternative is related to the amount of harvest activity.

Old growth amounts over time by alternative are displayed below in Table IV-14.

TABLE IV-14
ACRES OF OLD GROWTH REMAINING
(INCLUDING WILDERNESS)
AT THE END OF DECADES 1, 2 AND 5

Alternatives	Decades		
	1	2	5
NC	305,100	291,400	250,400
A/NFMA	307,300	295,800	261,600
B	305,200	291,500	250,700
C	307,300	295,700	261,200
D	305,900	293,100	254,500
E	310,600	302,400	277,700
F	309,300	300,900	275,700
G	299,600	289,500	259,300
H	306,700	294,600	258,400
I	307,300	295,300	261,200
J	305,100	291,300	250,100

Generally, the harvest rate of old growth forest is higher in the alternatives that have higher levels of timber harvest. The amounts in the table are based upon current acres of old growth and their decrease over time, predicted by subtracting the estimated acres of old growth harvested in each decade by alternative. The remaining old growth acres do not, however, reflect any possible additions resulting from ingrowth (i.e., the development over time of old growth stands from stands that previously did not exhibit old growth characteristics). The average age of mature stands on the Wenatchee is approximately 150 years (estimate from timber inventory data). Approximately 30 percent of the forested stands on the Forest fit into this category. Although some of these mature stands have been disturbed recently, there are many stands that have the potential to become old growth in the near future. Consequently, some old growth will develop with time and should increase the amount of old growth actually remaining in each alternative. Alternatives with greater amounts of no-harvest allocations should accrue old growth at a relatively faster rate because fewer stands would experience the disturbance that might preclude old growth development in the near future (see Table II-3a in Chapter II).

Old growth is an important component of vegetation diversity. Vegetation diversity, in turn, is an important component of total biological diversity. Old growth forest is a vital cog in the maintenance of diversity. Both distribution and abundance are important considerations in assessing old growth--especially as it contributes to diversity.

Vegetation diversity is predicted to vary by alternative in the same way that total biological diversity does. A rating of biological diversity by alternative is presented in Table II-3b, in Chapter II. Generally, the distribution and number of plant and animal species will be highest in the amenity alternatives (E, F and G) and lowest in the commodity alternatives (B, N/C and J). The other alternatives are either moderate (A/NFMA and C) or low to moderate (D, H and I) in diversity.

Another consequence of timber harvest activities is the change in corridors that provide avenues for genetic flow. An important corridor will be available in all alternatives except N/C in the form of riparian areas, as described in the riparian area management prescription. However, as higher proportions of the landscape are included in timber harvest allocations, there will be fewer undisturbed corridors to allow for genetic flow between undisturbed "islands" of vegetation for species that require such environments. This has been a particular concern of those individuals interested in old growth forest maintenance. N/C will have the fewest corridors over time, followed by J and B (the highest timber alternatives). Alternatives E and F will have the greatest number of undisturbed corridors. Of the middle-harvest-level Alternatives D and H, D will have the fewest corridors, due to the heavier roading. Alternatives A/NFMA, C, G and I will have a moderate number of corridors available.

Old growth forests are typically in mid-seral to near climax condition. Generally, alternatives that have more acres excluded from timber harvest will have a greater land area in more advanced stages of successional development. The amenity Alternatives E and F and Alternative G would result in more of the advanced seral stage stands over time. Alternatives B, N/C, and J would produce fewer of these higher seral stage communities.

There are some indirect effects of the timber management program on old growth. In Alternatives E and F, the existing vegetative character may be at risk of high intensity wildfire and/or epidemics. It will be difficult to prolong the character of older age classes without an active program of fuel and stand maintenance, which are usually tied to an active timber management program. Intense harvest activities may also cause too much fragmentation of old growth, essentially reducing the effectiveness of small old growth stands in maintaining old growth ecosystem attributes.

3) Effects of Range Management on Vegetation - Old Growth

Grazing can impact old growth ecosystems mainly through vegetation modification and soil compaction. Old growth forest in upland locations will likely not be impacted much by grazing, except perhaps open stands of ponderosa pine or in some cases, Douglas-fir. Most old growth stands are dark, with little available forage, and consequently most of these areas are not grazed by livestock. Use and the possible resultant damage to old growth stands would mainly be restricted to riparian areas and adjacent stands where animals might go for shade. In the first two decades there is no significant difference between the alternatives. By the fifth decade Alternatives B, D, E, G, H and I would have heavier grazing use than the other alternatives and as a result, more resource damage to old growth would be expected in these alternatives. However, it is likely that most old growth stands will not be significantly impacted by grazing.

4) Effects of Mineral Activity on Vegetation - Old Growth

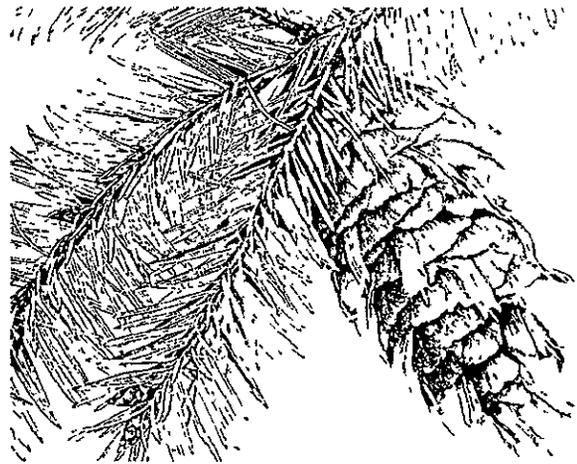
Like road construction, mining activities often result in movement of earth and direct habitat modification that can be severe in nature. Those activities with the most influence on vegetation will be access road construction, mineral extraction and processing, waste disposal, increases in human use and reclamation activities. Generally, claimants holding a valid mining claim have a statutory right to mine and this right supersedes law and policy that protect vegetation from modification or destruction. The extent of the effects of mineral activities on old growth cannot be determined until the location, type and timing of the proposed activity is known. As a consequence, the impacts that mining would have on the amount and distribution of old growth by alternative cannot be estimated.

5) Effects of Roads on Vegetation - Old Growth

Road construction causes significant ground disturbance and is associated with many activities on National Forest lands. The major impacts of roading on old growth are both direct and indirect. Direct effects are physical site modification

along the right-of-way. Succession is set back when portions of old growth vegetation are removed. Indirect impacts of roads include changes in site hydrology, which may change the character of adjacent old growth forest stands. Other indirect impacts of roads are increased access and traffic leading to higher use levels, the disturbance of corridors important to genetic flow, and excessive fragmentation of old growth stands.

Alternative NC has the most roads followed by Alternatives J and B. These alternatives would have the highest risk of adverse impacts. Alternatives E and F construct the least number of new roads and have the least potential for adverse impacts. Table II-3a in Chapter II displays the miles of new road construction by alternative.



b. Cumulative Effects of Each Alternative

All alternatives will reduce the "natural" character of the vegetation through timber harvest, roading, recreational use and the myriad of other activities associated with the multiple use of National Forest System lands. The rate at which these modifications occur and the risk of error are what change by alternative. Cumulative effects are also the result of activities on lands owned by other parties. This section will discuss the effects of various activities on old growth attributes regardless of ownership.

Currently, private and state-owned lands reflect management activities that are highly commodity oriented. Consequently, in areas of intermixed ownership, the cumulative effects and risk of Forest Service alternatives that are also commodity oriented becomes very high. Forest Service lands become the critical links in the maintenance of old growth.

Old growth will decline in all alternatives. There should be enough old growth maintained (at least in the short term) to meet legal requirements for diversity. Alternatives E, F and G will have the greatest maintenance of the natural character of the landscape over time. Indirectly, however, the influence of insects, disease and fire may result in major cumulative effects on old growth--perhaps even greater cumulative effects than the more commodity oriented alternatives would have. With fire suppression activities, fuels will build up to unnatural levels, increasing the fire hazard. Residue amounts that are higher than would naturally occur, may also result in a higher incidence of insects and disease. It will be very difficult to maintain the natural character of the stands over time, considering that the fire, insect and disease outbreaks will be the result of unnatural circumstances.

Alternatives A/NFMA, C, I and H will have intermediate levels of timber harvest and roading so that the cumulative effects of these types of activities should be more than in Alternatives E, F and G but less than in the high commodity Alternatives D, B and J. The indirect effects on old growth of increased fire intensity and insect and disease outbreaks should be somewhat less than Alternatives E, F and G.

Alternatives D, B, J and NC have the highest commodity outputs. The amount of direct ground disturbance is directly proportional to the commodity output levels. Consequently, the amount of old growth is less and the risk of error in maintaining diversity and sensitive plant species is higher. This is especially true in Alternative NC where no standards and guidelines have been developed, and the policies and laws have not been interpreted for on-the-ground application.

It may be difficult if not impossible to maintain the corridors and amount of old growth necessary to support adequate diversity in the commodity alternatives. However, at this time the quantity and distribution of old growth necessary to meet legal requirements for biological diversity are not established. The risk of unnatural fire and insect and disease outbreaks resulting from high residue build up are reduced though.

c. Alternatives' Conflicts With Other Agency Plans and Policies

No conflicts are anticipated between the effects of the alternatives and other agency plans and policies

d. Mitigation Measures for Vegetation - Old Growth

There are a number of mitigation measures incorporated in the Forest Plan for the maintenance of old growth. Any mitigation measures in the Plan are applicable to all alternatives except NC. Measures required by law and policy are universally applicable. Mitigation measures applicable to all Forest Service activities are primarily addressed through land allocations, standards and guidelines and capital investments. Laws and Forest Service policy are also, to some extent, mitigation measures.

Generally, mitigation measures that are used in relation to vegetative attributes that are in limited abundance (like sensitive plants and old growth) are those that: 1. Avoid impact by not taking a certain action or parts of an action; 2. Minimize impacts by limiting the degree or magnitude of the action and its implementation or; 3. Reduce or eliminate the impact by preservation and maintenance operations during the life of the action. Repairing, rehabilitating, or restoring the affected environment are generally not effective means of mitigation for old growth. In the case of old growth (including diversity) sometimes substitute resources or environments can be provided.

Standards and Guidelines in the Forest Plan for old growth include strategies of management to maintain old growth for diversity, wildlife and plant habitat, and aesthetics. The Forest has also enumerated goals for old growth and diversity. Further, Forest Service policy and laws (in some cases) provide management requirements for the maintenance of diversity (to which old growth contributes).

**9(C) ENVIRONMENTAL
CONSEQUENCES OF THE ALTERNA-
TIVES ON VEGETATION: FORAGE**

This section describes the direct and indirect effects of the alternatives on the forage portion of the vegetative environmental component. As discussed in Chapter III, vegetation types within the Forest evolved through the natural interactions of climate, wildfire occurrence, and grazing animals. Fire removed or thinned the trees while large grazing animals used and modified the resulting forage resource.

Utilization of forage will cause vegetative changes, including changes in numbers and species of plants and the growth habit (both size and shape) of some plants. When grazing by livestock is continuous and unmanaged, the changes in numbers and species of plants can be detrimental to the forage base, as well as to the soil and watershed resources. However, when grazing use is controlled through intensive management systems, the results can have a beneficial effect by increasing plant vigor and numbers of desirable forage species. This, in turn, can improve soil and watershed condition. Hormay (1970) observed that species composition of the vegetation changes continuously. It changes slowly in natural succession but may change rapidly under the influence of forces such as grazing or fire. Hormay also noted that cattle use of bitterbrush caused a change in form which resulted in both an increase of annual leader growth, and protection of a percentage of this growth from grazing due to crown hedging. Observations have been made which compares responses to different intensities of grazing with reproductive response of some grass species. Significantly more bluebunch wheatgrass seedlings become established under intensive management systems than under continuous grazing or where grazing has been eliminated.

Savory (1984) observed that lack of forage use on low rainfall areas (brittle environments) can cause poor water cycling, poor mineral cycling, and poor energy flow (sun's energy converted to forage). This will result in loss of vegetation and the exposure of soil to wind and water erosion. This same observation has been made on the Forest within animal exclosures on drier sites.

The above discussion provides the key elements in determining the direct and indirect environmental consequences of the alternatives on the forage within the vegetation component. The numbers of livestock available to use as a management tool are the same in all alternatives in the first decade (see Table IV-15). Numbers of permitted livestock vary by alternative after the first decade, with the greatest variation coming in the fifth decade. The number of acres of suitable forage that will be available to livestock use also varies by alternative.

TABLE IV-15
EXPECTED PERMITTED USE IN THOUSANDS
OF ANIMAL UNIT MONTHS

Decade	Alternative										
	NC	A/NFMA	B	C	D	E	F	G	H	I	J
1	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
2	23.0	23.0	25.5	24.0	25.5	25.5	23.0	25.5	25.5	25.5	25.5
3	22.0	22.0	29.0	24.0	29.0	29.0	23.0	29.0	29.0	29.0	29.0
4	21.0	21.0	32.0	24.0	32.0	30.5	23.0	32.0	32.0	32.0	32.0
5	20.0	20.0	36.0	24.0	36.0	31.5	23.0	33.5	36.0	36.0	36.0

Table IV-16 shows the number of acres subject to grazing management. The consequences of forage utilization by alternative are discussed below.

TABLE IV-16
LANDS WHICH ARE AVAILABLE TO BE MANAGED
FOR LIVESTOCK GRAZING IN THOUSANDS OF ACRES 1/

	NC	A/NFMA	B	C	D	E	F	G	H	I	J
Suitable	203.4	203.4	403.7	203.4	401.4	350.9	203.4	378.1	397.4	399.4	403.8
Potential Suitable	203.5	203.5	504.2	203.5	501.3	438.2	203.5	472.2	496.2	498.8	504.4
Total	406.9	406.9	907.9	406.9	902.7	789.1	406.9	850.3	893.6	898.2	908.2

1/ These acres include both existing suitable and potentially suitable lands after vegetative manipulation through timber harvest

a. Direct and Indirect Effects of Each Alternative on Vegetation: Forage

There are several environmental components and/or activities that, due to their nature or scope, have little effect or a minor constant effect by alternative on the forage base. These environmental components and/or activities include; Wild, Scenic and Recreational Rivers, Cultural Resources, Scenery, Wilderness, Fisheries, Water and Soils, Air, and Minerals. The minor effects of these environmental components or activities on forage are not discussed below.

1) Effects of Developed Recreation on Vegetation: Forage

Most developed recreation sites are fenced to exclude livestock, and heavy seasonal use by recreationists generally excludes forage use by wildlife. Developed ski areas are an exception, and ski runs do provide forage for big-game. These effects of developed recreation on forage are directly related to the number of acres allocated to developed use. Alternatives NC, E, H and A/NFMA would have the least effect on available forage as a result of the lowest acres allocated to developed recreation. Alternatives C and I would be next followed by Alternatives F and G. Alternatives B, D and J would have the greatest number of acres allocated to developed recreation.

2) Effects of Dispersed Recreation on Vegetation: Forage

There are 36 recreation livestock allotments on 30,000 acres of suitable rangelands. Approximately 13,500 head of recreation livestock grazed on the Forest in 1988, with most of this use occurring in unroaded and wilderness allocations. This use is expected to increase in the future until limited by user or resource conflicts. Alternatives which provide more unroaded and wilderness recreation opportunities will provide more area for use by recreation livestock owners, and reduce the probability of future user and resource conflicts. Alternatives E, F and G have the most land allocated to the combination of unroaded and wilderness areas, and will provide the most recreation livestock forage. Alternatives C and I are next, followed by A/NFMA and H. Alternatives B, D and J have fewer acres available while NC would have the least available for recreation livestock forage use.

3) Effects of Wildlife and Livestock on Vegetation: Forage

The forage base occurring on the Forest will be utilized to some degree by either wildlife or livestock, and in some cases both classes of animals will use the same forage at different times of the year. Forest-wide there is forage in excess of current and projected needs. However, where some key winter range areas are utilized by livestock in the summer, there may be reductions in forage below the needs of wildlife. Wildlife use different vegetative areas depending upon the season of the year and also depending upon the severity of the winter. In mild winters with low snow depths, wildlife will use higher elevations, which greatly increases the size of their winter range. It is only in the more severe winters where deep snow forces animals into smaller areas that competition for forage becomes significant. Livestock can be managed to reduce or eliminate this competition. However, competition between wildlife of the same species or between elk and deer can only be controlled by reductions in numbers through hunting.

Wildlife habitat can be managed through use of vegetative manipulation, livestock grazing, and prescribed fire. Fire, as an alternative, can have some adverse consequences including the exposure of soil to erosive processes by reducing plant density. It is difficult to manage wildlife in order to achieve the desired effect on the forage resource. The Department of Game is expected to continue to feed elk in the winter which will maintain elk numbers above the natural habitat capacity. The Wenatchee National Forest contains between 10 and 20 percent of the winter range available to wildlife in this area. Livestock use, in combination with vegetation manipulation through timber harvest and some prescribed use of fire, becomes the primary tool for management of the vegetation on the Forest. Scotten (1980) notes that the scale of operations in logging and range livestock production in the west provides tremendous opportunities for improving wild ungulate habitats.

Alternatives NC and A/NFMA have 406,872 acres available for livestock grazing, and between 20,000 to 23,000 AUM's of permitted livestock use. All use will be within existing allotments. There will be 495,099 acres of suitable forage outside of existing allotments that will not be used by livestock. Palatable brush species in some habitats will grow out of reach of both wildlife and livestock within 5 to 10 years after timber harvest. There will be areas in the low elevation dry vegetative types that will not be used which may result in loss of plants needed for soil protection. This effect will be greater in decades three through five when livestock numbers are reduced. In addition, some areas such as riparian zones will be heavily utilized due to loss of fences in the last three decades. Heavy annual utilization in this zone and other concentration areas will result in loss of plants and further reduce the forage base.

Alternatives B, D, H, I and J have, respectively, 907,900, 902,753, 893,642, 898,184 and 908,200 acres available to use for livestock grazing, and there will be between 23,000 and 36,000 AUM's of permitted grazing use, depending on the decade. These alternatives have a high level of existing and potential forage and moderate to high number of livestock to use as a tool to manage the forage base. There may be some loss of forage through natural succession or lack of

utilization, particularly in the first two or three decades. By the end of the fifth decade, there will be from 41,000 to 85,000 acres of suitable forage that will not be used by livestock and permitted use will be from 800 to 4,700 AUM's below livestock grazing capacity. The brush types created by fire or silvicultural manipulation will remain available to wildlife and livestock for up to 20 years on 75 percent of the suitable forage areas, particularly in decades 3 through 5. The drier vegetative zones may have some vegetative loss in the first few decades, but management of the vegetation will reverse this trend in later decades. Structural improvements such as fences and water developments will allow regulation of use in riparian zones and intensive grazing management systems will improve vegetative composition.

Alternatives C and F have 406,872 acres available to use for livestock grazing, and between 23,000 to 24,000 AUM's of permitted livestock use. All use will be within existing allotments. There will be 495,099 acres of suitable forage areas outside of existing allotments that will not be used by livestock. Between 14,700 and 15,500 AUM's of forage available for livestock use, and not needed for wildlife or other resource protection, will not be used. Brush types will grow out of reach in non-use areas within 5 to 10 years after timber harvest, but will remain usable for 20 years in existing allotments. A few of the lower elevation dry sites, where there is no current use by livestock, may continue to lose some vegetative cover. Utilization of riparian zones, and other natural animal concentration areas within allotments, will be regulated through intensive grazing systems and related structural improvements, which will maintain or improve plant composition and densities.

Alternatives E and G have 789,085 and 850,283 acres, respectively, available to use for livestock grazing, and there will be between 23,000 and 33,500 AUM's of permitted grazing use. These alternatives have a high number of acres of existing and potential forage and a moderate number of livestock to use as a management tool. There may be some loss of forage both through natural succession and lack of utilization. By the end of the fifth decade, there will be 65,000 acres of suitable forage that will not be used by live-

stock and permitted use will be from 5,300 to 6,900 AUM's below livestock grazing capacity. Forage created through fire and silvicultural practices may remain available to grazing animals for up to 20 years on 75 percent of the suitable grazing acres. In these two alternatives, some areas will not receive grazing treatment in the first few decades and low intensity treatment in decades three through five. The overall consequence will be some loss of available forage to animals, both wildlife and livestock, in 25 percent of the manipulated acreage. In these alternatives, as in the previous ones, the lower elevation dry sites will remain in intensive management or brought under more intensive management to improve vegetative cover. Riparian zones will be intensively managed through fencing, and use will be regulated to improve plant composition and densities.

4) Effects of Timber Management, Roads and Slash Disposal on Vegetation: Forage

Vegetative manipulation through logging with the related roading and slash reduction, provide transitory forage for big-game and livestock. Roading provides more opportunity for intensive management and dispersal of livestock, which offsets the loss of vegetation on the road surface. The effect of the additional forage results in greater grazing capacity for both wildlife and livestock in alternatives which have higher development and annual timber sale quantities. Alternatives J and NC have the most developed acres and the highest programmed timber sale offering Alternatives B, I and D are next followed by H, C and A/NFMA. Alternatives G, F and E will have the least development and smallest timber program, which will result in the least amount of forage for wildlife and livestock.

b. Cumulative Effects of Each Alternative

Although direct effects on vegetation, and subsequent indirect effects on other resources, are more readily apparent when vegetation is manipulated through silvicultural practices, manipulation of forage vegetation through grazing can contribute to effects on wildlife, soil, water, and fish. Forage can be increased or decreased by both use and lack of use. Losses in forage from total non-

use occurs through successional changes which are relatively slow, while seasonal non-use (intensive grazing) can improve density and composition of plants in just a few years. Heavy continuous use of forage by wildlife and/or livestock can speed up succession toward tree cover or reverse succession toward bare ground. If plant numbers are reduced over a large area or areas, there can be cumulative effects on other resources particularly livestock, wildlife, soil, water, and fish.

Effects such as those on stream habitat integrity, sediment yields, and competition for forage between wildlife and livestock are isolated and short term. They tend to be site specific rather than cumulative. In addition less than 20 percent of the total National Forest acres are available for use by livestock in any one decade. The acres suitable for livestock are widely dispersed through many separate watersheds, which reduces the chances of effects becoming cumulative. Many of the perceived effects of livestock on soils are actually visual effects resulting from trampling and utilization of vegetation.

Alternatives NC and A/NFMA may result in some cumulative effects in decades three through five. This would be due to the possibility of extensive continuous grazing without replacement of existing fences and water developments, which will become ineffective due to age. This loss of structural improvements and continued low level of administration may result in overutilization in riparian zones. When vegetative cover is lost along streambanks over a large area, increased sediment and degraded fish habitat may occur. Because livestock tend to congregate in this zone regardless of numbers, reducing livestock numbers will not be totally effective. In addition to the effects on soil, water, and fish, Alternative A/NFMA has only 18,800 acres allocated to key wildlife habitat management areas. Some cumulative effects may be expected on big game as more forage will be available to livestock on winter range areas. This effect will be even more likely to occur in Alternative H where only 17,000 acres are allocated to wildlife habitat management and livestock numbers will increase.

There are not expected to be any cumulative effects of Alternatives B, C, D, E, F, G, I and J on forage due to the following:

- (1) The effects described above will remain short term or site specific due to intensive grazing systems and higher levels of administration.
- (2) The forage base in all alternatives exceeds the projected levels of use.
- (3) The mitigation measures described below will help to avoid or reduce these effects.

c. Alternatives' Conflicts With Other Agency Plans and Policies

The Washington State Department of Wildlife developed a plan for managing Washington's wildlife through the year 1995. The Region III plan, which includes the Wenatchee National Forest, is completed. Based on information contained in the Region III plan, the forage base available for wildlife would be adequate in all alternatives to meet the Department of Wildlife's goals for wildlife.

All alternatives would have adequate vegetative forage resource to meet livestock and big game needs in any Coordinated Resource Management plans. These plans are a joint effort by the Washington State Department of Natural Resources, the U.S. Bureau of Land Management, and the U.S. Forest Service to coordinate management and use of all resources on an area which includes State and Federal ownership.

d. Mitigation Measures for Vegetation: Forage

There are several mitigation measures which are being implemented or will be implemented, to avoid or reduce the potential adverse impacts resulting from the utilization of the forage resource.

In development of the yields in animal unit months of grazing, an allowable utilization percent was used and adjusted to provide for plant needs and cover for soil and watershed protec-

tion. Some additional reductions in utilization were applied for other environmental factors, including fisheries, wildlife, recreation, and scenery.

The Standards and Guidelines which are part of the Forest Plan contain a listing of practices which include:

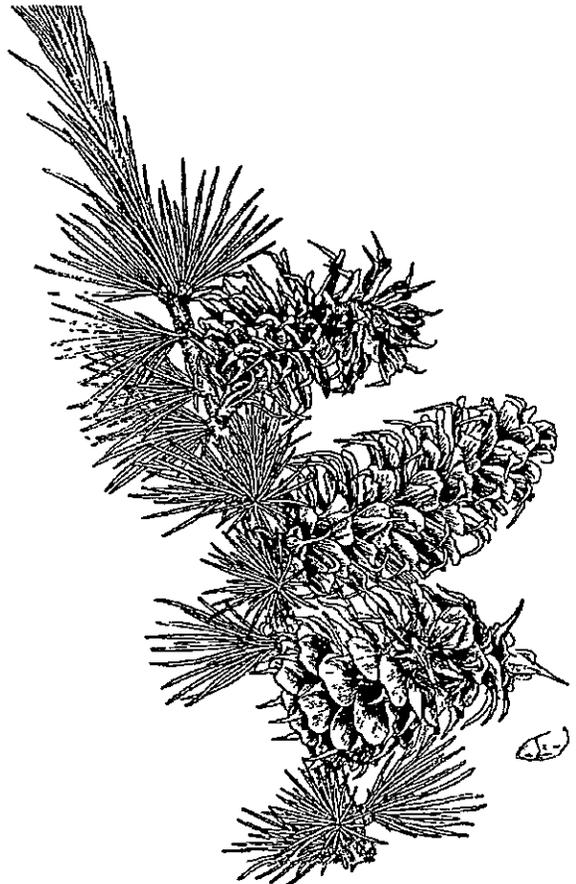
- (1) The grazing of suitable range through intensive systems will maximize the production of forage for wildlife in key wildlife areas, and for cover and watershed protection in the riparian protection zone.
- (2) Management systems will be designed to meet the highest prescribed levels of management when allotment boundaries cover more than one allocation area.
- (3) Utilization by livestock will follow established allowable use guides (see the Forest Plan), but may be adjusted to meet total resource needs.

Proper utilization and management of forage is the key to protection and enhancement of all resource values in the Forest environment. This has been studied and documented in numerous publications contained in the Journal of the Society for Range Management, and results have recently been documented in Forestland Grazing which are the proceedings of a Symposium held in 1983 at Spokane, Washington (a cooperative extension effort through Washington State University). The application of this management has been observed throughout the Forest on several range allotments. Where the integrity of a planned grazing management system is maintained through cooperation of the livestock owner, increased forage and ground cover has improved wildlife habitat as well as soil and watershed conditions.

The Forest will continue to do environmental analyses on existing range allotments in addition to new allotments and individual projects. These activities will be evaluated, using the Forest Plan Standards and Guidelines, for effects on the environment, and mitigation measures will be taken to reduce or avoid adverse impacts. The mitigation measures will include intensive man-

agement systems for controlling utilization. If the proposal would result in a significant unavoidable impact, it would be dropped or modified.

The effectiveness of the above mitigation measures may vary by alternative after the first decade. Generally the alternatives with the least amount of proposed permitted grazing use will respond more to the mitigation measures intended to reduce the adverse effects of grazing on the forage. However, because Alternatives NC and A/NFMA do not contain the funding levels to apply some of the mitigation measures, the above measures will be least effective in these two alternatives (see the discussion on NC and A/NFMA in Cumulative Effects on Vegetation: Forage). Permitted numbers will be the same in all alternatives during the first decade, so mitigation measures should respond equally for that period. After decade one, mitigation measures should produce the best results in Alternatives F, C and I, which allow the fewest number of permitted livestock. Alternatives E and G have the next fewest number of permitted livestock use. Mitigation measures may be least effective in Alternatives B, D, H and J due to the high level of permitted use in these alternatives.



**9(D) ENVIRONMENTAL
CONSEQUENCES OF THE ALTERNA-
TIVES ON UNIQUE ECOSYSTEMS**

**a. Direct and Indirect Effects of Each Alterna-
tive on Vegetation: Unique Ecosystems**

Unique ecosystems are areas that support or contain unique vegetative, ecologic or geologic attributes worthy of protection. The one existing area is the Tumwater Botanical Area on the Leavenworth Ranger District. This area is described in Chapter III.

The following 13 special interest areas are proposed for protection in some alternatives:

Camas Botanical Area - Located on the Leavenworth Ranger District in Section 32, T. 23 N., R. 18 E., and Section 4, T. 22 N., R. 18 E., this area is approximately 800 acres in size. Protection is proposed for Delphinium viridescens, Wenatchee Larkspur, which is one of two State and Federal candidates to the endangered species list.

Gene Creek Botanical Area - Located on the Entiat Ranger District in Sections 8, 17, and 20, T. 27 N., R. 20 E., this area is 1,930 acres in size. Protection is proposed for a ponderosa pine ecosystem containing old growth dependent animals and plants.

Hornet Ridge Botanical Area - Located on the Entiat Ranger District in Sections 4, 5, 6, and 10, T. 26 N., R. 19 E., this area is approximately 2,100 acres in size. Protection is proposed for the park-like stands of ponderosa pine containing old growth dependent animals and plants.

Lake Creek Botanical Area - Located on the Entiat Ranger District in Sections 27, 28, 33, and 34, T. 29 N., R. 19 E., this area is 212 acres in size. Protection is proposed for plants associated with an undisturbed wetland habitat.

Kloochman Rock Geologic Area - Located on the Naches Ranger District in Sections 4, 5, 8, and 9, T. 13 N., R. 14 E., this area is approximately 340 acres in size. Protection is proposed for a unique geologic feature.

Goose Egg Mountain Geologic Area - Located on the Naches Ranger District in Sections 31 and 32, T. 14 N., R. 14 E., and Sections 5 and 6, T. 13 N., R. 14 E., this area is approximately 635 acres in size. Protection is proposed for this unique geologic feature.

Rimrock Geologic Area - Located on the Naches Ranger District in Sections 25 and 36, T. 14 N., R. 13 E., and Sections 30 and 31, T. 14 N., R. 14 E., this area is approximately 425 acres in size. Protection is proposed for this unique geologic feature.

Blue Slide Geologic Area - Located on the Naches Ranger District in Sections 28, 29, 32, 33, and 34, T. 13 N., R. 13 E., and Section 4, T. 12 N., R. 13 E., this area is approximately 740 acres in size. Protection is proposed for this unique geologic feature.

Boulder Cave - Located on the Naches Ranger District in Section 16, T. 17 N., R. 14 E., this area is approximately 5 acres in size. Protection is proposed for this unique geologic feature and the habitat it provides for the Townsend's Big-eared bat.

Upper Naneum Meadows - Located on the Cle Elum Ranger District in Sections 1, 12 and 13, T. 21 N., R. 18 E. and Sections 7 and 18, T. 21 N., R. 19 E., this area is approximately 700 acres in size. Protection is proposed for the unique wet meadow ecosystems of this area.

Squaw Lake Area - Located on the Lake Wenatchee Ranger District in Sections 14, 15, 22 and 23, T. 27 N., R. 16 E., this area is approximately 200 acres in size. Protection is proposed for this area for its wetlands ecosystem, raptor nest habitat (bald eagle and osprey) and moose habitat.

Fish Lake Run - Located on the Lake Wenatchee Ranger District in Section 22, T. 27 N., R. 17 E., this area is approximately 150 acres in size. Protection is proposed because this is a critical riparian corridor that allows gene flow for the major riparian areas in the vicinity and also serves as unique wildlife habitat for Great Blue Heron, beaver and osprey.

Ponderosa Estates - Located on the Lake Wenatchee District in Section 24, T. 26 N., R. 17 E., this area is about 40 acres in size. Protection is proposed for this area because it is a unique transition zone between forest and non-forest and supports a number of unusual plant species including the sensitive species Cypripedium fasciculatum.

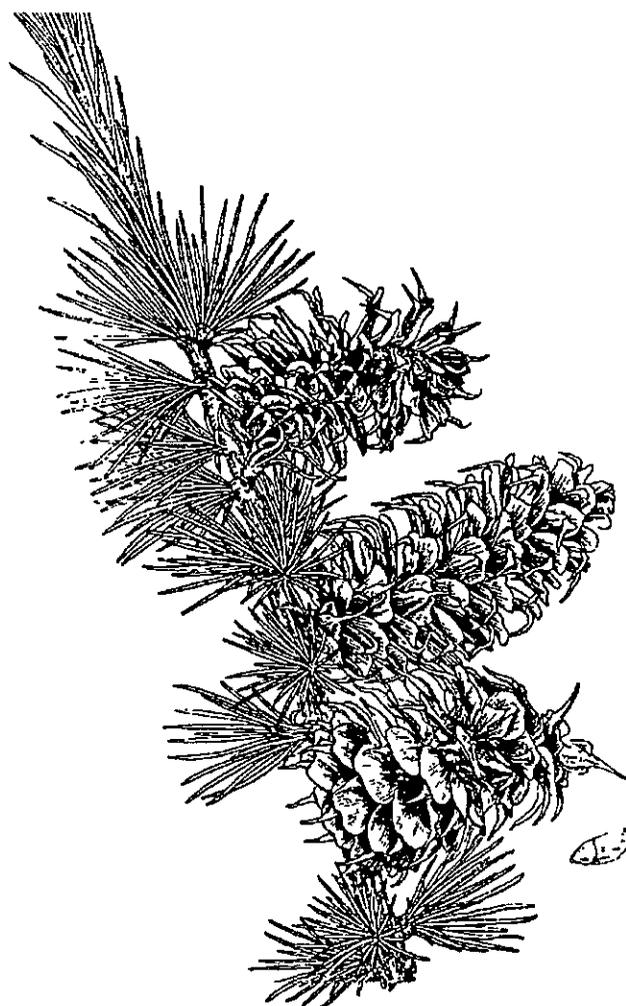
Many of the areas proposed are not subject to regular management activities regardless of the alternative. Five (Lake Creek, Camas, Upper Naneum, Squaw Lake, and Fish Lake Run) are wetland or riparian areas of noted value. Timber harvest and road building would likely avoid these areas. Five more areas (Kloochman Rock, Goose Egg, Rimrock, Blue Slide, and Boulder Cave) are being proposed for their geologic features. Many of these support little timber worth harvesting, are poor areas for locating new roads and the value for which the areas are being proposed are difficult to damage (geologic values). Some of the areas (especially Gene Creek and Hornet Ridge) do support significant merchantable timber. If not placed in a Special Interest Area prescription, these areas may be subject to timber harvest. However, Hornet Ridge may be protected by an Old Growth Forest prescription.

Mining activity, including mineral exploration, places all lands on the Forest in jeopardy at any time. This is true regardless of the alternative.

Designation of a unique ecosystem would definitely protect an area from management activities under normal circumstances. Grazing will not be allowed at all under the Special Interest Area (SI-2) designation. Any area that is not within a no-harvest prescription is subject to harvest and to some degree of risk. Generally only those attributes of an area that are vegetative or ecologic in nature can be significantly impacted by normal management activities.

In some alternatives, the above areas will be protected through allocation to the classified Special Interest management area when the adjacent management area is scheduled for vegetative manipulation. The areas may also be protected by unroaded allocations in some alternatives.

Table IV-17 shows the areas by alternative and under which alternative(s) they are proposed for protection. Areas showing an "X" in the table have a Special Interest area allocation, while areas showing an "A" are protected by an unroaded, non-vegetation manipulation prescription. In light of the above discussion, Table IV-17 provides an indication of the effects of the different alternatives on unique ecosystems and their inclusion into the Special Interest Area Management allocation. All alternatives contain the Tumwater Botanical Area under the Special Interest area allocation.



**TABLE IV-17
PROPOSED SPECIAL INTEREST AREAS BY ALTERNATIVE**

AREA	ALTERNATIVES										
	N/C	A	B	C	D	E	F	G	H	I	J
Camas							X				
Gene Creek							X				
Hornet Ridge				X		A	X	A			
Lake Creek			X	X	X	X	X	A		X	
Klouchman Rock				X			X				
Goose Egg Mt.			X	X	X		X				
Rimrock			X	X	X		X				
Blue Slide			X	X	X	A	A	A			
Upper Naneum Mdw				X		A					
Boulder Cave				X							
Squaw Lake Area				X							
Fish Lake Run				X							
Ponderosa Estates				X							

b. Cumulative Effects of Each Alternative

Each area is proposed due to its own unique feature. Not protecting the area may result in an effect on that feature, however, the effect would not be cumulative.

There are no cumulative effects of alternatives on Unique Ecosystems.

c. Alternatives' Conflicts with Other Agency Plans and Policies

There are no conflicts between the effects of the alternatives and other plans for Unique Ecosystems.

d. Mitigation Measures for Unique Ecosystems

The Standards and Guidelines which are part of the Forest Plan contain a listing of practices for the Unique Ecosystems which include:

- 1) Do not encourage recreation use and prohibit use if damaging to the area.
- 2) Fence as needed to exclude livestock.
- 3) No timber practice.
- 4) Exclude transportation and utility corridors.
- 5) Recommend withdrawal from mining and mineral leasing.
- 6) No roads will be constructed except reasonable access will be granted to landlocked inholders.
- 7) Use appropriate fire suppression strategy.

These measures should be equally effective in all alternatives in which the unique ecosystems are proposed for Special Interest Area designation

9(E) ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON VEGETATION: SENSITIVE PLANTS

a. Direct and Indirect Effects of Each Alternative on Vegetation: Sensitive Plants

Sensitive plants are protected by Forest Service policy under all alternatives. Biological evaluations are required for all ground-disturbing activities. These evaluations usually require on-the-ground surveys to locate sensitive plant species so that impacts can be avoided. However, as the number of ground-disturbing activities increase, the chance that a survey will miss a sensitive species increases, resulting in higher risk of unplanned impacts.

Effects of management activities on sensitive plants may also significantly affect biodiversity. Sensitive species are a component of biodiversity, and are limited in abundance and distribution. Consequently, the maintenance of sensitive plants is important to the maintenance of diversity.

1) Effects of Recreation on Vegetation: Sensitive Plants

Recreational use on the Wenatchee National Forest is ever increasing. Greater numbers of people on the landscape, and the development of campgrounds and access roads to accommodate the increase in numbers, will result in direct modification of the vegetation. This will produce greater risk of detrimental impacts to sensitive plants or their habitat.

Detrimental impacts to sensitive plants will result from trampling, compaction and vehicular use. Noxious weeds will increase because of both disturbance and introduction of weed seeds. Many of the impacts to sensitive species will be inadvertent. However, there probably will be deliberate collections by those who want either a live or pressed specimen for their personal use.

Forest-wide standards and guidelines for old growth and diversity, and policy for sensitive plants are designed to maintain adequate amounts of old growth and sensitive species for their own intrinsic values and as components of biological diversity. Increased recreational use will increase the risk of detrimental impacts to vegetation.

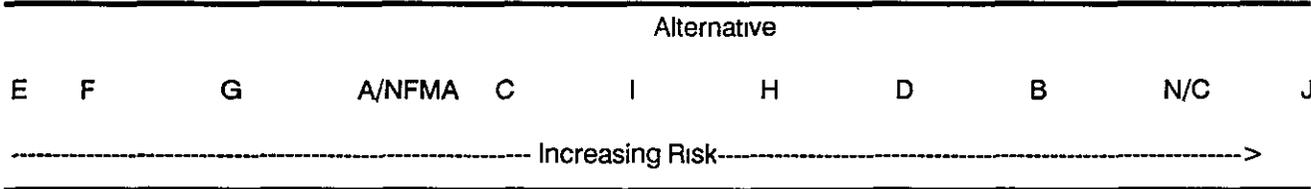
Semi-primitive recreation probably results in the least risk to sensitive plants, as impacts are fairly restricted in nature. As more land is allocated to developed and roaded recreation, however, the risk of substantive adverse impacts increases.

Alternatives with the most acres in non-motorized, semi-primitive allocations such as E (320,038 acres) and F (259,088 acres) would result in the least potential risk for adverse impacts to sensitive plants from recreation. Alternatives C and I (116,092 acres) and G (100,362 acres) would have somewhat greater risk of damage to sensitive plants than E and F, while alternatives with the least land allocated to semi-primitive, unroaded allocations (B, D, J, H, A/NFMA and NC) would have the greatest potential risk of adverse impacts to sensitive plants. Of all the alternatives, NC would pose the greatest risk because motorized recreational use is more widespread than in any other alternative.

2) Effects of Timber Management on Vegetation: Sensitive Plants

Please refer to the "Effects of Timber Management on Vegetation: Old Growth" for a general discussion of the types of activities related to timber management and the general effects that these activities have.

The predicted risk of impacts to sensitive species by alternative is shown below and reflects the effects of timber management, based on harvest levels.



3) Effects of Range Management on Vegetation: Sensitive Plants

It is difficult to assess the effects of the range management program on sensitive plants because so little is known about the ecological requirements of the species. Obviously, sensitive species that occupy springs and seeps where livestock come for water may be trampled out by the heavy use in the area. However, some sensitive species on the Forest appear to have undergone tremendous past livestock pressure and still survive. In fact, grazing may actually enhance some species. However, it is reasonable to assume that grazing, especially heavy grazing, is detrimental to most sensitive species. Extremely palatable sensitive species are searched out by livestock and may face adverse impacts from grazing. In the first two decades there is no significant difference between the alternatives. By the fifth decade, Alternatives B, D, E, G, H, I and J would have heavier grazing use than the other alternatives and consequently more damage to sensitive species would be expected in these alternatives.

4) Effects of Mineral Activity on Vegetation: Sensitive Plants

Like road construction, mining type activities often result in movement of earth and direct habitat modification that can be severe in nature. Those activities with the most influence on sensitive plants will be access road construction, mineral extraction and processing, waste disposal, increases in human use and reclamation activities. Generally, claimants holding a valid mining claim have a statutory right to mine, and this right *supersedes law and policy that protect vegetation from modification or destruction*. The extent of the effects of mineral activities on sensitive plants cannot be determined until the location, type and timing of the proposed activity is known. As a consequence, the specific effects that mining would have on vegetation resources and the differences in these effects by alternative cannot be estimated.

5) Effects of Roads on Vegetation: Sensitive Species

The increase in noxious weeds, increased access, changes in site hydrology and direct plant or habitat destruction are the greatest impacts of

roading to sensitive plant populations. Most of these effects cause vegetation change to some degree.

Although biological evaluations are completed for road right-of-ways, an increase in roading increases the risk of accidental destruction of sensitive species. These impacts would normally result from direct destruction of plants or their habitat or through changes in site hydrology. Indirect impacts of roads include an increase in habitat for pioneer species and for species that prefer ravelly type road-cut sites, including noxious weeds. Other indirect effects are increased access and traffic, leading to higher use levels and corridors for noxious weed increase.

The risk of impacts from roads in an alternative is directly related to the amount of roading. Alternative NC has the most roads followed by Alternatives J and B. These alternatives would have the highest risk of adverse impacts. Alternatives E and F construct the least number of new roads and have the least relative potential for adverse impacts. Table II-3a in Chapter II displays the miles of new road construction by alternative.

b. Cumulative Effects of Each Alternative

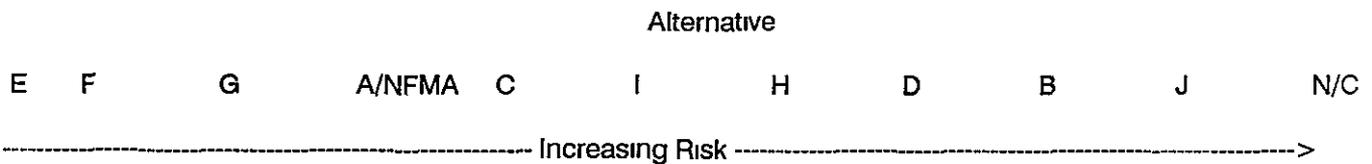
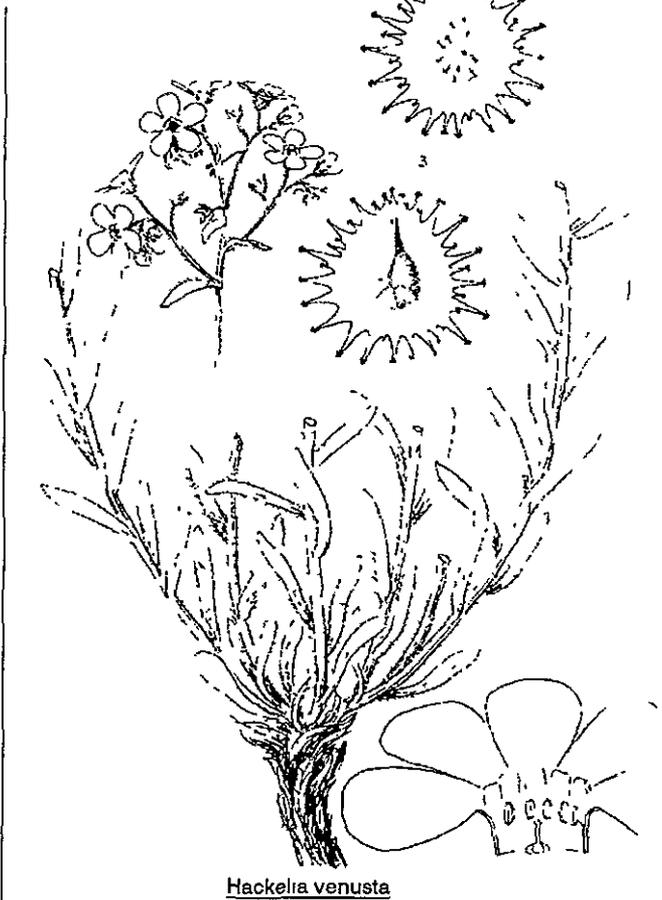
All alternatives will reduce the "natural" character of the vegetation through timber harvest, roading, recreational use and the myriad of other activities associated with the multiple use of National Forest System lands. The rate at which these modifications occur and the risk of error are what change by alternative. Cumulative effects are also the result of activities on lands owned by other parties. This section will discuss the effects of various activities on vegetation attributes regardless of ownership.

Currently, private and state owned lands reflect management activities that are highly commodity oriented. Consequently, in areas of intermixed ownership, the cumulative effects and risk of Forest Service alternatives that are also commodity oriented becomes very high. Forest Service lands become the critical links in the maintenance of sensitive plants.

Alternatives E, F, and G will have the greatest maintenance of the natural character of the landscape over time. Indirectly, however, the influence of insects, disease and fire may result in major cumulative effects on vegetation attributes, perhaps producing even greater cumulative effects than the more commodity oriented alternatives. With fire suppression activities, fuels will build up to unnatural levels, increasing the fire hazard. Higher than natural amounts of residue may also result in higher incidence of insects and disease. It will be very difficult to maintain the natural character of the stands over time, considering that the fire, insect and disease outbreaks will be the result of unnatural circumstances.

Rarer vegetation attributes like sensitive plants and old growth (and diversity of which these two attributes are a part) should (at least in the short term) be adequately maintained and/or the risk of error should be fairly low, since policy and law require their maintenance.

Considering all of the effects of activities on sensitive plants the predicted cumulative risk rating by alternative is shown below:



Alternatives A/NFMA, C, I and H will have intermediate levels of timber harvest and roading so that the cumulative effects of these types of activities should be more than in Alternatives E, F and G, but less than the high commodity Alternatives D, B and J. The indirect effects on vegetation attributes of increased fire intensity and insect and disease outbreaks in the mid-range alternatives should be somewhat less than in Alternatives E, F and G.

c. Alternatives' Conflicts with Other Agency Plans and Policies

No conflicts are anticipated between the effects of the alternatives and other agency plans and policies.

d. Mitigation Measures for Vegetation: Sensitive Plants

There are a number of mitigation measures incorporated into the Forest Plan for the maintenance of sensitive plants. Any mitigation measures in the Plan are applicable to all alternatives except NC. Measures required by law and policy are universally applicable. Mitigation measures applicable to all Forest Service activities are primarily addressed through land allocations, standards and guidelines and capital investments. Laws and Forest Service policy are also, to some extent, mitigation measures.

Generally, mitigation measures that are used for vegetative attributes of limited abundance such as sensitive plants (or old growth) are those that: 1. Avoid impact by not taking a certain action or parts of an action; 2. Minimize impacts by limiting the degree or magnitude of the action and its implementation or; 3. Reduce or eliminate the impact by preservation and maintenance operations during the life of the action. Repairing, rehabilitating or restoring the affected environment or compensating for the impact by replacing or providing substitute resources or environments are generally not effective means of mitigation for sensitive plants. Finally, Forest Service policy provides management requirements for the maintenance of sensitive plants.

9(F) ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON VEGETATION: RESEARCH NATURAL AREAS

a. Direct and Indirect Effects of Each Alternative on Vegetation: Research Natural Areas

Research Natural Areas (RNA's) are representative ecosystems where natural processes dominate. They are areas set aside for research, preservation of gene pools for sensitive plants and preservation of "typical" communities to serve as a baseline for management activities. Management is allowed only when needed to preserve the attributes for which the RNA was established. The two existing RNA's, Meeks Table and Thompson Clover, are described in Chapter III. Four new RNA's, in addition to the two already formally proposed, are listed in Table IV-18.

Alternatives B through G and I would recommend the establishment of four new Research Natural Areas. In addition, the two RNA's that are already formally proposed will remain in all alternatives.

Forest Service policy is to support the Research Natural Area program. Areas that fill needed cells in the system that are brought to the attention of the Forest by the Pacific Northwest Research Natural Area Committee are recommended for RNA designation. The Forest follows the recommendation of the Research Natural Area Committee.

Alternatives B through G fully support the maintenance of the RNA network on the Wenatchee as recommended by the Research Natural Area Committee. Alternatives N/C, A/NFMA, H and J only partially support the recommended RNA network, with four recommended areas not being proposed. For these four areas, the consequences are that vegetation manipulation (for any management purpose) or site destruction by roading may irreversibly preclude the selection of some of these areas for RNAs in the future. However, with our policy of supporting the RNA committee recommendations, further recommendation of potential RNAs would be ongoing and lead to amendment of the Forest Plan at any time to fill needed cells in the RNA system.

Alternatives that have greater amounts of ground-disturbing activities and vegetation manipulation may result in needed cells, whose existence are at this time unknown, being lost to management activity.

**TABLE IV-18
PROPOSED RESEARCH NATURAL AREAS BY ALTERNATIVE**

	ALTERNATIVES										
	N/C	A	B	C	D	E	F	G	H	I	J
1. Cedar Creek 1/			X	X	X	X	X	X		X	
2. Icicle/Frosty 1/			X	X	X	X	X	X		X	
3. Chiwaukum Creek 1/			X	X	X	X	X	X		X	
4. Drop Creek			X	X	X	X	X	X		X	
5. Fish Lake Bog 2/	X	X	X	X	X	X	X	X	X	X	X
6. El Dorado Creek 2/	X	X	X	X	X	X	X	X	X	X	X

1/ Within Wilderness
2/ Formally Proposed RNA

Three of the proposed RNA's are within wilderness. The effects of the alternatives would not vary in the wilderness and are not significant. Wilderness would have priority over non-manipulative research.

The proposed new RNA (Drop Creek) is located on Table Mountain. The effects of the alternatives on this proposed RNA would be related to the management area(s) that surround it as follows:

**TABLE IV-19
EFFECTS ON DROP CREEK PROPOSED RNA**

Alternative	ALTERNATIVES										
	N/C	A	B	C	D	E	F	G	H	I	J
Management Area(s) Bordering the RNA	N/A	N/A	RM-1	EW-1 ST-2	RM-1	ST-2	ST-2	EW-1 ST-2	N/A	EW-1 ST-2	N/A

N/A = Not Applicable

Alternatives A/NFMA, H, N/C and J would not make any new RNA proposals, and the Drop Creek Area would be designated as EW-1, Big Game Habitat. Alternatives C, G, and I have EW-1 (Deer and Elk Habitat) and ST-1 (Scenic Travel Retention) management areas adjacent to the RNA's. Both of these management areas allow timber harvest and livestock grazing but no harvest or grazing is allowed in the RNA. Alternatives B and D have RM-1 (Intensive Range) management areas adjacent to the RNA, however, grazing by livestock is not allowed in the RNA. The RE-2a (Unroaded Non-motorized)

management area in Alternatives E and F allow grazing also, but none will be allowed in the RNA's. The integrity of the new proposals for Research Natural Areas will be maintained in all alternatives except A/NFMA, H, N/C and J. That does not necessarily mean that these areas will be lost to the system. A later proposal by the Research Natural Committee or the Forest could result in these areas being proposed again in the selected alternative and the plan amended.

b. Cumulative Effects of Each Alternative

In every alternative, all RNAs are protected either by allocation as Research Natural Areas, or by their location within wilderness, with the exception of Drop Creek. The fact that Drop Creek, which is outside wilderness, is not protected in Alternatives NC, A/NFMA and H may result in a loss of the area as an RNA. However, the effect is direct and specific, not cumulative.

There are no cumulative effects of alternatives on Research Natural Areas.

c. Alternatives' Conflicts with Other Agency Plans and Policies

There are no conflicts between the effects of the alternatives and others' plans for Research Natural Areas. All alternatives contain areas formally proposed by the Research Natural Area Committee for the Pacific Northwest.

d. Mitigation Measures for Vegetation: Research Natural Areas

The Standards and Guidelines which are part of the Forest Plan contain a listing of practices which include:

- 1) Do not encourage recreation use and prohibit use if damaging to the area.
- 2) Fence as needed to exclude livestock.
- 3) No timber practice.
- 4) Exclude transportation and utility corridors.
- 5) Recommend withdrawal from mining and mineral leasing.
- 6) No roads will be constructed except reasonable access will be granted to landlocked in-holders.
- 7) Use appropriate fire suppression strategy.

These measures should be equally effective in all alternatives in which Research Natural Areas are proposed.

10. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON SOIL AND WATER

A primary objective of forest managers is to maintain soil productivity, water quality and the hydrologic balance of watershed systems. The intent of all alternatives is to manage watersheds to minimize the loss of soil productivity and to provide riparian area, stream channel and water quality conditions that would protect beneficial uses of water. Measures to achieve this intent, through preventive and mitigative measures, would be built into every alternative as Standards and Guidelines.

The following sections disclose the potential direct, indirect and cumulative effects of various allocations or management activities on soil and water resources. Descriptions are based on the analysis of those activities which have the greatest potential for effects on soil and water. Comparisons between alternatives are based on the relative amount of risk or benefit to soil and water resources from the management proposed in each alternative. Risk assessment is based on: (1) probable impact of implementation, including mitigation, (2) possible errors leading to inadequate project design, and (3) likelihood of administrative errors leading to inadequate implementation.

The cumulative effects section utilizes information from Tables F-1 through F-8 in the FEIS, Appendix F. These tables list the Forest's 25 major watersheds, providing information by alternative on the acreage in each watershed in private ownership, wilderness, National Forest lands subject to timber harvest, and unharvestable land. The cumulative effects section provides more information on long-term trends in watershed condition and a summary of the risk to soil and water resources for the various alternatives by watershed. A discussion of potential mitigation measures follows the narrative on the effects of alternatives.

Fish habitat is recognized as one of the most sensitive beneficial uses of water and as a primary indicator of watershed condition. The section in this chapter that discloses the effects of management activities on fish habitat compliments this soil and water narrative.

a. Direct and Indirect Effects of Each Alternative on Soil and Water

1) Effects of Developed Recreation on Soil and Water

The concentration of human activity at developed recreation facilities and their surrounding areas can adversely affect soil and water resources at these sites. Since most existing and potential developed sites are located within or adjacent to riparian areas, adverse impacts on riparian ecosystems and water quality can result.

Potential effects of developed recreation include total soil resource commitment to facilities, other reductions in soil productivity due to compaction, displacement, and erosion, increased sedimentation; reduced vegetative and other soil cover, collapsed stream banks and degraded shorelines. Microbial water pollution can occur from uncontrolled waste disposal. The potential for petroleum pollution also exists from use of vehicles and power boats. Some sites may show significant resource damage from a combination of overuse, improper camping techniques and insufficient maintenance. On a Forest-wide scale, these effects are localized and generally minor. Refer to the section on roads for a discussion of delivered sediment from recreation activities by alternative

Acres allocated to developed recreation provide an indication of the potential for impacts to soil and water resources from developed recreation. Alternatives E, H and A/NFMA would provide the lowest risk of adverse impacts to soil and water resources as a result of the lowest number of acres allocated to developed recreation (4,500 acres). Alternatives C and I would be next (6,000 acres), followed by Alternatives F (7,500 acres) and G (7,900 acres). Alternatives NC, B, D and J would provide the highest risk of adverse impacts to soil and water resources due to development and expansion of recreation facilities, with 8,200 to 8,500 acres in this allocation.

2) Effects of Dispersed Recreation on Soil and Water

Dispersed recreation decreases the risk of damage to soil and water resources from human-related causes compared to areas designated for developed recreation development. Effects of dispersed recreation activities on soil and water resources can include soil resource commitment, soil compaction, soil displacement, damage to vegetation, and increased erosion and sedimentation. Campsites and trails may show significant resource damage given a combination of overuse, improper camping techniques and insufficient control and maintenance, especially in riparian areas. The impact of horse and foot traffic in wet or other sensitive areas is common. Livestock usage and/or improper human sanitation can lead to increases in microbial contamination of streams and lakes.

Alternatives with the most acres in non-motorized, unroaded (semi-primitive) allocations, such as Alternative E (320,000 acres) and Alternative F (259,000 acres) would have the least potential for adverse impacts to soil and water resources from recreation. Alternatives C and I (116,092 acres) and G (100,362 acres) would provide appreciably more risk, followed by Alternatives B and D (84,400 acres), Alternative J (79,500 acres), Alternatives H and A/NFMA (59,500 acres) and Alternative NC (no acreage figures available). Alternative NC would pose the greatest risk because Forest-wide riparian standards would not apply.

3) Effects of Wild and Scenic River Recommendations on Soil and Water

Wild and Scenic River recommendation increases the probability that watershed conditions within study corridors would not be degraded during future planning. Natural riparian area and stream functions would receive the most protection under the development restrictions for the Wild River designation. These processes would receive somewhat less protection under the Scenic designation, with the Recreational designation allowing the most development

Wild and Scenic River designation would provide the most protection to fish habitat under Alternatives C, E, F, H and I as these alternatives allocate the most land to Wild, Scenic and Recreational River management and also have the most acreage managed as Wild River. Alternatives A/ NFMA and G allocate less land to Wild, Scenic, and Recreational River management, so they would provide somewhat less opportunity for protection of natural stream processes. Alternatives B, D, J and NC with no streams recommended would provide no additional protection to any streams.

4) Effects of Wildlife Habitat Improvement Projects on Soil and Water

The effects of planned ignitions for wildlife habitat improvement include stimulation of vegetative communities and reductions in catastrophic fire hazard. Burning for wildlife habitat improvement is addressed in the section on Fire Management effects.

Differences between alternatives for other wildlife related revegetation projects are not significant. The types of seeding/planting practices typically employed in revegetation projects for wildlife habitat improvement generally pose little risk of impacts to soil and water resources, while benefits occur from increases in soil cover.

5) Effects of Fish Habitat Improvement Projects on Soil and Water

The intent of the fish habitat improvement program is to improve riparian and in-stream habitat conditions. However, risk of damage to soil and water resources from fish habitat improvement projects exists for all alternatives. Damage to riparian areas and stream channels may result from administrative error and poorly planned or implemented projects in these sensitive locations.

Some fish habitat improvement projects would produce short-term localized increases in sediment. Certain practices may temporarily destabilize sections of stream channels. Improvements in streamside vegetation, pools and resting areas and the subsequent improved cover and reduced stream temperatures would provide long-term positive effects in the watershed.

6) Effects of Timber Management on Soil and Water

Timber harvest can have a significant effect on watershed conditions. The extent of the effect is dependent on the location, intensity and timing of harvest, and the specific methods of treatment. Effects can include commitment of the soil resource, other soil productivity reductions due to compaction, displacement, puddling, erosion and loss of nutrients, increased sedimentation, alteration of the water balance in cutover areas, and disturbance of riparian areas and stream channels.

There are many different soils on this Forest, with some being very sensitive to soil compaction. Still others may be sensitive to some other impact such as erosion, or displacement, etc. Some of the soils on the Forest are subject to mass failures, whereas others exhibit a high degree of stability. Soil types can change drastically within short distances, and it is important to determine soil conditions on a site-by-site basis.

Tractor logging costs are usually much lower than the costs for other kinds of systems, so they usually become the preferred system wherever possible. Tractor logging can cause unacceptable soil displacement, soil compaction, and puddling. Machine piling of logging slash can aggravate these effects to the soil resource. In addition, nutrients may be lost by removal of the surface layer (the "A" horizon), or by burning the organic residue in a very hot fire. Furthermore, tractor skid trails can cause runoff water to concentrate and increase in velocity, and thereby increase the risk of soil erosion if they are not properly treated.

Soil properties and characteristics can affect timber management activities. Some soils become slippery and sticky when wet, so they may affect the operating season or the choice of equipment, which then indirectly affects logging costs. Other soils are unstable and are subject to mass failures. These may affect the roadability or the cost of the operation. Some soils are easily compacted when the moisture conditions are just right, so they would affect the selection of equipment as well as the operating season. Some soils are excessively well drained and are well suited for winter logging because they resist compaction, are non-sticky or slippery, and often occur on gentle slopes.

Timber management activities most often have some degree of impact upon the soil resource. It is important to minimize the impacts whenever possible because most of the effects to soils are long-term. In addition, soil rehabilitation treatments for these effects are often very expensive and seldom are totally effective.

Timber harvest can cause potentially significant effects on stream channels. Changes in water yield, timing, and disturbance of the riparian vegetation can upset the dynamic equilibrium through which channel systems have evolved. Specific effects can include such factors as accelerated sedimentation, loss of streambank structure, alteration of water temperature, alteration of woody debris cycling, and spills of petroleum products. The potential impact on the channel network in subdrainages requires site specific analysis, especially when intermingled ownerships are involved (private lands, state land and other federal lands).

The following sections concentrate on the following factors in a comparison of the proposed alternatives: (1) areal extent and intensity of proposed treatment; (2) harvest in riparian management areas; and (3) potential changes in water yield. Refer to the section on roads for a discussion of delivered sediment from timber harvest and related road construction by alternative.

a. Areal Extent and Intensity of Proposed Treatment

The number of acres managed for timber production and the intensity of proposed management provide an indication of potential impact to soil and water resources. Higher risks are associated with those alternatives that require more acres allocated to intensive timber management.

Alternative NC would continue timber management activities as prescribed in the old timber management plans. Protection measures would include only those practices necessary to meet minimum conditions of the Washington State Forest Practice Rules. The Forest-wide Riparian Standards in the Plan are more restrictive than the State Forest Practice rules, but they would not

apply to this alternative. Therefore, Alternative NC would have the highest risk of not meeting watershed management objectives.

Out of the approximately 791,899 suitable acres available for timber management land allocations for the Forest Plan, Alternatives B and J harvest the most timber. They also have the most land allocated to General Forest (approximately 77 percent) and therefore exhibit a relatively high risk of adverse impacts to soil and water resources from timber harvest. Alternative D also has 77 percent of the land allocated to timber management, but the harvest rate is slower and therefore would have somewhat less risk than Alternatives B and J. Alternatives A/NFMA, C, H, and I have a relatively moderate risk of adverse impacts, with approximately 49 percent allocated to General Forest. Of these four, Alternative I would have somewhat higher risk because it is a departure alternative and would enter more acres in the first decade. Finally, Alternatives E, F, and G carry the least risk with 19 percent, 26 percent and 28 percent respectively of the available land allocated to timber production.

b. Harvest in Riparian Management Areas

Potential effects to riparian areas from timber management include soil productivity losses due to commitment of soil resource, compaction, displacement, erosion, increased sedimentation, damage to vegetation, disruption of debris cycling, changes in water temperature, disturbance of streambanks and chemical contamination. Harvest on these acres may have beneficial effects on riparian succession when conducted to reduce excessive fuel loading resulting from long-term fire suppression or to meet other watershed or fish habitat objectives.

The number of acres in the riparian prescription (EW-2) provides an indication of the potential for direct impacts to soil and water resources in these sensitive areas. Alternatives E and F would pose the least risk of damage to soil and water resources from timber management activities, with 38,012 and 40,832 acres allocated to the riparian prescription. Alternative G would be next since it allocates 47,573 acres to the prescription and contains less risk of management conflicts result-

ing from harvest in adjacent upland areas due to the lower yield. Alternatives C and I would be next (47,361 acres), but with Alternative I having a higher risk due to the management intensity of this departure alternative. Alternatives H (52,301), J (52,470 acres) and A/NFMA (53,849 acres) would be next, with Alternatives D and B (58,046) posing the most risk to soil and water resources due to timber harvest activities within riparian areas.

Timber harvest in stands adjacent to riparian areas pose a risk to soil and water resources within these zones. For example, blowdown potential may increase in shallow-rooted riparian stands if large openings are created in adjacent areas. The desire to treat potential insect and disease sources in riparian stands would increase proportionally to the management intensity on adjacent lands. The risks associated with these kinds of potential conflicts are proportional to the increase in treated acres by alternative.

c. Potential Changes in Water Yield

The primary source of streamflow on the east side of the Cascades is the winter snowpack. Streamflow is characterized by great seasonal fluctuations, being abundant and flashy in the spring and diminishing rapidly to near base flow levels during the summer. Water yield management is, therefore, related to management of the snowpack (USFS, 1978).

Numerous research and administrative studies have been completed on small watersheds (generally less than 100 acres) in which streamflow has been evaluated both before and after timber harvest. The general conclusion is that temporary on-site increases in annual and summer flows normally occur. Increases in annual and low flows are greatest in moist environments and least in arid areas. When the extra water contributed from newly harvested areas is added to the vast areas yielding water at background level, the increase in water yield becomes insignificant. While initial on-site increases may be substantial, they are generally too small (less than 5 percent) to be measureable in larger watersheds downstream, where only one to two percent of the area is harvested annually. This is due to vegetation regrowth in harvested areas.

The magnitude of the increase depends on a number of factors including the vegetation type, total area harvested, the silvicultural treatment applied (e.g., percent of crown removed), soils, geology, topography and climatic factors. Water yield can generally be expected to increase proportionally with increases in the area logged or crown removed. Increases are due mainly to reduced interception, decreased evapotranspiration, increased snow accumulations on cutover areas, and more efficient conversion of the snowpack to streamflow. The magnitude and duration of these increases in discharge, which generally occur during spring runoff, may affect the stability and integrity of stream channels.

Research has shown that water yield increases from timber harvest may persist from 5 to 30 or more years. However, the magnitude of the water yield increase from a cutover area is gradually diminished each year as revegetation occurs, eventually returning to preharvest levels.

A positive result of timber harvest is the increase in stream flow during the critical summer months. Although the increased flow in the summer period is small, the greatest percentage increase occurs during the summer. Current research suggests that the duration of increase for low summer stream flows is shorter, perhaps only five years, even though the increase in total annual yield may persist for up to 25 years or longer. Actual realization of this increase may be affected by downstream masking of flows as well as management practices downstream that degrade riparian conditions and lower water tables.

Research also indicates that the effects of timber harvest on peak flows are inconclusive. Even though peak flows may be increased by harvest on the immediate small watershed, this effect is rapidly diminished downstream as the flows of many tributaries combine with the main stream (Bethlahmy, 1972). Maximum floods on the main stream result from the synchronization of the flood peaks from its tributaries. Therefore, partial clearcutting of a watershed may reduce the magnitude of peaks when snowmelt from clearcut areas is not synchronized with slower melt from forested tributaries of the watershed. Conversely, the opposite may occur if synchronization is

enhanced. Sufficient knowledge is presently available to make it possible to cut timber with no aggravation of peak flows or possibly a reduction of peak flows. This may be accomplished by designing the timber harvesting program (area, size, aspect, elevation, etc.) to maximize the diversity of snowmelt on the various components of a watershed, and to reduce the chance of synchronized peak flows from tributaries of the watershed (USDA, 1978).

When soils are saturated, the magnitude of larger peak flows will normally be similar with or without timber harvest and roads (Wright, 1985). However, in the less frequent "rain-on-snow" events, harvested areas may contribute to increased peaks. A major storm event, coupled with a heavy snowpack at the mid to lower elevations, may produce higher peak flows which increase the potential for both hillslope and channel erosion. The drainage size will normally influence and normalize the peak flows to the extent that downstream values and structures are not placed at risk.

The potential increases in annual water yield over existing yields by alternative are shown in Chapter II in Table II-3a. These values are intended to be used for relative comparison between alternatives and should not be taken as absolute numbers. All alternatives would increase water yield over existing conditions at varying amounts that reflect differing harvest levels.

The magnitude of estimated yield increases provides an indication of the potential for the occurrence of adverse impacts to soil and water resources. Over the first five decades, Alternative J would pose the most risk, followed by Alternative B and NC. Alternatives H, D, C, I, and A/NFMA would pose moderate levels of risk. Alternatives G, F and E would pose the least risk of adverse impacts to soil and water resources due to alterations in water yield.

In all alternatives, the magnitude of the increase would fluctuate significantly from year to year due to natural conditions. When the annual yield increase by alternative is compared to the Forest's annual background runoff, the increase appears insignificant because it is "masked" by the large annual runoff figure. The additional water pro-

duced by the removal of forest vegetation during timber harvest for all alternatives varies less than 1 percent when compared to the Forest's background annual runoff of 4,455,000 acre feet. Therefore, the consequences of increased water yield need to be evaluated on a watershed basis. In a small watershed heavily impacted by timber harvest, stream channel erosion and degradation could occur. On a site-specific basis, potential increases in water yield will probably not affect stream channel morphology as long as timber harvests are not concentrated in any one drainage over time and space.

Public concern exists for the potential for the cumulative effect of management activities on water yield from several standpoints, such as: (1) quantity of flow available through augmentation and storage, (2) channel stability impacts from variations in peakflows, (3) maintenance of low flows for channel maintenance and fish habitat, and (4) maintenance of low flows for irrigation. These issues are affected by a large number of interrelated factors such as annual and long-term trends in precipitation, evapotranspiration, groundwater movement, stream channel and riparian conditions, irrigation withdrawals, storage facilities, land use practices and water conservation efforts.

Protection of water resources is a primary responsibility of the USDA Forest Service. In this regard, maintenance of water quality and a favorable streamflow regime are high priority goals. Direct augmentation of streamflows is not a primary goal of the Forest Service. Increases in water quantity may result from some forest management activities; however, concern over the protection of water quality and streamflow regime would be paramount. The Forest Service is only one of the many organizations involved in water yield management. The Forest will fulfill its role in this effort through more site specific analysis of the cumulative effects issue at the project level. However, the responsibility for basin-wide management of the water resource is shared by all landowners.

7) Effects of Range Management on Soil and Water

The effects of grazing depend on the intensity, duration and season of use and on soil and site sensitivity. The two categories of effects include: (1) the effects of the animals (both wildlife and domestic stock) as they graze, and (2) the effects of the structural and nonstructural improvements constructed to manage livestock.

Grazing animals consume varying amounts of water and vegetation (grasses, forbs, and shrubs), and alter plant communities. Soil displacement and compaction combined with a reduction in ground cover can create bare soil areas. Effects of grazing may be localized, such as compaction around water developments, salt licks, major travel routes, and along fences. More widespread effects are evident from concentrations of animals in dry meadows, riparian areas, and other favorable sites near water and shade.

Some site-specific impacts to riparian management areas from grazing would occur under all alternatives. Heavy grazing in riparian areas can reduce or modify plant species composition, structure, abundance, and plant vigor. Soils in riparian areas open to grazing are especially susceptible to puddling, compaction and erosion due to livestock concentrations. Alteration of channel morphology (width/depth) results from trampling and bank cave-ins as stock seek access to and across streams. Additional effects include increased sedimentation, a decrease in stream-bank habitat, reduced streamside cover and shading, altered stream temperatures, nutrient loading and microbial pollution. These effects can be lessened by mitigation identified through increased administration and coordination with other resources.

Structural range improvements include construction of fences, water developments, corrals and cattleguards. These activities have local, site-specific effects on soil physical properties and conditions (compaction, displacement, erosion). A total soil resource commitment is made in areas such as corrals and water developments.

Nonstructural range improvements include grass seeding, fertilizing, discing, burning, and noxious weed control. Nonstructural activities can affect soil physical, chemical and biological properties. Minor and temporary effects would occur under all alternatives. Exposure of bare soil for short periods of time would cause some soil loss. If intense rainstorms occur at this time, soil erosion would occur. Successful treatment, however, allows grasses and other vegetation to rapidly occupy the sites and mitigate impacts to soil and water resources.

Under all alternatives, permitted use in the first decade would remain at the present level (23,000 AUM's). Beyond the first decade, Alternatives A/NFMA and NC include progressive reductions in expected grazing use. Alternative NC would not meet legal requirements since, for example, standards designed to protect riparian habitat are not included in the alternative. Reductions in use in Alternative A/NFMA may result in improvements in watershed condition in some areas, however, lack of control due to loss of fences after the second decade may result in increased compaction and puddling of soils.

Alternatives B, D, E, G, H, I and J would allow an increase in grazing over more acres, between approximately 400,000 and 450,000 acres. These alternatives would increase the risk of impacts to soil and water resources, but due to increased range administration funds needed for implementation, these alternatives may actually be less risky than Alternative A/NFMA.

Alternatives C and F pose the least risk of impacts to soil and water resources, as the number of acres allocated to grazing would remain the same as the current situation. There would also be little or no increase in permitted use over the life of the Plan.

All alternatives contain risk of damage to riparian management areas and other concentration sites from dispersed recreation use, especially from private and commercial stock use.

8) Effects of Forest Pest Management on Soil and Water

Alternatives rank the same as discussed under the effects of fire, timber, and range management for the effects of forest pest management. Increased livestock grazing or timber management might lead to increased need for pest control measures. Decreases in acres of prescribed fire may lead to increases in the need for pest control measures.

The physical, chemical and biological measures used in Forest pest management have a wide range of effects. The effects of timber harvest (salvage) are addressed under the section on timber management. The use of chemical biocides can have both direct and indirect effects such as direct toxicity on non-target species and bioaccumulation, including the potential degradation of domestic water supplies. Biological control measures pose the least risk of damage to soil and water resources.

9) Effects of Watershed Improvement Projects on Soil and Water

Watershed improvement projects have as their objective the improvement of long-term watershed condition. These projects consist of treatments such as site revegetation, obliteration of non-system roads and stabilization of gullies and streambanks. Projects involve relatively small acreages or stream reaches, but may result in the improvement of conditions in a larger portion of the watershed and its stream system. Productivity losses from other Forest management activities may be partially offset by watershed improvement projects in localized areas.

Short-term soil disturbance is associated with most projects and some minor sediment increases may occur, especially with some stream-related improvement projects. Some risks of damage to riparian areas and stream channels exist as a result of administrative error and poorly planned or implemented projects in these sensitive locations. However, the long-term effects on soil productivity and beneficial uses are positive.

10) Effects of Mineral Activities on Soil and Water

The amount of mining activity on the Forest is more a reflection of metal prices than activities scheduled by the Forest. Effects of mining on soil and water resources vary only slightly by alternative, primarily based on changes in access, which are addressed in the section on roads. Other effects of mining on soil and water are assumed to be constant by alternative.

Exploration for and development of mineral, non-mineral, and energy resources affect soil and water resources. Activities that can occur include construction of roads and trails, pipelines, ditches, drill pads, water impoundments, adits and shafts, and various buildings and support facilities.

Potential effects of mining include: total soil resource commitment to facilities, other soil productivity losses due to compaction, displacement and erosion, increased sedimentation, removal of vegetative cover, riparian area and stream channel alterations, streamflow diversion, thermal changes and chemical pollution from leaching or spills.

The magnitude, extent, and duration of the effects are project dependent. The effects of mining activities cannot be anticipated until specific proposals are submitted. Each proposal will be analyzed with respect to existing mining and environmental laws at the time of submission. Operating plans would include provisions to minimize detrimental impacts on watershed conditions and water quality. In relative terms, the potential for mining to cause adverse impacts on soil and water resources is inversely proportional to the amount of area managed as roadless or under highly restrictive management strategies. Refer to the minerals section of Chapter IV for further details.

11) Effects of Special Use Activities on Soil and Water

The effects of special use activities vary only slightly by alternative. This variation is primarily related to increased access which is addressed in the section on roads.

Special use activities that have the potential to affect soil and water resources include cabins, group camps, roads for access to mining claims and private lands, water developments (such as dams, diversions and hydropower projects), utility corridors, and outfitting and guiding operations.

Access roads have both short and long-term impacts on the soil and water resource as discussed in the section on roads.

Effects of water-related developments may include total commitment of the soil resource for facilities, increases in erosion, modification of riparian areas and stream channels, and the interactive effects of increased sedimentation and altered flow regimes.

Construction and maintenance of utility corridors involve roading and other disturbances that may affect soil productivity, increase erosion/sedimentation and disturb riparian areas. Outfitting and guiding operations may damage upland and riparian areas at camps and other sites where use is concentrated.

Although the effects of special uses can be significant for a specific site, individually these uses are generally limited to small acreages on the Forest. Collectively, special uses affect a significant acreage of land on the Forest. The magnitude, extent and duration of the effects are dependent on the type and amount of use, and cannot be anticipated until proposals are submitted. Each proposal will be analyzed with respect to Standards and Guidelines and other direction to minimize the potential for adverse impacts.

12) Effects of Roads on Soil and Water

Roads can have a significant effect on soil and water resources and are probably the greatest potential sediment source of all land management activities. Potential effects of road construction/reconstruction and maintenance include total commitment of the soil resource, alteration of the runoff characteristics of the slope, increases in sedimentation from accelerated surface and mass erosion, reduction in soil productivity (compaction, puddling, displacement), and disturbance of riparian areas and stream channels.

It is well documented in the scientific literature that the largest amounts of activity-related sediment in streams are the result of road construction. The largest increases in sediment production occur during the first two years following construction, with the magnitude of the increase diminishing over time, depending on road use and management.

Impacts associated with reconstruction of existing roads from prior entries should be significantly less than those associated with new construction. Risk of damage to soil and water resources should be lower in those alternatives that emphasize reconstruction and use of well-located existing roads to achieve market outputs.

a. Sediment Yield

Sediment yield (amount of eroded soil material that enters a live stream or lake) varies depending on many different factors such as: erosiveness of the local soil material, amount of exposed (bare) mineral surface soil, infiltration capacity of the soil surface, steepness of slope, length of individual slopes, distance from the stream or lake, roughness coefficient, and storm intensity. The kind of activity that takes place on the land can also have a major effect, because of the amount of land that the activity takes place on.

Road construction and reconstruction have the greatest potential, on an acre by acre basis, of producing the most delivered sediment. This is because these activities are designed to move large amounts of soil from one place to another. Having the road properly located to avoid particularly hazardous areas, using good road design to provide adequate water control measures, and using mitigation measures such as grass seeding cut and fill slopes, can all reduce the amount of delivered sediment that is produced. Road surfaces can also be a major source of sediment which should be considered when designing erosion control measures.

Timber management activities include many different kinds of logging systems, such as tractors, cable, helicopter, etc. Each has its own unique characteristics that affect how much or how little soil displacement takes place (from both road construction and yarding of logs).

Another common problem associated with these activities is slash disposal. Machine piling, broadcast burning, leaving the slash in place, or "lop and scatter" are commonly accepted disposal practices. Each method can affect how much soil displacement or compaction may or may not take place. Delivered sediment, therefore, is dependent on many variables related to the kind and timing of management practices that are applied to the lands that lie above the streams and lakes.

Sediment yields vary by alternative because of differences in management objectives. The management activities that have been used for modeling are the road construction/reconstruction activities and the timber harvesting systems. Because of this, alternatives that build more roads and harvest more timber also produce more delivered sediment. The assumption was made that the number of other sediment producing activities either are not well defined (e.g. mining), produce too little sediment to be concerned about in a Forest-wide analysis, or else the activities that produce it are the same for all alternatives, e.g., developed recreation sites. Refer to Chapter II for the quantities of delivered sediment produced by the different alternatives.

b. Road Construction - Total Proposed

The major changes in watershed condition would occur during the first three decades when most new road construction would take place. The miles of road construction provide an indication of potential impact to soil and water resources. Higher risks are associated with those alternatives that require more new road construction to achieve market outputs. The risk of road-related conflicts in riparian areas may also increase proportionally to the amount of new road constructed by alternative.

Other than Alternative NC, Alternatives J and B construct the most roads and therefore have the greatest potential risk of adverse impacts. Alternatives E and F construct the least amount of new roads and have the least potential for impact. Refer to Table II-3a in Chapter II for a display of new road construction by alternative.

c. Road Construction - Within Roadless Areas Only

Road construction in unroaded areas introduces the area to a wide range of new resource risks. Road construction, maintenance, and use may significantly affect watershed condition. This is dependent on the location, extent, and intensity of new roading and associated activities, and the management controls applied to the new system.

As noted in the previous section, miles of new road construction provide an indication of potential impact to soil and water resources. Higher risks are associated with those alternatives that require more new road construction to achieve market outputs. The risk of road-related conflicts in riparian areas increases proportionally to the amount of road constructed by alternative.

Alternatives E and F would pose the least risk of damage to soil and water resources from new road construction in roadless areas, with only 180 and 222 miles proposed during the first three decades, respectively. Alternative G (458 miles) is next, followed by Alternatives H (652 miles), C (706 miles), I (713 miles), A/NFMA (748 miles), and D (853 miles). Alternatives B (979 miles) and J (1,006 miles) would pose the highest risk of damage to soil and water resources from new road construction on the Forest.

d. Road Maintenance

The effects of road maintenance are the same for all alternatives, the only difference being the variation in the number of miles requiring maintenance. Alternatives with higher timber harvest (such as Alternatives B and J) would have correspondingly higher amounts of road maintenance performed by timber purchasers rather than Forest crews. The risk of damage to soil and water resources from poor maintenance practices is proportional to the levels of new road construction, which has already been addressed. The future shift from direct maintenance to more emphasis on access management, such as restrictions and closures, should have mitigative benefits for soil and water resources.

e. Management of New Roads

Benefits to soil and water resources from access management occur in alternatives that emphasize access restrictions or closures. These management options can significantly reduce erosion and sedimentation from roadways, as well as reducing maintenance costs. Traffic management can also significantly reduce the potential for damage to facilities and adjacent areas by off-highway vehicles (OHVs).

The proposed new road closure policy provides an indication of the potential benefits to soil and water resources between the alternatives. Alternatives C, D, E, and J provide the most potential benefits due to a 100% closure policy on all new roads. Alternatives F (90%), A/NFMA (80%), and G (70%) provide progressively less benefit. Alternatives I (25%) and H (20%) provide substantially fewer benefits, followed by Alternative B (0%) which would not close any new roads.

13) Effects of Fire Management on Soil and Water

Impacts from burns vary widely, depending on fire type, timing, extent, intensity and location. Prescribed fires for natural fuels reduction and range and wildlife improvement typically occur in the spring. High soil and litter moisture levels at this time of year generally result in cool burns with low potential for significant erosion and sedimentation.

Planned ignitions in the fall have a higher risk due to lower soil moistures. The amount of soil loss from wildfires is primarily dependent on the fire intensity and soil type on which the fire occurred. Runoff from burned areas may result in lower water quality for short periods of time, with the greatest risk associated with large, high intensity wildfires.

Planned ignitions benefit watershed condition by reducing the risk of catastrophic wildfire and promoting more natural ecosystem function. The effects of high intensity burns (hot burns) include such things as: changes in soil physical and chemical properties (nutrient loss, loss of micro-organisms, altered infiltration rates, erosion, and

sedimentation), alteration of water yields (volume and timing), and thermal changes in the watershed (soil and stream temperatures).

High soil temperatures from hot burns can have an effect upon the soil resource. Not only can it destroy micro-organisms in the soil, but it may also volatilize some of the nutrients. Machine piling slash can be particularly damaging, because it can cause soil displacement, soil compaction, and puddling. Broadcast burning is less likely to damage the soil than is machine piling. Most prescribed burning is tied to timber harvest activities, so the possible impact to the soil resources will generally be tied to these same general areas.

Those alternatives with the lowest potential for high intensity wildfires have the lowest potential for adverse effects from wildfire suppression activities. Potential effects of fire suppression activities include increased erosion and sedimentation from fireline construction, direct damage to riparian areas, and potential for spills (e.g., petroleum products, retardant). Under all alternatives, appropriate burn rehabilitation measures would be implemented following major wildfires to minimize adverse on-site and off-site impacts to soil and water resources.

14) Effects of Other Forest Management Activities on Soil and Water

Other factors affecting soil and water resources are constant or nearly constant among alternatives. Management of water rights on the Forest, administrative site management, special area designations, such as wilderness and Research Natural Areas, and special uses other than those discussed above are assumed to be similar between alternatives. These activities are covered by Standards and Guidelines which should be similarly effective in all alternatives.

The effects of these and other activities discussed in this section are considered in the following section on cumulative effects.

b. Cumulative Effects of Each Alternative

This analysis considers the potential for cumulative effects of management activities on soil and water resources only.

Cumulative effects are the result of the combined effects of individual management activities on all lands within a watershed. This could be for areas that are completely in Federal ownership, as well as for areas with intermingled ownerships (areas that include both National Forest and other ownerships). Other ownership includes lands controlled by other federal agencies, the state, private landowners and Indian tribes.

Cumulative effects can be negative, neutral, or positive depending upon the net results of the applied activities. Changes that occur as a result of management activities can be the result of one or more repetitions of one specific activity, or the combined effect of several different activities or factors.

Reduction of soil productivity and/or degradation of water quality are cumulative effects of primary concern to the forest manager. Some of the specific effects that may be generated and interact in a cumulative fashion are identified below. For a more complete discussion of the specific effects of various allocations and management activities on soil and water resources, refer to the Direct and Indirect Effects sections in this chapter for Soil and Water and for Fisheries.

Soil Resources

Soil productivity can be changed (lowered), by both physical and chemical processes. Specific soil changes that usually reduce soil productivity include: soil compaction (change in soil structure, increased bulk density, reduced pore space, and resistance to root development), puddling (change in soil structure, reduced infiltration rate, and reduced root penetration), soil erosion (loss of nutrients, and reduced water holding capacity - soil depth); soil displacement (removal of the A horizon - loss of organic matter and nutrients); volatilization (loss of nutrients and organic matter), and nutrient cycling (loss of nutrients).

Water Resources

Water quality, quantity and associated values (e.g., fish habitat) can be altered by physical, chemical and biological processes. Specific effects on the water resource due to management activities may include: accelerated sedimentation (e.g., increased turbidity, increased suspended sediment concentrations, increased bedload sediment transport, increased sediment deposition in fish habitat); alteration of stream temperatures (e.g., summer stream temperature increases, winter temperature decreases); changes in fine and large organic matter input to stream channels (e.g., alteration of food supplies, and changes in stream energy dissipation patterns); alteration of streamflow regimes (e.g., increased peak flows, increased low flows, and changes in timing); disruption of hillslope hydrology (e.g., changes in water tables, interception of subsurface flows).

Individually, changes in any of these factors can reduce soil productivity or alter water quality, respectively; however, in most forest situations, these processes seldom occur by themselves. Instead, several processes and associated effects may be occurring at the same time within any specific activity area.

Analysis Approach

Current state-of-the-art environmental analysis does not permit a reliable prediction and quantification of the impacts of all activities that can potentially affect soil and water resources. Quantification techniques are available for individual factors, such as sediment yield or water temperature, for use where select parameters are of primary concern. However, evaluation of how several parameters or activities might interact in a cumulative manner is still largely a task of professional judgement.

A risk factor approach was used to evaluate the potential cumulative effects of the proposed alternatives on soil and water resources. This approach was taken because available methodologies, which produce a single quantitative index, do not adequately portray the effects of multiple management activities across the entire Forest.

This is due to the complex and diverse nature of watersheds, and to the variations in the intensity, patterns, and types of land uses on the Forest.

This analysis is based on the premise that land disturbing, management activities can have an effect upon watershed values, specifically soil productivity, slope hydrology, water quality and fish habitat. Furthermore, it can generally be assumed that the more activities that take place in an area (e.g., acres of timber harvested, miles of road built, etc.), the greater will be the risk of watershed degradation.

The analysis process includes all lands (federal, state, and private) inside the National Forest protection boundary, including both wilderness and non-wilderness areas, that lie within each of the 25 watersheds identified on the Forest (see FEIS, Appendix F). Some of the watersheds are located entirely within the National Forest protection boundary. However, most watersheds extend beyond the Forest boundary. The Forest Plan can only address the use and management of the land administered by the Forest Service, but it must also consider the use and management of all lands within the Forest protection boundary, both National Forest and other owners. Portions of watersheds downstream from the Forest protection boundary are not considered in this analysis.

The potential for cumulative effects on soil and water resources has been grouped into three broad risk categories: high, moderate, and low. This rating considers both the long-term risk of on-site soil productivity losses as well as the risk of downstream impacts to channel condition, water quality and capital investments. For purposes of this analysis, it will be assumed that all other ownership lands within the Forest protection boundary will be managed for intensive timber management. The risk categories are defined as follows: "High" refers to watersheds that have fifty percent or more of the land being managed for intensive timber management over the long term; "Moderate" refers to watersheds that have twenty-six to forty-nine percent of the land being managed for intensive timber management; and "Low" refers to watersheds that have twenty-five percent or less of the land being managed for intensive timber management.

Refer to the tables in FEIS, Appendix F for details on the ownership and allocations in the 25 watersheds in this analysis.

Watershed Analysis

Eight of the watersheds (Nason Creek, White/Little Wenatchee, Bumping River, Teanaway, Cle Elum, American River, Icicle River, and Stehekin River) have low percentages of the land allocated to intensive timber management activities. Consequently the risk for cumulative effects on soil and water resources in these watersheds in all alternatives will be low. Even though the overall rating for these watersheds is low, there could be individual subdrainages within some of the watersheds that could have a moderate or high risk for cumulative effects. Site specific determinations will be made on a project basis.

Five watersheds (Upper Tieton, Peshastin Creek, Chiwawa Creek, Lake Chelan, and Rattlesnake Creek) have low and moderate risk ratings for cumulative effects from management activities on soil and water resources. Alternatives E, F, and G all have a low risk (twenty-five percent or less of the land allocated to intensive timber management) for cumulative effects for the above named watersheds. Except for Peshastin Creek, these watersheds also have a low risk rating for cumulative effects for Alternatives A/NFMA, C, H, and I. Peshastin Creek has a moderate risk for these same alternatives. All of the five watersheds have a moderate risk for cumulative effects with Alternatives B and D. All of the watersheds, except the Rattlesnake watershed, have a moderate risk associated with Alternative J. Alternative J poses a low risk for cumulative effects in the Rattlesnake watershed. However, within any of these watersheds, there could be specific subdrainages that could have a high risk for cumulative effects. Site specific determinations will be made on a project basis.

Of the remaining twelve watersheds (Mission Creek, minor Naches River Tributaries, minor Columbia River Tributaries, Mad River, Swauk-Naneum, Wenas Creek, Lower Tieton, Little Naches, Entiat River, Wenatchee River, Taneum-Manastash, and Yakima River), all have at least one alternative that poses a high risk of cumula-

tive effects from management activities to soil and water resources (> 50% allocation to intensive timber management). It is important to understand, however, that individual subdrainages within these watersheds may have a different risk rating (high, medium, low) from the overall one shown for a given alternative. The amount and concentration of timber management activities within a given subdrainage will vary, requiring more site specific determinations to be made on a project basis. The watersheds are addressed individually in the following narrative.

MISSION CREEK - There are 40,959 acres in this watershed within the Forest protection zone boundary, which is nearly all of the watershed. Eight percent of it is composed of other ownerships. The City of Cashmere lies at the mouth of the watershed, where in the past there have been floods that have damaged homes along the channel and in the city. This watershed is characterized by steep and very steep slopes and very erodible soils that have formed in Chumstick sandstone residuum.

Alternatives B, D, and J all pose a high risk for cumulative effects to soil and water resources from management activities in this watershed (60% land allocation to intensive timber management; an additional 35% of the watershed subject to less intense harvest prescriptions).

Alternatives A/NFMA, C, H, and I all have a moderate risk for cumulative effects (between 35%-49% allocation to intensive timber management).

Alternatives E, F, and G all have a low risk for cumulative effects in this watershed, because only nine percent of the watershed is allocated to intensive timber harvest (National Forest plus other ownerships).

MINOR NACHES RIVER TRIBUTARIES - There are 54,485 acres in this watershed. As the name suggests, it is made up of several subdrainages that flow into the Naches River system. The watershed boundaries begin on the west near where the Bumping River enters the Naches River and extends downstream along the Naches

River to the Forest protection boundary, where the Naches River leaves the Forest.

Alternatives A/NFMA, B, D, C, H, I, and J all pose a high risk for cumulative effects from management activities on soil and water resources (between 59% and 81% allocation to intensive timber management activities; an additional 16% to 32% of the watershed subject to less intense harvest prescriptions).

Alternatives E, F, and G have a moderate risk for cumulative effects, because from forty-one to forty-nine percent of the land is allocated to intensive timber harvest.

There are no alternatives that pose a low risk for cumulative effects in this watershed.

MINOR COLUMBIA RIVER TRIBUTARIES - There are 44,245 acres in this watershed, stretching from the Kittitas County line to the Okanogan County line. It is made up of many separate subdrainages that flow directly into the Columbia River. In most cases, a large part of the acreage in these subdrainages lies outside of the National Forest protection boundary.

Alternatives A/NFMA and H both have a high risk for cumulative effects from management activities on soil and water resources (about 56% of the land allocated to intensive timber management; an additional 26% of the watershed subject to less intensive harvest prescriptions).

Alternatives D, C, I, and J all have a moderate risk for cumulative effects on the portion of these subdrainages that lie within the National Forest protection boundary. The percentages of land allocated to intensive timber management in these alternatives ranges from twenty-eight to thirty-six percent, with the total acres that could be affected by the addition of modified harvesting being about ninety-six percent of the available land base.

Alternatives E, F, and G pose a low risk of cumulative effects in this watershed (21% allocated to intensive timber management)

MAD RIVER - There are 61,035 acres in this watershed. The soil pattern in this watershed is complex, and soil types can change drastically within short distances. The soils in the northern part in the upper watershed position have developed in volcanic ash and pumice (mostly from Glacier Peak), and can be very erodible. In the Indian Creek, Tillicum Creek, and Kloochman Gulch parts of the watershed, there are some unstable soils that are subject to mass failures. These soils can produce large quantities of silt and clay when disturbed.

Alternatives A/NFMA, B, C, D, H, I, and J all have a high risk for cumulative effects from management activities on soil and water resources (between 48% to 77% of the land allocated to intensive timber management). When combined with less intensive timber management activities the range is from seventy-eight to eighty-eight percent of the total land available.

Alternatives F and G pose a moderate risk for cumulative effects within this watershed (36% and 29% of the watershed in intensive timber management, respectively, an additional 22% and 29% of the watershed subject to less intensive timber harvest prescriptions, respectively).

Alternative E poses a low risk of cumulative effects, because intensive timber harvest is allocated on only twenty-four percent of the watershed. This alternative also has another twenty percent of the land allocated to less intensive timber management activities; thus, the total amount of land available for some form of timber management activity is fifty-three percent of the watershed.

SWAUK-NANEUM - There are 81,748 acres in this watershed. As the name implies, it is composed of two separate and distinct drainage systems. The Swauk is the larger of the two, and lies west of Naneum Creek. Both drainages include some soil areas that are subject to mass failures, and both have some very erodible soils in them. The geology/soil patterns are complex and mixed, making it a difficult area to manage with regard to the protection of the soil and water resources.

Alternatives B and D both have a high risk for cumulative effects from management activities on soil and water resources (52% allocation to intensive timber management; an additional 34% of the watershed subject to less intensive harvest prescriptions).

Alternatives C, I, and J all have a moderate risk for cumulative effects because twenty-seven to forty-two percent of the land has been allocated for intensive timber management. The total amount of land affected by timber management activities, including the less intensive, ranges from seventy-seven to eighty-six percent of the entire watershed.

Alternatives A/NFMA, E, F, G, and H all have a low risk for cumulative effect because less than twenty-five percent of the land is allocated to intensive timber harvest. When other allocations that allow for less intensive timber management activities are included, the percentages range from sixty-seven to ninety-one percent of the watershed.

WENAS CREEK - The portion of this watershed that lies within the National Forest protection boundary is a relatively small area (11,109 acres). Furthermore, the area of concern lies high in the watershed, and is distributed across the upper part of many separate subdrainages.

All of the alternatives have more than fifty percent of the land allocated to intensive timber management. The percentages range from seventy-eight to ninety-two percent of the watershed for just the intensive timber management. When these percentages are added to other allocations that also allow less intensive timber management, the totals add up to between eighty-eight to one hundred percent of the watershed.

The soils in this watershed have developed mostly from basaltic materials, and although they are erodible, they tend to be stable. Also, since the area that is being considered lies mostly at the headwaters of several subdrainages, there is less risk of these systems creating a major watershed problem on Wenas Creek.

LOWER TIETON - There are 55,290 acres in this watershed. It is composed of many subdrainages that enter the Tieton River from both the north and south. This watershed starts just downstream from Rimrock Dam, near where the west side of the Soup Creek drainage meets the Tieton River, and extends downstream to the Forest boundary. There are some unstable soils on the south side of the river in the western part of this watershed; however, the remainder of the soils in this watershed are reasonably stable. The soils can be very erodible if left bare and unprotected, or if exposed to intensive storms.

Alternatives B, D, and J all have a high risk for cumulative effects from management activities on soil and water resources (between 54% to 65% of the watershed allocated to intensive timber management activities, an additional 31% of the watershed subject to less intense harvest prescriptions).

Alternatives A/NFMA, C, H, and I pose a moderate risk of cumulative effects, with between thirty-six and forty percent of the watershed allocated to intensive timber management activities. When these totals are added to the other allocations that allow less intensive timber harvest, timber management activities will occur on approximately eighty-five percent of the watershed.

Alternatives E, F, and G all have a low risk for cumulative effects (18%-19% allocation to intensive timber management). However, when this is added to the amount of other land that allows less intensive timber management activities, the total amount of land affected ranges from seventy-four to eighty-three percent.

LITTLE NACHES - The Little Naches is a large watershed, encompassing 94,023 acres. It lies entirely within the National Forest protection boundary, bounded on the west by the Cascade Mountains, on the south by the American River drainage, and on the north by the ridge that separates the Cle Elum and Naches Ranger Districts. The eastern boundary for this watershed is near the confluence of the American and the Little Naches Rivers. This watershed has some very unstable soil areas in it and areas that are highly erodible, particularly along the north side of the Little Naches River.

Alternatives B, D, and J pose a high risk for cumulative effects from management activities on soil and water resources (about 65% of the land allocated to intensive timber harvest, an additional 10% of the watershed subject to less intense harvest prescriptions).

Alternatives A/NFMA, C, F, G, H, and I all have between twenty-eight and fifty percent of the watershed allocated to intensive timber management activities. This added to the less intensive timber management activities that are allowed on other land allocations, adds up to between fifty-eight and seventy-five percent of the watershed.

Alternative E is the only alternative that poses a low risk of effects in this watershed (24% allocated to intensive timber management). Approximately 27% of this watershed will be subject to less intensive timber management activities.

ENTIAT RIVER - There are 174,202 acres in the Entiat watershed. Within the Forest protection boundary, there is not much land in other ownership. Most of these acres are in the eastern part of the watershed and along the bottomlands adjacent to the Entiat River. Most of the soils in this watershed have developed in volcanic ash and pumice. The soils are easily displaced and are subject to both wind and water erosion when the surface vegetation is removed, exposing the mineral soil.

Alternatives B and D both have a high risk for cumulative effects from management activities on soil and water resources in this watershed (50% of the land allocated to intensive timber management, an additional 10% of the watershed subject to less intense harvest prescriptions).

Alternatives A/NFMA, H, and J have a moderate risk for cumulative effects, because the land allocated to intensive timber management activities ranges from thirty-three to forty-five percent. When this is added to the less intensive timber management allocations, the combined totals range from sixty-one to sixty five percent.

Alternatives C, E, F, G, and I all have a low risk for cumulative effects, because all have twenty-five percent or less of the watershed allocated to intensive timber management activities. The

totals for all lands allocated for some type of timber management activity, both intensive and less intensive timber management, range from thirty-nine to fifty-seven percent of the watershed.

WENATCHEE RIVER - There are 160,676 acres in the Wenatchee River watershed. The Wenatchee River watershed starts roughly at the mouth of Lake Wenatchee (it also includes the waters draining into and out of Fish Lake), then extends towards the southeast to the Columbia River, covering all of the land within the National Forest protection boundary. Soils in this watershed are highly variable, having formed in a variety of parent materials. Some of these soils are very erodible and subject to mass failures if surface waters are allowed to concentrate as a result of management activity. Other soils in the watershed are excessively well drained and are very stable under most conditions.

Alternatives B and D both have a high risk for cumulative effects from management activities on soil and water resources (53% allocated to intensive timber management; an additional 20% of the watershed subject to less intense harvest prescriptions).

Alternatives A/NFMA, C, E, F, G, H, I, and J all have a moderate risk for cumulative effects from management activities on soil and water resources (between 30% to 49% allocated to intensive timber management). When the other allocations that allow less intensive timber management are added, the amount of land affected will range from seventy to seventy-three percent.

There are no alternatives that have a low risk for cumulative effects in this watershed.

TANEUM-MANASTASH - There are 54,485 acres in the Taneum-Manastash watershed. This watershed is made up of the Taneum Creek drainage and the Manastash drainage, from the headwaters to the National Forest boundary.

Alternatives B, D, and J all have a high risk for cumulative effects from management activities on soil and water resources. Alternatives B and D have seventy-two percent, and Alternative J has

seventy-eight percent of the watershed allocated to intensive timber harvest.

Alternatives A/NFMA, C, E, F, G, H, and I all have a moderate risk for cumulative effects. Alternatives A/NFMA, G, and H all have forty-two percent; Alternatives C and I have forty-four percent, and Alternatives E and F have thirty-five percent of the watershed allocated to intensive timber management. Timber harvesting is allowed on all lands in all allocations. However, lands other than those listed above are considered to be in less intensive timber management allocations where harvest activities may be carried out for the benefit of other resource values.

YAKIMA RIVER - There are 128,282 acres in the Yakima River watershed within the National Forest protection boundary. The watershed starts at the crest of the Cascade Mountains and extends east to the Forest boundary. The soils in this watershed are reasonably stable and are not noted for being high sediment producers. There have been rain-on-snow events in the past that have scoured some drainages (Cabin Creek and Log Creek), so severe erosion is possible, but is not probable under normal conditions.

Alternatives B, D, and J all have a high risk for cumulative effects from management activities on soil and water resources in this watershed (54% allocated to intensive timber management activities, an additional 23% of the watershed subject to less intense timber harvest prescriptions).

Alternatives A/NFMA, C, E, F, G, H, and I all have a moderate risk for cumulative effects, because between forty-three to forty-eight percent of the land is allocated to intensive timber management. The amount of land in other allocations that allow less intensive timber harvest is about seventy percent. Combining both adds up to seventy-five percent of all lands within this watershed that would be affected by some kind of timber management activity.

There are no alternatives that have a low risk for cumulative effects in this watershed.

c. Alternatives' Conflicts with Other Agency Plans and Policies

There are no known significant conflicts between the effects of the alternatives and the plans and policies of the State, other Federal agencies, the Yakima Indian Nation and local interest groups for the management of the soil and water resources on the Forest. There is considerable competition for the water produced on the Forest. The principal competitors include irrigation interests, small hydroelectric interests, and those interested in maintaining adequate fish habitat.

Soil erosion and transport of these materials off-Forest may be some cause of conflict. However, the anticipated amounts of delivered sediment should be minimal, if Forest and Regional Standards and Guidelines are met. In order to meet the Standards, the Forest will need to adhere closely to the Forest Service Nonpoint Source Management System.

d. Mitigation Measures for Soil and Water

The degree to which direct, indirect and cumulative effects are realized is a function of many variables, including the magnitude of proposed management activities and the level of success in project design and implementation. A critical step in the process is the identification and successful application of mitigation measures.

Mitigation measures for soil and water resources are designed to reduce the potential impacts of management activities on soil productivity and the beneficial uses of water. The public has expressed a high level of concern over the sufficiency and effectiveness of proposed mitigation measures on National Forest System lands.

Mitigation measures are developed through implementation of the Forest-wide Standards and Guidelines. Standards and Guidelines for all resource management activities provide general direction for analysis and design that requires more detailed follow-up in project level planning. The formulation of specific mitigation strategies to reduce resource risks will occur at the project level, where site conditions and required mitiga-

tion effectiveness can be better defined.

A wide range of mitigation measures are available for application at the project level. For example, mitigation measures to protect soil productivity might range from a decision to avoid building a road across unstable soils to selection of special site preparation techniques in a harvest unit. Mitigation measures linked directly to the protection of water quality might range from exclusion of a sensitive riparian zone from an activity area to the selection of special sanitary facilities at a developed campground.

The Forest-wide Standards and Guidelines for Soil and Water provide direction for meeting Forest Plan objectives for the management of soil productivity and water quality. For example, nonpoint source activities will be conducted using Best Management Practices (BMP's) and Forest Service Soil and Water Conservation Practices (SWCP's).

BMP's for water quality are implemented on National Forest System lands to comply with Washington State requirements for the protection of beneficial uses. SWCP's include specialized management practices, beyond those currently required by the State, to further insure protection of soil productivity and beneficial uses. Sullivan (et al., 1987) suggests that application of BMP's provides the needed basis for reducing effects of forest management activities. Application of these guidelines provides a basis for careful planning, proper design, and close scrutiny of Forest Service, contracted, and private sector activities and projects on National Forest lands.

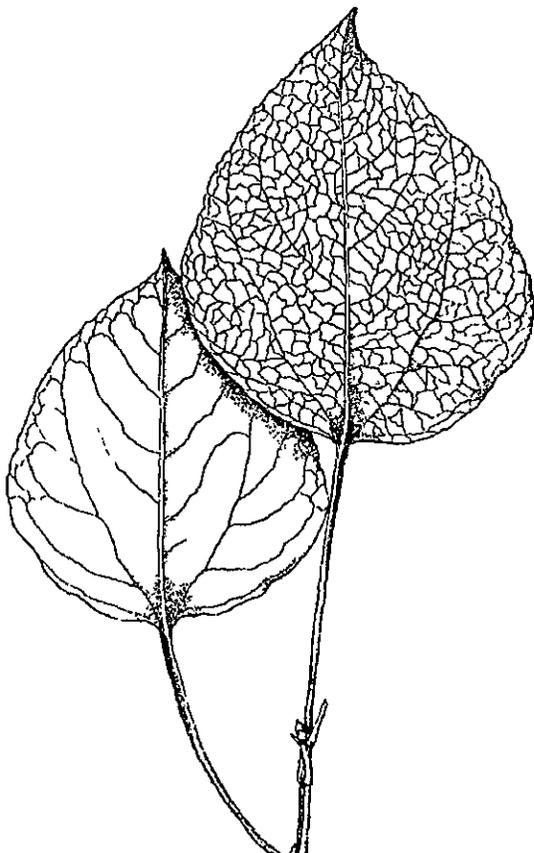
For private lands in watersheds with multiple ownerships, the BMP's for timber harvest and related activities are contained in the Washington Forest Practices Rules and Regulations. These are designed to protect water quality and beneficial uses following timber harvest on private lands.

Although most attention is focused on mitigation of impacts from timber harvest and related road work, the concepts outlined above are applicable to all other nonpoint source activities. For example, the General BMP's for water quality protection described in FEIS, Appendix J include practices for recreation, grazing and mining

activities as well as timber management and road systems. All activities scheduled under each alternative would adhere to these minimum legal requirements and would comply with all future refinements in Federal and State laws.

Refer to FEIS, Appendix J for additional details on BMP's for the protection of water quality. This appendix provides a description of the Forest Service process for the prevention and control of nonpoint sources and examples of the system. Refer to Forest Plan, Chapter V for a description of the monitoring strategy for the implementation and effectiveness of management practices.

Approaches to evaluating non-point source impacts on soil and water resources from timber harvest and related activities are discussed in the WRENS document (EPA, 1980). Other overviews of erosion, sedimentation, and water quality relationships are covered in Forestry and Water Quality (Brown, 1980), Forest and Water: Effects of Forest Management on Floods, Sedimentation, and Water Supply (H.W. Anderson, et al., 1976) and Logging Roads and Protection of Water Quality (EPA, 1975).



11. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON AIR

The management of Air as a resource for which the federal land manager is responsible was clearly stated in the Clean Air Act of 1970.

During the past eighteen years, the Wenatchee National Forest has been implementing a program which has complied with this direction. Rapid development of the program has occurred during the past five years and this trend towards more intensive air resource management is expected to continue as the implementation of this plan begins.

Forest management activities have effects of differing duration on this resource. Prescribed fire and wildfire are the largest contributors to the temporary degradation of air quality but the management of all vegetation is known to be important to the maintenance of the chemical components of the atmosphere. From this standpoint the management of all ecosystems in a "healthy and productive" state is crucial to our air resource management program.

a. Direct and Indirect Effects of Each Alternative on Air

Each alternative allocates portions of the Forest by priority of management activity. Within these alternative allocations there will be resource management activities which vary in intensity and extent. It is the variation in these specific activities which create impacts on our management of the Air resource.

The management of Air as a resource will not vary significantly between alternatives. There will be some short-term changes created by the implementation of resource management activities but all of these changes will be of limited duration and extent. Since the data concerning the impacts of various management activities on air quality is presently limited, the discussion of the effects of implementation of each of the alternatives will tend to be a subjective one.

1) Effects of Timber Management on Air Quality

The value of the many ecosystems within the boundaries of the Wenatchee National Forest in the maintenance of the chemical composition of our atmosphere is well recognized but remains unquantified. Maintaining all ecosystems in a thrifty condition is important to the management of our air resources. The need to improve the quality of the information available about this interaction has been documented and will be pursued during the implementation of this plan.

The activities involved in the harvesting of timber (road building, skidding, etc.) produce dust during the dry months of the year. The adverse impact of this dust on air quality is usually very short term in nature (hours to days) and very localized in extent. These effects are normally observed only during periods of active logging and log hauling.

Alternatives NC, B and J have the potential to impact air quality the most due to the higher volumes of timber harvested. Alternatives E, F and G have the lowest potential impact as they have the lowest harvest levels. Alternatives A/NFMA, C, D, H and I have mid-range harvest volumes and would have moderate potential for impact on the air resource,

2) Effects of Mineral Activity on Air Quality

The effects of mining on air quality cannot be described by alternative as they are dependent on each specific action undertaken and the management of the facilities developed. It is known that the development of large tailing piles, such as those located near Holden, Washington, can have significant, long term, localized effects on air quality if they are not stabilized in an appropriate manner.

3) Effects of Roads on Air Quality

The construction of roads during the dry periods encountered each year can have a temporary (hours to days) impact on air quality. These impacts are normally very transitory in nature and are the result of dust being created by heavy equipment or blasting. Occasionally, there are

effects of smoke from prescribed fire which is used to dispose of slash created during the right-of-way clearing.

Stabilization of new roads including cutbanks, fills, and the running surface, normally occurs within one of the initial disturbances. When roads are being heavily used, dust abatement techniques are often employed (watering and/or the application of road oil). The Forest does have areas where pumice soil types dominate the terrain. In these areas dust resulting from road construction and use will be more evident.

Due to variable soil conditions across the forest and the different running surfaces that would be used in each alternative, it is not possible to draw a direct correlation between the miles of road developed and the impact on the air resource.

4) Effects of Fire Management on Air Quality

The most noticeable impact on the quality of the Air on the Wenatchee National Forest is the smoke generated from either wildfire or prescribed fire. Both of these events generate quantities of smoke which adversely impacts the quality of the Air. The difference between these two types of activities is in the development of prescribed fire plans. The management of smoke is a key to the successful implementation of each plan. Environmental factors such as wind direction, atmospheric stability, and fuel moisture are critical environmental influences on smoke management. Additional parameters are considered to ensure optimum dispersion occurs.

This is in contrast to the situation encountered when wildfires occur, which is usually when the atmosphere is hot and stable. Under these conditions, dispersion of smoke is often minimal. During some of the more severe wildfire episodes experienced on the Wenatchee National Forest and in other areas of the Pacific Northwest, the air quality has been significantly impaired.

The management of wildfire remains constant through all alternatives but the number of acres treated for fuels management reasons varies by alternative. The acres expected to be treated are listed below. In interpreting the values listed in Table IV-20, it is appropriate to assume that the

more acres treated, the larger the impact on air quality. It is not possible to try to establish a direct correlation between these values and the quality of the air, however, as the type and season of treatment, which varies by alternative, will control the level of effect.

**TABLE IV-20
ACRES TREATED FOR FUEL MANAGEMENT**

Alternative	Acres treated per year
NC	7,000
A/NFMA	6,100
B	11,000
C	6,700
D	6,100
E	4,200
F	4,500
G	5,300
H	7,200
I	6,800
J	11,300

The treatment of additional acres should reduce the potential for large wildfires. It will increase the frequency of managed smoke emissions from the implementation of prescribed fire projects. The many variables involved in wildfire ignition preclude forecasting how much impact the prescribed fire program will have on wildfire ignitions. For this reason, the effects of fire management on air can only be related to the predicted fuels management program outlined above.

b. Cumulative Effects of Each Alternative

The management activities outlined in each alternative will not result in significantly different and lasting effects on the quality of the Air Resource. Short-term effects will differ in the amount of smoke emitted from the prescribed fire program. The number of acres of fuel treatment described under the vegetation management section will provide a general comparison of the acres of fuels treatment expected. A portion of these acres will be treated by prescribed fire.

Managing the Forest in a manner that promotes healthy ecosystems will help in maintaining the balance of atmospheric components. Some events and activities (wildfires, prescribed fires, timber harvest, and road building) will degrade the quality of the atmosphere for short periods of time in limited geographical locations.

Because of the transient nature of this resource the management of air is affected by the air management practices of the regulatory jurisdictions which surround the Forest. The Forest will maintain communication with these agencies and curtail activities which add additional pollutants when atmospheric conditions warrant. These episodes will be managed in compliance with all Federal, State, and local regulations.

c) Alternatives' Conflicts with Other Agency Plans and Programs

Air Resource Management activities will be approached in a cooperative spirit utilizing the best information from all Federal, State, and local agencies. All prescribed fire will be managed to comply with the State of Washington Smoke Management Plan, State of Washington Implementation Plan (SIP) and USDA Forest Service, R-6, Pacific Northwest Regional Guide. Conflicts with other agencies as a result of implementing this Plan should be minimal. Through the implementation of the Plan, the potential for future conflicts will be decreased.

d. Mitigation Measures for Air Quality

The role of Forest ecosystems in maintaining the chemical balance of the atmospheric components has been documented. The need to identify and quantify the contributions of the Wenatchee National Forest has been noted and will be developed during the life of this plan. The development of this data base will assist the managers of the Wenatchee National Forest in mitigating the effects of human activity on local air quality.

Mitigation measures which will be used for forest management activities can be divided into three primary categories. They are: dust control, smoke management, and chemical emissions. Outlined

below are the primary mitigation procedures which will be used as the implementation of this plan begins. Additional actions will be included as new technologies are developed.

1. DUST CONTROL

- a. Control season of activity.
- b. Apply dust abatement treatments.
- c. Design projects to minimize surface disturbance.

2. SMOKE MANAGEMENT

- a. Encourage more complete utilization of wood products in timber harvest activities to reduce the need for applying prescribed fire.
- b. Encourage the gathering of firewood by the public. Emphasize the value of dry wood to clean combustion. Utilize commercial firewood sales to help reduce the amount of residue in need of disposal.
- c. Support research which will help in reducing smoke emissions and develop technologies which will replace burning.
- d. Apply state of the art methodology to all prescribed burning projects including the modeling of atmospheric conditions to evaluate dispersion. Utilize consumption models to predict the components and amount of smoke to be produced by each prescribed fire.

3. CHEMICAL EMISSIONS

- a. Continue to work with all agencies to review Point Source Development permit applications for those projects which have the potential to impact the Wenatchee National Forest.

12. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON MINERALS

The Forest's policy is to encourage and facilitate mineral exploration and development on all lands not withdrawn from mineral entry. That policy will not change as a result of implementing any one of the alternatives. Considering the limited number of additional withdrawals recommended in the alternatives, it also appears that present management of mineral-related activities would not change significantly as a result of implementing any one of the alternatives.

Demand for access to National Forest lands for the purpose of mineral exploration and development is expected to increase over the long term. This will not change as a result of implementing any of the alternatives. Operating plans will continue to be submitted for approval in a timely manner. The regulations under which those operating plans are processed also will not change as a result of implementing any of the alternatives. Mineral commodities, deposit locations, and deposit characteristics will not vary by alternative, and the demand for mineral commodities is expected to increase regardless of the alternative selected. As described in Chapter III, minerals are classified as being locatable, leasable, or salable, and the laws by which each type is disposed of and managed will not change by alternative. Those lands that are not withdrawn from mineral entry will remain subject to exploration and development under the mining and mineral leasing laws.

Under the various alternatives, certain lands are recommended for withdrawal from mining activity while other lands are recommended for management by various prescriptions. The manner in which the lands are to be managed under each alternative will have an effect on the availability of those lands for mineral entry. It will also have an indirect effect on the cost of conducting exploration, development, and reclamation activities. Not only may implementation of the plan preclude future exploration and development in areas recommended for withdrawal, but since management prescriptions and the management of other resources may affect the actual cost

of operating, the management approach may also influence interest in exploring some areas for their mineral resources.

For the most part, the value of mineral resources is not well quantified. Therefore, it is difficult to quantify the effects on minerals that each alternative would have in terms of dollars, tons at a certain grade or billions of BTU's. Likewise, since specific activities have not been proposed, the indirect effects of protecting other resources from mining impacts cannot be specifically quantified in terms of delays, cost of operating, cost of reclaiming or in terms of production. These impacts will be analyzed and quantified when specific activities have been proposed, and the location, scope and timing of an operation is known. As a consequence, the effects are best shown by analyzing the relative degree to which management prescriptions may increase the cost of operating, limit the availability of lands for mineral exploration and development, or constrain proposed mineral activities.

For this analysis, management prescriptions have been grouped by their relative sensitivity or restrictive nature. These groups are shown on Tables IV-21 through IV-25. For example the prescriptions requiring complete withdrawal of lands from mineral entry (management prescriptions WI-1, RN-1, and WS-3) are most restrictive because the withdrawals will usually preclude mineral entry. Other than possible use for panning, sluicing and mineral collecting, the only mineral activities allowed in the area will be those conducted on mining claims, leases, or permits having valid existing rights established prior to the date of withdrawal. Prospecting permits, leases, and mineral permits may be allowed in some circumstances. However, since wilderness does not vary between alternative and proposed withdrawals do not vary much between alternatives, the effects that these prescriptions would have do not vary significantly between alternative.

The second group of prescriptions, which are considered to be "highly" sensitive toward mineral-related activities (see Table IV-21 through Table IV-25), includes those lands managed as "Scenic" or "Recreational" Rivers, as "Dispersed Recreation Unroaded-Nonmotorized" areas, as "Developed Recreation Sites", as "Experimental

Forests", as "Old Growth" or as "Special Interest" areas. The least sensitive management areas are those lands allocated to "General Forest" or "Range Management" strategies. In all except the first group, mineral activity is not restricted beyond reasonable precautions for environmental protection and to insure management objectives for the affected land are met, if at all possible. However, the RE-1, SI-2, ST-1, and ST-2 prescriptions could result in the withdrawal of localized areas where resources are especially sensitive and cannot be protected by measures other than withdrawal. The use of these prescriptions does vary between alternative, and, therefore, both the direct and indirect effects on minerals does vary somewhat between alternatives. The effects are summarized as follows.

a. Direct and Indirect Effects of Each Alternative on Mineral Resources

1) Effects of Recreation (Developed, Dispersed and Unroaded) on Mineral Resources

The effect that the recreational setting has on mineral resources comes in the form of withdrawals (when needed for developed recreation sites, special interest areas, etc), delays, increased costs associated with protecting the recreational resource from the impacts caused by mineral activities, and the negative influence that managing areas as roadless areas might have on interest in conducting mineral activities. As with the other resources, this effect cannot be quantified any more than is shown below. However, it is assumed that those alternatives which provide for less emphasis on roadless and non-motorized recreational resource management would have fewer impacts on mineral resource availability than those alternatives with more roadless or non-motorized emphasis. The amount of area managed as roadless or non-motorized does vary some between alternatives, and that amount varies from a minimum to a maximum in the following order. Alternatives J, B, D, NC, A/NFMA, H, C, I, G, F, E.

The dispersed recreation activities will have little effect on mineral resource availability, but the developed recreation activities may require a withdrawal from mineral entry to ensure appro-

ropriate protection. As a consequence, the developed recreation activities can have adverse impacts on the availability of mineral resources. In general terms, the area eventually withdrawn for developed recreation sites may vary from a greater to a lesser amount in the following order: J, B, D, NC, A/NFMA, G, H, C, I, E and F. The specific effects that any such development and associated withdrawal would have, however, will be assessed when a recreation development is proposed.

2) Effects of Wild and Scenic Rivers on Mineral Resources

Designation of Wild and Scenic Rivers can affect the availability of mineral resources. River segments classified as "Wild" are withdrawn from mineral entry. Except for possible panning, sluicing and mineral collecting, only mining activities with valid existing rights established prior to the date the river was designated as a Wild River, can occur within segments. However, since all but two of the recommended Wild segments lie within already existing wilderness areas which are also withdrawn from mineral entry, the effect of having the rivers designated as Wild Rivers would have little new effect on mineral resources.

Only under Alternatives E and F would both river segments (the Entiat River between Cottonwood Campground and the wilderness boundary, and the lower mile of the Waptus River) lying outside wilderness be recommended for "wild" designation. As a consequence, the effect that Wild and Scenic designations would have on the availability of mineral resources would be greatest under Alternatives E and F.

Scenic and Recreational River segments are not withdrawn from mineral entry, and therefore they remain available for claim staking, mineral leasing and the issuance of mineral permits. Even though they are not withdrawn, however, if they become part of the Wild and Scenic River System, mining activities will have to be conducted in keeping with a management plan established for the river. It is assumed that the management plan could cause some delays and could cause the cost of operating to increase. As a consequence, those alternatives which call for more Scenic and Rec-

reational designations may have a greater impact on mineral resource availability. Conversely, alternatives that would designate fewer rivers as part of the System would have a relatively smaller effect. Those effects range from smaller to larger in the following order: Alternatives NC, J, B, D, A/NFMA, G, H, C, I, F and E.

3) Effects of Cultural Resources on Mineral Resources

All persons, whether prospecting, locating or developing the mineral resources must comply with the cultural resource rules and regulations of the Forest Service. The Forest Service is responsible for obtaining adequate cultural resource inventory data and is responsible for ensuring the adverse impacts on cultural resources are mitigated, but the cost of mitigating those impacts are the responsibility of the operator. Complying with the requirements for inventories and mitigation could result in delays and increased costs. However, since the cultural resource rules and regulations are the same in all alternatives, the effect that such management would have would not vary by alternative.

4) Effects of Scenery on Mineral Resources

As with many of the other surface resources, the effects that scenery resources will have on mineral resources are in the form of increased operating and reclamation costs. These costs cannot be quantified until mining activities are proposed. Since visually sensitive areas vary little by alternative, it could be assumed that the effects would vary little by alternative. However, some of the alternatives do emphasize retention and/or preservation visual quality objectives, and those alternatives would tend to increase the costs of operating and reclamation. Those alternatives that do not emphasize visual resource protection would tend to decrease the relative cost of operating. Therefore, the relative effect that visual resources might have would range by alternative from less restrictive to more restrictive objectives in the following manner: Alternatives J, B, D, A/NFMA, NC, H, C, I, G, F and E.

5) Effects of Wilderness on Mineral Resources

Since wilderness is withdrawn from mineral entry, the impact that wilderness has on the availability of mineral resources is significant. The only mining-related activities that can be conducted in wilderness areas are prospecting, and exploration or mining activities conducted under valid existing rights established prior to the date the area was withdrawn as wilderness. However, wilderness does not vary by alternative, and therefore the effects that wilderness has on mineral resources do not vary by alternative.

6) Effects of Wildlife on Mineral Resources

The effect that wildlife resources will have on mineral resources comes in the form of increased or decreased operating and reclamation costs, and in the form of delays to accommodate seasonal restrictions for wintering habitats, for fawning and calving grounds, and for nesting, breeding, and fledgling periods for deer, elk, mountain goat, sheep and various threatened, endangered or sensitive species of wildlife. Since threatened and endangered species and their associated habitat does not vary by alternative and they are protected by the Threatened and Endangered Species Act in all alternatives, the effect that those species will have on mineral resources would not vary by alternative. Likewise, the location of fawning, calving, lambing and kidding grounds generally does not vary by alternative, and therefore the effects that those areas would have does not vary by alternative. However, the effect of managing for the deer, elk, mountain goat and sheep habitat, does vary somewhat between alternatives, and those effects on mineral resource availability vary relatively from less restrictive to more restrictive objectives in the following order: Alternatives J, B, D, A/NFMA, NC, H, C, I, G, F and E. The actual effect that wildlife habitat will have on mining activities in the form of delays or cost will be assessed and quantified when activities are proposed.

7) Effects of Timber Management and Roads on Mineral Resources

The effect that increased roading and utilization of the timber resources would have on mineral resources is generally considered to be beneficial. As new roads are built and timber is harvested,

access to unexplored areas is improved and mineral exploration and development opportunities are enhanced. Closure of roads would not preclude access reasonably needed for mineral-related activities but may tend to discourage such activity. It may also limit some rockhounding activities or at least make conducting such activities more difficult. Therefore, in general terms the indirect effect that roads and timber harvesting activities may have on minerals varies by alternative in the following order (eg., maximum to minimum road construction and timber harvesting activity): Alternatives J, B, D, H, A/NFMA, NC, C, I, G, F and E. The actual effect cannot be quantified more than what is shown as direct effects on mineral resources.

8) Effects of Range Management on Mineral Resources

The effect that range management will have on mineral resources comes in the form of increased or decreased operating and reclamation costs. However, as with the soil resources, the forage resources do not vary significantly by alternative. As a result, the impact that this activity would have on mineral resource availability would not vary much by alternative.

9) Effects of Old Growth and Threatened and Endangered Species on Mineral Resources

Section 7 of the Endangered Species Act of 1973 requires the Forest Service to ensure that an action is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of any such species' critical habitat, unless that agency has been granted an exemption for such action. Based upon 45 F.R. 78905, November 26, 1980, an operating plan could be rejected based on Section 7 if there is an unavoidable conflict with an endangered species habitat. As a consequence, the effect of these resources can be the same as any withdrawal. On the other hand, even though an operator can be required to include protective measures for sensitive species, it is less likely a plan could be disapproved based upon impacts to a sensitive species or it's habitat. In any case, the requirements of the Endangered Species Act and the manner in which we manage for such resources is the same in all alternatives.

10) Effects of Unique Ecosystems and RNA's on Mineral Resources

As with many of the other resources, the effect of managing for unique ecosystems and Research Natural Areas can either be restrictive in nature by limiting the scope and location of activity, or preclude such activity if an area is withdrawn from mineral entry. If withdrawn the effects would be the same as discussed under wilderness above. As indicated under the Unique Ecosystem section of this chapter, protection of these areas would range from minimal to maximum in the following order: Alternatives NC, J, A/NFMA, H, C, I, G, E, B, D and F. However, the protection of Research Natural Areas would vary only slightly by alternative since all but one RNA is either formally proposed as a Research Natural Area or is located within wilderness in every alternative.

11) Effects of Water, Air and Fisheries on Mineral Resources

Protecting air quality, water quality and fish habitat from the impacts of mining related activities may cause delays and increase the cost of conducting those activities. However, since mining operators are required to meet all Federal and State water and air quality requirements no matter which alternative is implemented, the effects of managing for those resources will actually vary little between alternatives. The actual effect in terms of increased cost of operation or delays is assessed when activities are proposed.

12) Effects of Soil on Mineral Resources

The effect that soil has on mineral resources generally comes in the form of delays and increased operating costs which are involved with ensuring minimal erosion and appropriate reclamation. However, since soil erosion characteristics do not vary by alternative, the effect that soil will have on mineral resource activities does not vary much by alternative.



TABLE IV-21
EFFECTS OF THE ALTERNATIVES ON A FOREST-WIDE BASIS
(ACRES AND PERCENTAGES OF FOREST WITHDRAWN OR MANAGED AS HIGHLY
SENSITIVE AREAS) ^{1/}

Alternative ^{3/}	Area Other Than ^{2/} Wilderness Where Management Prescrip- tions Call Specific- ally for Withdrawal Acres/ % of Forest	Highly Sensitive Management Area (Generally open to mineral entry, but highly restrictive protective mea- sures may apply). Acres/ % of Forest
A/NFMA	1,717 acres (0.08%)	411,199 Acres (18.9%)
B	2,247 Acres (0.1%)	384,868 Acres (17.8%)
C	2,247 Acres (0.1%)	482,876 Acres (22%)
D	2,247 Acres (0.1%)	384,868 Acres (17.8%)
E	3,837 Acres (0.2%)	654,598 Acres (30%)
F	3,689 Acres (0.2%)	606,495 Acres (28%)
G	2,247 Acres (0.1%)	536,513 Acres (24.8%)
H	1,717 Acres (0.08%)	417,325 Acres (19%)
I	2,247 Acres (0.1%)	482,876 Acres (22%)
J	2,247 Acres (0.1%)	365,046 Acres (16.9%)

^{1/} Highly sensitive areas are generally open to mineral entry, however, "seasonal restrictions," "no surface occupancy stipulations" or other highly protective measures may be required for approved mineral-related activities.

^{2/} Wilderness includes 841,034 acres which is 38.9% of the Forest. This does not change by alternative. Current administrative withdrawals include approximately 7,627 acres, which is 0.35% of the Forest. These may or may not be continued depending upon the results of the withdrawal review process.

^{3/} Figures for Alternative NC are not available

FIGURE IV-9
EFFECT OF MANAGEMENT PRESCRIPTIONS ON MINERAL ACTIVITIES

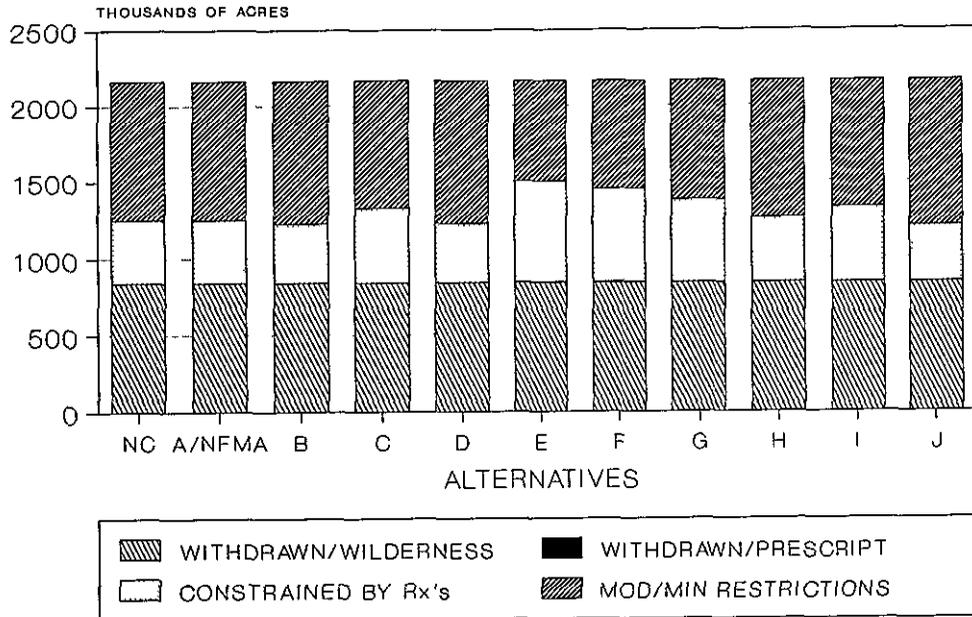


TABLE IV-22
CONSEQUENCES ON LOCATABLE MINERALS RESOURCES
ACRES IDENTIFIED AS HAVING LOCATABLE MINERAL RESOURCE POTENTIAL
AFFECTED BY HIGHLY SENSITIVE MANAGEMENT PRESCRIPTIONS

ACCESS RESTRICTIONS, i.e., the degree to which management prescriptions restrict mineral activities (prospecting, exploration and development) WITHDRAWAL FROM MINERAL ENTRY (Valid existing rights will be determined and recognized)	1/ Applicable Management Prescriptions 2/ RN-1 WS-3	Mineral Potential Category (Locatable Minerals) High Moderate Low/Unknown	ACRES 3/											
			ALTERNATIVES											
			A/NFMA 0	B 0	C 0	D 0	E 0	F 0	G 0	H 0	I 0	J 0		
			827	827	827	827	827	827	827	827	827	827	827	827
			890	1,420	1,420	1,420	3,010	2,862	1,420	890	1,420	1,420		
HIGHLY SENSITIVE AREAS (Withdrawals from mineral entry will be recommended for limited areas and only when found to be necessary, maximum but reasonable resource protection will be emphasized, special stipulations will be used, mineral exploration and development will be encouraged and facilitated)	EF-1 OG-1 RE-1 RE-2 RE-3 SI-1 SI-2 WS-1 WS-2	High	4,961	4,431	7,081	4,431	11,575	8,692	5,024	5,470	7,081	4,431		
		Moderate	17,999	18,850	21,518	18,805	24,804	23,596	21,879	18,444	21,518	18,805		
		Low/Unknown	380,458	353,853	446,497	353,853	610,439	566,427	501,830	385,632	446,497	334,030		
MODERATELY SENSITIVE AREAS (Mineral exploration and development will be encouraged and facilitated, however, period of operation may be restricted, special stipulations may be applied)	EW-1 EW-2 ST-1 ST-2	High	8,141	4,113	6,084	4,113	2,629	5,491	8,162	7,632	6,084	4,113		
		Moderate	25,377	15,116	16,367	15,116	20,458	21,349	22,939	24,931	16,367	14,967		
		Low/Unknown	521,398	293,580	479,528	293,580	548,577	545,905	591,676	516,225	479,528	330,978		
LOW SENSITIVITY (Mineral exploration and development will be encouraged with minimal restraints)	GF RM-1	High	1,102	5,660	1,039	5,660	0	21	1,018	1,102	1,039	5,660		
		Moderate	2,162	11,618	7,653	11,618	276	594	721	2,162	7,653	11,766		
		Low/Unknown	352,050	605,944	327,352	605,944	92,772	139,603	159,871	352,050	327,352	588,369		

1/ See standards and guidelines, strategy goal statements, and descriptions

2/ This does not include wilderness, since it does not change between alternatives. Wilderness areas do affect 32,776 acres or 67.5% of the high potential area, and 786,718 acres or 39% of the Low/Unknown potential area.

3/ These acreages do not include private lands and water. In addition, acreage figures are not available for the NC alternative.

FIGURE IV-10
CONSEQUENCES ON LOCATABLE MINERAL RESOURCES

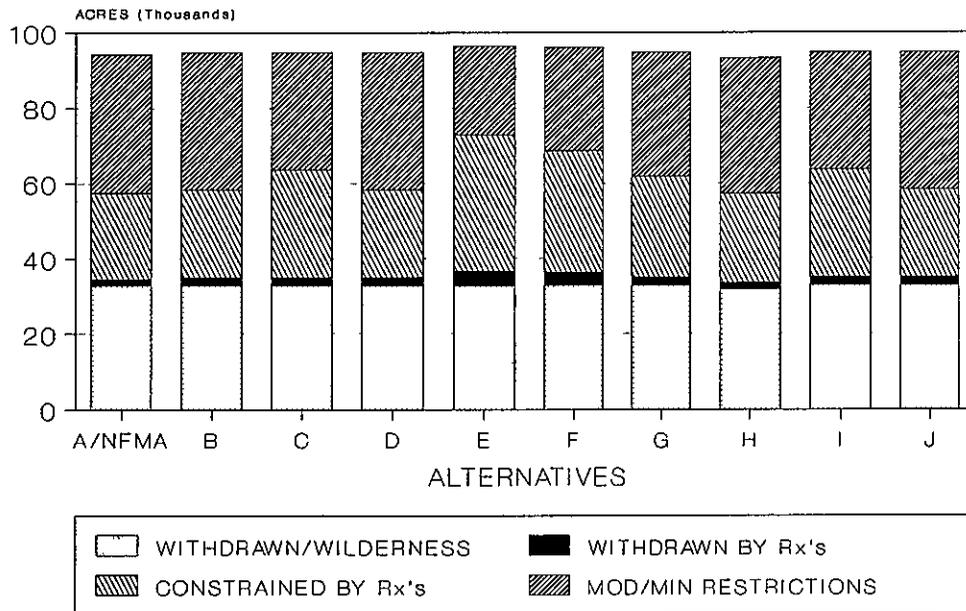


TABLE IV-23
LOCATABLE MINERAL POTENTIAL AREA WITHDRAWN
OR MANAGED AS HIGHLY SENSITIVE AREAS

Alternative ^{3/}	Portion of the "High" and "Moderate" Locatable Mineral Potential Area Withdrawn by Management Prescriptions ^{1/}		Portion of the "High" and "Moderate" Locatable Mineral Potential Area Managed As Highly Sensitive Areas ^{2/}	
	Acres	% of the High and Moderate Potential Area	Acres	% of the High and Moderate Potential Area
A/NFMA	827	0.7%	22,960	19.3%
B	827	0.7%	23,236	19.5%
C	827	0.7%	28,599	24%
D	827	0.7%	23,236	19.5%
E	827	0.7%	36,379	27.1%
F	827	0.7%	32,288	30.5%
G	827	0.7%	26,903	22.6%
H	827	0.7%	23,914	20.1%
I	827	0.7%	28,599	24%
J	827	0.7%	23,236	19.5%

^{1/} This does not include wilderness which is 51,072 acres or 42.9% of the area identified as having a "High" to "Moderate" potential for the occurrence of locatable mineral resources. None of the alternatives would change the location of wilderness.

^{2/} Highly sensitive areas are generally open to mineral entry, however, "seasonal restrictions," "no surface occupancy stipulations" or other highly restricted measures may be required for approved mineral-related activities.

^{3/} No acreage figures are available for the NC alternative.

**TABLE IV-24
CONSEQUENCES ON ENERGY MINERALS (ACCESS AND MINERAL POTENTIAL IN ACRES)**

ACCESS RESTRICTION, i.e., the degree to which management prescriptions re- strict mineral related activities (prospecting, ex- ploration, and development)			ACRES AFFECTED BY MANAGEMENT PRESCRIPTIONS, WHICH ARE CLASSIFIED "PROSPECTIVELY VALUABLE" FOR A LEASABLE MINERAL COMMODITY										
3/ WITHDRAWAL FROM MINERAL ENTRY (Valid existing rights will be de- termined and recognized)	1/ Applicable Management Prescriptions	2/ Energy minerals classified "prospectively valuable" for coal, oil, and gas, geothermal	7/ ACRES										
	3/ WITHDRAWAL FROM MINERAL ENTRY (Valid existing rights will be de- termined and recognized)	4/ Oil and Gas and A.C.M.P. Oil and Gas Geothermal Coal 5/	A/NFMA	B	C	D	ALTERNATIVES				I	J	
6/ HIGHLY SENSITIVE (Withdrawal from mineral entry will be recommended for limited areas and only when found to be necessary, maximum resource protection will be emphasized, spe- cial stipulations will be used)	1/ EF-1 OG-1 OG-2 RE-1 RE-2 RE-3 SI-1 SI-2 WS-1 WS-2 MP-1 EW-3	4/ Oil and Gas and A.C.M.P. Oil and Gas Geothermal Coal					E	F	G	H	I	J	
			0	530	530	530	530	530	530	530	0	530	530
	RN-1	Oil and Gas	0	530	530	530	530	530	530	530	0	530	530
	WS-3	Geothermal	0	0	0	0	0	0	0	0	0	0	0
		Coal 5/	869	869	869	869	869	869	869	869	869	869	869
			12,890	12,763	22,578	12,763	28,875	26,649	20,967	12,890	22,578	12,763	
	OG-1	Oil and Gas	32,246	29,108	44,330	29,108	63,792	53,234	48,082	32,246	44,330	28,070	
	OG-2	Oil and Gas											
	RE-1	Geothermal	55,269	43,503	58,767	43,503	95,189	76,787	62,074	56,774	58,767	42,379	
	RE-2	Geothermal											
	RE-3	Geothermal											
	SI-1	Coal	140,070	126,396	155,758	126,396	199,091	186,646	172,294	138,904	155,758	123,110	
	SI-2	Coal											
	WS-1	Coal											
	WS-2	Coal											
	MP-1	Coal											
	EW-3	Coal											
			56,053	23,002	36,528	23,002	42,506	44,033	49,566	56,053	36,528	29,617	
	EW-1	Oil and Gas and A.C.M.P.											
	EW-2	Oil and Gas	104,559	49,969	94,956	49,969	114,438	116,707	126,290	104,559	94,956	72,314	
	ST-1	Geothermal	93,111	38,139	72,929	38,139	73,056	85,310	93,556	91,606	72,929	37,885	
	ST-2	Geothermal											
	RE-4	Coal	187,961	127,159	171,276	127,159	204,201	207,762	197,649	189,127	171,276	135,575	
			4,622	37,270	13,929	37,270	1,654	2,353	2,502	4,622	13,929	30,655	
	GF-1	Oil and Gas and A.C.M.P.											
	GF-3	Geothermal	34,005	100,743	50,690	100,743	14,141	20,289	26,755	34,055	50,690	102,121	
	GF-4	Geothermal											
	GF-5	Coal	96,757	171,234	97,754	171,234	21,497	30,380	54,844	96,757	97,759	166,103	
	GF-6	Coal											
	RM-1	Coal											

1/ See standards and guidelines and management area descriptions

2/ These acreages may overlap (e.g. the same area may be classified "PV" for geothermal, coal and/or oil and gas)

3/ This does not include wilderness since it does not change by alternative. The wilderness areas do affect 107,379 acres classified prospectively valuable for coal resources (18% of the total "PV" coal area), 6,190 acres classified "PV" for oil and gas (3.0% of the total "PV" oil and gas area), and 417,517 acres classified "PV" for geothermal resources (70% of the total "PV" geothermal area)

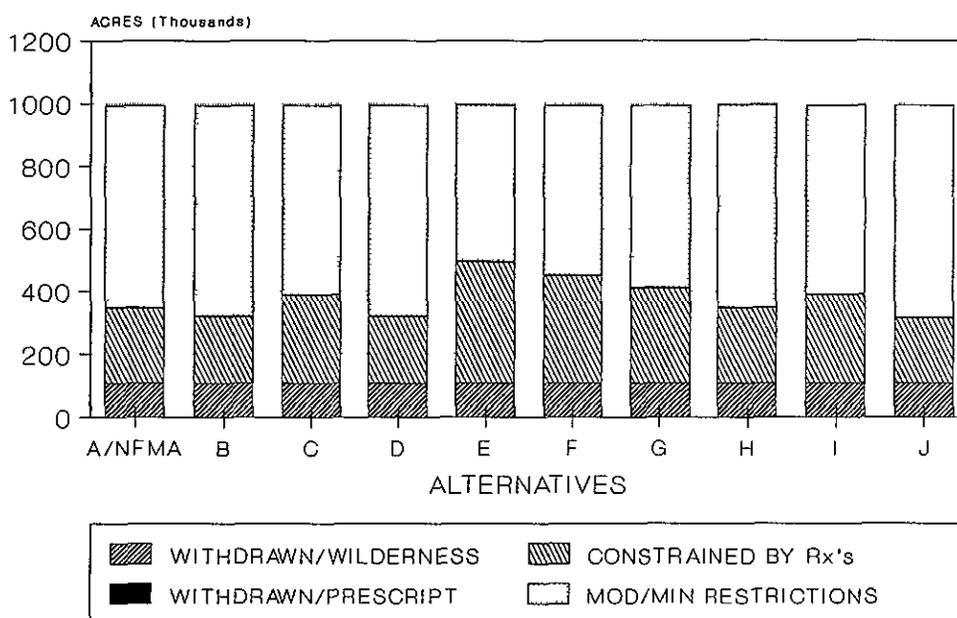
4/ A.C.M.P. Area of Critical Mineral Potential identified in a BLM nomination process

5/ Area classified as a "known coal area" by the BLM lies entirely on private land

6/ "Highly" sensitive areas are generally open to mineral entry, however, "seasonal restrictions," "no surface occupancy" stipulation or other highly restrictive measures may be required for approved activities

7/ No acreage figures are available for the NC alternative

**FIGURE IV-11
CONSEQUENCES ON ENERGY MINERAL RESOURCES**



**TABLE IV-25
AREA CLASSIFIED "PROSPECTIVELY VALUABLE" FOR LEASEABLE ENERGY MINERALS 1/
WITHDRAWN OR MANAGED AS HIGHLY SENSITIVE AREAS 2/**

Alternative 4/	Highly Sensitive Management Area (generally open to mineral entry, but highly restrictive protection measures may apply).		Withdrawn as a Result of Management Prescriptions 3/	
	Acres	% of Total Classified Area	Acres	% of Total Classified Area
A/NFMA	227,585	17%	869	<0.1%
B	199,007	15%	1,399	0.1%
C	258,855	19%	1,399	0.1%
D	199,007	15%	1,399	0.1%
E	358,072	27%	1,399	0.1%
F	316,667	24%	1,399	0.1%
G	282,450	21%	1,399	0.1%
H	227,924	17%	869	<0.1%
I	258,855	19%	1,399	0.1%
J	193,559	14%	1,399	0.1%

1/ The amount of area identified may include duplicated acreages when an area is classified prospectively valuable for more than one energy mineral resource

2/ Highly sensitive areas are generally open to mineral entry, however, "seasonal restrictions," "no surface occupancy" stipulations, or other protective measures including some withdrawals may be required

3/ This does not include wilderness which is 531,086 acres or 40% of the total area identified as being prospectively valuable for energy mineral resources. None of the alternatives would change the location of wilderness

4/ No acreage figures are available for the NC alternative

13) Effects of Alternatives in general on mineral resources

As with the effects that the other resources have on mineral resources which are addressed above, the effects that each alternative in general would have cannot be quantified in terms of dollars or tons at a certain grade, but they can be shown in relative terms. Except in those areas that are withdrawn from mineral entry, the public has a statutory, non-discretionary right to explore the public lands for locatable minerals. Upon confirmation that a discovery of a valuable mineral deposit has been made, they have the right to mine. The Forest Service does not have authority to deny an operating plan filed to conduct mineral activities on public lands, but they do have the authority to approve only those activities that are reasonably necessary for mining purposes. The authority also exists to restrict those activities to a degree that insures no undue degradation of the environment occurs.

The public also has an exclusive right to explore for leasable minerals and to produce both leasable and salable minerals from public lands if they hold a valid lease or permit. Whether leases or permits will be issued, and the environmental constraints which are attached, depends on whether the associated mineral activities meet the management strategies for the land.

Specific leasing decisions will be made when applications to lease are received, or the Forest Service initiates oil and gas leasing activity in keeping with the Oil and Gas Leasing Reform Act of 1987. When claimants have a right to mine or produce minerals, they are also guaranteed reasonable access for mining purposes. The same rights apply to withdrawn areas if valid rights perfected prior to the withdrawal exist. Operators will, however, be expected to reasonably protect the sensitive resources for which any area is being managed. This is especially important within the environmentally sensitive areas or roadless areas where "highly" sensitive management prescriptions have been adopted. In those areas where environmental protection measures are required in approved operating plans, leases and permits will be more stringent. Reclamation objectives and mitigation measures may also be more difficult to satisfy. As a consequence,

operating costs will be higher than they are in areas managed under less sensitive resource objectives. This may influence interest in exploring these areas for their mineral resources, but it would not preclude exploration or development should demand justify the higher cost of operating in these areas.

The effect that the management prescriptions used for "highly" sensitive management areas will have on mineral resources, again, cannot be accurately quantified in terms of tons at a certain grade or in dollars. However, Figures IV-9 through IV-11 visually depict the different restrictive effects that implementing the various alternatives would have. As these three figures and Tables IV-21 through IV-23 show, 841,034 acres (39 percent of the total Forest acres) have already been withdrawn as wilderness. The only mineral activities allowed within these areas will be those authorized by valid existing rights perfected prior to the area's withdrawal as wilderness. As a consequence, the area is no longer available for exploration and development under the mining and mineral leasing laws. The quantified effect of these withdrawals has not been determined, but since this impact does not vary by alternative, it will not be discussed further in this part of the analysis.

In general terms, if withdrawing lands, restricting use of and access by motorized equipment, limiting road construction activities, limiting mining-related surface disturbing activities or increasing reclamation and environmental protection requirements for recreation, scenic, wildlife and other purposes are considered to cause more negative impacts on mineral resource availability than an opposite or less restrictive approach to management would, then the effect that the alternatives have on mineral resource availability varies relatively from smaller to greater in the following manner:

Forest-wide (no consideration for mineral resource potential)
Alternatives J, B, D, A/NFMA, NC, H, C, I, G, F and E (see Table IV-21 and Figure IV-9).

Locatable mineral resources (High to moderate potential)
Alternatives A/NFMA, NC, B, D, J, H, G, C, I, F and E (see Tables IV-22 and 23, and Figure IV-10).

Energy mineral resources (oil and gas, coal and/or geothermal)
Alternatives J, B, D, A/NFMA, NC, H, C, I, G, F, E (see Tables IV-24 and 25, and Figures IV-11).

As an example, Table IV-21 indicates how much of the Forest would be proposed for additional withdrawals and what portion of the Forest would be managed as highly sensitive areas. Tables IV-22 and IV-23, on the other hand indicate how the withdrawal or highly sensitive management approach would affect areas having potential for the occurrence of locatable mineral resources and/or leasable mineral resources.

As the figures and tables show, Alternative A/NFMA would result in the withdrawal of an additional 1,717 acres, with 309,332 acres managed under "highly" sensitive management prescriptions (14 percent of the total Forest acres). This would have the effect of limiting, "highly" constraining or increasing the cost of conducting mineral-related activities on: (1) 20,458 acres (18 percent) of the area identified as having a "high" and "moderate" potential for the occurrence of locatable minerals; (2) 12,911 acres (17 percent) of the area classified "prospectively valuable" for oil and gas; (3) 42,103 acres (9 percent) of the area classified "prospectively valuable" for geothermal resources, and (4) 98,603 (18 percent) of the acres classified "prospectively valuable" for coal resources. The withdrawal areas would not affect any "high" potential locatable mineral areas, but would affect 869 acres classified "valuable" for coal.

Alternative C would result in the withdrawal of an additional 2,247 acres with 436,915 acres managed under "highly" sensitive management prescriptions (20 percent of the total Forest acres). This would have the effect of limiting, "highly" constraining or increasing the cost of conducting mineral-related activities on: (1) 25,652 (23 percent) of the area identified as having a "high" and "moderate" potential for the occurrence of locatable minerals; (2) 35,192 acres (17 percent) of the area classified "prospectively valuable" for oil and gas; (3) 48,209 acres (8 percent) of the area classified "prospectively valuable" for geothermal resources; and (4) 140,896 acres (26 percent) of the area classified "prospectively valuable" for coal resources. The withdrawal

areas would not affect any "high" potential locatable mineral areas, but would affect 869 acres classified "valuable" for coal. It also would affect 530 acres classified "prospectively valuable" for oil and gas resources, which is also identified as an "area of critical mineral potential."

Using the referenced Figures and Tables, effects of a similar nature caused by Alternatives NC, B, D, E, F, G, H, I and J can be identified and compared.

The effects that the alternatives have on "areas of critical mineral potential" (ACMP) are essentially covered by the above discussion. However, for the benefit of the reader a little more detail is being provided. The Forest has four "areas of critical mineral potential". One lying in Townships 20 and 21 N., Ranges 17,18, 19 and 20 E., appears to have been nominated primarily for its oil and gas resource potential. That ACMP area is included with the oil and gas discussion above, and is addressed in the Tables and Figures.

The other three ACMP areas lie on the Naches Ranger District. One of those areas lies wholly within a designated wilderness and the other two lie partially within wilderness. Since wilderness does not change by alternative, the effects that the alternatives would have on that portion of the ACMP's lying within wilderness areas does not change by alternative.

The two areas which have portions lying outside wilderness would be managed differently under the various alternatives (Area #1 in T.17N.,R.13E. and Area #2 in T.17N., R.11E.). The amount of Area #1 managed as General Forest, Scenic Travel Routes, Developed and Dispersed Recreation, Old Growth Habitat and as a Scenic River changes by alternative. As a consequence, Alternatives A/NFMA, B, D, C, H, I and J would have less effect on minerals than would Alternatives E, F and G. Conversely, Area #2 would be managed for Scenic Travel, and Dispersed and Developed Recreation under all the alternatives. Since all of these prescriptions are considered to be highly sensitive to land-disturbing activities, it appears that the effects would not vary significantly by alternative.

As far as recreational panning, sluicing, dredging and collecting is concerned, none of the alternatives specifically preclude such activities nor do they withdraw areas specifically for that purpose. If such activities can be conducted in a manner that is compatible with management objectives for the area, the standards and guidelines provide for the approval of such activities. As a consequence, it does not appear that the effects would vary much by alternative. If anything, they would vary in the same relative manner as is shown for locatable minerals above.

Common variety minerals, on the other hand, occur throughout the Forest and it appears that none of the alternatives will significantly affect the availability of that resource.

b. Cumulative Effects of Each Alternative on Minerals

Since we do not know where, what type, or when mineral activities will be conducted, the cumulative effects that mineral-related activities may have on other resources must be addressed when activities are actually proposed. As a consequence, the cumulative effects that mineral-related activities may have on other resources have not been addressed in any detail. On the other hand, the cumulative effects that the alternatives have on mineral resource availability have been addressed in some detail.

Even though an area has a "high" or "moderate" potential for the occurrence of mineral resources, it is of little value if the area is off limits to mineral exploration and development, or constrained by protective management prescriptions. Formal withdrawals have the effect of placing lands off limits unless prior existing rights are involved. Management prescriptions, on the other hand, can take the form of a "de facto" withdrawal when discretionary actions such as the leasing and selling of minerals is involved. Managers may choose not to issue a lease or a permit if the related activities would be incompatible with the management objectives for the land, or may strongly constrain mineral activities to meet the management objectives for the land. Since mineral deposits are not distributed randomly, but are associated with unique geologic conditions, a few

withdrawals accompanied by highly restrictive stipulations attached to leases or permits could effectively eliminate production of certain mineral commodities from the forest lands.

In addition to the wilderness, there are approximately 7,627 acres of Forest Service administrative withdrawals and 67,651 acres of powersite and reclamation withdrawals which are currently being reviewed as required by Federal Lands Policy Management Act. As they are reviewed, a decision will be made as to whether they should be retained, modified or terminated. That decision has not been addressed in any one of the alternatives. Therefore, other than the fact that they presently exist and contribute to the cumulative impact of mineral withdrawals, that effect cannot be quantified except by indicating which acreage is currently withdrawn. The effect of that does not vary by alternative.

By implementing the various alternatives, an additional 18 to 35 percent of the "high" and "moderate" potential locatable mineral resource areas, 15 to 32 percent of the potential oil and gas areas, 24 to 38 percent of the potential coal resource areas, and 8 to 18 percent of the potential geothermal resource areas would be affected by highly sensitive management strategies. Cumulatively, the consequences appear to be most severe on geothermal resources where 70 percent of the area classified "prospectively valuable" for geothermal resources is already withdrawn as wilderness, and an additional 8 percent to 16 percent would be withdrawn or "highly" restricted as a result of implementing the various alternatives.

To add to the cumulative effects of the existing withdrawals, and any new withdrawals initiated as a result of implementing the Forest Plan, are those withdrawals made effective when a new application for a power project is received. Not only is the site automatically withdrawn from mineral entry when the application is received, but it remains withdrawn and there is presently no mechanism for revocation. Since we do not know where, when, or what type of hydroelectric project will be applied for, there is no way to quantify the anticipated impact that future proposals of this nature will have on minerals availability.

c. Alternatives' Conflicts with Other Agency Plans and Policies

The mineral management objectives and policy of the Forest Service are quite similar to and compatible with the objectives and policy of other Federal, State, and local agencies. Considering the regulatory control and mineral management policy of the Forest Service, it appears that there are no significant conflicts between the effects of the alternatives and the objectives of the other agencies.

d. Mitigation Measures for Mineral Resources

The impacts that each alternative would have on mineral resources has been measured in terms of land availability for mineral exploration and development activities and in terms of regulatory constraints. As a mitigating measure for these impacts and to insure lands remain available for mineral exploration and development if at all possible, existing withdrawals will be reviewed for need, and new withdrawals will be periodically reviewed as well. If they are not necessary for adequate protection of sensitive resources or substantial investments, then the withdrawals will be revoked and the land reopened to mineral entry. Stipulations attached to leases, permits, and approved operating plans as a result of management prescriptions will also be reviewed for reasonableness and effectiveness, as well as their influence on mineral activity. When warranted, stipulations will be modified.

The mitigating measures used to protect or minimize the impacts caused by mining related activities are discussed under the other resource narratives in this chapter.

13. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON ROADS

a. Direct and Indirect Effects of Each Alternative on Roads

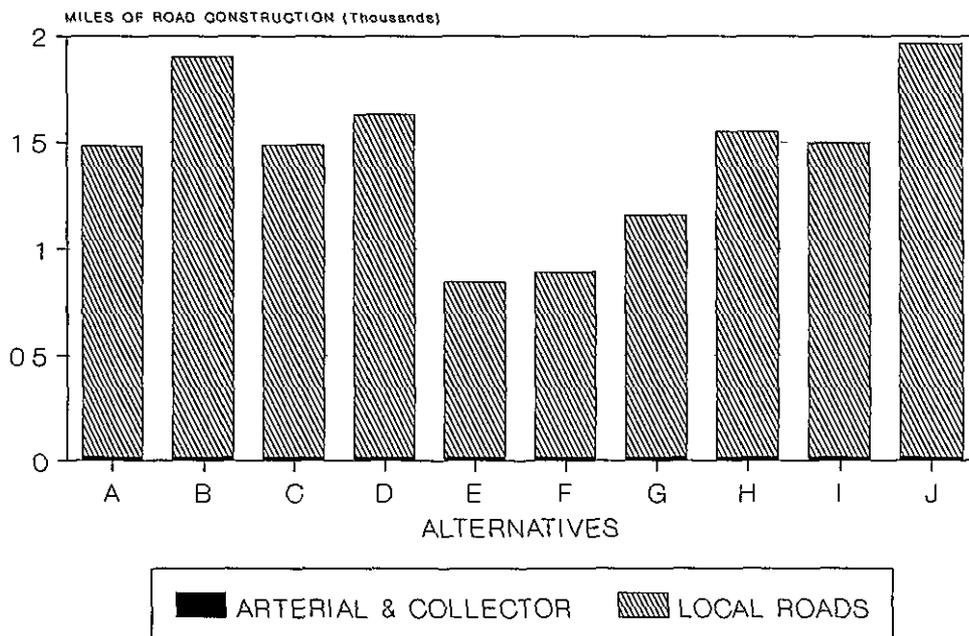
It is the effects of roads on the environment that is of concern to both the public and the managers of the Wenatchee, and these have been addressed under the individual environmental components throughout Chapter IV. However, there are also direct effects on the road system created by the implementation of a land use alternative, as described below. The information presented here may be useful in comparing the direct and indirect effects of the road system on soil, water, wildlife, scenery, recreation, cultural and other environmental components found elsewhere in this chapter.

(1) **Arterial and Collector Roads**

The proposed construction and reconstruction of the arterial and collector system for the various alternatives is shown on Table IV-26. As the table shows, these roads are not as sensitive to the alternative development process as the local roads are. These roads are the primary and secondary travel routes, the people movers. They access large and popular land areas. A typical arterial road on the Wenatchee National Forest begins as a double lane, asphalt-surfaced road that takes off from a State highway or is an extension of a County road. Typically these roads are located in valley bottoms adjacent to major rivers. They provide access to several developed sites, numerous trailheads, lakes, timber sales, and usually end at a wilderness trailhead. These roads collect timber traffic and disperse recreation traffic.

It is the type and amount of traffic generated by this mix of resource activities that determines the location, standard, and management of these facilities. As these roads proceed up the valleys, the amount of traffic decreases as people "get off" the system at the various recreation sites and the size of the tributary area and the amount of timber traffic becomes less and less. As the traffic decreases, so does the road standard and the level of service that the road provides. Ultimately, as the roads approach the wilderness, they become single-lane dirt roads. These more primitive roads provide a more appropriate setting for those individuals about to enter the wilderness and serve to discourage the less determined users.

FIGURE IV-12
MILES OF NEW ROAD CONSTRUCTION BY ALTERNATIVE



**TABLE IV-26
ARTERIAL AND COLLECTOR ROAD CONSTRUCTION AND RECONSTRUCTION BY ALTERNATIVE**

Road Name	Number	SL	Proposed		ALTERNATIVE ^{1/}											Remarks
			Const Mi M \$	Reconst Mi M \$	A	B	C	D	E	F	G	H	I	J		
Entiat Valley	5100	B		5 1 250	X	X	X	X	NA	NA	X	X	X	X	Recreation Road Capitol Investment	
Tyee Ridge	5700	B		4 0 100	X	X	X	X	NA	NA	NA	X	X	X	Asphalt surface	
Shady Pass	5900	C		15 8 725	NA	X	X	X	NA	NA	NA	X	X	X	Recreation access, safe joint use	
Chiwawa	6200	C		4 0 500	X	X	X	X	NA	NA	NA	X	X	X	Wilderness, Recreation access, safe joint use	
West Chiwawa	6306	C	5 0 250	3 6 135	X	X	X	X	NA	NA	X	X	X	X	Timber access	
Rainy Cr.	6700	B		1 1 61	X	X	X	X	NA	NA	X	X	X	X	Asphalt surface	
Labyrinth Mtn	6701	B		4 6 255	X	X	X	X	NA	NA	X	X	X	X	Asphalt surface	
Mission Cr	7100	C		12 7 315	X	X	X	X	NA	NA	NA	X	X	X	Timber, Recreation Access safe joint use	
Van Creek	7520	B		1 6 70	X	X	NA	X	NA	NA	NA	X	NA	X	Asphalt surface	
Icicle	76	A		4 6 400	X	X	X	X	NA	NA	NA	X	X	X	Recreation Road Capital Investment	
Grade Creek	8200	D		4 2 205	NA	X	X	X	NA	NA	NA	X	X	X	Recreation road	
Liberty Beehive	9712	C		2 1 100	NA	X	X	X	NA	NA	NA	X	X	X	Recreation road	
Derby	7400	A		0 7 100	NA	X	X	X	NA	NA	NA	X	X	X	Safe joint use	
Tieton	12	A		1 0 400	X	X	X	X	NA	NA	X	X	X	X	Coop with Yakima County	
Naches Pass	19	A	1 3 180	1 6 150	NA	X	NA	X	NA	NA	NA	X	NA	X	Asphalt surface	
	19	B			NA	X	NA	X	NA	NA						
Bethel Ridge	1500	C		3 0 200	X	X	X	X	NA	NA	X	X	X	X	Cronic Sediment Source	
S F Tieton	1000	B		7 3 960	X	X	X	X	NA	NA	NA	X	X	X	Asphalt surface	
Bumping Lake	18	B		0 3 40	X	X	X	X	NA	NA	X	X	X	X	Asphalt surface	
Nile Loop	1600	B		3 0 250	X	X	X	X	NA	NA	NA	X	X	X	Asphalt surface	
	1600	C		6 1 400	X	X	X	X	NA	NA	NA	X	X	X	Wilderness, Recreation, timber access safe joint use	
Manastash Lk	3100	C		2 3 30	X	X	X	X	NA	NA	X	X	X	X	Minor reconstruction	
Taneum	33	A		6 8 270	NA	X	X	X	NA	NA	NA	X	X	X	Asphalt surface	
Cooper	4600	C		2 2 25	X	X	NA	X	NA	NA	X	X	X	X	Minor reconstruction	
Table Mtn	3500	C		4 2 50	X	X	X	X	NA	NA	X	X	X	X	Minor reconstruction	
Cow Camp	3111	C		3 0 40	X	X	X	X	NA	NA	X	X	X	X	Minor reconstruction	
Tamarack Spr	3120	C		0 2 4	X	X	X	X	NA	NA	X	X	X	X	Minor reconstruction	
Log Creek	4110	C		0 4 5	X	X	X	X	NA	NA	X	X	X	X	Minor reconstruction	
East Kachess	4818	C	3 8 150		X	X	X	X	NA	NA	X	X	X	X	Timber access, share cost	
French Cabin	4308	C		2 0 30	X	X	X	X	NA	NA	X	X	X	X	Minor reconstruction	
N Fk Teanaway	9737	C		10 0 575	X	X	X	X	NA	NA	NA	X	X	X	Recreation, Wilderness access	
S Fk Taneum	3320	C	9 0 500		X	X	X	X	NA	NA	X	X	X	X	Timber Access	

X = Applies to this alternative

NA = Not applicable to this alternative

SL = Service Level See Chapter III for a description

^{1/} Data is not available for the NC alternative

Forest Service collector roads access the smaller drainages. Occasionally they cross over ridges to connect with the arterial roads in the major drainages. Collector roads have less traffic and provide lower levels of service.

The recreation use patterns within these road corridors is well established and is not expected to change significantly between alternatives. The construction and reconstruction is assumed to occur in the next 10 years.

Alternatives E and F will require a reduced level of development. There are a few primitive single-lane collector roads that are currently operating at or near their safe and efficient capacity and these roads are sensitive to the allocation of the land within their tributary area. Because of the reduced harvest level in Alternatives E and F, it may not be necessary to reconstruct roads like the Upper Chiwawa or Mission Creek.

The allocation of forest land to roadless management prescriptions will have an effect upon the share cost roads systems in "checkerboard" ownership areas. Because the allocations do not change between alternatives within the Alpine Lakes Management Unit, there will be no change from the existing situation in the share cost program within that area. There will also be no significant changes in the Oak Creek and Entiat Summit areas between alternatives. These areas are essentially developed. It is the allocation of the National Forest land to roadless prescriptions in the Cle Elum Ridge, Manastash and Taneum areas that varies between alternatives. There will be minor changes in the share cost systems in Alternatives B, J and D, a moderate impact in Alternatives A/NFMA, C, H, and I, a greater impact in Alternative G, and a significant impact in Alternatives E and F. Regardless of the alternative selected, the owner of the intermingled land in this area can be expected to access and manage the private lands, and has a right to reasonable access across National Forest land. When the surrounding land is allocated to roadless prescriptions, the Forest Service will not share in the construction of roads.

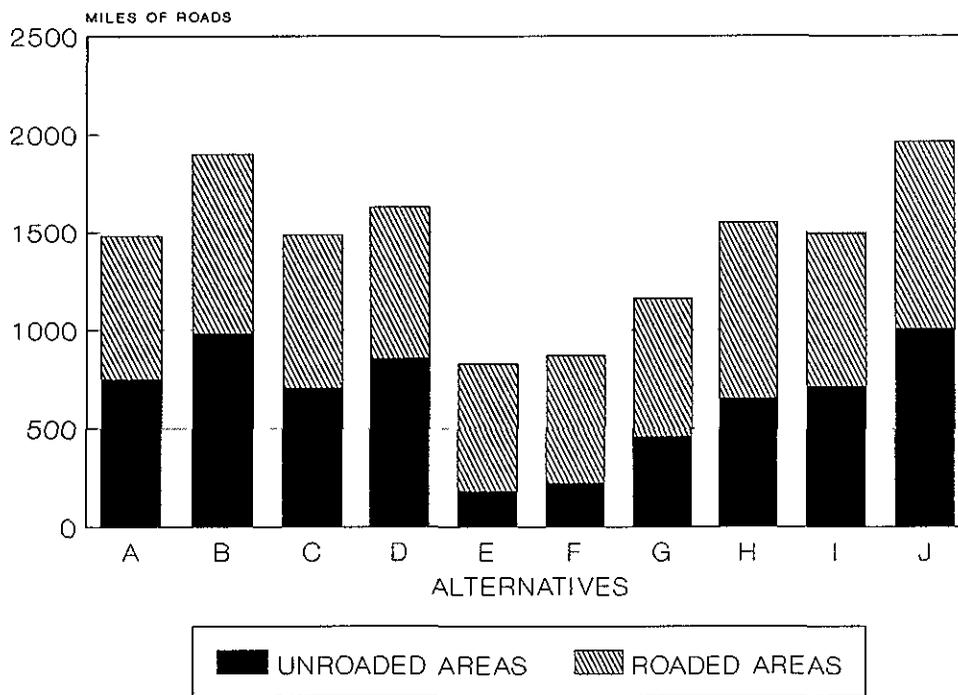
(2) Local Roads

In contrast to the arterial and collector roads, local roads are sensitive to the alternative development process. As shown in Table II-3a, the miles of timber purchaser roads vary with the amount and rate of timber harvest. These are the log movers. Although these roads are built by the purchasers of National Forest timber, they do provide opportunities for dispersed recreation in a roaded natural or roaded modified setting.

An analysis of the road systems required for the first entry into unroaded areas on the Wenatchee National Forest over the past 10 years has shown that there are an average of 5.5 acres accessed for each acre that is harvested during the initial entry. The reasons for this include timber size, age, visual quality objectives, wildlife concerns, and legal and policy requirements for clearcut size, leave strips, etc. These issues, concerns, and opportunities are identified during project planning and design and result in an increase in the number of acres accessed, relative to the number of acres actually managed. Because of these assumptions, and the concern over the rate of development in unroaded areas, this is an item that will be included in the monitoring plan. The reviewers of this document should be aware that development sales in unroaded areas will change the recreation setting on more acres than are actually harvested during the initial entry.

All alternatives will require new road construction. Figure IV-13 shows the long-term total miles of new road construction that are projected for each alternative.

FIGURE IV-13
TOTAL MILES OF NEW ROAD TO BE CONSTRUCTED



b. Cumulative Effects of Each Alternative

It may be more correct to identify the cumulative effects that roads have on other environmental components; however, the implementation of the various alternatives will have a cumulative impact on the Forest road system and the users of that system. The incremental effect, measured in the amount and type of traffic generated, determines the selection of road standards and their levels of service. This is particularly true of the arterial and collector road systems. The standards and service levels for the different alternatives are found in Table IV-26. The number or miles of road suitable for public use by passenger cars and high clearance vehicles, found in Table II-3a, could also be viewed as a cumulative impact on the accessibility of the Forest to road users. The variation in miles is a product of direction for road construction or operation found in the prescriptions applied in that alternative.

c. Alternatives' Conflicts with Other Agency Plans and Policies

Because of their capacity, the traffic impacts on the State highways are not expected to vary significantly between alternatives and will fall within the ranges identified in Chapter III.

The traffic impacts on Yakima County and Kittitas County roads are not expected to vary significantly between alternatives, also because of their capacity.

Because of the many primitive County roads, there will be a need for close coordination with Chelan County Public Works Department regardless of the alternative selected.

d. Mitigation Measures for Roads

It is generally accepted that roads generate most of the effects on water, soil, fish, wildlife, and scenery. In addition to changing the recreation setting, they also have potential to change recreation use patterns in adjacent roadless areas and wilderness areas. The surest method of mitigating those impacts is to avoid building roads. If it is not possible or practical to do this, the minimum amount of road of the lowest standard can do much to reduce those probable adverse environmental impacts that cannot be avoided. In addition to the Standards and Guidelines included in this plan, the Forest Service Manuals and Handbooks contain the direction necessary to mitigate the effects of roads with proper location, design, and management. Much of the recent research conducted by the Forest Service and others in the Blue Mountains, the Idaho Batholith, the Experimental Forests, and elsewhere is incorporated into the directives system. No road is constructed without appropriate environmental analysis; nevertheless, the potential risk to the environment is proportional to the amount of roading.

Road management, and in particular, road closures can mitigate the impacts caused by roads. The miles of road expected to be closed for the various alternatives is found in Table II-3a in Chapter II.

14. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON FIRE MANAGEMENT

For the purpose of this plan, wildfire and prescribed fire will be addressed together since the relationship between the two are inseparably intertwined. In this planning effort we have not attempted to develop separate fire management plans for each alternative. We have utilized the National Fire Management Analysis System (NFMAS) to determine the most cost effective level of protection given the range of outputs and the expected frequency of wildfires. This effort will provide us with an economic basis on which to begin the development of the Fire Management Action Plans for the Forest.

Fuels Management is an activity which varies in extent between alternatives. One of the methods of Fuels Management is to use prescribed fire to dispose of the unwanted residue. The management of fuels affects the management of fire by decreasing the accumulation of residue. This reduction in the volume of fuel available decreases the intensity of wildfires and also changes the characteristics of the fuel bed to the extent that the number of ignitions is also limited.

a. Direct and Indirect Effects of Each Alternative on Fire Management

Fire has played a significant role in the management of the Wenatchee National Forest. It has been a major influence on the ability of the Forest to provide commodities and amenities for the public and it has also influenced how the organization employed to manage the Forest has evolved.

Wildfires will continue to influence the management of the Forest as this plan is implemented. The primary emphasis of this planning effort has been to define the level of protection necessary to provide the outputs defined in the alternatives, and then to seek the most efficient organization to provide that protection

The management practices employed in several resource management disciplines significantly affect how fire will be managed as this plan is implemented. Those interactions are outlined below.

1) The Effects of Recreation on Fire Management

With increased recreational use of the Forest during the summer months there is an increased risk of human-caused fires. This risk depends on the type of activity being pursued and the location of the activity (i.e. off-road-vehicle use has more inherent fire risk than climbing glaciers). However, the occurrence of human-caused fires cannot be correlated to one specific user group. The activity causing the ignition, the location of the ignition, and the timing of ignition are of a random enough nature to cause comparison between alternatives to be, at best, subjective.

Recreational demand is expected to increase under all alternatives. The type of activities which are in vogue, and several cultural factors ranging from the acceptance of smoking to the knowledge of the public, will be the factors which determine how much impact recreational use of the Forest has on the management of fire.

2) The Effects of Wilderness Management on Fire Management

The largest impact of the proposed wilderness management practices is the use of natural ignitions to start prescribed fires within the seven wilderness areas. The reader should refer to Appendix E of the Plan for a detailed review of the wilderness management practices proposed for the Forest. This change is intended to allow fire to play a more natural role in these varied ecosystems. All human-caused fires will be managed as wildfires and an appropriate suppression strategy applied. If any of the prescribed fires exceed the parameters described in the prescribed fire plan for that wilderness, it will be declared a wildfire and suppressed. Examples of these parameters are funding, rate of fire spread, direction of spread, location, and predicted weather patterns.

Another impact of wilderness management on fire management is the need to protect the Class I airsheds associated with the Glacier Peak, Alpine Lakes, and Goat Rocks Wilderness areas from the smoke produced by the prescribed fires outside of these designated areas.

As the wilderness areas are constant through all alternatives, the impacts of these management practices on fire management is constant through all alternatives.

3) The Effects of Timber Management on Fire Management

The alternatives displayed in this plan are composed of differing allocations and management prescriptions. These prescriptions discuss the acceptable management practices for each area. It is the role of fire management to protect these areas efficiently and ensure that changes detrimental to the long-term production of resources do not occur.

Timber management is the primary vegetative management activity that affects fire management. If the debris that is left after a harvest activity is not disposed of, there is an increased chance of destructive wildfires occurring. Utilizing management practices which to some extent replicate the natural role of fire helps maintain a vegetative mosaic that is less susceptible to large, uncontrollable wildfires. Increasing the utilization of woody debris as chips or firewood can also be important to lowering the amount of fuel available. If management objectives can not be met through utilization, and further disposal of the material on the site is needed, prescribed fire is often used. The number of acres on which fuel management activities will occur annually are shown below for each alternative.

ALTERNATIVE	ACRES TO BE TREATED PER YEAR
NC	7,000
A	6,100
B	11,000
C	6,700
D	6,100
E	4,200
F	4,500
G	5,300
H	7,200
I	6,800
J	11,300

Implementation of Alternatives B or J would result in the most acres of fuel treatment. Alternatives E, F and G would result in the fewest acres of post harvest fuels treatment. Alternatives NC, A/NFMA, C, D, H and I would result in a mid-range of acres treated. Treatment of these acres would result in reduced wildfire hazard, but would also increase the potential for wildfire ignition from both industrial activity and slash disposal activities. When all the variables involved in the ignition and potential spread of wildfires are considered, it is not possible to develop a meaningful differentiation between the alternatives in terms of the effects of timber management on the management of fire.

Vegetation management has many facets other than timber management. The Plan will dedicate specific areas to be managed primarily for forage, old growth, riparian habitat, and many other uses. The management practices in each of these areas will affect fire management practices. In each area, the protection criteria will be jointly developed with the resource managers. Prescribed fire will be used as a tool when appropriate.

4) The Effects of Road Management on Fire Management

Road management affects fire management in two primary ways. The road system allows more rapid access for wildfire suppression, and it allows more access to the Forest for public use. This could result in an increased number of ignitions in areas that were previously subject to less intensive use.

For each alternative the sequence of roading by type and amount has been developed. Although there are differences between the alternatives, the impacts of these actions are not expected to significantly affect the implementation of the fire management program.

The reader should refer to Table II-3A in Chapter II of this document for an overview of the Road Management program by alternative.

b. Cumulative Effects of Each Alternative

The cumulative effects of each alternative should be viewed in concert with the management of the intermingled and adjacent lands. The timber on many of the private lands is being rapidly harvested. In some instances, disposal of the resulting slash adjacent to National Forest lands is not occurring. This results in an increased fire hazard. In other areas the private lands are being developed, with a dramatic increase in the number of structures found in the forest environment. These factors influence both the need to implement fuels/vegetation management projects on National Forest lands as well as the strategic decisions which must be made when wildfires occur.

The increasing demands being placed on the Forest to provide a variety of products and recreational amenities results in the fire management task becoming more complex. The cumulative effects will require a more intense effort to protect the Forest from wildfires to ensure the resource outputs described can be attained. It will also require that the fuel management activities be totally integrated into our resource management projects. The use of prescribed fire as one method of fuel management will require in-depth analysis and professional application. This will be of particular importance as we implement our revised wilderness management policies.

The losses and disturbance created by wildfire will continue to be detrimental to the management of the forest regardless of the alternative chosen for implementation.

As the use of the Forest changes so does the combination of ignition sources which result in the wildfires. The dynamic nature of the Forest ecosystems in combination with the shifting patterns of use and variable weather regimes make evaluation of the effects of the alternatives less than accurate. For that reason, it has not been attempted in this narrative.

c. Alternatives' Conflicts with Other Agency Plans and Policies

There are no identifiable conflicts between the implementation of the fire management direction outlined in the preferred alternative and the plans or policies of other Federal, State, or local agencies. As mentioned above, separate fire management plans have not been developed for the other alternatives.

d. Mitigation Measures for Fire Management

Several measures need to be pursued to ensure that the fire management program outlined in this document can be implemented. Specifically the following actions are recommended as being equally effective in all alternatives:

- 1) Continued emphasis must be placed on developing interagency cooperation between all parties involved in wildland fire suppression.
- 2) Fuel management must be integrated into all proposed project activities and must be an emphasis item for our timber harvest program. Utilization must be emphasized.
- 3) Cooperative protection planning must be implemented to provide appropriate protection for Federal, State, and private lands. It is imperative that we work with all county planning commissions and county commissioners in an attempt to improve their understanding of the effects of their decisions on fire management.

4) Continued research into the role of fire in maintaining the various ecosystems found on the Forest must occur.

5) Fire prevention must be integrated into all forest management activities. Private landowners and recreational users must continue to be made aware of the fire hazards and risks involved in outdoor activities.

Additional mitigation measures may be developed on a site specific basis. These activities should be pursued and implemented as appropriate

15. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON SOCIAL/ECONOMIC

a. Direct and Indirect Effects of Each Alternative on Social/Economic

Changes in the levels of Forest outputs have the potential to impact employment and income levels in local communities. Timber harvest levels do vary significantly between alternatives, accounting for the variation in jobs and income between alternatives.

Table IV-27 displays changes in employment and income by alternative in the first decade.

**TABLE IV-27
CHANGES IN EMPLOYMENT AND INCOME BY ALTERNATIVE**

	ALTERNATIVES									
	A/NFMA	B	C	D	E	F	G	H	I	J
Change in Employment (Jobs)	+ 39	+ 577	+203	+279	- 520	- 473	- 225	+ 324	+ 413	+ 630
Change in Income (Million \$)	+0 65	+15 31	+5.14	+7.20	-14 56	-13 30	-6 54	+8 43	+10.86	+16 76

For the first decade, Alternatives C and D would have similar community and social effects. In these alternatives, timber harvest declines slightly from the 1982 base period. There would be some decrease in economic activity related to timber harvest. Other economic activity due to recreation and wildlife outputs would increase slightly.

Visual quality could be decreased slightly from current conditions for Alternative C. The change would be slightly greater for Alternative D. The overall appearance of the Forest would be maintained.

Alternatives B, H, I, and J with their emphasis on the production of commodities, would have community and social effects developing sooner than the other alternatives.

The principal positive effect is the creation or maintenance of jobs in Chelan, Douglas, Kittitas, and Yakima Counties. The metropolitan areas would also benefit from the increased economic activity. However, the altered appearance of the Forest would be a major change from the expected appearance of the Forest for many urban residents. The perceived loss in recreation and visual qualities will have an adverse effect on these users.

The tourist-based communities would also experience an adverse effect based on the perceived loss in recreation and visual qualities. More than the urban areas, these communities would feel the benefits of a healthy economy, and the loss of unroaded recreation opportunities and natural-appearing landscapes. Generally, the older residents of these communities would be more accepting of these changes than the newer residents to whom the recreation opportunities are more important. There would be some breakdown in community cohesion in their outlook on the Wenatchee National Forest.

Many of the positive benefits of Alternatives B, H, I and J will accrue to the rural communities with ties to the wood products industry. Because of increased timber harvest there would be more good paying jobs to contribute to the quality of life in these communities. The leisure aspects of life in these towns would experience an adverse impact due to the change in local environmental

amenities, and changes in recreational opportunities.

The American Indian communities will experience the economic benefits experienced by other communities. There would be adverse effects due to perceived increased risk to cultural sites, risks to anadromous fish, a changed environmental setting of identified cultural sites, and a change in setting of activities identified in treaties.

These alternatives would be the most beneficial to other racial and cultural minorities, principally Hispanic-Americans, owing to their participation in the increased general economic activity in the local area. Similarly, women would benefit from the increased economic activity.

The principal negative effect of Alternatives E, F, and G is the reduction in the number of jobs. The decline in jobs would result in a decline in local economic activity and the related decline in county government receipts. These alternatives would have the most adverse social impacts on racial and cultural minorities (apart from American Indians) and on women.

The negative economic effects of these alternatives would not reach the metropolitan areas. Most urban residents would view the lack of development in a positive light. The effects on the expectations, beliefs, and cohesion would generally be positive.

The loss of jobs and the major social and psychological impacts of unemployment would hurt the rural wood product communities. While some values such as wildlife and visual qualities are improved, the net effect would be substantially adverse. In addition, the apparent "locking up" of productive resources is counter to deeply held values in these communities.

While the preservation of unroaded recreational opportunities and the maintenance of the natural appearance of the Forest are consistent with the values and expectations of tourist-based communities, the conflict between unroaded recreation and resource use will become more apparent and will have the effect of reducing the community cohesion. These communities could experience some of the economic down turn experienced by the wood products-based communities.

American Indian concerns would be alleviated in a large part because of the reduced activity on the Forest under Alternatives E, F and G. Cultural sites and areas relevant to Treaty Rights are generally unaffected, and these alternatives best contribute to their traditional way of life.

b. Cumulative Effects on Social/Economics

Private landowners, the Yakima Indian Nation and the Wenatchee National Forest are major suppliers of sawtimber in the immediate area of the Forest. Local area mills depend on all these sources for timber. Local area employment and income are influenced by the cumulative impact of timber supplied from all these sources.

Major private owners of timberlands have expressed an intention to harvest the remaining sawtimber on their lands within the next 10 to 20 years. The Forest Service attempts to supply a relatively steady flow of timber over time. This may result in large fluctuations in the amount of timber available to local mills over the next few decades. In general, those alternatives with higher harvest levels such as B, D, H, and J would have a lower cumulative effect. Alternative I would have the greatest cumulative effect since it has a higher harvest level for two decades, then drops to long-term sustained yield at the same time that the harvest levels from private lands drop. Alternatives E, F and G would have a cumulative effect in the first decade, but this would decrease thereafter as the area adjusts to the lower harvest level. Alternatives A/NFMA and C are in the middle range of cumulative effects.

16. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON CONSUMERS, CIVIL RIGHTS, MINORITY GROUPS, AND WOMEN

The environmental consequences of the alternatives on American Indian treaty rights and traditional uses of the Forest vary considerably. Each type of Indian use (hunting, fishing, food gathering, religious purposes) may require a different set of environmental conditions to sustain or enhance that use. No single alternative will directly benefit the American Indian community in all situations, nor will it resolve every concern.

Although every alternative would maintain and enhance the resident and anadromous fish habitat on the Forest, there would be differences in the potential pounds of anadromous fish that are available for subsistence and commercial harvest. (A large proportion of this difference would be due to downstream, off-Forest activities, however.) In Alternatives NC, A/NFMA, C, F, G, H, I, and J this potential harvest would be similar to the current situation. There would be little change to the anadromous fish with respect to reserved Treaty rights. In Alternatives B and D, there would be a slight increase in the potential pounds of anadromous fish available for commercial harvest, and in Alternative E, there would be the greatest potential increase. Some of this increase could be attributed to anadromous fish habitat improvements carried out on the Forest under these alternatives.

With respect to hunting and gathering rights, Alternatives NC, A/NFMA, B, D, H, I, and J would likely result in an overall drop in the large game populations due to loss of cover and some problems in forage availability. Conversely, huckleberry production would increase substantially due to the higher level of timber harvest. There would be no overall change in the availability of edible root plants. In Alternatives E, F, and G, there would be an increase in large game cover and forage. As a consequence, large game populations would also increase. With more acres in tree cover, there would be some loss in huckleberry habitat, but no overall change in the availability of edible root plants. In Alternative C, large game cover and forage remain at about current

levels. There would be some increase in huckleberry production, but no overall change in the availability of edible root plants.

The effects of the alternatives on traditional and religious uses of the Forest by American Indians can be assessed by examining the effects on cultural sites and the level of alteration of the natural landscape (generally, pristine environments are favored in religious ceremonies or uses).

In Alternatives NC, B, D, and J there would be substantial modification of the landscape. Timber harvest units and roads would be visible in many areas, detracting from the natural, scenic qualities at those localities. In addition, it might not be possible to manage all significant cultural resources in place. Localities that are culturally sensitive to the American Indians in the Little Naches drainage, in the Clemens and Bald Mountain area, in the upper Rattlesnake, and in the upper Chiwawa and White River drainages would all potentially be affected.

In Alternatives A/NFMA, C, H, and I, 41 percent of the known sites are within management allocations specifying intensive vegetative management. Most sites could be protected in place, but some data recovery might be required where conflicts could not be resolved. In these situations, all information of scientific value would be retrieved. However, some of these sites might represent a physical link between the American Indians and their ancestors. The loss of this attachment could not be adequately mitigated.

Alternatives C and I would also involve the modification of the natural-appearing character of several viewsheds. Of concern to the American Indians would be modifications in the Little Rattlesnake and Little Naches River drainages. Alternatives A/NFMA and H protect or enhance the majority of the important visual areas on the Forest. This would directly benefit ongoing traditional and religious uses of the Forest by the American Indians.

Alternatives E, F, and G have a high emphasis on scenic values, with little predictable impact on cultural sites. These three alternatives would likely enhance American Indian uses of the Forest.

The effects which the varying harvest levels have on employment are discussed elsewhere in this document. A decrease in available jobs, returns to counties, etc., would affect all persons, including minority groups and women.

Indirect but minor effects that would change by alternative are fuelwood availability and housing

Alternatives such as NC, B, D and J have the highest levels of timber harvest. These alternatives also provide more opportunities for wood gathering. Low income families often depend upon Forest residues for heat.

Probably the most significant change between alternatives is in the amount of work in reforestation and timber stand improvement which would be available for women and minority employment. This type of Forest work employs crews that have greater than the average number of minority contractors and employees.

Planting and thinning would decrease for all alternatives except B and H. The least work would be generated under Alternatives E and F. Alternative I would reflect little change from current employment in the first decade but would reduce jobs in the future. Alternatives A/NFMA, C and D all reforest between 3,000 and 5,000 acres per year and thin 3,000 to 4,000 acres per year. These program levels are within the lower range experienced in the past on the Forest. Therefore, those alternatives would have little impact on minority employment.

17. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON PRIME FARMLANDS, RANGELAND, AND FOREST LAND

Farmland

There are no prime farmlands within or adjacent to the Forest. Water from the Forest is used to irrigate orchards, pastures, and farmland in Central Washington, but none of the alternatives significantly affects the quality or quantity of water.

Rangeland

No prime grazing lands have been identified on the Forest. Non-tree vegetative types outside of wilderness contain less than five percent of the total forage acreage. Most of these grassland-shrub types are on the lower dry foothills or river breaks which receive less than 15 inches of annual precipitation.

Forest Land

The average growth rate of timber on the Forest under current conditions is 42 cubic feet per acre per year. There are approximately 120,000 acres that currently produce 85 cubic feet or more per acre per year. It is estimated that under intensive management the number of forest land acres producing 85 cubic feet or more can be increased by 20 to 30 percent. "Prime" forest land is a term used only for non-federal land and does not apply to National Forest lands.

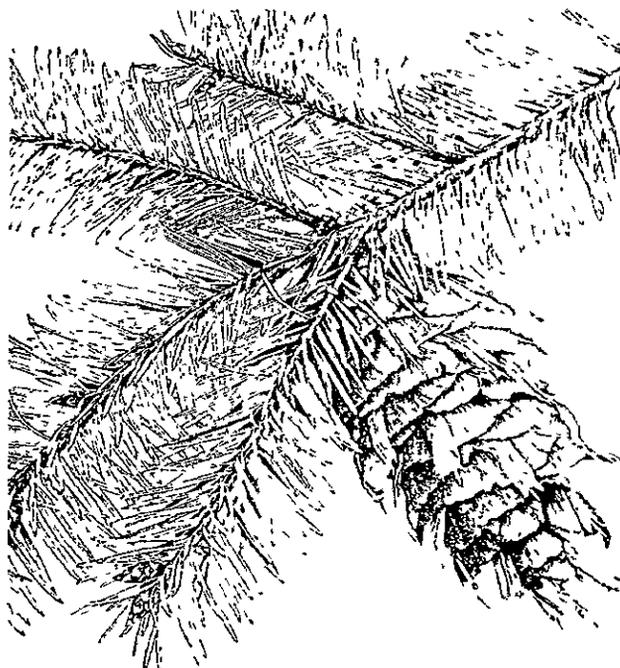
18. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON WETLANDS AND FLOODPLAINS

No significant effects within areas of wetlands and floodplains are anticipated. Adherence to mitigation measures should prevent all but minor and temporary impacts on these sensitive water-oriented areas.

Protection is afforded to these areas through the EW-2 prescription, Best Management Practices, environmental analysis evaluations, and Executive Orders (E.O.'s) 11990 (wetlands) and 11988 (floodplains). These E.O.'s provide direction to ensure that construction of roads, campgrounds, buildings, and other facilities will not have unacceptable adverse impacts on wet-type lands.

Riparian zones are afforded protection through the EW-2 direction along with the Forest's Standards and Guidelines. Protective measures for riparian measures include filter strips, stream channel stability considerations, instream flow maintenance and other resource concerns that are applicable across all proposed alternatives.

Floodplains shall be managed by locating necessary and critical facilities out of the wet areas or by utilizing structural measures to mitigate the impact to acceptable standards.



19. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON THREATENED AND ENDANGERED SPECIES, AND CRITICAL HABITAT

The Endangered Species Act mandates management of threatened and endangered species, therefore, emphasis on these species will have priority over other management objectives. Under restricted funding, threatened and endangered species management will take precedence over other direction and will be accomplished, to the extent possible, at the expense of other needs.

Species on the Forest that are managed under the Endangered Species Act are the Bald Eagle and Peregrine Falcon. The Grizzly Bear and Gray Wolf are being studied for potential recovery on the Forest. If it is decided to recover these species on the Forest then the present direction will be reviewed and adjusted as needed. The environmental consequences of the alternatives on these species are described in conjunction with the Wildlife section of this Chapter.

20. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON ENERGY REQUIREMENTS

Table IV-28 displays the estimated energy impacts of the various alternatives. The energy consumption component encompasses the energy required to produce and utilize Forest resources and to provide services and protection from natural calamities. The energy yields consider direct fuel values, hydroelectric power generation, savings over substitute materials, and savings due to a reduced need for energy expenditure. The net Forest resource energy balance is the difference between the energy produced and the energy expended in utilizing a Forest resource or service.

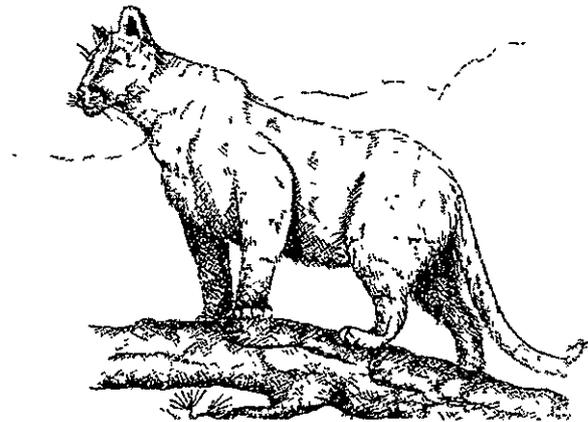


TABLE IV-28

ENERGY BALANCE BY RESOURCE GROUP AND BY PLANNING ALTERNATIVE

Trillions of BTU's

Length of Planning Period: 5 Decades

Resource Group	NC		A/NFMA		B		C		D		E		F		G		H		I		J	
	Con-sume	Yield																				
Timber	218 6	103 7	135 5	64 2	209 1	99 1	133 5	63 2	153 9	72 9	82.8	39 2	95 1	45 0	120 7	57 0	172 3	81 6	154 0	72 9	214 9	101 9
Biomass	0 9	89 8	1 1	66 9	0 9	85 9	1 1	65 7	1 3	76 3	0 8	40 8	0 9	46 9	1 0	60 1	1 4	85 0	1 3	78 4	0 9	88 3
Range	0 8	0 3	0 6	0 2	0 8	0 3	0 8	0 3	0 8	0 3	0 8	0 3	0 8	0 3	0 8	0 3	0 8	0 3	0 8	0 3	0 8	0 3
Recreation	6 7 8	0 3	6 7 8	0 3	6 7 8	0 3	6 7 8	0 3	6 7 8	0 3	6 7 8	0 3	6 7 8	0 3	6 7 8	0 3	6 7 8	0 3	6 7 8	0 3	6 7 8	0 3
Water	19 0	316 3	18 6	310 0	18 7	310 9	18 6	310 0	18 6	310 2	18 6	309 6	18 6	309 7	18 6	309 9	18 6	310 5	18 6	310 3	18 7	310 9
Minerals 1/ (Fuels)																						
Minerals 1/ (Non-Fuels)	1 9	0	1 5	0 0	1 9	0 0	1 5	0 0	1 5	0 0	0 8	0 0	1 0	0 0	1 2	0 0	1 5	0 0	1 5	0 0	1 9	0 0
Roads	5 1	0	5 0	0 0	5 0	0 0	5 0	0 0	5 0	0 0	4 4	0 0	4 4	0 0	5 0	0 0	5 0	0 0	5 0	0 0	5 0	0 0
Fire Mgmt	7 9	0	7 7	0 0	7 8	0 0	7 7	0 0	7 7	0 0	7 6	0 0	7 6	0 0	7 7	0 0	7 8	0 0	7 7	0 0	7 8	0 0
TOTALS	322 7	501 1	237 8	441 6	312	496 5	236	439 5	256 6	460	183 6	390 2	196 2	402 2	222 8	427 6	275 2	477 7	256 7	462 2	317 7	501 1
Net Energy Balance (Yield Minus Consumption)	+188 4		+203 8		+184 5		+203 5		+203 4		+206 6		+206		+204 8		+202 5		+205 5		+183 4	

1/Energy balance for fuel mineral production is predicted on "proven" deposits. There are no "proven" mineral fuel deposits (economically extractable) presently known to occur on the Wenatchee National Forest. Projected future production is speculative and is dependent upon future energy demand, industry interest and exploration results. Therefore, energy computations for this resource group have not been made.

21. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON URBAN QUALITY; HISTORIC AND CULTURAL RESOURCES; AND THE DESIGN OF THE BUILT ENVIRONMENT INCLUDING THE REUSE AND CONSERVATION POTENTIAL OF VARIOUS ALTERNATIVES

The consequences of the alternatives on Historic and Cultural Resources, and Conservation Potential of the alternatives, are discussed in detail in this Chapter under the Cultural Resource and Energy headings. None of the alternatives has an effect on urban quality or design of the built environment.

C. SUMMARY OF THE RELATIONSHIP BETWEEN SHORT- TERM USES AND LONG-TERM PRODUCTIVITY

The relationship between the short-term uses of man's environment and the maintenance and/or enhancement of long-term productivity is complex. For the purposes of this assessment, short-term uses are those that generally occur on a yearly basis on some area of the Wenatchee National Forest, such as timber harvest as a use of the wood resource, livestock grazing as a use of the forage resource, and recreation and irrigation uses of the water resource.

"Long-term" refers to longer than a 10 year period. Productivity refers to the capability of the land to provide market and amenity outputs and values for future generations. For example, maintenance of long-term soil productivity requires that activities which cause excessive erosion, compaction, and other adverse impacts to soil be mitigated. Occasionally short-term uses will cause substantial damage to isolated areas. Forest direction in Chapter IV of the Land Management Plan contains management requirements designed to protect soil and water resources so that long-term productivity is not significantly impaired.

The Forest Plan establishes a sustained yield of resource outputs while maintaining productivity of resources. The specific direction and mitigation measures included in the Forest-wide direction ensure that long-term productivity will not be impaired by the application of short-term management practices.

Each alternative except NC was analyzed to assure that Forest direction could be met. An alternative was revised if some aspect did not meet these requirements. Thus, long-term productivity is assured in every alternative.

A discussion of how various environmental components can affect the long-term productivity of the Forest is presented in the next few pages.

Recreation uses such as developed campgrounds, ski areas, recreation residences, and wilderness, all represent long-term commitments of the land. These commitments, in some cases, can mean a loss of long-term productivity of other resources. Heavy, short-term recreation uses such as large group outings or concentrated use in popular areas may also result in a reduction of productivity. For example, campsites and trails can be compacted by heavy use which may result in soil and vegetation damage. The short-term use of a campsite in a fragile wilderness ecosystem can result in a long-term loss of vegetation. Recreation use in critical fish habitat areas has the potential to affect the genetic make-up of fish populations by reducing the wild-type genes which may be necessary for the long-term maintenance of a fish species.

Cultural resources represent a long-term use of the land. In many cases, the resources have been in place for decades or even centuries. However, these resources generally occupy a small area of land (average site on the Forest is less than one acre in size) and thus have a negligible effect on the long-term productivity of the area they occupy.

Short-term vegetation management practices can have a long-term effect on the maintenance of scenery. Timber harvest with its associated road construction will lead to greater visual diversity in the forest stands but also will contribute to the loss of the "natural-appearing" setting. Natural-appearing landscapes are preserved in wilderness and roadless area allocations.

A measure of long-term productivity for the fisheries resource is the effect on stream habitat capability. It is not anticipated that there will be any losses of this capability with implementation of any of the alternatives (see Chapter IV on Fish, including the mitigation section). Overfishing streams can have negative effects, as detailed earlier. Those alternatives with the most roading and access into wild fish producing streams would have the greatest potential for this effect. The possible reductions in the long-term productivity of the wild fish species should be roughly proportional to the increase in fishing due to roading. However, it is anticipated that the net losses would be insignificant.

Short-term management of the tree resource will have effects upon long-term productivity depending on the intensity of management selected. All alternatives would increase projected per-acre productivity during the next 50 years. The amount of this increase is shown below by alternative.

TABLE IV-29
TIMBER PRODUCTIVITY INCREASE BY ALTERNATIVE 1/

	A/NFMA	B	C	D	E	F	G	H	I	J
Productivity by year 2030 in cubic feet per acre per year	33	42	32	33	30	31	35	43	36	37
Increase in productivity in percent	+14	+46	+12	+14	+3	+7	+22	+47	+24	+26

1/ Figures are not available for the NC alternative.

Average net growth on the Forest's existing timber stands is 29 cubic feet per acre. Short-term management techniques which will increase the long-term productivity include the planting of genetically superior trees. This can account for about 10 percent of the yield increase. An additional 10 percent of the yield increase can be achieved through thinning of the stands. Another 30 percent could be gained through prevention of disease and insect losses. Approximately 50 percent more yield could come through harvest of the trees at the culmination of their growth rather than allowing the trees' growth to slow down and stagnate. And finally an extra seven percent, or 2,000 board feet per acre, can be obtained through fertilization. This is based upon a 1979-1984 study of fertilization plots to determine the increase in growth resulting from the use of fertilization.

Long-term productivity of forage on the Forest will be little affected by short-term grazing of livestock. Without grazing use, some areas will become tree covered or have some shrub types grow out of reach of grazing animals, including wildlife. Grazing by livestock can help the nutrient recycling process, particularly in drier vegetative types where natural decomposition of dead

organic material is very slow. Trampling action by grazing animals help sow seeds beneath the litter layers thereby enhancing reproduction of grasses and other vegetation.

Background water yield on the Forest is assured for short-term uses as well as long-term productivity. Vegetation management activities on the Forest can provide for some water yield increases. Thus, Alternative B provides the maximum water yield increase while Alternative E affects water yield increases the least. Under all alternatives, timber harvesting operations will be designed to insure the short-term and long-term maintenance of water quality.

The soil resources are affected by most management activities. Activities such as timber harvest, road construction, and use of developed recreation sites, are cumulative and have long-term effects on the productivity of the soil. These effects can be seen through both soil erosion and soil compaction. Soil compaction is generally considered to be a long-term effect. However, on some types of clayey soils, the processes of wetting and drying (shrink/swell) tend to break up the compaction over several years.

The long-term quality of air is not expected to be degraded by short-term events or uses. These events could be wildfires, prescribed fire, or use of vehicles. It is likely that the quality of air moving onto the Forest from prescribed burning by State, Federal, and other agencies to the west will have a greater effect than air pollution generated on the Forest itself.

Mineral resources are not renewable and deposits are fixed in size and grade. Forest Service policy as it relates to exploration and development of mineral resources does not change by alternative. Therefore, the short-term/long-term relationship does not vary by alternative. However, management prescriptions which call for withdrawing lands from mineral entry have a short-term effect on minerals' availability. This can have a long-term effect if withdrawn indefinitely. Examples of areas withdrawn include wilderness areas, research natural areas, developed recreation sites, and some special interest areas and scenic travel routes.

Arterial and collector roads, and some local roads and landings, are dedicated uses that take land out of production. Therefore, these kinds of uses have long-term effects. These effects vary because they are directly related to the amount of timber harvested. Roads can have indirect effects on long-term productivity of fish and wildlife by increasing the amount of recreational fishing and hunting use. Long-term productivity of timber can be increased due to roads allowing access for more intensive management activities. Long-term effects of roads on the soil resource and on water quality can also be significant.

Forest and range wildfires are short-term events. In the natural environment, they occur on a cyclic basis and do not affect the long-term productivity of the land. In the short-term, both the wildfire itself and fire suppression activities can affect productivity by altering plant succession, productivity, and diversity; fuel accumulations; nutrient cycles and energy flow; stability of ecosystems; and air quality.

Major transmission line corridors which cross the Forest are essentially long-term commitments of the land within the corridors. While the types of use may be limited, the long-term productivity of the land is not lost. Growing sawtimber, for example, would not be compatible but growing forage for livestock and wildlife would be.

Small hydroelectric projects are, by their nature, long-term uses. Long-term productivity is thereby closed on areas being inundated or occupied by above-ground conduits.

D. SUMMARY OF IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

An "irreversible commitment of resources" results from a decision to use or modify resources that are renewable only over a long period of time, such as soil productivity, or non-renewable resources such as cultural resources or minerals. An "irretrievable commitment of resources" refers to resource production or the use of a renewable resource that is lost because of land allocation and/or scheduling decisions. In other words, opportunities are foregone for the period of time that resource cannot be used. The proposed Forest Plan and the alternatives examined were all based on the principles of multiple-use and long-term productivity for all resources. Measures to protect natural resources that could be irreversibly affected by management practices were incorporated into Forest-wide Standards and Guidelines (see Chapter IV of the Forest Plan).

The major irreversible and irretrievable resources on the Wenatchee National Forest are the roadless areas. The development of roadless areas would mean an irreversible loss of the characteristics which qualify these areas for wilderness or roadless areas. Development could also mean an irreversible loss of natural scenery and, in some cases, old growth habitat. On the other hand, not developing roadless areas may be an irretrievable loss of opportunities for vegetation management. This could result in lower volumes of timber harvest and forage being produced on the Forest.

The protection of cultural resources also may affect timber production. This effect would be relatively small, however. Trees on and near cultural sites may not be harvested or may be harvested at less than maximum intensity. Since the commitment to protect these cultural resources will continue in the foreseeable future, the timber not harvested on these sites represents an irretrievable loss of that resource.

Another irretrievable loss of timber would be those stands occurring in designated wilderness or dedicated as old growth wildlife habitat. Insects, disease, and fire can also cause irretrievable losses.

Commitments for grazing cattle on the Forest are based on a term permit system which is a privilege to livestock owners. This is not an irretrievable commitment if unacceptable resource damage occurs or terms of the permit are violated.

Under Alternative C, unique ecosystem classifications would not be proposed for all possible areas (see the *Vegetation* section in this chapter for a list of the areas). This may mean an irreversible loss of the opportunity for classification. For example, the Camas area was proposed as a Botanical Area for protection of *Delphinium viridescens*, Wenatchee Larkspur. The area would not be classified but the plant would be protected through the Forest Plan Standards and Guidelines. Similar effects would occur to the other proposed Botanical Areas. Geologic features in proposed Geologic Areas would not be irreversibly lost even though they would not be designated.

The water resource on the Forest fluctuates in runoff or output in response to changes in climate. Water quality and timing of runoff is affected by management activities. These effects are rarely irreversible with degradation being only temporary over time.

Soil productivity can be irreversibly lost or reduced by dedicated uses of the land. Examples of these uses would be arterial and collector roads, administrative sites, and developed recreation sites. Soil erosion, as a result of management activities, is an irreversible loss because once the soil particles are removed from the site and deposited into a stream or river, they are no longer available. Accelerated erosion rates can reduce soil productivity and also reduce the water holding capacity of the soil.

Removal of mineral or energy resources is an irreversible commitment of resources. The removal and utilization of rock resources for road construction would be an example of a common use on the Forest. Actual commitment of mineral resources will depend upon demand and mining industry initiative.

There are no known irreversible and irretrievable commitments of resources affecting fisheries or air quality involved in the implementation of the preferred alternative.

E. SUMMARY OF PROBABLE ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Implementation of the preferred alternative on the Wenatchee National Forest will result in some adverse environmental effects that cannot be avoided. The degree of severity of the adverse effects can be minimized by adhering to the direction in the management prescriptions and Forest-wide Standards and Guidelines in Chapter IV of the Forest Plan, but some impacts generally cannot be avoided if any management activities occur.

Development and use of recreation sites would have several adverse effects. These effects include: compaction of soil, vegetative damage, water pollution, noise and dust from motorized use, disturbance of game animals and their habitat; and localized air pollution from campfire smoke and vehicle exhaust.

It is likely that some significant cultural resource sites will inadvertently or unavoidably be disturbed or destroyed by management activities. This would be especially true for subsurface sites that cannot be located through surface surveys. Even with mitigation, unanticipated or unavoidable disturbances can result in the loss of cultural values that might otherwise be available for future enhancement or research uses.

Vegetation management activities, particularly timber harvest, have several unavoidable adverse effects. The most conspicuous of these is the effect on scenery. Visual quality can be lowered by timber harvest on steep slopes that are highly visible from recreational travel routes. Burning of harvest units will also affect the visual quality for a short time. These adverse effects will eventually be reduced by the regrowth of the vegetation. Other impacts on

the natural appearance of the landscape would include roads and structures which would be apparent despite efforts to carefully blend them with the landform.

Timber harvest activities would also have adverse effect on water quality and soil. Water quality effects would be short-term within riparian zones and wetlands. Soil effects are more long-term due to road construction and reconstruction associated with timber harvest. Road construction disturbs and displaces soil but is a necessary activity that needs to be carried out in order to harvest trees and carry out other management activities. Management can have an effect on how the activities are carried out, as well as the scheduling. Both the technique and the scheduling can affect the kind and amount of impact that can occur on the soil and water resources.

Livestock use of the forage component may cause some stream bank trampling with increases in sediment and fecal coliform in the streams. There may also be some displacement of wildlife by livestock due to the social behavior between them and minor competition for forage or space.

Because mineral development on open public land is a right under certain conditions, unavoidable adverse effects on other resources will occur. Predicting where these impacts will occur and the scope of these impacts depends upon the location and type of activity proposed. Since this activity is proposed by the public rather than by the Forest Service, identification of the unavoidable environmental effects will be done when an operating plan is received and an environmental analysis of the proposal is made.

Wildfires can cause loss of soil, wildlife habitat, vegetation, structures, and can increase the potential for flooding. The possibility of these adverse effects always exists. However, the proper treatment of fuels will result in a gradual reduction and breakup in the continuity of natural residues. This would tend to reduce the occurrence of large wildfires in the long-term. The smoke from wildfires and prescribed fire will have a short-term adverse effect on the air quality.

The clearings for utility corridors, with the multiple steel and wood towers, have unavoidably modified the landscape in the areas where they occur. The need to maintain the corridors in a "clean" condition assures that the unnatural appearance will continue. On the other hand, soil displacement and any effects on water resources within the existing corridors have long since stabilized.

Construction of the one identified potential utility corridor would result in modification of the visual quality for a long time. During the construction phase, there would be some soil disturbance, some possible effect on water quality, and some possible disruption of wildlife patterns. These effects can be mitigated, with the adverse effects on all but the visual quality and some types of recreation being of short duration.

Any of the proposed small hydroelectric projects which reach the construction stage will result in some adverse environmental effects. Impacts to soil and water will occur to some degree. Construction techniques and mitigation measures can minimize most impacts and limit them to the construction effects on the visual resource. Some projects will also have long-term impacts on wildlife and recreation. This is particularly true of those projects which require large structures, such as large diameter, above-ground penstocks of several miles in length.

F. ENVIRONMENTAL CONDITIONS UNCHANGED BY THE ALTERNATIVES

1. Wilderness

The land area designated as wilderness is the same in each alternative. Within wilderness the physical and biological environmental conditions would remain unchanged between alternatives.

Wilderness has a special relationship to fish and wildlife. Since two goals of wilderness are to preserve wilderness character and to preserve their natural conditions, the maintenance of genetic diversity is assured. In all alternatives, this maintenance of the existing fish and wildlife populations is similar because the quantity of wilderness does not vary.

Planting of fish species into previously stocked lakes, as long as native species are used, is still usually allowed. The Forest Service will continue to coordinate with the Washington Department of Game and user groups to be sure that stocking is conducted in a manner to preserve the inherent qualities of the wilderness.

Wilderness also has a benefit in assuring the long-term supply of high quality water runoff in streams. Again, since the quantity of wilderness will not vary by alternative, the quality of the water inhabited by fish both in the wilderness and downstream will not change.

2. Alpine Lakes Management Unit

The environmental conditions and effects within the Alpine Lakes Management Unit do not vary by alternative. In all alternatives the land use allocations within the Alpine Lakes Management Unit are the same as those in the Alpine Lakes Area Land Management Plan FEIS of November 2, 1981.

3. Research Natural Areas

Environmental conditions and effects on the Thompson Clover and Meeks Table Research Natural Areas will be the same in each alternative. These Research Natural Areas were established by the Chief of the Forest Service and will receive equal protection in all alternatives.

4. Entiat Experimental Forest

The Entiat Experimental Forest was formally designated by the Chief of the Forest Service in 1971. The Entiat Experimental Forest occupies the same land area and is managed under the same management prescription (EF-1) in all alternatives.

5. Utility Corridors

Existing Corridors: These corridors do not vary by alternative. Each alternative proposes that they continue basically as they exist today. Some upgrading of corridors is anticipated in all alternatives. For instance, a 115 KV line might be increased to a 230 KV line.

Proposed Corridors: The Western Regional Corridor study for the State of Washington identified one proposed corridor crossing the Wenatchee National Forest. This corridor, if built, would utilize a "window" in the Cascade Mountains in the area from about Tacoma Pass to Pyramid Peak. The corridor itself would then run southeasterly across the Forest toward the Hanford Reservation/Tri-Cities area. The study projected this corridor for the period 1990-2020. This proposal is identified in all alternatives.

6. Small Hydroelectric Projects

The opportunity for small hydroelectric projects varies only slightly from alternative to alternative. Generally it is assumed that those alternatives which allocate the most acres to roading and other surface disturbing activities will provide the best opportunities for small hydro development. This is attributed to the existence of road access which would lower resistance to proposed projects.

However, the range of probable small hydro projects across all alternatives is quite small. In the existing situation (Alternative A/NFMA) the Forest has 25 projects proposed. Twenty-two of these are in the feasibility study stage. Only three have resulted in applications to build small hydroelectric projects.

It is estimated that a maximum of 40 projects could be proposed and move to the feasibility study stage. But only four would proceed to the stage of applying for a license to build and operate a project. Thus, there is little difference in the effects of this activity between alternatives.



LIST OF PREPARERS

The following is a list of Forest Interdisciplinary (ID) Team and Forest Management Team members who participated in the Forest Plan development. Their qualifications (position, education and experience) and their responsibilities for preparing the Final Environmental Impact Statement, including significant methodology and analysis, is indicated.

O'NEAL, SONNY Forest Supervisor

Education: B.S. Forest Management, University of Arkansas at Monticello.

Experience: Twenty-three years experience with the Forest Service in Utah, Idaho, Wyoming and Washington Forest Service line officer positions have included Forest Supervisor, Deputy Forest Supervisor, District Ranger positions. Forest staff positions have included Planning, Timber, Lands, Recreation, Minerals, Fire and Manpower Member of Management Team which participated in all facets of plan development.

FERGUSON, LAURA Deputy Forest Supervisor

Education B.S. Landscape Architecture, W. Virginia University, 1969.

Experience: Seventeen years with the Forest Service in landscape architecture, recreation, Forest Planning, State-wide Forest Resource Planning, Federal Liaison, and District Ranger. Member of Management Team which participated in all facets of plan development.

BICKFORD, L. MONROE Forest Silviculturist

Education: B.S. Forest Management, Washington State University, 1962
M.F. Silviculture, Oregon State University, 1964.

Experience: Twenty-six years experience with the Forest Service in the Pacific Northwest Region, primarily in timber management but including brief periods in research and other resource activities. Member of the ID Team since 1979. Provided timber management input for the Forest Plan. Developed timber yield tables and analyzed the effects of the alternatives on the timber resource.

CARTER, SUSAN Archaeologist

Education: B.A. Anthropology, University of Washington, 1973.

Experience. Twelve years experience with the Forest Service as a Cultural Resource Specialist on the Mount Baker-Snoqualmie and Wenatchee National Forests. Member of the Interdisciplinary Team from 1981-1988. Primarily responsible for accumulating, evaluating, and providing cultural resource data for the Forest Plan Analyzed the effects of the alternative on the cultural resource Also updated the Wild and Scenic River portions of the FEIS and Forest Plan.

CHRISTENSEN, WAYNE C., P.E. Engineer

Education: B.S. Degree Civil Engineering, Utah State University, 1963.

Experience: Three years with Federal Highway Administration at various locations throughout the country. Twenty-three years with the Forest Service in Intermountain and Pacific Northwest Regions. Assignment in various engineering areas, primarily in road planning design and construction. Member of Management Team which participated in all facets of plan development.

EDWARDS, RICK Hydrologist

Education: B.S. Aquatic Biology; M.S. Forest Engineering (Forest Hydrology / Aquatic Ecology)

Experience: Ten years experience with the Forest Service. Member of ID Team since 1988. Worked on preparation of Soil and Water, Riparian Area and Fish Habitat resource information for the FEIS and Forest Plan in cooperation with other members of the ID Team.

GLASS, PHILLIP D. Recreation Staff Officer

Education: B.S. General Forest Management, North Carolina State, 1959.

Experience: Twenty-nine years experience with the Forest Service--22 years in the Intermountain Region and 5 years in the Pacific Northwest Region. Project Forester for four years, Assistant District Ranger for 4 years, on four Ranger Districts for 14 years, Recreation Staff Officer for 7 years. Member of the Management Team which participated in all facets of the plan development.

HART, PAUL R. JR. Forest Public Affairs Officer

Education: B.A. Political Science, Central Washington University, 1967.

Experience: Fifteen years experience in Forest Service public involvement and public information work. Five years experience as reporter and photographer for daily newspapers. Member of the Management Team which participated in all facets of plan development.

**HEATH, MONTY Assistant Recreation Staff
Wilderness and Recreation Program Coordinator**

Education: B.S. Forest Management, University of Washington, 1974.

Experience: Fifteen years with the Forest Service with 11 of those years in Wilderness and Recreation Management. Member of the ID Team since 1987. Provided Wilderness and Recreation planning data and analysis for the Forest Plan

HOFFMAN, GLENN Forest Planning Staff Officer

Education: B.S. Forest Management, Washington State University, 1966.

Experience: Twenty-two years total experience with the Forest Service in the Pacific Northwest Region with 13 years on the Wenatchee National Forest. Areas of experience include timber management, land management planning, and administration. Lake Wenatchee District Ranger 1980-1987 and served as member of Management Team which participated in all facets of plan development. Planning Team Leader since 1987 Responsible for coordinating and directing the interdisciplinary team's efforts in completing the Forest Plan and associated environmental documents.

JONES, PHILIP J. Range Specialist / Planner

Education: B.S. Forestry-Range Management, University of Montana, 1961

Experience: Twenty-seven years experience with the Forest Service in the Northern and Pacific Northwest Regions with main responsibilities in resource management Member of the I.D Team since 1981. Responsible for providing range and NEPA compliance input for the Forest Plan. Analyzed the effects of the alternatives on the range resource.

KELEMAN, BRUCE A. Fire, Air Resouce Planning

Education: B.S. Renewable Natural Resource Management, University of California, Davis Campus, 1972

Experience: Twenty years experience in fire management assignments on four National Forests in three states Have served on several Regional Fire planning groups and is currently on the National Fire Management Analysis Work Group. Provided Fire and Air Resource management input for the Forest Plan

LACABE, LARRY Transportation Planner

Experience: Twenty-five years experience with the Forest Service including transportation planning and land and resource planning. Member of the I.D Team since 1980 Provided road inventory data for the Forest Plan Analyzed the effects of the alternatives on the transportation system.

LILLYBRIDGE, TERRY Botanist/Ecologist

Education: B.S. Range Management, Washington State University, 1974
M.S. Forest and Range Management, Washington State University, 1976.

Experience: One year Soil Conservation Service soil scientist Two years Soil Conservation Service range conservationist. Ten years Forest Service plant ecologist and botanist. Member of Interdisciplinary Team since 1988 Provided input on threatened and endangered species, old growth, Research Natural Areas, and biological diversity

LOWERY, BILL District Ranger, Cle Elum

Education: B.S in Forestry

Experience: Thirty years Forest Service in Region 6. This includes 21 years as District Ranger on two Ranger Districts and two National Forests Other experiences include positions as District Timber Management Assistant, Fire Control, and Recreation Assistant. Member of Management Team which participated in all facets of plan development

MACDONALD, KENNETH D. North Zone Fish Biologist

Education: B.S Fisheries Science, Oregon State University, 1977
B S. Forest Management, Oregon State University, 1981

Experience: Eight years with the Forest Service as a Fish Biologist providing input to timber sales and other resource activities, as well as habitat assessment, improvement and monitoring. Member of Interdisciplinary Team since 1988. Prepared Forest-wide standards for fish and for the riparian prescription

MAEKAWA, HENRY Landscape Architect

Education: B.S. Agriculture, Colorado State University, 1965.
Masters Landscape Architecture, University of Oregon, 1970.

Experience: Nineteen years experience with the Forest Service as a Landscape Architect on the Deschutes and Wenatchee National Forests. Member of the I.D. Team since 1979. Primarily responsible for providing visual resource data for the Forest Plan. Analyzed the effects of the alternatives on the visual resource.

MALONE, JOHN Forest Timber Harvest Specialist

Education: B.S. Forestry - Logging Engineer, Oregon State University, 1958

Experience: Twenty-five years experience with the Forest Service in the Pacific Northwest Region, primarily in timber management. Provided timber harvest system information for the Forest Plan.

MARVIN, SUSAN Forest Archaeologist

Education: B.A. Anthropology, Northwestern University 1972.
M A. Antrhology, Washinton State University 1978.

Experience: Fifteen years as an archeologist, the last eight years as a Cultural Resource Specialist for the Forest Service. Member of the Interdisciplinary Team since 1988. Updated cultural resource management data for the FEIS and Forest Plan.

McCUTCHEN, EDWIN L. Range, Wildlife, and Watershed Officer

Education: B.S. Forest-Range Management - 1962, Colorado State University.

Experience: Twenty-five years experience with the Forest Service (17 years in the Southwest Region and 8 years in the Pacific Northwest Region). Primarily responsible for range, wildlife, fish, soil and watershed management programs on the Wenatchee National Forest for last 9 years. Previous assignments were 7 years as District Ranger on the Luna Ranger District, Gila National Forest and 3 years as the District Ranger on the Wilderness Ranger District, Gila National Forest. Provided functional information, review and editorial comment for range, wildlife, watershed, soils, fish, and threatened, endangered, and sensitive species sections of the Forest Plan. Member of Management Team which participated in all facets of plan development.

MCCOLLEY, PHILLIP Soil Scientist

Education: B.S. General Agronomy, Washington State University, 1958

Experience: Twenty-eight years experience as a Soil Scientist; 15 years with the Wenatchee National Forest and 13 years with the Soil Conservation Service. Member of the I.D Team since 1979. Primarily responsible for providing soil resource input for the Forest Plan Analyzed the effects of the alternatives on the Forest's soil resources

MORTON, STEPHEN L. District Ranger, Leavenworth

Education: B.S. Forest Management, 1965, University of Minnesota/M.S. in Forestry (Rec.) University of Minnesota, 1967.

Experience: Twenty-two years experience with the Forest Service in Forest resource management. Served on five National Forests. Since 1981 have been District Ranger of the Leavenworth Ranger District. Primarily responsible for providing information, analysis, and evaluation of alternatives, with special concentration on the Leavenworth District. Member of the Management Team which participated in all facets of plan development

MURPHY, AL District Ranger, Chelan

Education: B S. Forestry, University of Montana, 1974.

Experience. Fifteen years experience with the Forest Service in the Southwest, Intermountain, and Pacific Northwest Regions. Positions have included fire management, timber, minerals, recreation, and range Member of Management Team which participated in all facets of plan development.

MURPHY, PATRICK M. Writer/Editor, Data Base Manager

Education. B S. Forest Management, Washington State University, 1977.

Experience: Eleven years experience with the Forest Service on the Wenatchee National Forest in wilderness, silviculture, and planning. Two years experience with the Bureau of Land Management in wilderness inventory. Writer/Editor since 1985, R2 Map manager since 1986.

O'CONNOR, DANIEL M. Graphics Specialist

Education: A.A. Technical Illustration, Clover Park Technical Institute, 1988

Experience: Eight years experience on Wenatchee National Forest; Wilderness Ranger, and other experience includes fire and timber management, graphics and desktop publishing for planning documents

PAYNE, GROVER G. Fire Management Officer

Education: B.S. Forestry, University of Georgia, 1965.

Experience: Twenty-six years experience with the Forest Service in Southwest, Southern, and Pacific Northwest Regions, primarily in timber management, recreation and resource management, state and private forestry, aviation and fire management, public affairs and National Forest administration (District Ranger). Member of Management Team which participated in all facets of plan development.

PHILLIPS, CHARLES A. Forest Wildlife Biologist

Education: B.S. Zoology, Southern Oregon College, 1967.

Experience: Twenty-one years with the Forest Service. District level work included 2 years in fire control, 7 years in timber, and 2 years as wildlife biologist. Have been a Forest wildlife biologist for 10 years on two National Forests. Provided threatened, endangered and sensitive species, big game species, indicator species, and wildlife range information for Forest planning.

POZZUTO, GEORGE District Ranger, Lake Wenatchee

Education: B.S. Forest Management, University of Maine, 1970

Experience: Eighteen years with the Forest Service. Served ten years as Forest Planning Team Leader on the Olympic National Forest. Led process for the Wild and Scenic River suitability study on the Wenatchee. Member of Management Team which participated in all facets of plan development.

ROTELL, DONALD F. District Ranger, Naches

Education: B.S. Forest Management, Pennsylvania State University, 1960

Experience: Ten years experience District Ranger in Pacific Northwest. Fifteen years experience in timber, land adjustments, recreation management. Member of Management Team which participated in all facets of plan development.

SIMMONS, JOHN D. Area Minerals Specialist

Education: B.S. Geology, Western Washington State University, 1973. Graduate Studies - Geology, WWSU, 1973/74.

Experience: Four and one-half years experience with the Forest Service in the Pacific Southwest and Pacific Northwest Regions and six years experience with the Bureau of Land Management in California, Montana, North Dakota, and South Dakota as a district, zone and area mineral specialist. Member of the I.D. Team since 1985. Primarily responsible for providing minerals data for the Forest Plan. Analyzed the effect of the alternatives on the mineral resources.

STEBLINA, VLADIMIR I. Forester/Economist

Education: B.S. Forestry, University of California at Berkeley, 1972. Graduate Studies, University of California at Berkeley, 1976-1977.

Experience: Eight years experience with the Forest Service primarily as a Planner/Economist. Two years experience with Forest Service as Recreation Planner. Two years experience with Bureau of Land Management as Forester/Recreation. One year as Environmental Specialist with National Park Service. Two years consulting firm as a Forester. Member of the I.D. Team since 1985. Provided and analyzed resource and economic data for the Forest Plan.

VANDERLIN, ORVILLE Assistant Staff Officer, Lands and Minerals

Education: B.S. Forest Management, Michigan Technological University, 1959.

Experience: Twenty-four years experience with the Forest Service in engineering, timber, recreation, lands and minerals. Member of the I.D. Team since 1980. Analyzed the effects of the alternatives on lands, and utility corridors.

WALK, FRED O. Timber Staff Officer

Education: B.S. Forest Management 1961, Iowa State University.

Experience: Twenty-nine years in R-6, primarily in timber management and resource management. Four years line officer (District Ranger). Member of Management Team which participated in all facets of plan development

WHITEHALL, KARIN District Ranger, Entiat

Education: B.S. College of Forestry, Colorado State University, 1975

Experience: Fifteen years with the Forest Service in forest management and wildland hydrology. Member of Management Team which participated in all facts of plan development.

Development of the Forest Plan and FEIS required the support and assistance of the entire National Forest staff over an eight year period. The following persons, in addition to the current preparers, also provided significant contributions:

Anderson, Carl F. Entiat District Ranger, 1981-1984. Interagency planning Liaison 1984-1986.

Croyle, Carmen Visual Information Assistant, 1980-1986.

Heath, Gerald Deputy Forest Supervisor, 1984-1987.

Hetzer, Robert Chelan District Ranger, 1976-1987.

Hohisel, Neal Recreation Specialist, 1979-1987

Kessler, Steven Fisheries Biologist, 1983-1987.

Krzak, Joan Economist, 1981-1983.

Kuiper, Orville Fire Management, 1981-1985.

Lambert, Daniel Cartographic Aid, 1981-1984.

Lyon, Donald Forest Planner, 1980-1986.

Meschter, Daniel Mining Engineer, 1980-1984.

Opdycke, James Timber Planner, 1979-1983.

Pederson, Robert FORPLAN Specialist, 1979-1986.

Rhodus, Gran Forest Hydrologist, 1980-1985.

Roberts, Rick Wildlife Biologist, 1982-1986

Salinas, Joe M. Entiat District Ranger, 1985-1987.

Smith, Donald H. Forest Supervisor, 1980-1987.

Thompson, Allen Engineering Staff, 1983-1988.

Tiedemann, Roland K. Planner, Writer/Editor, 1979-1985.

Wilson, Thurman Economist/Analyst, 1984-1985.

Wischnofske, Merle Wildlife Biologist, 1979-1982.

BIBLIOGRAPHY

- Alexander, Robert R.; Charles B. Edminster; 1981 Management of ponderosa pine in even-aged stands in the Black Hills. Res Paper 228. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station.
- Allen, Larry, 1986, Suction dredging, sluicing, panning and mineral collecting areas on the Wenatchee N.F, Boeing Employees Prosector' Association. Map scale 1/2 inch:1 mile.
- Anderson, H W.; et al; 1976. Forests and water: effects of the forest management of floods, sedimentation, and water supply. USDA Forest Service General Technical Report, PSW-18. Pacific Southwest Experiment Station, Berkeley, California.
- Ball, Chester C ; 1973. Wildlife Evaluation--Monetary Return. Small Game Management Report, 1972-1973; Washington Department of Game.
- Banister, D'Arcy P., Barnes, Donald J., Longwill, Warren D., 1984, Availability of Federal lands for mineral exploration and development in the State of Washington: State of Washington Department of Natural Resources, Division of Geology and Earth Resources Geologic Map GM-30.
- Barrett, James W.; 1970. Ponderosa pine saplings respond to control of spacing and understory vegetation. USDA Forest Service Research Paper, PNW-106.
- Bateman, A.F., Gere, W C , Dockter, R , Villalobos, H., 1983, Leasable mineral classification map, Lands valuable for coal, Washington: U.S. Geological Survey, Conservation Division
- Bateman, A.F., 1961, Leasable mineral classification map, Lands valuable for oil and gas, Washington: U S. Geological Survey, Conservation Division
- Bee, S , 1983 (revised 12/13/84), Washington areas of critical mineral potential, Bureau of Land Management Map
- Beecher, William J.; 1942. Nesting birds and vegetation substrata. Chicago Ornithological Society
- Beikman, Helen M., Gower, Howard D. and Dana, Toni A.M., 1961, Coal Reserves of Washington: Washington State Department of Conservation, Division of Mines and Geology Bulletin No. 47, 115 pp.
- Benson, Robert E ; 1980. Damage from logging and prescribed burning in partially cut Douglas-fir stands. Res. Note 294, USDA Forest Service, Intermountain Forest and Range Experiment Station
- Bethlahmy, Nedavia; 1972 Comments on "Effects of Forest Clear-felling on the Storm Hydrograph". Water Resources Journal, 8 (1): 166-170.
- Biswell, Harold H., et al.; 1973. Ponderosa pine management, Misc. Publication No. 2, Tall Timbers Research Station, Tallahassee, Florida
- Black, Hugh C.; Edward F. Hoover; 1977. Effects of herbicide-induced habitat changes on pocket gophers in Southwestern Oregon In Proceedings of the twenty-ninth annual California Weed Conference. Sacramento, California
- Bloomquist, G.L. and Others, 1985, Evaluation and ranking of geothermal resources for electrical generation or electrical generation or electrical offset in Idaho, Montana, Oregon and Washington: Washington State Energy Office under Intergovernmental Agreement No DE-AI79-83PB13609

- Brazier, Jon R. and George W. Brown; 1973. Buffer strips for stream temperature control Forest Res. Paper 15, Forest Res. Lab. Oregon State University
- Broughton, W.A., 1944, Economic aspects of the Blewett-Cle Elum iron ore zone, Chelan and Kittitas Counties, Washington Washington State Department of Conservation and Development, Division of Geology Report of Investigation No. 12, 42 pp.
- Broughton, W.A., 1943, The blewett iron deposit, Chelan County, Washington: Washington State Department of Conservation and development, Division of Geology Report of Investigation No. 10, 17 pp.
- Brown, Arthur A.; Kenneth P. Davis; 1973. Forest fire control and use. 1973. McGraw Hill Book Co.
- Brown, George W.; 1980. Forestry and water quality. School of Forestry, Oregon State University. 124pp.
- Brown, Larry. 1989. Personal communication with Larry Brown, Washington Department of Wildlife, fish biologist. March 23, 1989, and May 11, 1989.
- Brown, R. E.; June 1985. Management of wildlife and fish habitats in forests of western Oregon and Washington, U. S. Forest Service.
- Burt, W. H , R. P. Grossenheider; September 1961. A field guide to the mammals.
- Carithers, Ward, 1946, Pumice and pumicite occurrences of Washington. State of Washington, Department of Conservation and Development, Division of Mines and Geology Report of Investigations No. 15
- Carothers, Richard, Associates; 1975. Yakima County Park, Recreation and Open Space Plan for Board of Yakima County Commissioners, 73 pp.
- Chapman, W.M.; E. Quistorff; 1938 The food of certain fishes of North Central Columbia River drainage, in particular, young Chinook salmon and steelhead Trout. Washington State Department of Fisheries, Biol. Report 37 A, pp 1-13.
- Chelan County Planning Department; 1977. Planning needs for forest lands in Chelan County. 17 pp.
- Chelan County Regional Planning Council; 1977 Chelan-Entiat Comprehensive Plan; 367 pp
- Chelan County Regional Planning Council; 1979. Draft revised Chelan County shoreline master program, 85 pp.
- Chelan County Regional Planning Council; 1973. West Central Chelan County Comprehensive Plan, 70 pp
- Chelan County "Summary of Chelan County 1983 Assessments for 1984 Taxes". 11 pp
- Church and Others, 1983, Mineral resource potential of the Goat Rocks wilderness and adjacent roadless areas, Lewis and Yakima Counties, Washington, U S Geological Survey Map MR-1653-A
- Church and Others, 1983, Mineral resource potential of the Goat Rocks wildeerness and adjacent roadless areas, Lewis and Yakima Counties, Washington, U.S Geological Survey Map MR-1653-A
- Cooperative Extension, Washington State University; 1983. A symposium held in Spokane, Washington on February 23 through 25, 1983, where papers were presented on Forestland Grazing
- Cormack, R.G.H ; 1949. A study of trout steamside cover in logged-over and undisturbed virgin spruce woods. Canadian Journal of Research; National Research Council (Ottawa) 27 (3): 78-94.

- Crowley, Jack, 1978, Leasable mineral classification map, Lands valuable for sodium and potassium: U.S. Geological Survey, Conservation Division
- Culver, Harold E. and Broughton, W A., 1945, Tungsten resources of Washington State of Washington, Department of Conservation and Development, Division of Geology Bulletin No 34
- Culver, Harold E., 1936, Mineral properties of Chelan County: Washington State Department of Conservation and Development, Division of Geology Report of Investigations Number 9, Plate 1
- Danner, Wilbert R., 1966, Limestone resources of western Washington: State of Washington, Department of Conservation, Division of Mines and Geology Bulletin No 52
- DeBano, L.F.; R M. Rice. Water-repellent soils their implications in forestry. Pacific Southwest Forest and Range Experiment Station, Forest Service, USDA, Berkeley, California.
- Duerr, W.; 1960. Fundamentals of forestry economics. McGraw-Hill Book Co., New York
- Dyrness, C.T.; 1965. Soil surface condition following tractor and high lead logging in the Oregon Cascades; Journal of Forestry: 63.
- Dyrness, C T.; et al , 1975. Research Natural Area Needs in the Pacific Northwest. USDA, Forest Service; Gen. Tech Rep., PNW-38. 231 p
- Easterbrook, Don J. and David A. Rahm; 1970. Landforms of Washington, The geologic environment Western Washington State College, Bellingham, Washington.
- Economic Report of the President; 1982 U S. Government Printing Office, Washington, D C , Table B-3, Implicit price deflators for gross national product, 1929-81.
- Eisler, David; David Porrella; Lee Spencer; 1978. Report on the investigation and analysis of cultural resources; Youngs Butte Fire; Paulina Ranger District; Ochoco National Forest; Manuscript on file, Ochoco National Forest, Prineville, Oregon.
- Envirosphere Company; 1984. Socioeconomic overview of the Wenatchee National Forest; Revised 1982; 109 pp
- Everest, F.; Procedures for economic evaluation of Region 6 fisheries, 1978. R-6 Fishery Workshop, March 21-22, 1978, Pacific Northwest Forest and Range Experiment Station, Corvallis, Oregon.
- Everest, Fred H and Phillip B. Summers; 1982. The sport fishing resource of the National Forest--Its extent, recreational use, and value. USDA Forest Service, W O.
- Eyre, F H , Ed ; 1980. Forest cover types of the United States and Canada Society of American Foresters.
- Fast, David E 1988. Spring and summer chinook spawning ground surveys Yakima and Wenatchee Rivers. Yakima Indian Nation. Fisheries Resource Management. December 1988 34 pp.
- Filip, Gregory M.; 1979. Symptom evaluations of conifers infested with root diseases in a proposed seed orchard and evaluation plantation site on the Tieton Ranger District Copy on file at Wenatchee National Forest Supervisor's Office.
- Filip, Gregory M ; 1982. Forest pest survey of stands along the Chirwawa River corridor, Lake Wenatchee Ranger District. Copy on file Wenatchee National Forest, Supervisor's Office
- Fox, Douglas; J Christopher Bernabo; Betsy Hood; November 1987. Guidelines for measuring the physical chemical and biological condition of wilderness ecosystems USDA Tech Report, RM-146 USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado 80526.

- Fox, Douglas; et al ; A screening procedure to evaluate air pollution effects on class I wilderness areas. USDA Tech Report, RM-168. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado 80526
- Flenniken, J. Jeffery; James C. Haggarty; 1979. Trampling as an agency in the formation of edge damage an experiment in lithic technology. Northwest Anthropological Research Notes 13 (2).
- Franklin, Jerry F. and C.T. Dyrness, 1973. Natural Vegetation of Oregon and Washington. USDA Forest Service General Technical Report PNW-8, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. 417 pp. illus.
- Fredricksen, R. L. and R. D Harr. Soil, vegetation and watershed management of the douglas-fir region. Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Corvallis, Oregon
- French, Robert R. and Roy J. Wahle; 1959. Biology of Chinook and Blueback salmon and steelhead in the Wenatchee River System. Fish and Wildlife Spec. Sci Rep , Fish No. 304. 1979; 79 p.
- French, Robert R. and Roy J. Wahle; 1965. Salmon escapements above Rock Island Dam, 1954-60. USDI, F. and W. Service, Special Scientific Report-Fisheries No. 493, 18 p
- Frizzell, Virgil A., Jr. and Others, 1984, Preliminary geologic map of the Snoqualmie Pass 1 : 100,000 quadrangle, Washington: U.S. Geological Survey Open-file Report Map OF-84-693.
- Froelich, H ; 1976. The influence of different thinning systems on damage to soil and trees. In: Proceedings, XVI IUFRO World Congress; Division IV; Norway.
- Froelich, Henry A., D. Edward Aulerich, Rich Curtis; 1981. Designing skid trail systems to reduce soil impacts from tractive logging machines, Research Paper 44, Forest Research Laboratory, Oregon State University.
- Froelich, Henry A.; J. Azevedo, Peter Cafferata, Dave Lysne; 1980 Predicting soil compaction on forested land. Oregon State University, Corvallis, Oregon.
- Froehlich, Henry A.; D.W.R. Miles, R.W. Robbins, J.K. Lyons, 1983. Soil monitoring project report on Payette national forest and Boise Cascade lands. Oregon State University, Corvallis, Oregon.
- Froehlich, Henry A. and R.W. Robbins; 1983. The influence of soil compaction on young tree growth on the Yakima indian reservation Oregon State University, Corvallis, Oregon
- Fulton, Leonard A.; 1970. Spawning areas and abundance of steelhead trout and Coho, Sockeye and Chum salmon in the Columbia River Basin - past and present USDC, N.O A A. Special Scientific Report - Fisheries No. 618. 37p.
- Gallagher, Joseph G.; 1978. Scarification and cultural resources: an experiment to evaluate serotinous lodgepole pine forest regeneration techniques. In. Plains, Pt 1, 23-82
- Galm, Jerry R.; Glenn D. Hartmann, Ruth A. Master; Garry O Stehphenson; 1981 A cultural resources overview of Bonneville Power Administration's Mid-Columbia Project, Central Washington In: Eastern Washington University Reports in archaeology and history, 100-116
- Gohen, D J ; et al; 1980. Losses from decay and insects in 40 to 120 year old Oregon and Washington western hemlock stands. R6-FPM-045-1980.
- Gohen, Donald J ; 1985. Biological evaluation forest pest survey of the Johnny Mac area, Leavenworth Ranger District On file at Wenatchee National Forest, Supervisor's Office

- Goudarzi, Gus H., 1984, Guide to preparation of mineral survey reports on Public Lands: U.S. Geological Survey Open-File Report 84-787
- Grant, Alan Robert, 1976, Mineral resource analysis study on United States Forest Service land, State of Washington Report of evaluation prepared for the U S. Forest Service-Region 6 under contract No 00472N.
- Grant, Alan Robert, 1973, Base and precious metal potential Alpine Lakes study area: Report to the Northwest Mining Association
- Grant, Alan Robert, 1969, Chemical and physical controls for base metal deposition in the Cascade Range of Washington: State of Washington, Department of Natural Resources, Division of Mines and Geology Bulletin No. 58.
- Grant, Robert A.; 1976. Report of evaluation mineral resource analysis study on United States Forest Service land - State of Washington, 93 pp.
- Gresens, Randall L., 1983, Geology of the Wenatchee and Monitor quadrangles, Chelan and Douglas Counties, Washington Washington State Department of Natural Resources, Division of Geology and Earth Resources Bulletin 75, 75 pp.
- Grier, Charles C.; 1975. Wildfire effects on nutrient distribution and leaching in a conifer ecosystem. Canadian Journal of Forestry, 5:599-607.
- Gualtieri, J.L., Thurber, H K, Miller, Michael S , McMahan, Areal B., Federspiel, Frank F., 1975, Mineral Resources of additions to the Alpine Lakes study area, Chelan, King and Kittitas Counties, Washington: U.S Geological Survey Open-file Report 75-3, 161 pp.
- Gualtieri, J.L., and Others, 1973, Mineral Resources of the Alpine Lakes study area, Chelan, King and Kittitas Counties, Washington: U.S. Geological Survey Open-file Report, 132 pp.
- Guenther, Keith and Thomas E Kucera; 1978 Wildlife of the Pacific Northwest: Occurrence and distribution by habitat, BLM District, and National Forest. USDA, F.S , R-6; 128p.
- Hall, Frederick C ; 1978. Pacific Northwest ecoclass vegetation identification concepts and codes. USDA Forest Service, R-6 Regional Guide; 1-3.
- Hanson, Everett; 1975. Phellinus (Poria) Wiern rootrot in Douglas-fir/alder stands, 10-17 years old. Res Note PNW-250, USDA Forest Service, Pacific Northwest Forest and Range Experiment Station.
- Hanson, Willis D and Robert S. Campbell; 1973. The effects of pool size and beaver activity on distribution and abundance of warm-water fishes in a north Missouri stream The American Midland Naturalist 69(1). 136-149.
- Haynes, R.W., K.P. Connaughton and D.M. Adams; 1980. Stumpage price projections for selected western species USDA Forest and Range Experiment Station; Research Note PNW-367, Portland, Oregon.
- Haynes, R.W., K.P. Connaughton, and D.M. Adams; 1981. Projections of the demand for National Forest stumpage by Region; 1980-2030. USDA Forest Service, Pacific Northwest Forest, and Range Experiment Station, Research Paper PNW-282, Portland, Oregon.
- Hays, Steve. 1989. Personal communication and discussion of spawning surveys. Chelan County Public Utility District.
- Hendee, John; George Stankey; Robert Lucas, 1976. Wilderness management. USDA Forest Service, Miscellaneous Publication #1365.

- Heritage Conservation & Recreation Service; 1980. Nationwide Rivers Inventory: A report on natural and free-flowing rivers in the Northwestern United States.
- Hillman, T.W. and D.W. Chapman; 1989, unpublished. Habitat use by juvenile steelhead in the Wenatchee River, Washington. Progress report to: Chelan County Public Utility District, Washington July - September 1988. 35 pp.
- Hillman, T.W.; 1988, unpublished. Summer and winter ecology of juvenile chinook salmon and steelhead trout in the Wenatchee River, Washington. Report to Chelan County Public Utility District, Washington July 1986 - May 1988. 379 pp.
- Hollenbeck, Jan L.; Susan L. Carter; 1986. A cultural resource overview: prehistory and ethnography, Wenatchee National Forest. USDA Forest Service, Pacific Northwest Region, Wenatchee, WA.
- Hoover, R. L.; D. L. Wills; 1984. Managing forested lands for wildlife. Colorado Division of Wildlife.
- Hormay, August L.; 1970. Principals of Rest-Rotation Grazing and Multiple-Use land Management. y
- Hoyer, G.E.; 1975 *Measuring and interpreting Douglas-fir management practices*. Washington State Department of Natural Resources.
- Huntting, Marshall T, Bennett, W.A.G, Livingston, Vaughn E., Moen, Wayne, 1961, Geologic Map of Washington: Washington Department of Conservation, Division of Mines and Geology
- Huntting, Marshall T., 1960, Inventory of Washington minerals, part I. Second edition, Nonmetallic minerals: State of Washington, Department of Conservation, Division of Mines and Geology Bulletin 37
- Huntting, Marshall T., 1956, Inventory of Washington minerals, part II, Metallic minerals: State of Washington, Department of Conservation, Division of Mines and Geology Bulletin 37
- Huntting, Marshall T., 1943, Inventory of mineral properties in Chelan County, Washington: Washington Division of Geology Report of Investigations Number 9
- Hynes, H.B.N.; 1970. The ecology of running waters. Liverpool University Press, 579 pp.
- Jackman, Siri M. and Scott J. Michael; 1975. Literature review of twenty-three selected forest birds of the Pacific Northwest. USDA Forest Service, PNW Region, 382 pp.
- Jameson, D.A.; M A. Moore and P.J. Case; 1982. Principles of land and resource management planning. USDA Forest Service, Washington, D.C
- Jim, Roger R., 1981 Letter to Regional Forester, Forest Service, Portland, Oregon On file, Wenatchee National Forest, Supervisor's Office.
- Johnson, K.N., D.B. Jones, and B M. Kent, 1980. (Draft) Forest Planning Model FORPLAN), User's Guide and Operations Manual. USDA Forest Service, Fort Collins, Colorado
- Joseph, Nancy L., 1988, The mineral industry in Washington, 1987: Washington Geologic Newsletter, Washington State Department of Natural Resources, Division of Geology and Earth Resources, pp 3-19.
- Kelly, Roger E.; Jim Mayberry, 1979. Trial by fire: effects of National Park Service burn programs upon archaeological resources. National Park Service, San Francisco, and University of Arizona, Tucson

- Kessler, Steve; unpublished. Documentation for formulation of fisheries outputs for the Wenatchee National Forest Plan.
- Kittitas County Planning Commission; 1968. Kittitas County zoning ordinance. 42 pp.
- Kittitas County Shoreline Citizen Advisory Committee and Kittitas County Regional Planning Office, 1975. Shoreline Master Program for Kittitas County, Washington, 28 sections.
- Klock, G. O., Research Soil Scientist. Are forest residues needed assets for soil protection and maintaining future site productivity? Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Wenatchee, Washington.
- Klock, G. O., Research Soil Scientist. Effects of fire on the long-term maintenance of forest productivity. Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Wenatchee, Washington; and C.C. Grier, College of Forestry, University of Washington, Seattle, Washington.
- Klock, G. O., Research Soil Scientist. Some soil erosion effects on forest soil productivity. Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Wenatchee, Washington, 1982
- Klock, Glen O.; 1975. Impact of five post-fire salvage logging systems on soils and vegetation Journal of Soil and Water Conservation. 30:78-81.
- Korosec, K.L. Kaler, and Schuster, J.E., 1981, Geothermal resources of Washington: Division of Geology and Earth Resources, Washington Department of Natural Resources Geologic Map GM-25.
- Kuchler, A.W.; 1964. Potential natural vegetation of the conterminous United States. Amer. Geo. Soc. Spec. Publication No. 36.
- Landsberg, J D.; et al; 1984. Foliar nitrogen content and tree growth after prescribed fire in ponderosa pine. Res Note 412, Portland, Oregon: USDA Forest Service, PNW Forest and Range Experiment Station
- Larsen, D. and L. Gee; 1981. 1980 Washington mill survey; wood consumption and mill characteristics. State of Washington, Department of Natural Resources. Washington mill survey series report No 7, Olympia, Washington
- Larsen, D.N. and R.K. Wadsworth; 1982. Washington forest productivity study, Phase III, Part II; Timber harvest projections for the 1980's and future decades in the State of Washington. State of Washington, Department of Natural Resources, Olympia, Washington.
- Lasmanis, Raymond, 1984, Geologic publications: State of Washington, Department of Natural Resources, Division of Geology and Earth Resources
- LeBlanc, Steven; Dee F. Green; 1982 Cultural resource protection: some considerations, In: Recreation Cultural Resource Management Bulletin 3.
- Leege, T A.; 1976. Relationships of logging to decline of the Peter King elk herd
- Lewis, Henry T.; 1982. A time for burning Occasional Publication No. 17; Boreal Institute for Northern Studies, University of Alberta, Edmonton.
- Livingston, Vaughn E. Jr , 1978, Geology of Washington' Washington State Department of Natural Resources, Division of Geology and Earth Resources Reprint 12, 51 pp
- Lucas, John M., 1975, The availability of nickel, chromium and silver in Washington: Washington State Department of Natural Resources, Division of Geology and Earth Resources Open-file Report 75-14.

- Lyon, J. L.; 1980. Influences of timber harvesting and residue management on big game.
- Lyon, Jack L., 1980. Management Implications of elk and deer use of clearcuts in Montana *Journal of Wildlife Management*. 44(2)
- Machlis, Gary E.; Donald R. Field; eds. 1984. *On interpretation* Oregon State University Press, Corvallis, Oregon.
- Manson, Connie J., 1984, Index to geologic and geophysical mapping of Washington, 1899-1983: State of Washington, Department of Natural Resources, Division of Geology and Earth Resources Information Circular 77
- Manzolf, G. Richard and Norman G. Benson, 1978 The potential effects of clearing and logging on stream ecosystems. *USDI, Fish and Wildlife Service, FWS/OBS-78/14.*
- Marvin, Susan H., 1982, The Hades Creek site and Kiwi salvage timber sale Report on file, Mt Hood National Forest, Gresham, OR.
- McColley, Phillip D.; 1976. Soil resource inventory, Wenatchee National Forest.
- Megahan, Walter F. and W.J. Kidd; 1972. Effects of logging and logging roads on erosion and sediment deposition from steep terrain Intermountain Forest and Range Experiment Station, Forest Service, USDA, Ogden, Utah, and N E. Area, State and Private Forestry, Columbus, Ohio
- Megahan, Walter F.; 1972. Logging, erosion, sedimentation - are they dirty words? Intermountain Forest and Range Experiment Station, Forest Service, USDA, Ogden, Utah.
- Megahan, Walter F.; 1974. Erosion over time on severely disturbed granitic soils· a model, USDA, forest service research paper, INT-156. Intermountain Forest and Range Experiment Station, Forest Service, USDA, Ogden, Utah
- Meschter, Daniel Y. 198? (not dated), Map of economic mineral potential areas Wenatchee National Forest, Chelan, Kittitas and Yakima Counties, Washington· Wenatchee N F. files
- Moen, Wayne S., 1976, Silver occurrences of Washington: Washington Department of Natural Resources Division of Geology and Earth Resources Bulletin No 69, pp 149-159
- Moen, Wayne S., 1964, Barite in Washington: State of Washington, Department of Conservation, Division of Mines and Geology Bulletin No 51
- Mullin, James, 1980. (Draft) Ecological Overview, Coho Salmon, Mid-Columbia River. *USDI, Fish and Wildlife Service.*, 35p.
- Mullan, James W. and Roy J Wahle, 1982. Draft - Determinants of sockeye salmon abundance in the Columbia River. *USDI, F & W Service.*
- Mullan, James. 1989. Personal communication *USDI Fish and Wildlife Service* *FAO* Leavenworth, Washington March 1989.
- Mullan, J.W., 1987. Status and propagation of chinook salmon in the mid-Columbia River through 1985. *U S Fish and Wildlife Service Biol. Rep.* 87(3) 111pp
- Mullan, J.W, 1986. Determinants of sockeye salmon abundance in the Columbia river, 1880's-1982: a review and synthesis. *U S. Fish and Wildlife Service Biol. Rep* 86(12) 136 pp.

- Northwest Indian Cemetary Association, 1983. Northwest Indian Cemetary Association, et al , versus R Max Peterson, et al (G-O Road). No. C-82-4049 SAW (N D. Calif.).
- Northwest Power Planning Council; 1982. Columbia River Basin fish and Wildlife Program. Portland, Oregon.
- Opdycke, James; 1982 Adjustments in managed yield tables. 1920 Memo, Land and Resource Management Planning. On file, Wenatchee National Forest, Supervisor's Office.
- Pacific Bald Eagle Recovery Plan, US Fish and Wildlife Service, 1986.
- Pacific Northwest River Basins Commission; 1977. The Yakima Basin Level B Study
- Pacific Northwest River Basins Commission; 1976 A regional recreation data program for the Northwest.
- "Pacific Northwest Industries Quarterly Summary - November, 1983". Seattle First National Bank, 7 pp.
- Packer, Paul E.; 1967 Criteria for designing and locating logging roads to control sediment Forest Science 13(1): 2-18.
- Park, Charles F., Jr., 1942, Manganese Resources of the Olympic Peninsula: Washington Geological Survey Bulletin 931-R, pp 435-457
- Peterson, Robert C and Kenneth W. Cummins, 1974. Leaf processing in a woodland stream. Freshwater Biol 4: 343-368.
- Peterson, R. Max (Memo to Regional Foresters). October 14, 1981 Chief's policy letter for development of required FORPLAN benchmarks and alternatives.
- Philipek, Frances M ; 1985, Over-Snow Logging. Analysis of Impacts to Lithic Scatters. Studies in Cultural Resource Management No. 5, USDA Forest Service, Pacific Northwest Region, Portland, OR.
- Pilles, Peter J., 1982 Prescribed fire management and cultural resource management Prepared for Prescribed Fire Management Training Course; National Interagency Fire Training Center, Murana, Arizona.
- Purdy, C. Phillips, Jr., 1954, Molybdenum occurrences of Washington: State of Washington, Department of Conservation and Development, Division of Mines and Geology Report of Investigations No 18
- Purdy, C. Phillips, Jr., 1951, Antimony occurrences of Washington State of Washington, Department of Conservation and Development, Division of Mines and Geology Bulletin No 39
- Plummer, Fred G.; 1900 Mount Rainier Forest Reserve, Washington. In Twenty-first annual report of the United States Geological Survey, Part V., G P O. Washington.
- Raney, John, 1977. Livestock and lithics: The effects of trampling Preliminary draft. On file, Wenatchee National Forest, Supervisor's Office, Wenatchee, Washington
- Renner, Joel L , Lee, W H., Brook, C , 1979, Leasable mineral classification map, lands valuable for geothermal resources: U S. Geological Survey, Conservation Division
- Rice, Raymond M ; Forest B. Tilley; Patricia A. Datzman; 1979. A watershed's response to logging and roads. Pacific Southwest Forest and Range Experiment Station, Forest Service, USDA, Berkeley, California

- Rice, Raymond M ; 1980. A perspective on the cumulative effects of logging on streamflow and sedimentation Pacific Southwest Forest and Range Experiment Station, Forest Service, USDA, Berkeley, California.
- Richards, Jack, 1986. Economic information for habitat management decisions prepublication draft, August 1986. National Marine Fisheries Service, Environmental and Technical Services Division, Portland, Oregon.
- Rimal, Durga, August 25, 1983, Determination of existence of valuable gold deposits--Wenatchee gold prospecting permit applications, Technical Notes for Files.
- Roberts, James Warren, 1985, Stratigraphy, sedimentology, and structure of the Swauk Formation along Tronsen Ridge, Central Cascades Washington: Master of Science in Geology Thesis, Washington State University, Department of Geology
- Row, C.; 1976. System MULTIPLOY: A computer language to simulate and evaluate investments in forestry; Part 1, Introduction and Basic Manual. USDA Forest Service, Washington, D.C..
- Row, C.; 1976. System MULTIPLOY: A computer language to simulate and evaluate investments in forestry; Part 2, Training Guide. USDA Forest Service, Washington, D.C.
- Ruggles, C.P.; 1959. Salmon populations and bottom fauna in the Wenatchee River, Washington. Trans. Am. Fishery Society, 88:186-190
- Russel, Kent; 1989. Personal communication regarding fish production in the Yakima and Cle Elum River systems. April 1989.
- Safrauyils, L.; et al.; 1974. Management of lodgepole pine to reduce losses from the mountain pine beetle. Canadian Forest Service Technical Report 1.
- Sanford, Bruce; 1989, unpublished. Entiat river sub-basin. Draft, April 1, 1989. Washington Department of Fisheries.
- Sanford, Bruce; 1989, unpublished. Wenatchee river sub-basin. Draft, March 31, 1989. Washington Department of Fisheries.
- Sartwell, Charles; R E. Stevens; 1975. Mountain pine beetle in ponderosa pine Journal of Forestry 73(3).
- Savory, A.; 1984. In a series of training program handouts, Savory describes the effects of Range influences on water cycles, succession, energy flow and on plants.
- Scotter, G. W.; 1980. Management of Wild Ungulate Habitat in the Western United States and Canada.
- Sedell, James; 1989. Personal communication March 1989.
- Sharp, Ward M.; 1963 The effects of habitat manipulation and forest succession on ruffed grouse. J. Wildl. Mgmt. 27(4): Grouse Mgmt.
- Simmons, George C., Van Noy, Ronald M and Zilka, Nicholas T , 1974, Mineral Resources of the Cougar Lakes-Mount Aix Study Area, Yakima and Lewis Counties Washington, United States Geological Survey Open-file Report 74-243
- Sirmon, Jeff; (Memo to Forest Supervisor); June 8,1982. CMAI requirements for forest planning
- Sirmon, Jeff (1920 memo to Forest Supervisors). March 16,1982. Regional planning criteria-guidelines for analysis.

- Snyder, Robert V. and John M Wade; 1973 Soil resource inventory, Snoqualmie National Forest, Eastside.
- Sullivan, Kathleen; et al; 1987. Stream channels the link between forests and fishes. In: Symposium on Streamside Management: Forestry and Fishery Interactions, February 12-14, 1986. University of Washington, Seattle, Washington.
- Swanston, D. N.; 1974. Slope stability problems associated with timber harvesting in mountainous regions of the western states. Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Portland, Oregon.
- Swanston, D. N., 1974. Erosion processes and control methods in North America. Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Corvallis, Oregon.
- Symons et al; 1964 Influence of impoundments on water quality Pubs. U.S. Public Health Service 999-WP-18.
- Tabor, R.W. and Others, 1987, Geologic Map of the Chelan 30-minute by 60-minute Quadrangle Washington: U S. Geological Survey Miscellaneous Investigations Series Map I-1661.
- Tabor, R.W. and Others, 1982, Geologic map of the Wenatchee 1:100,000 quadrangle, central Washington: U.S Geological Survey Miscellaneous Investigations Series Map I-1311
- Tabor, R.W. and Others, 1982, Preliminary geologic map of the Skykomish River 1:100,000 Quadrangel, Washington: U.S. Geological Survey Open-file Map OF-82-747
- Tabor, R.W. and Others, 1980, Preliminary geologic map of the Chelan 1:100,000 quadrangle, Washington: U.S. Geologic Survey Openfile Report 80-8041
- Teply, J L.; 1976. The development and projection of standing yield tables. Region 6; 1976.
- Teply, John; John Berger; 1971 Maximum mean annual increment equations Unpublished documents, on file. USDA Forest Service, Portland, Oregon.
- Terres, J. K.; 1980. The Audubon Society encyclopedia of North American birds, New York.
- Thomas, J.; et al, 1979. Wildlife habitats in managed forests, the Blue Mountains of Oregon and Washington. USDA Forest Service. Agricultural Handbook No 553.48-77, 1979.
- Tiedemann, A.R.; H W. Brandt; 1972 Vegetation and soils of a 30 year deer and elk enclosure in Central Washington Northwest Science. 46(1).
- Unger, D.G.; 1987 Anadromous fish planning coefficients Letter to regional foresters R-1, R-4 and R-6. April 22, 1987.
- U.S D.A., Bureau of Land Management, March 5, 1986, Leasable mineral report for the Longview Fibre No 2 proposed land exchange.
- U S. Bureau of Mines, 1986, Mineral Industry Location System, Wenatchee, Concrete and Yakima Quadrangles.
- USDA, Economic Research Service; 1982. Study of Wenatchee National Forest range forage value, file document: 2200, Range forage values for use in forest planning, April 6, 1982
- USDA, 1980 Outdoor recreation participation, Analysis of national surveys, 1959-1978 Agricultural Experiment Station, University of Vermont
- USDA. Recreation Information Management, (RIM). Various computer printouts for years 1975-1982, which show and describe recreation sites, use and costs.

- USDA, 1979. The Third Nationwide Outdoor Recreation Plan. Heritage Conservation and Recreation Plan
- USDA Forest Service; 1974. National Forest landscape management; Volume 1. Agriculture Handbook No 434, Washington, D.C.
- USDA Forest Service; 1974. National Forest Landscape Management, Volume 2; Chapter 1; Agricultural Handbook No. 462.
- USDA Forest Service; 1975. Research natural area needs in the Pacific Northwest. Forest Service General Technical Report PNW-38.
- USDA Forest Service; 1977. National Forest Landscape Management, Volume 2; Chapter 5, Agricultural Handbook No. 483.
- USDA Forest Service; 1978 Forest hydrology part II hydrologic effects of vegetation manipulation Unpublished report, Region 1, Missoula, Montana
- USDA Forest Service; 1978. Recreational impact on wildlands, Conference proceedings. Forest Service, PNW Region, NPS, Seattle, Washington.
- USDA Forest Service; 1979. Region 6 Dead Tree (snag) Policy Forest Service Manual 2630, R-6 Supplement No 18, 1 pp. 1979.
- USDA Forest Service; 1979. Roadless area review and evaluation (RARE II). Final Environmental Statement. Washington, D.C.
- USDA Forest Service; 1980 National Forest Landscape Management, Volume 2, Chapter 4; Agricultural Handbook No. 559.
- USDA Forest Service. Wenatchee National Forest timber sale data, Fiscal Years 74-80
- USDA Forest Service, Washington Office; 1980. Identifying lands suitable for timber production, "Tables of tree value indices by diameter class", Working Paper. Norman Gould, Director of Timber Management.
- USDA Forest Service. 1980 RPA program - A recommended renewable resources program, 1980 update. FS-346, Appendix C.
- USDA Forest Service, 1981. ROS and VRM integration into land management planning, Working draft, 1981.
- USDA Forest Service. Wenatchee National Forest financial and Forest attainment data, fiscal years 80-82. Program Accounting Management Attainment Reporting System (PAMARS).
- USDA Forest Service; 1982. Forest Service Manual 1970, Guidelines for economic and social analysis of programs, resource plans, and projects. United States Code of Federal Register, Vol. 47, No 80, April 26, 1982.
- USDA Forest Service; 1984. Regional Guide for the Pacific Northwest Region.
- USDA Forest Service; June 1986. Minimum management requirements for forest planning on the national forests of the Pacific Northwest Region.
- USDA Forest Service; Nov. 1988. General water quality best management practices. Pacific Northwest Region.
- US Dept of Commerce, 1980. "Number of Inhabitants, Washington".
- US Dept. of Commerce, Bureau of the Census. 1980 census of population and housing March, 1981.

- USDI, Bonneville Power Administration; 1977. The role of the Bonneville Power Administration in the Pacific Northwest power supply system; Portland, Oregon
- USDI Heritage Conservation Service; 1980 Nationwide Rivers Inventory. Washington, D.C
- US Dept of General Accounting Office; 1981 National direction required for effective management of America's fish and wildlife. G.A.O , CED-81-107.
- US Environmental Protection Agency, 1975. Logging roads and protection of water quality. USEPA, Region 10, Water Division, Seattle, Washington, 312 pp.
- US Environmental Protection Agency, 1980 An approach to water resources evaluation of non-point silvicultural sources (a procedural handbook), 600/8-80-012. U S Environmental Protection Agency, Athens, Georgia
- US Environmental Protection Agency, 1985. Final report on the federal/state/local nonpoint source task force and recommended national nonpoint source policy Office of Water, EPA, Washington, DC p. 17.
- US Environmental Protection Agency, 1987. Nonpoint source controls and water quality standards. Water Quality Standards Handbook, Chapter 2, General Program Guidance, pp2-25, August 19, 1987
- U.S. Geological Survey, List of Geological Survey geologic and water-supply reports and maps for Washington
- Wall, Brian R ; 1969. Projected developments of the timber economy of the Columbia--North Pacific Region. P.N.W. Forest and Range Experiment Station Research Paper (PNW-84).
- Warren, Charles E ; et al; 1964. Trout production in an experimental stream enriched with sucrose. J. Wildl. Mgmt 28(4): 617-660.
- Warrington, G. E.; 1978 Estimating soil erosion on forest land management planning. a procedure. in forest soils and land use. Forest Service, USDA, Fort Collins, Colorado.
- Washington Natural Heritage Program; 1981. An illustrated guide to the endangered, threatened, and sensitive vascular plants of Washington. Wash. Nat. Herit. Program, DNR, Olympia, WA.
- Washington Department of Games; 1982. Fauna of Washington. Washington Department of Game, Non-game. Unpublished. 23 p. (plus printset). Draft.
- Washington Department of Wildlife, undated. Parr production index Steelhead trout Wenatchee, Entiat, Yakima Rivers.
- Washington State. "1983 Population Trends for Washington State", State of Washington, Office of Financial Management, August, 1983. 89 pp.
- Washington State. "Population Trends for Washington State 1970-1980"; State of Washington Office of Financial Management, August, 1981. 57 pp.
- Washington State. "State of Washington Pocket Data Book 1983"; Office of Program Planning and Fiscal Management, 1984. 289 pp.
- Washington State; 1979 Washington State comprehensive outdoor recreation plan (SCORP)
- Washington State. Forecasting recreation participation: a theoretical model. Technical Report #2, Washington State Interagency Committee for Outdoor Recreations; 1976.

- State of Washington; 1961. Geologic Map of Washington, 1:500,000 scale, Division of Geology and Earth Resources, Department of Natural Resources.
- Weaver, Charles E., 1911, Geology and ore deposits of the Blewett mining district. Washington Geological Survey Bulletin No. 6.
- Weitkamp, D.E., J.P. Michaud, and J.G. Osborn. Downstream migrant estimates Rocky Reach and Rock Island Dams. Report to Chelan County Public Utility District. Parametrix, Inc Bellevue, Washington. Document No 85-0130-001FR1.
- White, Ray J. and Oscar M. Brynildson; 1967. Guidelines for management of trout stream habitat in Wisconsin Wisconsin Department of Natural Resources Tech. Bulletin No. 39.
- Wildesen; L E.; Y.T. Witherspoon; 1978. Archaeology for the people; the ethics of public archaeology. Paper presented at the 31st annual Northwest anthropological conference Pullman, Washington.
- Williams, Lance R.; 1982. A study of vandalism to cultural resources. In: Recreation cultural resource management bulletin 3
- Williamson, Richard L ; Frank E. Price; 1971 Initial thinning effects in 70 to 150 year old Douglas-fir - Western Oregon and Washington. Res. Note 117. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station.
- Willis, C.L , 1950, Geology of the northwestern quarter of the Chrwaukum Quadrangel, Washington: Seattle, Washington, University of Washington PHD dissertation.
- Wischnofske, Merle G.; 1977 Wildlife habitat relationships of Eastern Washington (Area 2) USDA Forest Service. PNW Region.
- Wood, W. Raymond; Donald L. Johnson, 1978 A survey of disturbance processes in archaeological site formation. In: Advances in archaeological method and theory. Vol 1, Academic Press, New York
- Wright, Kenneth A.; 1985 Changes in storm hydrographs after road building and selective logging on a coastal watershed in northern California MS thesis, Humboldt State University, Arcata, CA, 55 pp.10

LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE STATEMENT WERE SENT

FEDERAL OFFICIALS

U.S. Representative Sid Morrison
U.S. Representative John Miller
U.S. Representative Al Swift
U.S. Representative Jolene Unsoeld
U.S. Representative Thomas Foley
U.S. Representative Norman Dicks
U.S. Representative Jim McDermott
U.S. Representative Rod Chandler

U.S. Senator Brock Adams
U.S. Senator Slade Gorton

FEDERAL AGENCIES

Advisory Council on Historic Preservation, Washington, D.C.
Agriculture, Department of
Agricultural Library, Beltsville, MD
Animal & Plant Health Inspection Service, Hyattsville, MD
F.A.R.M, Seattle, WA
Farmers Home Administration, Wenatchee, WA
Forest Service, Washington, D.C.

Regional Offices

Region 1, Missoula, MT
Region 2, Lakewood, CO
Region 3, Albuquerque, NM
Region 4, Ogden, UT
Region 5, San Francisco, CA
Region 6, Portland, OR
Region 8, Atlanta, GA
Region 9, Milwaukee, WI
Region 10, Juneau, AK
WESTFORNET-North, Seattle, WA
WESTFORNET-South, Berkeley, CA

National Forests

Colville National Forest, Colville, WA
Deschutes National Forest, Bend, OR
Fremont National Forest, Lakeview, OR
Gifford Pinchot National Forest, Vancouver, WA
Packwood RD
Randle RD
White River RD

Mt. Baker-Snoqualime National Forest, Seattle, WA
Darrington RD
North Bend RD
Skykomish RD
White River RD
Mt. Hood National Forest, Gresham, OR
Ochoco National Forest, Prineville, OR
Okanogan National Forest, Okanogan, WA
Twisp RD
Olympia National Forest, Olympia, WA
Rogue River National Forest, Medford, OR
Siskiyou National Forest, Grants Pass, OR
Siuslaw National Forest, Corvallis, OR
Umatilla National Forest, Pendleton, OR
Umpqua National Forest, Roseburg, OR
Wallowa-Whitman National Forest, Baker, OR
Willamette National Forest, Eugene, OR
Winema National Forest, Klamath Falls, OR

Experimental Stations

Pacific Northwest Experiment Station, Corvallis, OR
Pacific Northwest Experiment Station, Portland, OR
Pacific Northwest Experiment Station, Wenatchee, WA

Office of Equal Opportunity, Washington, D.C.

Rural Electrification Administration, Environmental Policy Office, Washington, D.C.

Rural Electrification Administration, Assistant Administrator for Management, Washington, D.C.

Soil Conservation Service, Environmental Coordinator, Washington, D.C.

State Conservationist, Spokane, WA

District Conservationist, Wenatchee, WA

Bonneville Power Admin., Environmental Mgr., Portland, OR

Bonneville Power Commission, Wenatchee, WA

Corps of Engineers, Seattle, WA

Commerce, Department of

U.S Department of Commerce, Washington, D.C.

National Marine Fisheries Services, Northwest Region, Seattle, WA

NOAA, National Marine Fisheries Services, Portland, OR

Defense, Department of

Chairman, Explosives Safety Board, Alexandria, VA

Deputy Asst. Secretary of Defense, Environment, Washington, D.C.

Deputy Asst. Secretary of the Air Force, Environmental and Safety, Washington, D.C.

Chief of Navy Operations, Arlington, VA

U.S. Army Engineering and Housing Support Center, Washington, D.C.

Energy, Department of

Office of NEPA Project Assistance, Washington, D.C.

Environmental Protection Agency

Office of Environmental Review, Washington, D.C.

EIS Review Coordinator, Region X, Seattle, WA

Federal Energy Commission, Washington, D.C.

General Services Administration, Washington, D.C.

Health and Human Services, Department of, Washington, D.C.

Housing and Urban Development, Department of, Regional Administrator, Region X, Seattle, WA

Interior, Department of, Office of the Secretary, Portland, OR

Bureau of Indian Affairs, Toppenish, WA
Bureau of Land Management, Portland, OR
Bureau of Land Management, Spokane, WA
Bureau of Land Management, District Manager, Wenatchee, WA
Bureau of Mines, Spokane, WA
Bureau of Reclamation, Boise, ID
Bureau of Reclamation, Yakima, WA
Director, Environmental Project Review, Washington, D.C.
Fish and Wildlife Service, Seattle, WA
Fish and Wildlife Service, Union Gap, WA
Fish and Wildlife Service, Leavenworth, WA
Fish and Wildlife Service, Olympia, WA
Geological Survey, Menlo Park, CA
National Park Service
NPS, Superintendent, MT. Rainier, Ashford, WA
NPS, Denver Service Center, Denver, CO
NPS, North Cascades, Sedro Wooley, WA
NPS, Seattle, WA
NPS, Stehekin, WA
NPS, Enumclaw, WA

Interstate Commerce Commission, Washington, D.C.

Labor, Department of

Asst. Secretary, Mine Safety and Health, Arlington, VA

Asst. Secretary, Occupational Safety and Health, Washington, D.C.

United Nations, Seattle, WA

Pacific Northwest River Basin Commission, Vancouver, WA

Small Business Administration, Seattle, WA

Transportation, Department of

Asst. Secretary, Environmental Division, Washington, D.C.

Research and Special Program Administration, Washington, D.C.

Federal Aviation Administration, Northwest Region, Seattle, WA

Federal Highway Administration, Region X, Portland, OR

U.S. Coast Guard, Water Resources, Washington, D.C.

NATIVE AMERICAN TRIBES and ASSOCIATIONS

Colville Confederated Tribes, Nespelam, WA

Ted Felt, Nespelam, WA

Adeline Fredin, Nespelam, WA

Eddie Palmanteer, Nespelam, WA

Columbia River Inter-Tribal Fish Com., Portland, OR

Indian Center, Tacoma, WA

Native American Program, Granger, WA

Small Tribes of Western Washington, Sumner, WA

United Indian Association, Yakima, WA

Indian Student Division, U of Washington, Seattle, WA

Yakima Indian Agency, Branch of Forestry, Toppenish, WA

Yakima Indian Nation, Toppenish, WA

Department of Natural Resources, Department Director, Toppenish, WA

Fisheries Resource Mgmt., Toppenish, WA

Wildlife Resource Management Program, Toppenish, WA

STATE OFFICIALS

Governor Booth Gardner

State Representative Clyde Ballard
State Representative Forrest Baugher
State Representative Glyn Chandler
State Representative Shirley L. Doty
State Representative Jay Inslee
State Representative Alex McLean
State Representative Margaret Rayburn
State Representative Curtis P. Smith

State Senator Frank "Tub" Hansen
State Senator Jim Matson
State Senator Irving Newhouse
State Senator George L. Sellar

STATE AGENCIES

Department of Commerce and Economics, Olympia, WA
Department of Ecology, Olympia, WA
 Department of Ecology, Redmond, WA
 Department of Ecology, Yakima, WA
Department of Labor & Industry, Wenatchee, WA
Department of Natural Resources, Olympia, WA
 DNR, Division of Geology, Olympia, WA
 DNR, Ellensburg, WA
 DNR, Division of Private For/Rec, Olympia, WA
 DNR, Division of Geog and Earth Resource, Olympia, WA
 DNR, Division of Eng -Res Mapping, Olympia, WA
 DNR, Washington Natural Heritage Program, Olympia, WA
Department of Fisheries, Olympia, WA
 Dept. of Fisheries, Yakima, WA
 Dept. of Fisheries, Tumwater, WA
Department of Game Comm, Ellensburg, WA
Department of Parks and Rec Comm., Olympia, WA
Department of Parks and Rec. Comm., Wenatchee, WA
Department of Parks and Rec. Comm., Record Center, Olympia, WA
Department of Revenue, Wenatchee, WA
Department of Wildlife, Olympia, WA
 Dept. of Wildlife, Bothell, WA
 Dept. of Wildlife, Sedro Wooley, WA
 Dept. of Wildlife, Wenatchee, WA
 Dept of Wildlife, Yakima, WA
Department of Transportation, Wenatchee, WA
Department of Transportation, Vancouver, WA
Interagency Committee For Outdoor Recreation, Tumwater, WA
Office of Archaeology and Historic Preservation, Olympia, WA

COUNTY and LOCAL GOVERNMENTS

Chelan County Commissioners
Chelan County Planning Department
Douglas County Commissioners
Grant County Commissioners
Kittitas County Commissioners
Yakima County Commissioners
Moxee School District No 90
Port of Chelan County
P.U.D. #1 of Chelan County
P.U.D. Grant County
City of Roslyn
City of Roslyn, Roslyn Watershed Committee
City of Seattle
City of Yakima
Seattle Water Department
Town of Harrah
Town of Naches
Town of Union Gap

LIBRARIES

Adult Services Library, Bellingham, WA
Auburn Public Library, Auburn, WA
Bellevue Public Library, Bellevue, WA
Bellingham Public Library, Bellingham, WA
Benton City Public Library, Benton City, WA
Carpenter Memorial Library, Cle Elum, WA
Cashmere Public Library, Cashmere, WA
Central Wa. University Library, Ellensburg, WA
Chelan Public Library, Chelan, WA
Cheney Public Library, Cheney, WA
Colorado State University, The Libraries, Documents Department
Edmonds Public Library, Edmonds, WA
Ellensburg Public Library, Ellensburg, WA
Entiat Public Library, Entiat, WA
Everett Public Library, Everett, WA
Forest Resources Library, U. Of W., Seattle, WA
Kent Public Library, Kent, WA
Kirkland Public Library, Kirkland, WA
Lacey Public Library, Lacey, WA
Leavenworth Public Library, Leavenworth, WA
Library of Congress, The
Manson Public Library, Manson, WA
Marysville Public Library, Marysville, WA
Medical Lake Library, Medical Lake, WA
Mid-Columbia Library, Kennewick, WA
Naches Public Library, Naches, WA
North Central Washington Regional Library, Wenatchee, WA
Okanogan Public Library, Okanogan, WA

Olympia Public Library, Olympia, WA
Olympia Timberland Library, Olympia, WA
Omak Public Library, Olympia, WA
Oregon State University Library, Corvallis, OR
Pasco Public Library, Pasco, WA
Pateros Public Library, Pateros, WA
Peshastin Public Library, Peshastin, WA
Renton Public Library, Renton, WA
Richland Public Library, Richland, WA
Seattle Public Library, Seattle, WA
Shoreline Public Library, Shoreline, WA
Snohomish Public Library, Snohomish, WA
Spokane Public Library, Spokane, WA
Sunnyside Public Library, Sunnyside, WA
Tacoma Public Library, Tacoma, WA
Tukwila Public Library, Tukwila, WA
Tumwater Timberland Library, Tumwater, WA
University of Oregon Library, Documents Dept., Eugene, OR
University Of Washington Library, Seattle, WA
Vancouver Public Library, Vancouver, WA
Washington State University Library, Pullman, WA
Waterville Public Library, Waterville, WA
Wenatchee Public Library, Wenatchee, WA
Yakima Valley Regional Library, Yakima, WA

ORGANIZATIONS, BUSINESSES, and CIVIC GROUPS

Alpine Lakes Protection Society, Seattle, WA
AMA District 36, Carson City, NV
American Canoe Association, Lorton VA
American Rivers, Washington, D.C.
Baack, Don & Associates, Portland, OR
Backcountry Horseman, Leavenworth, WA
Big Toys, Entiat, WA
Boise Cascade Corp., Boise, ID
Boise Cascade Corp., Yakima, WA
Cascadians, Yakima, WA
Chamber of Commerce, Greater Yakima, Yakima, WA
CHEC - Forest Watch, Eugene, OR
Ehinger, Paul F. & Associates, Eugene, OR
Ellensburg Chamber of Commerce, Ellensburg, WA
Ellensburg Cross-Country Ski Club, Ellensburg, WA
Friends of The Earth, Northwest Office, Seattle, WA
Friends of The Forest, Ellensburg, WA
Frosty Hollow Nursery, Langley, WA
Icicle Irrigation Dist., Cashmere, WA
Kittitas Audubon Society, Ellensburg, WA
Knap-Wham Irrigation Dist., Agent Conrad Peterson & Son, Inc., Entiat, WA
League of Conservation Voters, Portland, OR
Leubec Company Inc., Seattle, WA

Longview Fibre Co., Leavenworth, WA
 LTC, Everett, WA
 Mt. Rainier Nat'l Park Assoc., Seattle, WA
 Mountaineers, Seattle, WA
 National Forest Products Assoc., Washington, D.C.
 National Wildlife Federation, Portland, OR
 Nature Conservancy The, Washington Field Office, Seattle, WA
 NFA, Tacoma, WA
 North Cascades Conservation Council, Seattle, WA
 North Central Mining District, Wallace Mineral, Moxee City, WA
 Northwest Forest Resource Council, Portland, OR
 Northwest Forestry Assn., Portland, OR
 Northwest Mining Assoc., Spokane, WA
 Northwest Rivers Council, Seattle, WA
 Oji Paper Co., LTD., Seattle, WA
 Omak Wood Products Inc., Omak, WA
 Pack River Management, Sandpoint, ID
 Plum Creek Timber Co., Roslyn, WA
 Resource Economics International, Corvallis, OR
 Rosa Irrigation District, Yakama, WA
 Save Lake Cle Elum, Renton, WA
 Sea-Sno. Mill Co. Inc., Sno., WA
 Sierra Club, Seattle, WA
 Simpson Timber Co., Seattle, WA
 Spokane Canoe and Kayak Club Inc., Spokane, WA
 Tacoma Motorcycle Club, Tacoma, WA
 Tahoma Audubon, Tacoma, WA
 Tall Timber Homeowners Assoc., Seattle, WA
 Timber and Wood Products, Yakama, WA
 United 4WD Associations, Fecton, PA
 Washington Cattlemen's Assn. Inc., Ellensburg, WA
 Washington Earth First, Seattle, WA
 Washington Native Plant Society, Seattle, WA
 Washington Rivers Coalition, Renton, WA
 Washington State Grange Headquarters, Seattle, WA
 Washington State Mineral Council, Renton, WA
 Washington State Mineral Council, Silverdale, WA
 Washington State Sportsmen's Council, Forest Conservation, Bothell, WA
 Washington Trails Association, Seattle, WA
 Washington Wilderness Coalition, Seattle, WA
 Washington Wildlife Study Council, Seattle, WA
 Washington Women In Timber, Seattle, WA
 Wenatchee Chiwawa Irrigation Dist., Leavenworth WA
 Western Forest Industry Assoc., Olympia, WA
 Western Wood Products Assn., Portland, OR
 WFIA, Portland, OR
 Weyerhaeuser Co., CHIM-29, Tacoma, WA
 W-I Forest Products, Peshastin, WA
 Wilderness Society The, Seattle, WA
 WSSA, Kirkland, WA
 Yakima Valley Audubon Society, Yakima, WA

SCHOOLS, COLLEGES, and UNIVERSITIES

Central Washington University, Biology Dept. ,Ellensburg, WA
Oregon State University Library, Corvallis, OR
University of Oregon Library, Documents Dept., Eugene, OR
University of Washington, Forest Resources Library, Seattle, WA
College of Forest Resources, Seattle, WA
Washington State University, Natural Resource Sciences, Pullman, WA
Wenatchee Valley College, Biology Dept., Wenatchee, WA

NEWS MEDIA

The Outdoor Press, Spokane, WA
WSSA Snoflyer, Yakima, WA

INDIVIDUALS

ANDERSEN, KAREN	BRODINE, RUSSELL
ANDERSON, SUSAN	BROWN, DAVID
ARNESON, ARNIE	BROWN, HAROLD
ARRE, WALLACE D.	BRUCE, M. M.
ASPLIN, WENDY M.	BRUCKER, JAN E.
AUGENSTEIN, ELISE	BURTLE, PAT
BALDRIDGE, TERRY R.	CAMBELL, PAUL L.
BEATTIGER, AL	CAMPELL, BILL
BEDARD, VAL & JUDY	CARRELL, MAY
BENDA, LEE	CLAUSING, TED
BENNETT, JACK AND MABEL	CLINE, LLOYD H.
BENNETT, R.A.	COMMACH, GARY
BERGESON, MICHAEL	COOLEY, M.
BERRERS, BOB	COOPER, VIRGINIA
BERTRAM, RICHARD L.	CORY, BARBARA
BEST, JACK W.	COX & CHESTNUT, CHARLES & BARB
BESWICK, RALPH	DAVIS, ELMER D.
BICCHIERI, BARBRA	DEAK, ALEXANDER
BIGAS, JOHN & PAM	DICKSON, DON
BLILIE, J.W.	DRAFFAN, GEORGE
BOCZONADI, L.E.	EDWARDS, JANEY
BOYLE, BARBRA E.	EDWARDS, NOREAN & TOM
BOYUM, BILL	ELLIS, WALLACE
BRINKMAN, CHUCK	EVANS, DEL K.
FAITH, RICHARD R.	LUTZ, MARK P.
FERRIANS, RONALD	MARR, JUDITH S.
FIDDLER, RICHARD W.	MARTEN, CHESTER
FISHBURN, STAN	MATSON, MARC
FLUHARTY, DAVID L.	MATTSON, KEN & VICKI
FOSS, TIM	MAY, STEVEN S.

FOSTER, JEFFREY R.
FOY, GERALD L.
FRIEDMAN, MITCH
FRIEDMAN, NEAL
GARDNER, LEONARD B.
GARRETT, ROGER C.
GASKINS, W.W.
GEOGH, WILSON
GILLEY, DELBERT D.
GLENN, ROBERT S.
GOLDSTEIN, DANIEL
GRANUM, JORDAN
GREENHAGEN, LIZ
HADFIELD, JEFF
HANNERLY, RAMONA
HANSON, LAURA
HARSTEAD, SANDRA
HEXSON, MARSHA
HOOVER, MARVIN D.
HORSWILL, EMILY J.
HOWARD, BILL
ISLEY, STAN
JARVIS, JOHN C.
JONES, ROD
JORDIN, C.B.
KAATZ, MARTIN R.
KAPLAN & PARR, NANCY AND JOSEPH P.
KERN, PHIL
KESSLER, STEVEN
KILPATRICK, RICK
KINNEY, J. DANIEL
KIRKMAN, MR. & MRS. J. C.
KLINGER, DAVID M.
KLOCK, GLEN
KNOX, LORI ANN
KOPLAU, LOUIS
KRUPIN, PAUL J.
LAHMAN, DALE
LAQUETA, KAMALIA
LARSON, D. J.
LAWLER, MARK
LAWRENCE, ADRIAN S.
LEACH, C.E.
LEINGANG, GENE
LOE, P.R.
LOEWEN, PAM
SCHROEDER, RICHARD
SCUDERI, MICHAEL
SHANNON, MICHAEL
SIMON, RON
SLATE, ROBERT C.
SLATER, ROB
SMITH, MERLIN

MC NEAL, CECELIA B.
McCAULEY, JAMES
MCFEELEY, MICHAEL R.
MCGREEVY, MICHAEL
MCGUIRE, CARLAA
MCINTIRE, PATRICK
MCMILLAN, ANDREW
MCMILLEN, BELINDA
MELTON, JAMES F.
MENNING, EDWARD
MILLAN, HOWARD W.
MOBURG, MARSHA L.
MOLLER, CHRISTIAN
MORGENTHALER, R.D.
MORRE, CM
MYCEK, LINDA M.
MYERS, TERRY
NEWMAN, ALLAN
NEWMAN, CONSTANCE & EDWARD
NORTH, DOUG
O'CALLAGHAN, MARILYN AND DR. P.D.
OLSON, MRS. LELLIE
OSPOM, JOHN, MD
PALMER, RUTH E.
PAOLELLA, RAY
PARDEE, SUZANNE
PARKS, DL
PAULY, DOUG
PETER, MARK
PLESS, DON
RAIN, JEFF
RAZEY, JERRY
RENFROW, BRENT
REUFRO, CLAUDE B.
RIBE, THOMAS E.
RIDEOUT, ELANINE
ROBERTS, PETER
RUSHTON, CHARLES AND HELENE
RUST, STEVE
RYAN, PATRICK J.
SANDBERG, MICHAEL
SAVER, CURT
SAY, ROBERT
SCALES, ANN
SCHOTT, JOSEPH
SCHROEDER, ED
TOWNSLEY, JOHN J.
TROUT, MIKE
TUCK, BOB
UNTHANK, AMY S.
USHAKOFF, VLADIMIR
VAIL, MARILYN L.
VAIL, W BANNING

SNYDER, TED & JERI
SPRINGER, SCOTT R.
STAN, SUE
STEEL, WILLIAM
STEELE & MEAGER, JANE & MIKE
STEINER, DANYA
STELZMILLER, MR. JEAN
STILES, DAVID W.
STREIFF, CARMEN L.
SWANSON, JOHN R.
TAHEKEAL, DON
TAKAHASHI, EUGENE R.
TANKE, LIZ
THOMPSON, JANET A.
THOMSON, TOMMY

VAN STAPPEN, JULIA
VICKERS, LEON
WAGONER, JIM B.
WEIGLE, R.D.
WEILAND, KEN
WERNEX, JOE
WIELAND, KURT
WIKE, D.
WILLIAMS, HELEN I.
WILLIS, GARY , A.
WILSON, CHARLES W.
WILSON, HARRY E.
WOODS, G. R.
WYMAN, PETE

GLOSSARY



ACRE EQUIVALENT - When applied to habitat improvement or improvement structures this term reflects overall habitat benefits derived. It reflects the zone of influence of the habitat improvement for the target species. For example, a single water development for upland game birds occupies very little space but has an acre equivalent of 160 because it serves 160 acres of bird habitat. A single water structure for big game has a value of 640 because it has a larger zone of influence for the more mobile big game animals.

ACRE-FOOT (AF) - A water measurement term equal to the amount of water that would cover an area of one acre to a depth of one foot (43,560 cubic feet).

ACTIVITY - Actions, measures, or treatments undertaken which directly or indirectly produce, enhance, or maintain forest outputs and rangeland outputs, or achieve administrative and environmental quality objectives. Forest Service activity definitions, codes, and units of measure are contained in the Management Information Handbook (FSM 1309 11).

AIRSHED - A geographical area that, because of topography, meteorology, and climate, shares the same air

ALLOCATED FUNDS - Funds from sources other than Congressionally appropriated funds. Allocated funds include the Senior Community Service Program, brush disposal (BD), Knutson-Vandenberg cooperative deposits (K-V), and State of Washington funds for trails from the Interagency Committee for Outdoor Recreation

ALLOWABLE SALE QUANTITY (ASQ) - The quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity" (36 CFR 219 3).

ALTERNATIVE - One of several policies, plans, or projects proposed for decision making

AMENITY - An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses. Amenity value is typically used in land use planning to describe those resource properties for which market values (or proxy values) are not or cannot be established.

AMS - An abbreviation of Analysis of the Management Situation.

ANADROMOUS FISH - Those species of fish that mature in the ocean and migrate into streams to spawn. Salmon, steelhead, and shad are examples

ANALYSIS AREA - A delineated area of land subject to analysis of (1) responses to proposed management practices in the production, enhancement, or maintenance of forest and rangeland outputs and environmental quality objectives and (2) economic and social impacts

ANALYSIS OF THE MANAGEMENT SITUATION (AMS) - A determination of the ability of the planning area to supply goods and services in response to society's demand for those goods and services

ANIMAL UNIT MONTH (AUM) - The quantity of forage required by one mature cow (1,000 pounds), or the equivalent for one month, based upon average daily forage consumption of 26 pounds of dry matter per day (800 pounds/month).

APPROPRIATE SUPPRESSION RESPONSE - The planned strategy for suppression action (in terms of kind, amount, and timing) on a wildfire which most efficiently meets fire management direction under current and expected burning conditions. It may range in objective from prompt control to one of containment or confinement.

APPROPRIATED FUNDS - Funds from the U. S Treasury, which Congress has authorized the Forest Service to obligate This is the sum of operational, capital investment, and backlog costs.

AQUATIC ECOSYSTEMS - Streams, channels, lakes, marshes or ponds, and the plant and animal communities they support.

ASQ - An abbreviation of Allowable Sale Quantity.

AREA OF SPECIES MANAGEMENT GUIDES - A contiguous area where management direction is the same

ARTERIAL ROADS - See Roads.

AUM'S - An abbreviation of Animal Unit Months.



BACKGROUND - In visual management terminology, refers to the visible terrain beyond the foreground and middleground where individual trees are not visible but are blended into the total fabric of the forest stand (also see Foreground and Middleground).

BASAL AREA - The cross-sectional area of a stand of trees measured at breast height. The area is expressed in square feet.

BASE TIMBER SALE SCHEDULE - A Timber Sale Schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade, and this planned sale and harvest for any decade is not greater than long-term sustained yield capacity. (36 CFR 219.3)

BASIN - The largest regional hydrologic unit for the Wenatchee National Forest (Columbia River Basin).

BENCHMARK LEVELS - The outputs and costs for managing the Forest at certain levels of management so that a comparison could be made on costs, values, and effects.

BENEFIT - (Value) Inclusive terms used to quantify the results of a proposed activity, program or project expressed in monetary or nonmonetary terms.

BENEFIT-COST RATIO - Measure of economic efficiency computed by dividing total discounted primary benefits by total discounted economic costs.

BEST MANAGEMENT PRACTICES (BMP's) - A practice or combination of practices determined by the state that are the most effective and practical (including technological, economic and institutional considerations) means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

BF - An abbreviation of board feet

BIG GAME - Those species of large mammals normally managed for sport hunting

BIOLOGICAL CONTROL - A method to control wildlife or insect populations and noxious weeds or tree diseases through the use of applied biology.

BIOLOGICAL GROWTH POTENTIAL - The average net growth attainable in a fully stocked natural forest stand. (36 CFR 2193)

BIOLOGICAL POTENTIAL - The maximum production of a selected organism that can be attained under optimum management

BIOMASS - The total quantity (at a given time) of living organisms of one or more species per unit of space (species biomass), or the total quantity of all the species in a biotic community (community biomass)

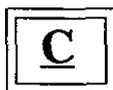
BOARD FOOT - The amount of wood equivalent to a piece of wood one foot by one foot by one inch thick

BRITISH THERMAL UNIT (BTU) - The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit

BROADCAST BURN - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for a reduction of fuel hazard or as a silvicultural treatment, or both.

BRUSH - A growth of shrubs or small trees usually of a type undesirable to livestock or timber management

BUREAU OF LAND MANAGEMENT (BLM) - An agency within the Department of the Interior with land management responsibility for the Public Domain lands.



CAPABILITY - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease (36 CFR 219.3)

CEQ - An abbreviation of Council on Environmental Quality.

CF - An abbreviation of cubic feet.

CHARGEABLE TIMBER VOLUME - The timber removed from regulated forest land that contributes to meeting the allowable sale quantity.

CLASS I (II & III) STREAMS - See Stream Class.

CLEARCUTTING - The harvesting in one cut of all trees in an area for the purpose of creating a new, even-aged stand. The area harvested may be a patch, stand, or strip large enough to be mapped or recorded as a separate age class in planning for sustained yield.

CLIMAX - The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition.

CLIMAX SPECIES - Those species that dominate the forest stand in either numbers per unit area or biomass at climax

CODE OF FEDERAL REGULATIONS (CFR) - The listing of various regulations pertaining to management and administration of the National Forest.

COLLECTOR ROAD SYSTEM - See Roads.

COMMERCIAL FOREST LAND (CFL) - Forest land that is producing or is capable of producing crops of industrial wood and (a) has not been withdrawn from timber management by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils, productivity, or watershed conditions; and (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking of young trees can be attained within 5 years after final harvest.

COMMERCIAL THINNING - Cutting by mean of sales of products (poles, posts, pulpwood, etc.) in immature forest stands to improve the quality and growth of the remaining stand.

COMMODITY - A transportable resource product with commercial value; all resource products which are articles of commerce.

COMPACTION - The packing together of soil particles by forces at the soil surface, resulting in increased soil density.

CONCERN - A point, matter, or question raised by management that must be addressed in the planning process

CONFINE - To restrict the fire spread within a predetermined area principally by use of natural or preconstructed barriers or environmental conditions. Suppression action may be minimal and limited to surveillance under appropriate conditions.

CONGRESSIONALLY CLASSIFIED AND DESIGNATED AREAS - Areas that require Congressional enactment for their establishment, such as National Wilderness Areas, National Wild, Scenic, and Recreational Rivers, and National Recreation Areas.

CONIFER - A group of cone-bearing trees, mostly evergreen, such as pine, spruce, fir, etc

CONSUMPTIVE USE - Those uses of a resource that reduce its supply

CONTAIN - To surround a fire, and any spot fires therefrom, with control line as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions The normal suppression tactic is indirect attack, allowing the fire to burn to human-made or natural barriers with little or no mop-up.

CONTROL - To complete the control line around a fire and around any spot fires therefrom and any interior islands of vegetation to be saved. Firefighters will also burn out any unburned area adjacent to the fire side of the control line, and cool down all hot spots that are immediate threats to the control line until the line can reasonably be expected to hold under foreseeable conditions The normal tactic is direct attack on the fire, if possible, and mop-up to extinguish all fire.

CORE AREA - (As related to spotted owl) An area encompassing at least 300 contiguous acres of old growth forest suitable for nesting and reproduction. The area consists of a portion of the territory required by a pair of owls, the nest site, and principal roost areas.

CORRIDOR - A linear strip of land identified for the present or future location of transportation or utility rights-of-way. (36 CFR 219.3)

COST EFFICIENCY - The usefulness of specified inputs (costs) to produce specified outputs (benefits) In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values but are achieved at specified levels in the least cost manner Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates of return may be appropriate (36 CFR 219.3)

COST, CAPITAL INVESTMENT - The cost of man made structures, facilities, or improvements in natural resources used as inputs in production processes to produce outputs over one or more planning periods

COST-EFFECTIVE - Achieving specified outputs or objectives under given conditions for the least cost

COST, FIXED - A cost that is committed for the time horizon of planning or the decision being considered Fixed costs include fixed ownership requirements, fixed protection, short-term maintenance and long-term planning and inventory costs

COST, OPERATIONAL - Costs associated with administering and maintaining National Forest facilities and resource programs. This includes appropriated funds only.

COST, VARIABLE - A cost that varies with the level of controlled outputs in the time horizon covered by the planning period or decisions being considered.

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) - An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

COVER/FORAGE RATIO - The mixture of cover and forage areas on a unit of land expressed as a ratio (e.g. deer summer range goal may be a 60/40 ratio).

CREATED OPENING - Created openings are openings in the Forest created by the silvicultural practices of shelterwood regeneration cutting at the final harvest, clearcutting, seed tree cutting, or group selection cutting.

CRITICAL HABITAT - For threatened or endangered species, the specific areas within the geographical area occupied by the species (at the time it is listed, in accordance with provisions of Section 4 of the Endangered Species Act) on which are found those physical or biological features essential to the conservation of the species. This habitat may require special management considerations or protecting. Protection may also be required for additional habitat areas outside the geographical area occupied by the species at the time it is listed based upon a determination of the Secretary of the Interior that such areas are essential for the conservation of the species.

CRITICAL MINERALS - Minerals essential to the national defense, but whose procurement, while difficult in case of war, is less serious than those of Strategic Minerals.

CUBIC FOOT (CF) - A unit of measure with the dimensions of one foot by one foot by one foot thick.

CULMINATION OF MEAN ANNUAL INCREMENT (CMAI) - The point where the mean annual growth of a timber stand ceases to increase prior to decline. Mean annual increment is expressed in cubic feet measure and is based upon expected growth according to the management intensities and utilization standards assumed in accordance with 36 CFR 219.16.

CULTURAL RESOURCES - Any site, structure, or object, or group of sites, structures, or objects that have been made, modified, or used by man in the past.

CUMULATIVE EFFECTS - The combined effects of two or more management activities. The effects may be related to the number of individual activities, or to the number of repeated activities on the same piece of ground. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.



DECISION CRITERIA - Essentially the rules or standards used to evaluate alternatives. They are measurements or indicators that are designed to assist a decision maker in identifying a preferred choice from an array of possible alternatives.

DEFERRED ROTATION - Any grazing system which provides for a systematic rotation of the delay or discontinuance of livestock grazing on an area to provide for plant reproduction establishment or restoration of vigor.

DEMAND - The amount of output that users are willing to take at specific price, time period, and conditions of sale.

DEPARTURE - A schedule which deviates from the principle of nondeclining flow of timber harvest by exhibiting an increase in cutting levels above sustainable levels followed by a planned decrease below sustainable levels in the timber sale and harvest schedule at some time in the future.

DESIGNATED AREA (AIR QUALITY) - Those areas delineated in the Oregon and Washington Smoke Management Plans as principal population centers of air quality concern.

DESTINATION RESORT - A recreation resort designed for multi-day use in contrast to single day use

DEVELOPED RECREATION SITE - Distinctly defined area where facilities are provided for concentrated public use; e.g. campgrounds, picnic areas, boating sites, and ski areas.

DIAMETER BREAST HIGH (DBH) - The diameter of a standing tree at a point 4 feet, 6 inches from ground level.

DISCOUNT RATE - An interest rate that represents the cost or time value of money in determining the present value of future costs and benefits.

DISCOUNT RATE, REAL - A discount rate adjusted to exclude the effects of inflation.

DISCOUNTING - An adjustment, using a discount rate, for the value of money over time so that costs and benefits occurring in the future are reduced to a common time, usually the present, for comparison

DISPERSED RECREATION - Outdoor recreation that takes place outside developed recreation sites or the Wilderness

DIVERSITY - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan. (36 CFR 219.3).

DRAINAGE PATTERN - The configuration or arrangement of streams within a drainage basin or other area.



ECONOMIC EFFICIENCY - The usefulness of inputs (costs) to produce outputs (benefits) and effects when all costs and benefits that can be identified and valued are included in the computations. Economic efficiency is usually measured using present net value, though use of benefit/cost ratios and rates of return may sometimes be appropriate.

ECONOMIC IMPACT - The positive or negative change in economic conditions, including distribution and stability of employment and income in affected local, regional, and national economies, which directly or indirectly results from an activity, project or program.

ECOSYSTEM - An interacting system of organisms considered together with their environment; for example, marsh, watershed, and lake ecosystems.

EDGE - The boundary between two or more elements of the environment; e.g. field and woodland.

EDGE CONTRAST - A qualitative measure of the difference in structure of two adjacent vegetated areas; for example, low, medium, or high edge contrast.

EFFECTS - Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include population growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

The terms "Effects" and "Impacts" as used in this statement are synonymous. Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems),

aesthetic quality, historic, cultural, economic, social, or health related, whether direct, indirect, or cumulative. Effects resulting from actions may have both beneficial and detrimental aspects, even if on balance the agency believes that the overall effects will be beneficial (40 CFR 1508.8).

ENDANGERED SPECIES - Any species of animal or plant which is in danger of extinction throughout all or a significant portion of its range. An endangered species must be designated by the Secretary of Interior as endangered in accordance with the Endangered Species Act of 1973.

ENVIRONMENTAL ANALYSIS - An analysis of alternative actions and their predictable short and long-term environmental effects, incorporating the physical, biological economic, social, and environmental design factors and their interactions.

ENVIRONMENTAL ASSESSMENT - A concise public document required by the regulations implementing the National Environmental Policy Act.

EROSION - The wearing away or detachment of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitation creep.

EROSION (ACCELERATED) - Erosion much more rapid than normal, primarily as a result of the influence or the activities of man.

EROSION (NATURAL) - Wearing away of the earth's surface by water, ice, or other natural agents under natural environmental conditions of climate, vegetation, etc., undisturbed by human activity.

ESCAPED FIRE - A fire which has exceeded, or is anticipated to exceed, preplanned initial action capabilities or the fire management direction

ESCAPE COVER - Usually vegetation dense enough to hide an animal; used by animals to escape from potential enemies.

ESSENTIAL HABITAT - Areas designated by the Forest Service Regional Forester that possess the same characteristics of critical habitat as those designated by the Secretary of the Interior or Commerce

EVEN-AGED MANAGEMENT - The application of a combination of actions that results in the creation of forest stands composed of trees of essentially the same age. Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes throughout the forest area) The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained in a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands. (36 CFR 219.3)

EVEN-FLOW - Maintaining a relatively constant supply of timber from decade to decade

EXCLUSION AREA - An area having a statutory prohibition to rights-of-way for linear facilities or corridor designation

EXPECTED BURNED ACREAGE - The expected annual number of acres burned by fire size class and intensity level for a given program option or budget level.

EXTENDED SHELTERWOOD - This is a variation of the shelterwood system design to provide for other resources such as wildlife or scenery considerations. The term extended is used to denote the retention of the old stand for a longer period than is necessary or, in many cases, desirable for maximum growth of the new stand.

EXTIRPATION - Extermination.



FINAL REMOVAL - The removal of the last seed bearers or shelter trees after regeneration is established under a shelterwood system

FIRE MANAGEMENT ANALYSIS ZONE - The geographically delineated areas into which the planning unit is divided for the purpose of fire management analysis. The delineation is based upon common fire-behavior characteristics which is the "corner stone" for fire planning and evaluation of fire effects.

FIRE MANAGEMENT DIRECTION - The direction provided by an interdisciplinary team for each separate management area on the Forest. It includes guides by management area for long-term maximum burn acreages, specifying fire size and intensity, which would not adversely affect attainment of resource targets or outputs. In addition, it provides guidelines on desired residue profiles and the use of fire to meet resource prescriptions.

FIRE PROGRAM OPTION - A given program mix funded at a given program level. Options are developed in response to specific fire management direction established for the Forest Plan. The objective is to identify the most cost-efficient option meeting resource protection and management objectives.

FLOOD PLAINS - Lowland and relatively flat areas adjoining inland and coastal water including, as a minimum, that area subject to one percent or greater chance of flooding in any given year.

FORAGE - All browse and non woody plants available to livestock or wildlife for grazing or harvestable for feed.

FORB - Any herb other than grass.

FORDRY - That forested ecotype where the climax conifer species is Douglas-fir or ponderosa pine.

FOREGROUND - A term used in visual (scenery) management to describe the stand of trees immediately adjacent to a high-value scenic area, recreation facility, or forest highway (see "Background", "Middleground")

FOREST LAND - Land at least 10 percent occupied by forest trees of any size or formerly having had such cover and not currently developed for non-forest use. Lands developed for non-forest use include areas devoted to crops, improved pasture, residential or administrative areas, improved roads of any width and adjoining road clearing and powerline clearing of any width. (36 CFR 219.3)

FOREST AND RANGELAND RENEWABLE RESOURCES PLANNING ACT (RPA) 1974 - An act of Congress requiring the preparation of a program for the management of the National Forest's renewable resources and preparation of land and resource management plans for units of the National Forest System. It also requires a continuing inventory of all National Forest System lands and renewable resources.

FOREST-WIDE STANDARD - A principle requiring a specific level of attainment; a rule to measure against. The Forest-wide Standards apply to all areas of the Forest regardless of the other prescriptions applied.

FORPLAN - A linear programming system used for developing and analyzing Forest Planning Alternatives.

FORWET - That forested ecotype where conifer trees other than Douglas-fir or ponderosa pine are climax species over time. Characterized by more available moisture than the forested dry (FORDRY) zone.

FREE-TO-GROW - A term used by silviculturists to indicate that trees are free of growth restraints, the most common of which is competing overtopping vegetation.

FUELBREAK - Any natural or constructed barrier utilized to segregate, stop, or control the spread of fire.

FUELS - Any material that will carry and sustain a forest fire, primarily natural materials, both live and dead.

FUEL TREATMENT - The rearrangement or disposal of natural or activity fuels to reduce the fire hazard.

G

GAME - Wildlife that are hunted for sport and regulated by State Game regulations

GENERAL DISTRIBUTION - The geographic area presently occupied, often on a seasonal basis, by a species within the planning area. Distribution is not to be confused with present occupancy of specific habitat(s). Resource management activities will create changes in habitat which will force local shifts in occupancy.

GENERAL FOREST (GF) - The portion of the Forest where timber management and other consumptive uses are emphasized

GENETIC INTEGRITY - Refers to a normal healthy genetic pool (foundation) within a biological population to provide for long-term maintenance and survival of the species. Of specific concern in management direction is the prevention of loss of genetic variance (heterozygosity) and the avoidance of inbreeding depression, an important part of a given population's genetic integrity within the gene pool.

GOAL - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principle basis from which objectives are developed. (36 CFR 219.3)

GOODS AND SERVICES - The various outputs, including on-site uses, produced from forest and rangeland resources (36 CFR 219.3)

GRADIENT - Change of elevation, velocity, pressure or other characteristics per unit length of slope

GROUP SELECTION CUTTING - Removal of tree groups ranging in size from a fraction of an acre up to about 2 acres in area that is smaller than the minimum feasible for even-aged management of a single stand.

GUIDELINE - An indication or outline of policy or conduct; i.e. any issuance that assists in determining the course of direction to be taken in any planned action to accomplish a specific objective.

GULLY - A channel or miniature valley cut by concentrated runoff but through which water commonly flows only during and immediately after heavy rains or during the melting of snow

GULLY EROSION - The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to considerable depths, ranging from one to two feet to as much as 75 to 100 feet.

H

HABITAT - The place where a plant or animal naturally or normally lives and grows.

HABITAT CAPABILITY - The estimated ability of an area, given existing or predicted habitat conditions, to support a wildlife, fish or plant population. It is measured in terms of potential population numbers.

HARVEST CUTTING METHOD - A combination of interrelated actions whereby forests are tended, harvested, and replaced. The combination of management practices used to manipulate the vegetation in forests. Harvest cutting methods are classified as even-aged and uneven-aged.

HEAVING - The partial lifting of plants out of the ground, frequently breaking their roots, as a result of freezing and thawing of the surface soil during the winter.

HIDING COVER - Vegetation capable of hiding 90 percent of a standing deer or elk from the view of a human at a distance of 200 feet.

HIGH QUALITY HABITAT - Habitat which completely satisfies a species existence requirement.

HORIZONTAL DIVERSITY - The distribution and abundance of plant and animal communities or successional stages across an area of land; the greater the number of communities, the higher the degree of horizontal diversity. This concept is close to, but not exactly the same as, "even-aged management," although each may influence the other. Application of even-aged management, for example, can be designed to accomplish horizontal diversity objectives.

HUMAN RESOURCE PROGRAMS - Providing human and natural resource benefits through administering and hosting programs in work, training, and education for the unemployed, the underemployed, the elderly, the young and others with special needs.

HYDRAULIC GRADIENT - The slope of the hydraulic grade line. The slope of the free surface of water flowing in an open channel.



INDICATOR SPECIES - A wildlife management scheme in which the welfare of a selected species is presumed to indicate the welfare of other species. The condition of the selected species can be used to assess the impacts of management actions on a particular area.

INITIAL ACTION - The prompt, preplanned response to a wildfire.

INTEGRATED PEST MANAGEMENT - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resources values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides. A basic principle in the choice of strategy is that it be ecologically compatible or acceptable. (36 CFR 219.3)

INTEGRATED RESOURCE MANAGEMENT - A management strategy which emphasizes no resource element to the exclusion or violation of the minimum legal standards of others.

INTENSIVE FOREST MANAGEMENT - A high investment level of timber management that includes regeneration with genetically improved seedling stock, control of competing vegetation, fill-in planting, precommercial thinning as needed for stocking control, and one or more commercial thinnings.

INTERDISCIPLINARY TEAM (ID TEAM) - A team of people that collectively represent several disciplines and whose duty it is to coordinate and integrate the planning activities.

INTERMITTENT STREAM - A stream that runs water in most months, but does not run water during dry seasons of most years.

INVENTORIED ROADLESS AREA - Areas of undeveloped Federal land, greater than 5,000 acres in size, within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use. Exceptions are those areas less than 5,000 acres manageable in their natural condition, contiguous to existing wilderness, or are of issue to the public.

IRRETRIEVABLE - Applies to losses of production, harvest, or use of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

IRREVERSIBLE - Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long time periods. Irreversible also includes loss of future options.

ISSUE - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

K

KNUTSON-VANDENBERG ACT (KV) - Legislation authorizing the collection of money from timber sale receipts for reforestation, stand improvements, and other resource improvement or mitigation projects on timber sale areas

KV - An abbreviation of Knutson-Vandenberg.

L

LAND ALLOCATION - The assignment of a management emphasis to particular land areas with the purpose of achieving the goals and objectives of that alternative.

LANDINGS - Those designated areas within a timber sale where logs are temporarily stored before transport to a mill.

LANDTYPE - A portion of the landscape resulting from geomorphic and climatic processes with defined characteristics having predictable soil, hydrologic, engineering productivity, and other behavior.

LEASABLE MINERALS - Coal, oil, gas, phosphate, sodium, potassium, oil shale, sulphur, geothermal steam
Also includes other minerals on acquired National Forest lands

LIMITING HABITAT - Habitat which restricts the distribution, numbers, or condition of an organism.

LOCATABLE MINERALS - Generally includes those hardrock minerals which are mined and processed for the recovery of metals, but may also include certain non-metallic minerals and uncommon varieties of mineral materials.

LONG-TERM SUSTAINED YIELD TIMBER CAPACITY - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives. (36 CFR 219.3)

M

M - Thousand

MANAGEMENT AREA - An area with similar management objectives and a common management prescription

MANAGEMENT CONCERN - An issue, problem, or a condition which constrains the range of management practices identified by the Forest Service in the planning process. (36 CFR 219.3)

MANAGEMENT DIRECTION - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them (36 CFR 219.3)

MANAGEMENT INTENSITY - The management practice or combination of management practices and associated costs designed to obtain different levels of goods and services (36 CFR 219.3)

MANAGEMENT PRACTICE - A specific activity, measure, course of action, or treatment. (36 CFR 219.3)

MANAGEMENT PRESCRIPTION - Management practices and intensity of management selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives. (36 CFR 219.3)

MANAGEMENT REQUIREMENT (MR) - Minimum standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, and soil and water resources, to be met in accomplishing National Forest System goals and objectives.

MARGINAL TIMBER COMPONENT - Timber on which the income just equals or could just equal the costs of production under a given form of management

MARKET RESOURCES - Products derived from renewable and nonrenewable resources that have a well-established market value; for example, forage, timber, water, and minerals.

MARKET VALUE - The unit price of an output normally exchanged in a market after at least one stage of production, expressed in terms of what people are willing to pay.

MASS MOVEMENT - A general term for any of the variety of processes by which large masses of earth material are moved down slope by gravitational forces, either slowly or quickly

MATURE TIMBER - Trees that have attained full development, particularly in height, and are in full seed production.

MAXIMUM MODIFICATION - A visual quality objective meaning man's activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background

MBF - Thousand board feet. A measure of wood volume.

MCF - Thousand cubic feet. A measure of wood volume. The conversion ratio for the Wenatchee National Forest is 5.45 board feet per one cubic foot of wood.

MEAN ANNUAL INCREMENT OF GROWTH - The total increase in girth, diameter, basal area, height, or volume of individual trees or a stand up to a given age, divided by that age.

MIDDLEGROUND - A term used in visual management to describe the visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly from the stand

MINERAL SOIL - Weathered rock materials usually containing less than 20 percent organic matter.

MINERAL WITHDRAWAL - The exclusion of locatable mineral deposits from mineral entry on areas required for administrative sites by the Forest Service and other areas highly valued by the public. Public lands withdrawn from entry under the General Mining Laws and/or the Mineral Leasing Laws

MINIMUM VIABLE POPULATION - The low end of the viable population range

MINING CLAIMS - That portion of the public estate held by law for mining purposes in which the right of exclusive possession of locatable mineral deposits is vested to the locator of a deposit

MITIGATION - Actions to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice

MM - Million.

MMBF - Million board feet

MMCF - Million cubic feet.

MONITORING - The periodic evaluation of Forest Plan management practices on a sample basis to determine how well objectives have been met.

MODIFICATION - A visual quality objective meaning man's activity may dominate the characteristic landscape but must, at the same time, utilize natural established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

MULTIPLE USE - The management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people. The concept also includes making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in the use to conform to changing needs and conditions. Some lands will be used for less than all of the resources. There will be harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land. Consideration will be given to the relative values of the various resources, and management will not necessarily favor the combination of uses that will give the greatest dollar return or the greatest unit output.

MUNICIPAL SUPPLY WATERSHED - A watershed that provides water for human consumption where Forest Service management could have a significant effect upon the quality of water at the point of intake. The watershed must provide water utilized by a community or any other public water system regularly serving 25 individuals at least 60 days out of the year or provide at least 15 service connections. This definition can include such facilities as campgrounds, organization camps, resorts, residential areas, etc.



NAAQS - National Ambient Air Quality Standards

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA) - An Act, to declare a National policy which will encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality.

NATIONAL FOREST MANAGEMENT ACT OF 1976 (NFMA) - An Act amending the Forest and Rangeland Renewable Resources Planning Act. NFMA requires the preparation of Regional and Forest Plans and the preparation of regulations to guide that development

NATIONAL FOREST SYSTEMS - All National Forest lands reserved or withdrawn from the public domain of the United States, all National Forest lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012), and other lands, waters or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system. (16 U.S.C. 1608)

NATURAL FOREST - The condition of a forest environment at any point in time including its associated plant and animal communities, which has been reached essentially through the process of natural succession. This process would include the effects of natural catastrophic occurrences.

NDF - An abbreviation of Non-Declining Flow

NEPA - An abbreviation of National Environmental Policy Act.

NET PUBLIC BENEFITS - An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of net public benefits to be derived from management of the units of the National Forest System is consistent with the principles of multiple-use and sustained-yield (36 CFR 219.3)

NET VALUE CHANGE - The estimation process carried out by an interdisciplinary team to assess positive and negative effects of individual resource allocation or management area designation. An estimation of physical effects and economic consequences of various fire intensity levels.

NFMA - An abbreviation of the National Forest Management Act of 1976.

NON-CHARGEABLE TIMBER HARVEST - Timber harvest that is not chargeable to the allowable sale quantity.

NON-CONSUMPTIVE USE - That use of a resource that does not reduce the supply.

NON-DECLINING FLOW (NDF) - A level of timber production assigned so that the planned timber sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade.

NON-GAME - Any species of wildlife or fish which is not managed or otherwise controlled by hunting, fishing, or trapping regulations.

NON-MARKET - Products derived from National Forest resources that do not have a well-established market value, for example, recreation, wilderness, wildlife

NON-POINT SOURCE POLLUTION - Pollution whose source is general rather than specific in location

NON-PRICED OUTPUTS - Outputs for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value. Subjective non-dollar values are given to non-priced outputs

NOXIOUS WEEDS - A plant considered to be extremely destructive or harmful to agriculture and designated by law. An undesirable species that conflicts with, restricts, or otherwise causes problems with the management objectives.

NPB - An abbreviation of net public benefits.



OBJECTIVE - A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals. (36 CFR 219.3)

OCCUPANCY TRESPASS - The illegal occupation or possession of National Forest land or property

OFF-ROAD VEHICLE (ORV) - Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, snow, ice, or other natural terrain

OLD GROWTH STAND - An old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics: 1) stands contain mature and overmature trees in the overstory and are well into the mature growth stage; 2) stands will usually contain a multilayered canopy and trees of several age classes; 3) standing dead trees and down material are present, and 4) evidence of man's activities may be present but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

OLIGOTROPHIC - Lakes having low nutrient supplies which are poor producers of organic matter.

OPPORTUNITY COSTS - The values of a resource's foregone net benefits in its most economically efficient alternative use.

OPTIMUM DENSITY - For wildlife, the maximum rate of animal stocking possible without inducing damage to vegetation or related resources, may vary from year to year because of environmental and/or population factors

ORV - An abbreviation for off-road vehicles.

OUTPUT - A good, service, or on-site use that is produced from forest and rangeland resources. See FSH 1309.11 for forest and rangeland outputs, codes and units of measure Examples: X06 - Softwood Sawtimber production - MCF; X80 - Increased Water Yield - Acre feet; W01 - Primitive Recreation Use - RVD's

OVERSTORY - That portion of the trees in a forest of more than one story, forming the upper or uppermost canopy layer.



PAOT - Persons At One Time - Public recreational measurement term. The number of people in an area or using a facility at one time.

PARENT MATERIAL - The unconsolidated and more or less chemically weathered mineral or organic matter from which the upper horizons of the soil profile are developed.

PARTIAL CUT - Covers a variety of silvicultural practices where a portion of the stand is removed and a portion is left.

PARTIAL RETENTION - A visual quality objective where man's activities may be evident but subordinate to the characteristic landscape.

PARTICULATES - Small particles suspended in the air and generally considered pollutants.

PATENTED MINING CLAIMS - A patent is a document which conveys a title Public law provides that when patented, a mining claim becomes private property and is land over which the United States has no property rights, except as may be reserved in the patent After a mining claim is patented, the owner does not have to comply with requirements of the General Federal Mining law, but is required to meet State regulations.

PAYMENT IN LIEU OF TAXES - Payments to local or State governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing Specifically, they include payments made under the Payments in Lieu of Taxes Act of 1976 by U.S. Department of the Interior.

PERENNIAL STREAMS - A stream that runs water year around.

PERSONS-AT-ONE-TIME (PAOT) - A recreation capacity measurement term indicating the number of people that can use a facility or area at one time.

PLANNING AREA - The area of the National Forest System covered by a regional guide or Forest Plan (36 CFR 219.3)

PLANNING HORIZON - The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions (36 CFR 219.3)

PLANNING PERIOD - One decade The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits. (36 CFR 219.3)

PLANT COMMUNITIES - A vegetation complex unique in its combination of plants which occur in particular locations under particular influences. A plant community is a reflection of integrated environmental influences on the site - such as soils, temperature, elevation, solar radiation, slope, aspect, and rainfall

PNV - An abbreviation of present net value

POTENTIAL YIELD - (This term is in reference to the Timber Management plans only.) Optimum sustained yield of timber harvest volume attainable with intensive forestry on available commercial forest land (forest lands able to produce 20 cubic feet of timber per acre per year or more) while considering the interrelationship with other forest resources and uses. Programmable net salvage volume and volume from marginally economical lands are also included.

PRACTICES - Those management activities that are proposed or expected to occur.

PRECOMMERCIAL THINNING - The selective felling or removal of trees in a young stand, primarily to accelerate diameter increment on the remaining stems, maintain a specific stocking or stand density range, and improve the vigor and quality of the trees that remain

PRESCRIBED FIRE - A wildland fire burning under preplanned specified conditions which will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions

PRESCRIBED NATURAL FIRE - The use of unplanned natural ignitions to meet management prescriptions

PRESENT NET VALUE (PNV) - The difference between the discounted values (benefits) of all outputs to which monetary values or established market prices are assigned, and the total discounted costs of managing the planning area. (36 CFR 219.3)

PRESERVATION - A visual quality objective that allows only ecological changes to take place

PRESUPPRESSION - Activities required in advance of fire occurrence to ensure an effective suppression action. It includes (1) recruiting and training fire forces, (2) planning and organizing attack methods, (3) procuring and maintaining fire equipment, and (4) maintaining structural improvements necessary for the fire program.

PRICE - The unit value of an output expressed in dollars.

PRIMARY CAVITY EXCAVATOR - Wildlife species that digs or chips out cavities in wood to provide itself or its mate with a site for nesting or roosting.

PRIMITIVE RECREATION - Those recreation activities which occur in areas characterized by an essentially unmodified natural environment of fairly large size (2,500 acres or greater).

PRODUCTION POTENTIAL - The capability of the land or water to produce a given resource.

PRODUCTIVE FOREST LANDS - Forest lands that are capable of producing crops of industrial wood and have not been reserved or deferred from timber management

PROGRAM DEVELOPMENT AND BUDGETING - The process by which forest management activities are proposed and funded.

PROGRAM ELEMENT - An individual Forest Service area of responsibility, which in combination with other elements, comprises the statutory or Executive directed mission of the Forest Service. Specific Forest Service program elements are defined in the Management Information Handbook (FSH 1309.11)

PROGRAMMED HARVEST - The amount of timber that is scheduled for harvesting. Includes salvage and cull timber volumes. It is based on current demand, funding, and multiple use considerations.

PUBLIC ACCESS - Usually refers to a road or trail route over which a public agency claims a right-of-way for public use.

PUBLIC ISSUE - A subject or question of widespread public interest relating to management of the National Forest System. (36 CFR 219.3)

PURCHASER CREDIT - Credit earned by the purchaser of a National Forest timber sale in return for construction of contract-specified roads. Earned purchaser credit may be used by the purchaser as payment for National Forest timber removed



RANGE ALLOTMENT - A designated area containing land suitable and available for livestock grazing use upon which a specified number and kind of livestock are grazed under an approved allotment management plan. It is the basic management unit of the range resource on National Forest System lands administered by the Forest Service.

RANGER DISTRICT - An administrative subdivision of the Forest, supervised by a District Ranger who reports to the Forest Supervisor.

RAPTORS - Any predatory bird - such as a falcon, hawk, eagle or owl - that has feet with sharp talons or claws adapted for seizing prey and a hooked beak for tearing flesh.

RARE II - An abbreviation of Roadless Area Review and Evaluation II.

REAL DOLLAR VALUE - A monetary value that compensates for the effects of inflation. (36 CFR 219.3)

RECORD OF DECISION (ROD) - A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not. (40 CFR 1505.2)

RECREATION CAPACITY - The number of people that can take advantage of recreation opportunity at any one time without substantially diminishing the quality of the experience or the biophysical resources.

RECREATION INFORMATION MANAGEMENT (RIM) - The Forest Service system for recording recreation facility condition and use.

RECREATION OPPORTUNITY - An opportunity for a user to participate in a preferred activity within a preferred setting, in order to realize those satisfying experiences which are desired

RECREATION OPPORTUNITY SPECTRUM (ROS) - Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs. This is measured based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The seven classes are

1. **Primitive**--Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low, and evidence of other users is minimal. The area is managed to be essentially free from evidence of management restrictions and controls. Motorized use within the area is not permitted.

2. **Semi-primitive Non-motorized**--Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.

3. Semi-primitive Motorized--Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but subtle. Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted.

4. Roaded Natural--Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, and evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities

5. Roaded Modified--Area is generally natural appearing, but has significant vegetation management and resource modification. Modifications generally harmonize with the natural environment. A moderate opportunity exists for isolation and undisturbed activities but some interaction with other visitors can be expected. Conventional motorized use is allowed and incorporated into construction standards and designs of facilities

6. Rural--Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agricultural development. Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.

7. Urban--Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant on site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

RECREATION VISITOR DAY (RVD) - A unit for measuring recreation use, with 12 visitor hours in a visitor day. This may consist of one person for 12 hours, 12 persons for one hour, or any equivalent combination of continuous or intermittent recreation use by individuals or groups

REFORESTATION - The natural or artificial restocking of an area with forest trees; most commonly used in reference to artificial restocking.

REGENERATION - The actual seedlings and saplings existing in a stand, or the act of establishing young trees naturally or artificially.

REGENERATION CUT - Any removal of trees to make regeneration possible.

REGION - An area covered by a Regional guide. See FSM 1221.3 for organizational definitions.

REGIONAL FORESTER - The official responsible for administering a single Forest Service region.

REGIONAL GUIDE - The guide developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended. It guides all natural resource management activities, and establishes management standards and guidelines for the National Forest System lands within a given region, it also disaggregates the assigned Regional RPA objectives to the Forests within that Region

REGULATED VOLUME - Same as Allowable Sale Quantity

REHABILITATION - A short-term management alternative used to return existing visual impacts in the natural landscape to a desired visual quality

RELEASE - Freeing a tree or group of trees from competition by cutting or otherwise eliminating vegetation that is overtopping or closely surrounding them.

REMOVAL CUT (Final Cut) - The removal of the last seed bearing or shelter trees after regeneration is established under a shelterwood method.

RESEARCH NATURAL AREA - An area of land in as near a natural condition as possible that exemplifies typical or unique vegetation and associated biotic, soil, geologic, and aquatic features. The area is set aside to preserve a representative sample of an ecological community primarily for non-manipulative scientific and education purposes.

RESERVED FOREST LAND - Public forest land withdrawn from timber utilization through statute or administrative regulations (e.g. Wilderness, Research Natural Areas).

RESIDENT FISH - Generally refers to trout and char which are not anadromous. However, some Forest reservoirs contain warmwater resident fish species such as bass.

RESIDUAL STAND - The trees remaining standing after some form of selection cutting is performed on a stand.

RESIDUE - Material which includes both desired and unwanted vegetative residues which result from an activity or natural event

RESOURCE PLANNING ACT (RPA) - The Forest and Rangeland Renewable Resources Planning Act of 1974 Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of the Act

RESPONSIBLE LINE OFFICER - For land management planning purposes, the Forest Service employee who has been delegated the authority to carry out a specific planning action (36 CFR 219.3)

REST-ROTATION - A system of grazing management which defines systematically recurring periods of grazing and deferment for two or more pastures or management units.

RETENTION - A visual quality objective where human activities are not evident to the casual forest visitor.

RILL EROSION - An erosion process in which numerous small channels only several inches deep are formed, occurs mainly on recently cultivated or disturbed soils.

RIPARIAN - Pertaining to acres of land directly influenced by water. Riparian areas usually have visible vegetative or physical characteristics reflecting this water influence Stream sides, lake borders, or marshes are typical riparian areas.

RIPARIAN-AQUATIC PROTECTION ZONE - A geographically delineated area with distinctive resource values and characteristics that is comprised of aquatic and riparian ecosystems. This includes floodplains, wetlands, and all areas within a variable horizontal distance from the normal line of high water of a stream channel or from the shoreline of a standing body of water

RISK - The degree and probability of loss based on chance

RUNOFF - That part of the water which travels over the soil surface to the nearest outlet or channel

RNA - An abbreviation of Research Natural Area.

ROAD - A general term denoting a way for purposes of travel by vehicles greater than 40 inches in width

a. **Forest Arterial Road**. Provides services to large land areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service. It is usually developed and operated for long-term land and resource management purposes and constant service (FSM 7710.51).

b. **Forest Collector Road**. Serves smaller land areas than a Forest arterial road and is usually connected to a Forest arterial or public highway. Collects traffic from Forest local roads and/or terminal facilities. The location and standard are influenced by both long-term multiresource service needs as well as travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility (FSM 7710.51).

c. **Forest Local Road**. Connects terminal facilities with Forest collector or Forest arterial roads or public highways. The location and standard are usually controlled by specific resource activity requirements rather than travel efficiency needs (FSM 7710.51).

ROADLESS AREA - See Inventoried Roadless Area.

ROADLESS AREA REVIEW AND EVALUATION II (RARE II) - The national inventory of roadless and undeveloped areas within the National Forest and grasslands. This refers to the second such assessment, which was documented in the Final Environmental Impact Statement of the Roadless Area Review and Evaluation, January 1979.

ROS - An abbreviation of Recreation Opportunity Spectrum.

ROTATION - Planned number of years, between the formation of a generation of trees and its final harvest of a specified stage of maturity.

ROTATION AGE - The age of a stand when harvested.

ROUNDWOOD - Commercially valuable wood that is generally too small to be made into boards.

RPA - The Forest and Rangeland Renewable Resources Planning Act of 1974. Also refers to the National Assessment and Recommended Program developed to fill the requirements of the Act.

RPA RESOURCE TARGETS - Quantified resource goals stated in the Forest Service Region 6 plan

RVD's An abbreviation of Recreation Visitor Days



SALE SCHEDULE - The quantity of timber planned for sale by time period from an area of suitable land covered by a forest plan. The first period (usually a decade) of the selected sale schedule provides the allowable sale quantity. Future periods are shown to ensure that long term sustained yield will be achieved and maintained (36 CFR 219.3)

SALVAGE CUTTING - Intermediate cuttings made to remove trees that are dead or in imminent danger of being killed by injurious agents

SANITATION CUTTING - The removal of dead, damaged or susceptible trees primarily to prevent the spread of insect pests or diseases.

SATURATION DENSITY - (Same as tolerance density.) This term relates to the requirement of many wildlife species for living space. This condition is most marked in territorial species. Space is the limiting factor to the further increases of the population density of these species

SCENIC AREAS - Places of outstanding or matchless beauty which require special management to preserve these qualities. They may be established under 36 CFR 294.1 whenever lands possessing outstanding or unique natural beauty warrant this classification.

SCENIC RIVERS - See Wild and Scenic Rivers.

SCHEDULED TIMBER HARVEST - Timber harvest that is chargeable to the annual allowable sale quantity for the Forest.

SCOPING PROCESS - A part of the National Environmental Policy Act (NEPA) process; early and open activities used to determine the scope and significance of the issues; and the range of actions, alternatives, and impacts to be considered in an Environmental Impact Statement (40 CFR 1501.7).

SCORP - Statewide Comprehensive Outdoor Recreation Plan.

SECOND GROWTH - Forest growth that has become established following some interference with the previous forest growth (e.g , cutting, serious fire, or insect attack)

SECONDARY USER SPECIES - Wildlife that occupies a site (cavity in a snag or a den) created by another species.

SEDIMENT - Solid material, both mineral and organic, that is in suspension, and is being transported from its site of origin by air, water, gravity, or ice, or has come to rest on the earth's surface either above or below sea level.

SEDIMENT YIELD - the total sediment outflow from a drainage basin in a specified period of time.

SEED TREE CUTTING - Removing all mature trees from a stand except for selected seed-bearing trees retained on site to provide a seed source for stand regeneration.

SELECTION CUT - Selection cutting is the periodic removal of mature trees individually or in small groups from an uneven-aged forest. By this method, both regeneration cutting and tending of immature stand components are accomplished at each entry.

SEMI-PRIMITIVE MOTORIZED ROS CLASS - See RECREATION OPPORTUNITY SPECTRUM

SEMI-PRIMITIVE NON-MOTORIZED ROS CLASS - See RECREATION OPPORTUNITY SPECTRUM.

SENSITIVE SPECIES - Those species of plants or animals that have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent their being placed on Federal or State lists.

SERAL - A biotic community which is a developmental, transitory stage in an ecological succession

SERAL STAGE--See "successional stage"

SHELTERWOOD CUTTING - Any regeneration cutting in a stand designed to establish a new stand under the protection (overhead or side) of the old stand. Usually the shelterwood involves two separate harvest operations. The first harvest (seed cut) is designed to create space and seed production to establish new trees. The second cut (removal cut) is designed to remove the remainder of the old stand before it begins to compete with the new stand for light and nutrients. This is usually within 10 years (See also EXTENDED SHELTERWOOD.).

SHEET EROSION - The removal of a fairly uniform layer of soil from the land surface by runoff water.

SILVICULTURAL SYSTEM - A management process whereby forests are tended, harvested, and replaced resulting in a forest of distinctive form. Systems are classified according to the logging method that removes the mature crop and provides for regeneration and according to the type of forest thereby produced. (36 CFR 219.3)

SILVICULTURE - The art and science of controlling the establishment, composition and growth of forests.

SITE INDEX - A numerical evaluation of the quality of land for plant productivity which uses height growth as a function of age.

SITE PRODUCTIVITY - Production capability of specific areas of land to produce defined outputs such as AUMs, cubic feet/acre/yr., etc.

SIZE CLASS - For purposes of Forest planning, size class refers to the three intervals of tree stem diameter used for classification of timber in the Forest Plan data base:

less than five-inch diameter = seedling/sapling
five to eight-inch diameter = pole timber
greater than eight-inch diameter = sawtimber

SLASH - The wood residue left on the ground after timber cutting and/or accumulating there as a result of storm, fire, or other damage. It includes unused logs, uprooted stumps, broken or uprooted stems, branches, twigs, leaves, bark, and chips.

SMALL GAME - Birds and small mammals typically hunted or trapped.

SMOLT HABITAT CAPABILITY - Smolt habitat capability is a measure of the productive capability of aquatic habitat to produce smolts of a given species

SNAG - A standing dead tree.

SOCIOECONOMIC - Pertaining to, or signifying the combination or interaction of, social and economic factors

SOHA - An abbreviation for Spotted Owl Habitat Area

SOIL - The unconsolidated mineral and organic material on the immediate surface of the earth.

SOIL and WATER CONSERVATION PRACTICES (SWCP) -- The set of practices which ensures that soil productivity is maintained, soil loss and water quality impacts are minimized, and water related beneficial are protected during implementation of a project. These practices include the following: (1) State recognized Best Management Practices, (2) Forest-wide standards and guidelines (3) Management Area standards and guidelines, and (4) practices identified at the area and project levels based on on-site specific evaluation.

SOIL DISTURBANCE - Soil disturbance is the mixing of duff material or other woody material into the surface horizon or horizons without significant movement of the soil from one spot to another.

SOIL RESOURCE COMMITMENT - Soil resource commitment is a conversion of a productive site to an essentially nonproductive site for a period of more than 50 years.

SOIL SURVEYS - Systematic examinations of soils in the field and in laboratories which are then interpreted according to their adaptability for various crops, grasses and trees.

SOUND WOOD - Timber that is free from defect, damage, or decay; i.e., in solid, whole, good condition

SPECIAL TIMBER COMPONENT - (obsolete term) That part of the planned timber harvest area and volume where timber production may require special harvest methods, production rates, or other requirements to benefit or mitigate resources other than timber.

SPECIES MANAGEMENT GUIDE - A guide for management of an indicator species in a particular area. The guide includes management direction, schedules for utilization, inventories, research, monitoring, and optimum cover/forage relationships for the long term.

SPECIES RICHNESS MANAGEMENT - A wildlife management strategy to maintain viable populations of all resident species.

SPOTTED OWL HABITAT AREA (SOHA) - A habitat area designated to support one pair of owls. A dedicated SOHA does not allow scheduled timber harvest on otherwise suitable timber lands

SPRING BREAK-UP - Time of year when roads are damaged or "break up" due to melting frost and ice, generally from first of March to middle of April.

STAND - Timber possessing uniformity as regards to type, age class, risk class, vigor, size class, and stocking class.

STANDARD - A principle requiring a specific level of attainment, a rule to measure against.

STANDARD TIMBER COMPONENT - That part of the planned timber harvest area and volume of normal or "standard" sawlog production Used in Timber Management Plans.

STOCKING - The degree of occupancy of land by trees as measured by basal area or number of trees as compared to a stocking standard

STORET - The acronym for a computerized water quality data base operated nationwide by the U.S. Environmental Protection Agency.

STRATEGIC MINERALS - Those minerals of which the U.S imports 50 percent or more from foreign sources (based on 1978 U.S. Bureau of Mines figures).

STREAM CLASS - Classification of streams based on the present and foreseeable uses made of the water, and the potential effects of on-site changes on downstream uses. Four classes are defined

Class I - Perennial or intermittent streams that provide a source of water for domestic use; are used by large numbers of fish for spawning, rearing or migration; and/or are major tributaries to other Class I streams.

Class II - Perennial or intermittent streams that are used by moderate though significant numbers of fish for spawning, rearing or migration; and/or may be tributaries to Class I streams or other Class II streams

Class III - All other perennial streams not meeting higher class criteria

Class IV - All other intermittent streams not meeting higher class criteria.

STREAMSIDE MANAGEMENT UNIT (SMU) - An area of varying width adjacent to a stream where practices that might affect water quality, fish and other aquatic resources are modified to meet water quality goals, for each class of stream.

SUB-BASIN - Further subdivision of the Columbia Basin for the Wenatchee N.F. (Chelan, Entiat, Wenatchee and Yakima Sub-basins).

SUBWATERSHED - A part of a whole watershed. As used in this Forest plan: the part of a WATERSHED that lies within the boundary of the Wenatchee National Forest.

SUBSTANTIVE COMMENT - A comment that provides factual information, professional opinion, or informal judgement germane to the action being proposed

SUCCESSIONAL STAGE - A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax For example, coniferous forests in the Blue Mountains progress through six recognized stages: grass-forb; shrub-seedling, pole-sapling; young; mature, old growth.

SUITABILITY - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices. (36 CFR 219.3)

SUPPLY - The amount of an output that producers are willing to provide at a specific price, time period, and condition of sale.

SUPPRESSION - The action of extinguishing or confining a fire

SURFACE RESOURCES - Renewable resources located on the earth's surface in contrast to ground water and mineral resources located below the earth's surface

SURFACE RUNOFF - Water that flows over the ground surface and into streams and rivers.

SUSTAINED YIELD OF PRODUCTS AND SERVICES - The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land (36 CFR 219.3)



TARGETS - Output accomplishments assigned to the Forest by the Forest Service Regional Forester. A statement used to express planned results to be achieved within a stated period of time.

TEMPORARY ROAD --Any short-lived road not intended to be a part of the Forest development transportation system and not necessary for future resource management

TENTATIVELY SUITABLE FOREST LAND - Forest land that is capable of producing crops of industrial wood and: (a) has not been withdrawn by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soil productivity or watershed conditions, (c) existing technology and knowledge provides reasonable assurance that it is possible to restock adequately within five years after final harvest; and (d) adequate information is available to project responses to timber management activities

THERMAL COVER - Cover used by animals to lessen the effects of weather, for elk, a stand of coniferous trees 12 meters (40 feet) or more tall with an average crown closure of 70 percent or more; for deer, cover may include saplings, shrubs, or trees at least 1.5 meters (5 feet tall) with 75 percent crown closure.

THREATENED SPECIES - Any species of animal or plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which has been designated in the Federal Register by the Secretary of Interior as a threatened species

TIERING - The coverage of general matters in broader environmental impact statements with subsequent, narrower statements or environmental analyses incorporating by reference the general discussions and concentrating solely on specific issues

TIMBER CLASSIFICATION - Forest land is classified under each of the land management alternatives according to how it relates to the management of the timber resource. The following are definitions of timber classifications used for this purpose.

1.**Nonforest**--Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

2.**Forest**--Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

3. Suitable--Commercial forest land identified as appropriate for timber production in the Forest planning process.

4. Unsuitable--Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as not appropriate for timber production in the Forest planning process

5. Commercial Forest--Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn from timber utilization

TIMBER MANAGEMENT PLANS (TM PLANS) - Functional resource plans completed in 1963 for the Wenatchee Working Circle and 1969 for the Naches-Tieton Working Circle, which established a timber sale volume to be sold each year. They were not integrated resource plans which considered impacts to all other resources on the Forest.

TIMBER PRODUCTION - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use. For planning purposes, the term "timber production" does not include production of fuelwood. (36 CFR 219.3)

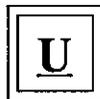
TIMBER STAND IMPROVEMENT (TSI) - The elimination or suppression of the less desirable vegetation in favor of the more desirable tree growth. It includes thinning, cleaning, weeding, and release cuttings.

TOLERANT SPECIES - Plants that grow well in shade

TOTAL SUSPENDED PARTICULATES (TSP) - Any finely divided material (solid or liquid) that is airborne with an aerodynamic diameter smaller than a few hundred micrometers

TRANSITORY RANGE - Land that is suitable for grazing use of a nonenduring nature over a period of time. For example, on particular disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage.

TURBIDITY - The degree of opaqueness, or cloudiness, produced in water by suspended particulate matter, either organic or inorganic. Measured by light filtration or transmission and expressed in Nephelometric Turbidity Units (NTU).



UNCERTAINTY - Whenever a variety of outcomes are possible and a probability of any specific outcome cannot be assigned with any degree of accuracy

UNDERSTORY - Vegetation growing under a higher canopy.

UNEVEN-AGED MANAGEMENT - The application of a combination of actions needed to simultaneously maintain continuous high forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. This management must provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection. (36 CFR 219.3)

UNIFORM FLOW - A state of steady water flow where the mean velocity and cross sectional area are equal at all sections.

UNREGULATED TIMBER MANAGEMENT - Timber cut from those lands that are not organized to provide sustained yields of timber.

UNROADED ACRES - Those areas of undeveloped Federal land within which there are no improved roads maintained for travel by means of vehicles intended for highway use.

UTILIZATION STANDARDS - Standards guiding the use and removal of timber which is measured in terms of diameter at breast height (d.b.h.), top diameter inside the bark (top d.i.b.), and percent "soundness" of the wood.

UTILITY AND TRANSPORTATION CORRIDORS - A strip of land designated for the transportation of energy, commodities, and communications by railroad, state highway, electrical power transmission (69 KV and above), oil and gas and coal slurry pipelines 10 inches in diameter and larger, and tele-communication cable and electronic sites for interstate use. Transportation of minor amounts of power for short distances, such as short feeder lines from small power projects including geothermal or wind, or to serve customer subservice substations along the line, are not to be treated within the Forest Plan effort.



VARIETY CLASS - A classification system for establishing three visual landscape categories according to the relative importance of the visual features. Those with the most variety of diversity have the greatest potential for high scenic value. The three variety classes are: *distinctive, common and minimal*.

VERTICAL DIVERSITY - The diversity in a stand that results from the complexity of the above ground structure of the vegetation; the more tiers of vegetation or the more diverse the species make up (or both), the higher the degree of vertical diversity. This concept is close to but not exactly the same as "uneven-aged management," although each may influence the other. Application of even-aged management, for example, can be designed to accomplish vertical diversity objectives.

VIALBE POPULATION - A population which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population on the planning area.

VIEWSHED - The total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.

VISITOR INFORMATION SERVICE (VIS) - Activities which interpret for visitors, in layman's language, Forest management, protection, utilization, and research. It also includes interpretation of local botany, geology, ecology, zoology, history, and archaeology.

VISUAL MANAGEMENT SYSTEM - The management system used to protect and enhance the visual resource

VISUAL QUALITY OBJECTIVES (VQO's) - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape. These categories include Preservation, Retention, Partial Retention, Modification, and Maximum Modification.

VISUAL RESOURCE (FOREST SCENERY) - The composite of basic terrain, geologic features, water features, vegetative patterns, and land-use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

VQO - An abbreviation of visual quality objective.



WATER QUALITY - The biological, physical, and chemical properties of water that make it suitable for given specified uses. Different instream conditions of levels of water quality are needed to support different beneficial uses.

WATER YIELD - The measured output of the Forest's streams.

WATER YIELD INCREASE - Additional water released to Forest streams as a result of Forest management activities.

WATERSHED - The entire land area that contributes water to a drainage system or stream.

WETLANDS - Areas that are inundated by surface or ground water with a frequency sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction (Executive Order 11990.) Under normal circumstances the area does or would support a prevalence of vegetative or aquatic life.

WFUD'S - An abbreviation of Wildlife and Fish User Days

WILD AND SCENIC RIVERS - Those rivers or sections of rivers designated as such by congressional action under the 1968 Wild and Scenic Rivers Act, as supplemented and amended, or those sections of rivers designated as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow Wild and scenic rivers may be classified and administered under one or more of the following categories:

1. Wild River Areas--Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America

2. Scenic River Areas--Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads

3. Recreational River Areas--Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

WILDERNESS - Areas designated by congressional action under the 1964 Wilderness Act Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and unconfined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

WILDERNESS RECREATION OPPORTUNITY SPECTRUM (WROS) --The Wilderness Recreation Opportunity Spectrum is an extension of the Recreation Opportunity Spectrum into Wilderness There are four classes; *Pristine, Primitive, Semi-Primitive and Transition* The *Primitive* and *Semi-Primitive* WROS classes correspond very closely to the *Primitive* and *Semi-Primitive Non-Motorized* classes in ROS The *Pristine* WROS class is the most undisturbed, natural portion of a primitive area. The *Transition* WROS class is essentially a *Semi-Primitive* WROS class area with greater allowances for social and biological influences of humans

WILDFIRE - Any wildland fire not designated and managed as a prescribed fire within an approved prescription.

WILDLIFE AND FISH USER DAY (WFUD) - One WFUD consists of 12 hours of recreation use that is the result of fish or wildlife

WINTER RANGE - The area available to and used by big game through the winter season.

WITHDRAWAL - An order removing specific land areas from availability for certain uses

WORKING CIRCLE - A geographic division of the Forest created for administrative or marketing purposes. The Wenatchee Working Circle in the Timber Management (TM) plans includes Chelan, Entiat, Lake Wenatchee, Leavenworth, and Cle Elum Ranger Districts. The Naches-Tieton Working Circle includes the Naches Ranger District.

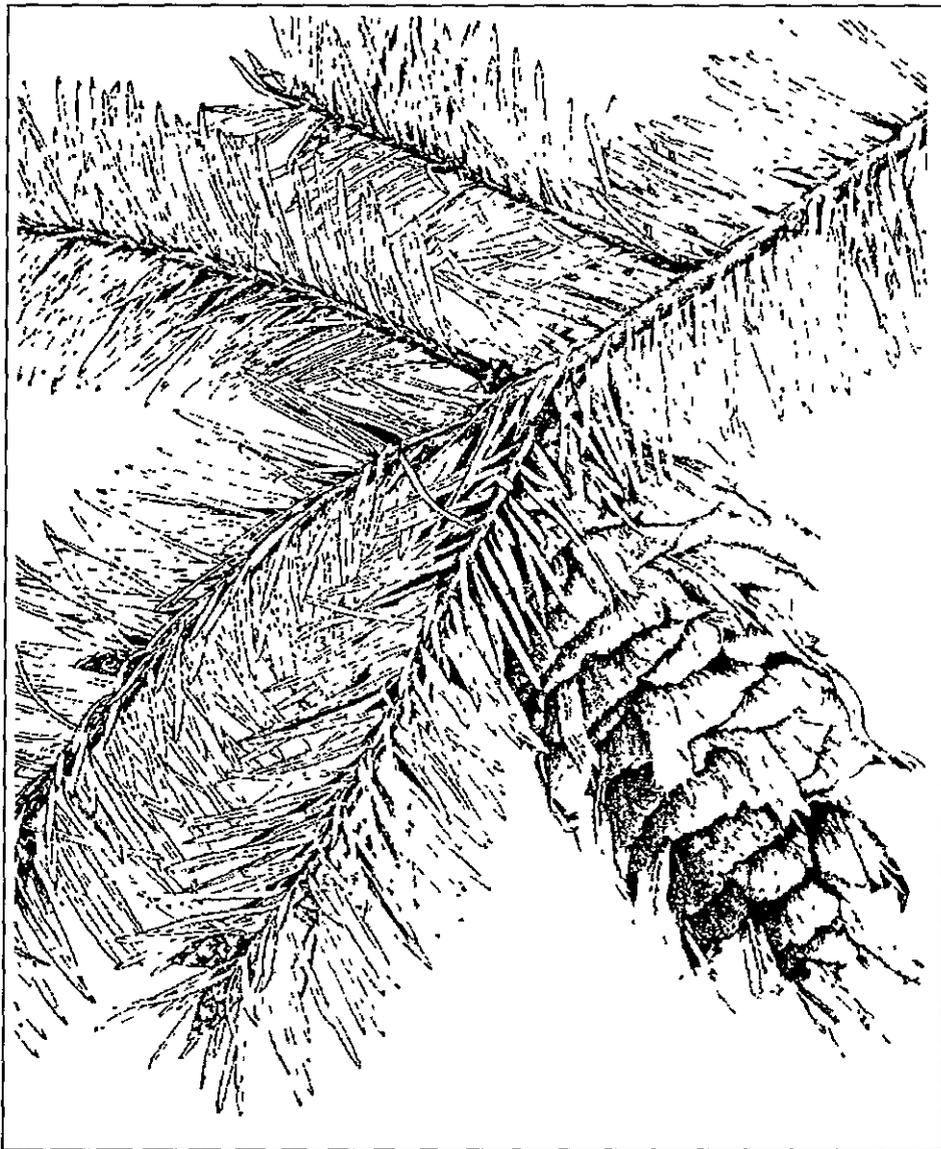
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YAKIMA INDIAN TREATY RIGHTS AREA - Those lands on the Wenatchee National Forest where the Yakima Indian Nation retained certain use rights under Article 3 of the Yakima Indian Treaty of 1855.

YIELD TABLES - Tables that estimate the level of outputs that would result from implementing a particular activity, yield tables can be developed for timber volumes, range production, soil and water outputs, and other resources.

Z

ZONE OF INFLUENCE - The geographic area whose social, economic and/or environmental condition is significantly affected by changes in Forest resource production or management.



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United States
Department of
Agriculture

Forest Service

Pacific
Northwest
Region

1990



Appendices A-J

Final Environmental Impact Statement

Land and Resource
Management Plan

Wenatchee National Forest



APPENDICES PREFACE

These appendices supplement the information provided in the Final Environmental Impact Statement for the Forest Management Plan, for the Wenatchee National Forest. They support the discussion which describes the flow of the analysis from the Issues, Concerns, and Opportunities to benchmarks to alternatives to effects.

The appendices provide the reader who is looking for more depth a more detailed description of how alternatives were developed, how the alternatives and benchmarks were analyzed, what standards and guidelines are used for all alternatives, specific information about special areas, and other information which was used in writing the main FEIS body but was too extensive to be included.

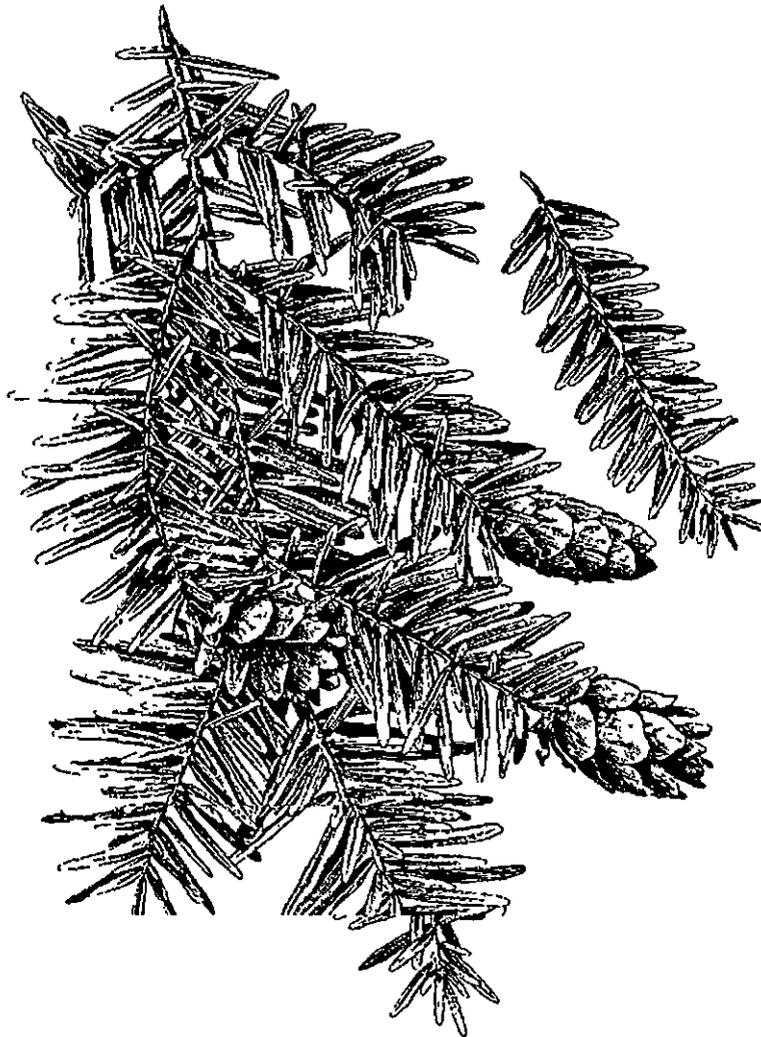


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APPENDIX A

ISSUES, CONCERNS, AND OPPORTUNITIES

IDENTIFICATION PROCESS

I. ISSUES, CONCERNS, AND OPPORTUNITIES

The public issues, management concerns, and development opportunities (ICO's) were identified over the entire period that the Land and Resource Management Plan was being developed. The process started in the spring of 1979 when a Forest list of ICO's was developed from previous public comments on Unit Plans. From May 1 through May 14, four workshops were held at central points on the Forest to involve Ranger Districts, Technical Work Centers, and Forest staff in the development of management concerns for the Forest. These concerns were summarized and refined at a meeting with the Forest Management Group on May 17, 1979. This resulted in the identification of 85 tentative issues. In June 1979, the tentative issues were published in Wenatchee Forest Plan Report 1 and sent to more than 2,400 people including a wide variety of interested citizens, interested groups, and State, County, and Federal agencies, Indian tribes, and private industry in Washington.

Specific contacts were made with County officials and planners for Chelan, Kittitas, and Yakima Counties, Washington. The tentative ICO's were also discussed with the Washington Departments of Fisheries, Wildlife, and Transportation as well as various Federal agencies such as the Soil Conservation Service, Bureau of Land Management, U.S. Fish and Wildlife Service, and the National Park Service. Other personal contacts were made with representatives of the Yakima Indian Nation, Colville Confederated Tribes, local private industrial timber managing companies and any interested groups--wildlife, sportsmen, or conservation.

The purpose of these meetings was two-fold:

1. To obtain input on the tentative planning Issues and Concerns.
2. To help ensure compatibility and consistency between local plans of others and the developing Wenatchee National Forest Plan through continuing dialogue and coordination.

Public workshops were held at key areas in the Forest's influence zone including Wenatchee, Yakima, Seattle, and Tacoma. The Seattle and Tacoma workshops were co-hosted by the Mt. Baker-Snoqualmie and Wenatchee National Forests. One hundred fifty-eight (158) people attended the workshops and 230 sent written responses. All of the potential issues were screened using the following criteria to determine their applicability to the Forest planning process:

1. Intensity of public issue or management concern - High.
2. Scope - Forest-wide or greater.
3. Duration - Long term.
4. Feasibility of solution in the Forest Plan - Feasible.
5. Future options - Decreasing.

Individual issues were lumped as facets of major issues whenever practical. Based on this analysis, a revised list of issues was mailed in October 1979 to more than 1,900 people including the public, Government agencies, and Indian tribes (Forest Plan Report 3). This listed 13 central issues with 27 questions to be addressed in the planning process.

In December, 1984, the Issues and Concerns were reviewed and updated. The revised issues were rewritten to include a discussion of the "opportunities" offered by the Forest Plan for resolving the issues. Three new issues were added: one dealing with the cumulative effects of Forest management activities, one concerning the recent mining interest on the Forest, and one relating to the management of prehistoric cultural resources.

The revised ICO's were mailed to more than 2,300 people on the Forest Plan mailing list in December, 1984. One hundred written responses were received. Based on this response, the ICO's were again revised. A new issue about the social and economic implications of the alternatives was added to the existing 15 issues in response to public comments on this subject.

II. CONSULTATION WITH OTHERS

Consultation with other agencies, local governments, interest groups, and individuals occurred throughout the planning process. Several interest groups tracked the planning process on a regular basis. Meetings were held to discuss specific concerns that surfaced over technical aspects of the planning data. Meetings were also held with any group that wanted to learn more about the planning process.

For instance, the Forest held meetings with the Yakima Indian Nation Tribal Council at various times to discuss the planning process and various issues such as rights under Article 3 of the Yakima Indian Treaty, the American Indian Religious Freedom Act, and the Forest's management of prehistoric cultural sites. The Forest and Washington Departments of Fisheries and Wildlife also held meetings to coordinate the Forest's and Department's planning efforts. The Forest biologist worked with the various State and Federal wildlife agencies to coordinate their respective plans with the Forest's planning process.

The Forest held four public meetings at various locations in central Washington from January through March of 1985. About 350 people attended the meetings. Attendance was as follows: Wenatchee--70, Yakima--125, Ellensburg--100, and Pasco--55. In addition, meetings were held with the Yakima Indian Nation Council and the County Commissioners of Chelan, Kittitas, and Yakima Counties. The purposes of the meetings were to share information on the status of planning, encourage public participation in the next major planning step (The Draft Environmental Impact Statement), and solicit concerns about planning to date.

The ICO's which had been developed for the Draft EIS were ratified again through extensive public comment received after publication of the DEIS and Proposed Forest Plan in June 1986, and the Supplement to the DEIS in October 1988. For the DEIS and proposed Plan, the Forest had a 120 day review period during which it received over 4,665 responses.

Eleven public meetings were held to give information and receive public input on the Draft planning documents. About 520 people attended the meetings. Attendance was as follows: Wenatchee--70, Chelan--30, Ellensburg--70, Entiat--38, Leavenworth--33, Seattle--53, Tacoma--25, Cle Elum--55, Yakima--90, Richland--30, and Lake Wenatchee--25. Presentations were also made to 164 people of eight different organizations. The Supplement to the DEIS had a 90 day review period and received about

2,650 responses. Eight public meetings were held for the Supplement. Attendance was as follows: Entiat--28, Lake Wenatchee--57, Wenatchee--32, Seattle--13, Cle Elum--12, Ellensburg--11, Leavenworth--50, and Yakima--16.

Several issues or aspects of issues received fresh emphasis after the issuance of the Draft in 1986 and the Supplement in 1988. Numerous meetings with interested agency officials, groups, and individuals since then have continued to clarify the ICO's. Appendix K describes the public involvement between the DEIS and FEIS. It also displays the public comments received and responses to the comments.

III. SELECTED ISSUES, CONCERNS, AND OPPORTUNITIES

In this section, the issues selected through the public involvement process are listed along with the opportunities each issue presents. There is little differentiation between issues and concerns. The management concerns were displayed to the public and many of them were adopted by the public as issues. Former Issue #13, "Allocation of Areas Designated for Further Planning by RARE II", is now included with Issue #2, "Management of Areas that are Presently Unroaded". New issue #13, "Minerals," was in the tentative list of issues. Recent mining activity near Wenatchee has boosted the significance of this issue. Other issues added to the original list include #14, "Cultural Resource Management," and #15, "Cumulative Effects." These issues were added because of continuing and intensifying concerns by the public and/or management. Issue #16, Social and Economic, was added as a result of public response to the revised ICO's in 1985. Issues #17 and #18, Wild and Scenic Rivers and Old Growth, were added as a result of public input to the Draft EIS, Proposed Forest Plan, and Supplement to the DEIS.

1. Recreation Opportunities and Use Conflicts

The Forest receives about 5 million visitor days of use a year. The Forest is one of the heaviest recreation-oriented Forests in the Pacific Northwest Region. Use is continuing to increase, and conflicts between recreational user groups (off-road vehicles, hikers, horses, snowmobilers, cross-country skiers, etc.) are becoming more evident. For instance, there are concerns about noise pollution from off-road-vehicles in narrow canyons, such as Devil's Gulch, the Teanaway, and the Lake Clara areas. In addition, some recreation activities can cause resource damage because of the level, type, or location of use. The use of ORV's received one of the largest volumes of comment to the DEIS with the majority opposed to ORV use in general, and especially to any expansion of use. There is also a demand to separate different types of recreation use by areas. Regulation of commercial use is included in the issue.

Recreational use in key wildlife habitat areas at certain times of the year in such places as Swakane Canyon and the Oak Creek Game areas may disrupt wildlife. Timber harvest access roads can increase roaded dispersed recreation opportunities but reduce primitive and semi-primitive recreational opportunities. The potential effect of the alternatives on trails and trail mileage is also an issue.

Opportunities

There are opportunities to reduce user conflicts by separating uses through land allocations: scenic areas, unroaded dispersed recreation areas, areas for motorized or non-motorized use, and classified Scenic or Recreational Rivers are all possible. It is also possible to eliminate or reduce damage of conflicts through information programs and by applying seasonal or year-long restrictions on uses of trails or areas where appropriate.

Management activities such as danger tree removal, thinning, or timber removal for ski runs are opportunities to compliment developed recreation management. In some instances, it may be desirable to remove diseased or fire damaged trees from recreational areas. In other instances, this would be inappropriate.

The Forest has an opportunity to develop or expand recreation sites, such as Johnny Creek, and ski areas, such as Mission Ridge and White Pass. There are opportunities for user groups to assist in the planning, construction, and maintenance of recreation trails and the maintenance and care of backcountry areas. There are also opportunities to contract with the private sector for recreation site development, operation, and maintenance, such as the Fields Point parking area and concession. There is an opportunity to use project design to encourage reconstruction of recreational trails when timber is harvested.

2. Management of Areas That Are Presently Undeveloped.

There are 556,272 acres of the Forest outside of the wilderness which are presently within inventoried roadless areas.

Name of Roadless Area	Location Ranger District (s)	Net National Forest Acres
Myrtle Lake	Entiat	10,918
Rock Creek	Lake Wenatchee	32,924
Twin Lakes	Lake Wenatchee	22,048
Canyon Creek	Lake Wenatchee	9,158
Heather Lake	Lake Wenatchee	11,067
Chelan	Chelan	71,063
Entiat	Entiat	71,254
Stormy	Chelan, Entiat	32,500
Slide Ridge	Chelan	10,091
Devil's Gulch	Leavenworth	25,186
Taneum	Cle Elum, Naches	25,122
Manastash	Cle Elum, Naches	8,798
Norse Peak Adjacent	Naches	11,300
Quartz	Naches	8,756
Naneum	Cle Elum	6,911
Lion Rock	Cle Elum	4,834
William O. Douglas Adj.	Naches	22,938
Blue Slide	Naches	18,571
Goat Rocks Adjacent	Naches	7,357
Nason Ridge 1/	Lake Wenatchee	19,123
Alpine Lakes-Adjacent 1/	Lake Wenatchee, Leavenworth	44,393
Thorp Mountain 1/	Cle Elum	15,667
Teanaway 1/	Cle Elum	66,293
TOTAL		556,272

1/ Located within Alpine Lakes Management Area.

Some areas could continue to be managed in a roadless condition, while others could be roaded to provide easier access for the enjoyment of scenic and recreational values as well as for the development of other resources. Areas which can provide unroaded types of recreation, both motorized and non-motorized, are becoming more scarce. People are concerned about how much of these areas should be managed for timber as opposed to management for roadless recreation and wildlife and wildlife habitat. This issue also received a very large volume of comment to the DEIS with the majority in favor of preservation.

Others would like to see these areas roaded to provide scenic drives or campgrounds. There is also a concern about how quickly these areas should be entered and the effect roading and management activities have on soils, water quality, old-growth forests, and wildlife and plant species dependent on old-growth forests.

Opportunities

There is an opportunity to provide for a variety of uses in the presently undeveloped areas. These could include unroaded recreation, roaded recreation, commodity production, and special area classification. The selected use would determine which lands would be roaded and how soon roading might occur. There are opportunities to help meet national and regional targets for timber and mineral production.

There is also an opportunity to use roadless areas to help meet management goals or targets for research natural areas, endangered, threatened and sensitive plant and wildlife habitat, and old-growth stands for dependent species such as spotted owls. These land allocations could be made in wilderness or unroaded recreation areas rather than in timber management areas whenever possible. There are opportunities to maintain the future suitability of roadless areas as potential wilderness additions. There is an opportunity to maintain the management direction in the Alpine Lakes Area Land Management Plan in all alternatives. This Plan had extensive public involvement and is continuing to be tested.

3. Transportation System Development and Management

Transportation systems (roads, trails, helispots, etc.) are necessary for Forest management, protection, and use. Presently, there are an estimated 4,667 miles of roads on the Forest. About 18 percent of these roads are major access routes. There are also 2,581 miles of trails on the Forest. Basically, the main access roads are in place, but new local roads and trails will be needed; however, there is increasing concern over the ultimate extent, standards, and management of roads and trails. For instance, there are concerns about the proposed Naches Pass Road and whether or not it should be built. Management of the transportation system is largely determined by management direction for other resources. This issue relates to undeveloped areas, timber, and wildlife issues.

Opportunities

An opportunity exists to match the transportation system with the goals of the specific management area, so that they complement each other. In other words, road and trail standards and densities should be planned to meet the management goals of the area they serve. For instance, the Icicle River Road is paved part way to facilitate recreation use.

Road and trail locations, standards, and use can be coordinated with intermingled or neighboring private and public land owners to best serve the interests of all parties involved. This occurs in such areas as the Taneum-Manastash, Little Naches, Icicle River, and Coulter Creek areas.

4. Water Quality and Quantity

The Forest currently produces more than 4.4 million acre feet of water runoff annually. A number of cities and towns near the Forest use water coming from National Forest lands for domestic purposes. This use will increase as communities grow, and the demand for sediment-free irrigation water will increase as new lands are cultivated. At the same time, increases in most uses (recreation, timber management, roading) will make it more difficult to maintain water quality and meet the demands for increased water quantity. The maintenance of enough clean, cool water for human use and fish and wildlife needs is a fundamental concern. An issue here also is protection of water quality and anadromous fish habitat. It is also important to assure that Forest responsibilities regarding the Yakima Indian Treaty fishing rights are met.

Opportunities

Riparian zone (streamside) management provides the opportunity to enhance wildlife, recreation, scenic values, and fishery habitat by providing hiding and thermal protection and minimizing ground disturbance while at the same time protecting water quality and soil productivity through use of Best Management Practices (see BMP Appendix J). There are also opportunities to improve the condition of some of the watersheds on the Forest.

5. Mixed Ownership Management

The land encompassed by the Forest boundary includes 2,457,379 acres. Of this, about 12 percent, or 293,199 acres, is managed by the Bureau of Land Management, Washington State, and private landowners. Much of this land is scattered throughout the Forest and occurs in "checkerboard" patterns in the Interstate 90 and Highway 2 corridors. Management philosophies, practices, and goals of other owners sometimes differ from those of the Forest Service. This can directly affect management options on National Forest land, influencing roading decisions, timber harvest scheduling, and scenery.

There are also concerns about the development of second homes or permanent residences (urban/wildland interface) near or within the Forest boundary (Rimrock, Number Two Canyon, Nahahum Canyon, Icicle River, Lake Wenatchee) and the resulting fire protection, road use, and water quality implications. The other issues that are involved include water quality maintenance and management of timber, recreation, wildlife management, and scenic values.

Opportunities

Opportunities exist to consolidate National Forest ownership for more effective management. There are less property line surveys, permits, and coordination meetings needed when lands are consolidated. There are also opportunities to better coordinate Forest plans and activities with neighboring intermingled landowners (Longview Fibre Co., Plum Creek Timber Co.) and local county governments in Chelan, Kittitas, and Yakima Counties.

6. Wilderness Management

Almost 39 percent, (841,034 acres) of the Wenatchee National Forest is classified as wilderness.

Name of Wilderness	Location Ranger District (s)	Net National Forest Acres
Lake Chelan-Sawtooth	Chelan	56,414
Glacier Peak	Chelan, Entiat, Lake Wenatchee	289,001
Henry M. Jackson	Lake Wenatchee	27,221
Alpine Lakes	Lake Wenatchee, Leavenworth, Cle Elum	244,057
Norse Peak	Naches	36,295
William O. Douglas	Naches	151,730
Goat Rocks	Naches	36,316
Total		841,034

This includes the 340,795 acres recently added to wilderness on the Forest through the Washington State Wilderness Act of 1984. The Washington Wilderness Act added land to the existing Glacier Peak and Goat Rocks Wildernesses and created the Lake Chelan-Sawtooth, Henry M. Jackson, Norse Peak, and William O. Douglas Wildernesses. Use in wilderness is increasing, and user conflicts (horse vs. hiker) and resource problems are occurring more frequently. The main issue is the Forest's ability to protect the wilderness environment and minimize conflicts between competing uses. Regulation of commercial use is also important.

The primary concern is recreation overuse along main trails and at destination sites in wilderness including vegetative disturbance and water pollution from people and/or recreation stock. Such impacts have occurred at Buck Creek Pass and Lyman Lake in the Glacier Peak Wilderness, the Enchantments in the Alpine Lakes Wilderness, and Shoe Lake in the Goat Rocks Wilderness.

Opportunities

There are opportunities to inform the public of proper use of the wilderness through techniques such as "no trace camping" and dispersion of use. Deteriorated campsites can be revegetated and trails relocated to avoid such problems. There are many opportunities for the public to become actively involved in the care and maintenance of the wilderness, including trail maintenance, litter patrol, and education of peers or children. There are also opportunities to provide for quality wilderness experiences for the public through permitted commercial outfitting and guiding.

There is an opportunity to allow fire to play a more natural role in the maintenance of the wilderness ecosystem. There is also an opportunity to inform the public of the past grazing history in these areas and the advantages to continuing this use where appropriate.

7. Wildlife and Fish

The Wenatchee Forest sustains a wide variety of fish and wildlife species because of its variety of habitats. Activities that affect habitat (trees, grass, shrubs, soil, and water) can have a direct influence on fish and wildlife. This issue includes the maintenance and management of essential habitats and maintenance or enhancement of animal diversity. The issue also involves identification and protection of threatened and endangered species and recognition of wildlife needs for old-growth forest stands. Management activities that affect fish and wildlife habitat are timber harvest, recreation, livestock

grazing, road management, and fire management. Small hydroelectric projects and irrigation impoundments may alter the quantity and quality of available fish habitat. This issue includes maintaining habitat quality for anadromous fish, although the existing habitats are now generally underutilized. The presumption is that, as a result of the Fish and Wildlife Program of the Pacific Northwest Electric Power Planning and Conservation Act of 1980, anadromous fish levels should increase to fully utilize the existing habitat.

Water quality may often limit the Forest's fisheries production potential. For instance, most of the streams exhibit very low year-long water temperatures due to their high altitude and their minimal nutrient content which results in slow fish growth. Also, there is the potential in some areas for high in-stream temperatures during short periods of the summer mostly due to past timber harvest activities.

Opportunities

There are opportunities to manage key habitat specifically for wildlife, (e.g., winter ranges, old-growth,) and for fish (e.g., riparian protection zones) through management area designations. There are opportunities to work more closely with the Washington State Department of Wildlife and Fisheries, the United States Fish and Wildlife Service, and the Yakima Indian Nation, to improve the management of fish and wildlife habitat on the Forest.

There are additional opportunities to:

Wildlife

- Improve habitat for big game.
- Improve browse production and quality on winter ranges.
- Develop and implement Forest standards and guidelines for the management of snags, down logs, and brush piles for wildlife.
- Provide structural habitat improvements such as water developments and nest platforms in snag deficient areas for birds of prey.
- Provide, where possible, habitat mitigation, rehabilitation, or enhancement for fish and wildlife through the use of range betterment funds, Knutson-Vandenberg funds, timber harvest design, or fuels treatment.
- Better balance livestock and wildlife range use by implementing improved range management and range rehabilitation practices.

Fisheries

- Manage habitat to maximize stream productivity. This includes controlling sediment, influencing high or low water temperatures, artificially adjusting pool to riffle ratios, and managing large woody debris and streamside vegetation.
- Remove barriers to spawning and rearing habitat for anadromous and resident fish.
- Assure that road crossings of streams do not obstruct upstream fish passage and that road and timber harvest activities do not cause damage to the riparian habitat.

--Improve habitat for anadromous fish to compliment the implementation of the Columbia Basin Fish and Wildlife Program and the Yakima River Water Basin Enhancement Project.

--Develop fish stocking plans with the fisheries agencies to optimize use of aquatic habitats, especially for high altitude lakes.

8. Management of Scenery

The Forest is well known for its sweeping vistas, variety in topography, ecotypes, life forms, and overall natural appearing environment (e.g. White, Chinook, and Stevens Pass). About 13 percent of the recreational use on the Forest is driving for pleasure and viewing scenery. As more demands are placed on the Forest for timber and other uses, it becomes more difficult to maintain a pleasant forest atmosphere and natural appearing environment. Timber management can compliment the scenic resource, and visual management can compliment wildlife habitat and recreation management. The issue involves the degree of protection scenic values should be given and the cost and impacts of visual management on other Forest activities, i.e., *reduction in the annual timber harvest and the resulting cost of implementing visual management activities.*

Opportunities

There are opportunities to compliment other management goals through the creative management of Forest scenery.

There are also opportunities to maintain and enhance the scenic quality of the major travel corridors. There is an opportunity to rehabilitate previously modified landscapes for improved scenic values.

9. Timber Management

Timber management is a major activity on the Forest. The ten-year (1977-1986) average harvest was 162 million board feet per year. The need for lumber and fiber is expected to stay about the same as the last decade's average in coming years. At the same time, increasing demands for other uses will add complexity to the task of timber management. For example, the recent addition of 340,795 acres of land to wilderness reduced the acreage available for timber management by about 51,500 acres. An additional 100,800 acres of previously deferred productive forest acres were also removed from future consideration for timber harvest.

This issue involves the determination of which of the tentatively suitable timberlands of the Forest are to be designated for timber management; the timber harvest level; and the effect timber management should have on other resources and multiple use objectives. People are concerned about the type and intensity of timber management practices necessary to increase timber production and growth, especially the role of clearcutting and pesticide use. There are also concerns about possible departures from the non-declining even flow timber harvest schedule. Timber harvest departure would accelerate harvest of old-growth stands. Comments to the DEIS concerning timber harvest levels were higher in number than any other subject. Most were in favor of increased harvest levels with the remaining voicing concerns about impacts of timber harvest on other resources.

Forest managers are concerned about maintaining or enhancing soil productivity. Timber harvest and slash treatment annually affect more National Forest land than any other activity, therefore, these activities are periodically monitored to ensure that impacts on the soil resource are within acceptable levels. Managers are most interested in improving soil productivity on those soils that show the best economic responses to applied management including rate of stocking, timber species, control of forest disease, tree improvement, and fertilization.

This issue involves other issues such as wildlife habitat, recreation opportunities, road densities, visual and cultural resource management, water quality, and range management. Timber management activities may be in competition with some of these issues such as the need for old-growth forest for dependent wildlife and the need for unroaded recreation areas.

Opportunities

There are opportunities to allocate the most suitable, productive timberlands, where management activities are most cost effective (such as Meadow Creek and the Little Naches) to intensive timber production. There are also opportunities to benefit other resources at little or no extra cost. This includes improvement of big game cover/forage relationships; development of temporary forage for wildlife and livestock; and selective timber removal to improve the visual condition of travel corridors, open views of surrounding landscapes, and promote vegetative diversity.

Another opportunity is the replacement of stands where the heaviest timber mortality and disease is occurring. Growth gains of up to ten percent can be expected by planting genetically superior seedlings rather than relying on trees from non-selected parents.

There is a sizeable existing and potential supply of cull timber material and small round wood which present marketing opportunities. The main source is defective logs and undersized wood resulting from logging residue. Precommercial thinning, disease and insect mortality, and stagnated stands also provide fiber sources. This material has a wide variety of present and potential uses for specialty building materials, energy production, pulp and fiber products, and home firewood.

10. Energy

An adequate supply of energy, as well as its conservation, is a high priority national objective. Forest lands play an important role in production and transmission of energy. Various types of energy resources exist on the Wenatchee National Forest. These include coal, hydroelectric power, and renewable forest products (wood and fiber). Energy resources also include potential oil and gas and geothermal resources.

The issue deals primarily with the extent, location, and availability of potential energy resources on the Forest and how they should be managed. The attainment of other resource goals in an energy conservative manner is a complimenting issue.

The resource conflicts associated with this issue are environmental concerns such as potential effects on water quality, instream flows, scenery, and special areas. Special areas include Research Natural Areas, cultural and historical sites, botanical, or scenic areas. It also includes the potential physical impacts of access roads, pipelines and transmission lines, such as on Stevens, Stampede, and Snoqualmie Passes, on commodity resources (e.g., timber and range).

Opportunities

There are opportunities to include additional transmission lines or pipelines within existing corridors. There is also an opportunity to plan needed access roads so that they serve multiple uses. Transmission lines can be located so that they have the least possible impact on forest scenery. Transmission line rights-of-way can provide products, such as Christmas trees, berries, forage, openings and edges for wildlife. There are opportunities to utilize wood fiber wastes for energy production while reducing fire hazard.

11. The Role of Fire

Fire was long considered the enemy of the Forest. For example, in 1970 about 130,000 acres of the Forest were burned by wildfire primarily in the Entiat Valley and Lake Chelan areas. However, excluding all fire from the Forest can have some undesirable consequences such as natural fuel build up, which may lead to more large scale fires in the future.

The issue deals with how and where to use prescribed fire as a tool to improve Forest conditions. It also considers the role naturally occurring fires should play in the Forest's management objectives.

This issue can have a complimentary relationship to wildlife habitat, timber management, and sometimes recreation management. There can be a conflict with the Clean Air Act, and current direction to allow fire to play a more natural role in the Forest may not be acceptable to some segments of the public.

Opportunities

If the timing, location, size, and frequency of fires can be controlled, then fire can be a tool to clean up natural fuels without damage to Forest resources while returning various ecosystems to a more natural condition.

There are opportunities to make more effective use of fire as a tool in wildlife, timber, and recreation management. Naturally occurring fires can also play a more effective part in maintaining ecosystems in wilderness and unroaded recreation areas. There is an opportunity to preplan and determine where fire can be used effectively to fulfill its role and to reduce the cost of fire management activities.

12. Range Management

Livestock grazing presently takes place on the Forest through grazing permits issued to 37 local livestock owners. Permitted livestock use has declined in recent years although it is still a significant activity on the Forest. As other uses have increased, potential conflicts with domestic grazing have become more apparent. At the same time, managers are concerned about development and management of grazing resources for use by livestock in the future.

Livestock grazing has the potential to conflict with recreation, water quality, wildlife, fish, and timber. When livestock use the same meadows, streams, and trails that recreationists use, conflicts may result. Livestock use of streamside (riparian) areas may cause damage from compaction of soils and reduced water quality from streambank disturbance. This issue received a large amount of comment to the DEIS, with most opposed to grazing on the Forest.

There may be competition between livestock and big game for available forage. Without careful management, concentrated livestock use can also result in the trampling of seedlings in young plantations and soil compaction.

Opportunities

Livestock grazing can compliment other activities including recreation, wildlife, and timber. Sheep grazing can retard brush growth in meadows and along trails. Wildlife forage areas can be maintained or improved through intensive grazing systems. Timber management activities such as clearcuts, partial cuts, and thinnings may provide temporary forage areas. Grazing use can also reduce brush and grass competition which will enhance tree establishment and growth.

13. Minerals

Mineral resource activities in the central part of the Wenatchee National Forest took a dramatic upturn in March 1983 following a major gold discovery in Dry Gulch, a few miles off the Forest near the city of Wenatchee. The response to this was the location of more than 6,000 lode claims on National Forest land in Chelan County and at least 1,000 new mining claims in Kittitas County. Forest Service managers predict an increased minerals work load over the first five years of the 10-year planning period as a result of industry exploration for metallic minerals (predominantly gold) and possible extraction activities.

In addition to the increased mining claim activity, there appears to be continuing interest in the oil and gas potential of the area. A total of more than one-half million acres of the Forest were leased for oil and gas exploration between 1979 and 1983. Of this total, the leases on nearly one-half of that acreage have terminated. As of February, 1985, however, there were still 79 existing oil and gas leases covering about 239,918 acres, while 94 oil and gas lease applications covering 365,491 acres were pending. To date, no exploratory wells have been drilled on the Forest. Off-Forest drilling in Yakima and Kittitas Counties has provided encouraging evidence, but only noncommercial quantities, of gas. The evidence encountered, however, will justify additional exploration and leasing activity, some of which may occur on Forest lands.

The issues expressed by the mining industry, as well as the recreational miner or hobbyist, are dominated by their concern that mineral potential lands will be allocated to uses which prohibit or severely limit exploration and mining opportunities. They are concerned that lands will be withdrawn from mineral entry, or unreasonable and costly constraints will be required in approved operating plans. Most of the comments to the DEIS repeated these concerns.

To the general public, the issue is the potential environmental impacts associated with exploration, extraction and processing operations, and whether successful mitigation and reclamation of those impacts on local communities would be successful, while others are especially concerned about possible air and water quality degradation.

Opportunities

By facilitating and encouraging mineral exploration and development activities, new mineral resources may be discovered and produced. Such development may not only improve the employment and economic condition of local communities, but the commodity produced may contribute to improvement in our national trade situation. When mining does occur, existing regulations ensure environmental impacts are minimized, undue degradation is prevented, and appropriate reclamation is successful. Through proper planning, reclamation objectives may be designed to benefit the management of other resources once the mining activity ceases.

14. Cultural Resource Management

There is an ongoing program to identify and evaluate the historic and prehistoric cultural resources which exist on National Forest lands. To date, over 500 cultural resource sites (archaeological sites, historic structures, etc.) have been reported within or adjacent to the Wenatchee National Forest. These sites represent a broad cross-section of uses, spanning a period of several thousand years. Decisions about how best to manage these sites relate to such issues as historic significance, local community interest, American Indian concerns, accessibility, compatibility with other management activities, and recreational, research, or interpretive values.

As land-modifying activities and public use increase within the Forest, so does the possibility of loss or degradation of the cultural resources. The degree of potential impact will depend upon the location and extent of land alteration, the nature of the site, and the concentration of public use. In these instances, appropriate mitigation methods may be necessary to reduce or eliminate the undesirable effects or to recover the historic values of the properties prior to their alteration. The most desirable management strategies, however, are those which effectively protect the site in place, are economically prudent, and are compatible with other resource management needs and uses. A central concern is to provide a balance between these other uses and the protection of cultural sites so as to provide adequately for their preservation.

Opportunities

Several opportunities exist in the management of cultural resources. Timber harvesting can compliment the cultural resource program by providing opportunities for the identification of previously unknown cultural properties. Field reconnaissance accelerates in proportion to the number of acres scheduled for harvesting. In addition, in heavily vegetated environments, removal of the understory and organic duff layer may provide the only means of locating archaeological sites (Lake Wenatchee, for instance).

Recreational use increases opportunities for interaction between the public and cultural resources. Interpretive programs through which the Forest visitor can both enjoy and appreciate the cultural resources can be planned and developed with community involvement. One such area is the Stevens Pass Historic District. An active effort to solicit public opinion well in advance of the development of a management direction for an area or property could help to define the level of anticipated demand for its use and preservation.

There is also an opportunity, in those instances where on-site preservation is not possible, to carry out data recovery which could contribute locally and regionally to significant research questions and, in some cases, could build a deeper awareness of the contributions of American Indians to the public heritage.

15. Cumulative Effects

“Cumulative effects” is a term which has been developed to describe the collective long-term environmental impacts which result from natural processes and human activities within a forest area. The principal areas of concern are the cumulative impacts of timber harvest activities on watersheds (soils, water quality, or quantity) and on fish and wildlife (numbers and habitat diversity). Other areas of concern are cumulative impacts on scenery and recreational resources. Any evaluation of the cumulative effects of activities on National Forest lands must consider the impacts of activities occurring on neighboring state and private lands as well. This is particularly important in areas of mixed ownership where timber harvest is occurring on private land, such as Cabin Creek near Snoqualmie Pass. Public comments to the DEIS on this issue were strongly concerned with the cumulative effects on soil and water.

Opportunities

There are opportunities to:

- a. Reduce negative cumulative impacts through timber harvest scheduling, coordination with other landowners, and land exchanges.
- b. Buffer the effects of accelerated timber harvest on adjoining ownership by delaying the timber harvest on National Forest system lands in sensitive drainages, such as Log and Cabin Creek on the Cle Elum District and Thompson Creek on the Leavenworth District.

16. Social/Economic

The Forest is primarily located in three central Washington State counties: Chelan, Kittitas, and Yakima. More than 250,000 people live in the three-county area (1983 Population Trends for Washington State). There are 16 cities within the three-county area that have more than 1,000 inhabitants. The Yakima Indian Nation occupies the southern part of Yakima County while the Colville Indian Reservation is 60 miles north of the Forest in Okanogan County.

Major basic industries of the three counties are agriculture, lumber and wood products, manufacture and services, and trade. Tourism and recreation are also important sources of revenue for the local economy. Total recreation use on the Forest in 1984 was about 4.5 million visitor days. The 1984 unemployment rate in the three-county area was 13 percent. This is more than 3 percent higher than the 9.5 percent average 1984 State-wide rate (Washington Employment Security Department, 1984).

Local mills are dependent on National Forest timber for 40-60 percent of their mill capacity. The ten-year average (1977-1986) timber harvest volume on the Forest was 162 million board feet per year. In 1983 a gold mine was developed near Wenatchee. Future gold mining exploration and mining is expected to be concentrated in Chelan and Kittitas Counties as a result of this discovery. Along with agriculture and recreation, these commodity producing activities affect the number of wholesale and retail positions, service and supply jobs, and much of the construction activity and other employment opportunities that occurs.

In as much as the local economy is based on commodities and recreation, residents are concerned as to the extent to which the Forest land uses will provide timber production, mining, and recreational opportunities which provide income. They are equally apprehensive regarding substantial changes in outdoor-oriented lifestyles. Many visitors live in or near the Forest while others must travel moderate distances (Seattle, Tacoma) to pursue their outdoor recreational interests.

Opportunities

There are opportunities to provide various levels of public benefits to local communities. There are opportunities to maximize revenues or stress benefits of wildlife habitat and recreation. There are also opportunities to strike a balance between commodity production and amenities.

17. Wild and Scenic Rivers Classification

Because of public input to the DEIS, the issue of Wild and Scenic Rivers was broken out into a separate topic. A total of 20 rivers were considered for an analysis of their eligibility. Some of these rivers were considered as suitable for classification and have received a preliminary administrative recommendation for classification.

There are concerns about what the effects of classification would have on timber harvest levels. The management of the scenic resource along the river and how it changes with the different proposed classifications is also a concern. A concern exists of which classification is most appropriate for specific segments of individual rivers. The major public concern is what effect classification would have on private lands within the river corridors.

Opportunities

The greatest opportunity with Wild and Scenic Rivers is for protecting the free-flowing nature of the proposed rivers by legislatively preventing the construction of dams. Associated with the dam prevention would be increased opportunities for maintaining or improving: recreational uses; scenery, through guidelines on timber harvest and shoreline development; and wildlife, fisheries, soils, and water resources, both through guidelines on management activities as well as through the maintenance of the free-flowing nature.

18. Old Growth

There is currently an estimated 319,000 acres of old growth on the Wenatchee National Forest. This issue has taken on regional and national importance because of its relationship to the spotted owl. The major concerns are the impacts on timber harvest levels and the associated jobs, and the impacts on the population levels of the spotted owls. There are also concerns in preserving old growth for aesthetic reasons as well as ecosystem diversity. Another concern is that there will be no old growth left in the future.

Opportunities

There are opportunities to provide for preservation of old growth which would mean further protection for water quality, wildlife, native plants, and scenery and for leaving old growth for future generations. There are also opportunities for maintaining a maximum amount of acreage for old growth while reducing the impact on timber harvest levels.

IV. ANALYSIS OF THE ISSUES

Each of the individual Issues were analyzed to determine if they can be addressed as a group in the planning process. There were no opportunities to group issues. Most issues can be addressed in the planning process to at least some degree (Table A). The next step was how to best address the issues. Three methods are possible.

1. The issue is resolved through the management prescription or Forest-wide standards and guidelines.
2. The issue is indirectly resolved through the land allocations made in the design and goals of the alternatives.
3. The issue is directly resolved through specific land allocations in the design and goals of the alternatives.

The first method is appropriate for issues that do not involve land allocation or scheduling decisions or where there are no choices. All issues could to some extent be resolved by this method. In the second method the issue is resolved indirectly through the land allocations that are made. The issue indirectly affects the choice of land allocations in the alternative. The third method directly resolves the issue through the development of alternatives which provide choices about how much of the resource will be provided over time. In nearly all instances, the issues are resolved through a combination of method 1 with either 2 or 3.

TABLE A-1
PRIMARY DISTRIBUTION OF ISSUES FOR RESOLUTION

1. The issue is not directly resolved through land allocations in the design and goals of the alternatives. It is resolved through the management prescription and/or Forest-wide guidelines.
2. The issue is resolved indirectly through land allocation made in the design and goals of the alternatives.
3. The issue is resolved through specific land allocations in the design and goals of the alternatives.

PUBLIC ISSUES	MANAGEMENT CONCERNS	OPPORTUNITIES	1 GUIDE- LINES	2 ALTERNATIVES INDIRECTLY	3 ALTERNATIVES DIRECTLY
1 Recreational Opportunities & Use Conflicts	The management options and which ones to adopt.	Reduce conflicts through land allocations	x		x
2 Management of Areas That Are Presently Undevelopment	Future needs for various resources—recreation, timber wildlife habitat.	Provide for the projected needs based on suitability	x		x
3 Transportation System Development and Management	The Forest's ultimate road and trail system	Match the proposed transportation system with the management of the selected alternative goals	x	x	
4 Water Quality and Quantity	Special management direction needed to insure water quality	Enhance fish and wildlife habitat while providing other uses through management of riparian areas.	x		x
5 Mixed Ownership Management	Effects of intermingled ownership on National Forest resources	Consolidate National Forest ownership where necessary to meet resource objectives	x	x	
6 Wilderness	Overuse in key areas	Utilize education programs and public involvement in care and rehabilitation of wilderness	x		x
7. Wildlife and Fish	The location of key wildlife and fish habitat (winter range, spawning beds).	Locate and manage key wildlife-fish habitat specifically for wildlife and fish in cooperation with the Dept. of Wildlife.	x		x
8 Visual Resource Management	Level of management for the visual resource.	Complement other resource goal (wildlife habitat, water, timber, recreation) through V R M	x	x	x
9 Timber Management	The location of the commercial forest land and annual harvest level for the Forest	Allocate the most suitable and productive lands to timber management Exclude problem areas	x		x

TABLE A-1 (continued)
PRIMARY DISTRIBUTION OF ISSUES FOR RESOLUTION

PUBLIC ISSUES	MANAGEMENT CONCERNS	OPPORTUNITIES	1 GUIDE- LINES	2 ALTERNATIVES INDIRECTLY	3 ALTERNATIVES DIRECTLY
10 Energy	Future utility corridor needs.	Increase the capacity of existing corridors when possible and provide multiple uses of corridors.	x	x	
11 The Role of Fire	The influence that cost effectiveness has on protection levels.	Use prescribed fire to enhance resource values and provide protection from wildfire	x		x
12 Range Management	The present and projected demand for range forage	Manage livestock use to enhance the forage resource.	x		x
13 Minerals	Location and extent of mineral resources on the Forest.	Provide options for mineral exploration and development	x	x	
14 Cultural Resource	Loss or degradation of cultural resource	Locate, protect, and enhance cultural sites as part of the support of other activities	x	x	x
15. Cumulative Effects	Cumulative effects of timber harvesting, road building, and other activities on the environment	Reduce negative cumulative impacts through timber harvest scheduling and through coordination with other landowners, and buffer the effects of accelerated timber harvest on adjoining ownership, for example, by delaying harvest on National Forest system lands in sensitive watersheds	x	x	
16. Social and Economic Effects	Effects on program and budgets and local communities and governments	Provide the greatest net public benefits to local communities.	x	x	
17 Wild and Scenic Rivers	Effects on free-flowing rivers, timber harvest levels, and on private land-holders	Increase recreation opportunities, further protection for wildlife, fisheries, plants, soil, scenery and water	x		x
18 Old Growth	Location and amounts of old growth to protect, effects on timber harvest levels	Preserve old growth for wildlife dependent species, biological diversity, aesthetic values, and for future generations	x	x	x

V. REDUCING THE ISSUES TO PLANNING PROBLEMS

The analysis in the previous section, Part IV and Table A, identified how issues are to be addressed. To make this information more usable in the formulation of alternatives, the issues can be stated in the form of basic planning problems needing resolution in the Forest Plan. The planning problems are as follows:

PLANNING PROBLEM:

1. Are Forest lands capable and suitable of meeting public demand for particular types of recreation use? Where are these lands located?

Opinions are divided on the quantity and type of recreational facilities and opportunities the Forest should be providing. Some people want increased opportunities for unroaded non-motorized recreation outside of wilderness while others want increased opportunities for motorized recreation and developed sites. Opinions also differ regarding the use and restrictions of off-road vehicles (ORV's).

Some people are strongly opposed to ORV use in any way because of incompatibility with their recreation experience including noise pollution in narrow canyons such as Devil's Gulch, Lake Clara, and the Teanaway. Other people feel that relatively unlimited use of ORV's is acceptable. They also feel that the remaining unroaded areas outside of wilderness should be open to ORV use.

There is a demand to expand existing or construct new developed sites such as Mission Ridge and White Pass Ski Areas and developed campsites. On the other hand, there are those who prefer minimum development sites and the expansion of cross-country skiing opportunities. There is interest in designating specific land areas such as Lake Chelan, the North Fork of the Entiat, and Rock Creek for unroaded recreation with fewer restrictions than those applied to wilderness.

Conflicts between recreation and other Forest values were frequently mentioned. For example: the visual effects of clearcutting are generally considered to be incompatible with recreationists while others feel roads are important for providing recreation access. Concerns are expressed about soil erosion caused by site overuse or misuse. Management of the Pacific Crest National Scenic Trail and the need and potential for special classification areas such as Research Natural Areas, Scenic areas, and Botanical areas were also mentioned.

PLANNING PROBLEM:

2. What kinds of recreational opportunities should the Forest provide in non-wilderness roadless areas and how much of the roadless area should be allocated to commodity production?

Even after the addition of 340,795 roadless acres to wilderness through the Washington State Wilderness Act of 1984, the public is strongly divided on the future management of the remaining 556,272 acres of roadless areas. Some people would like to develop the maximum timber and other commodity potentials of these areas. Others would like these areas including the North Fork of the Entiat, Rock Creek, Devil's Gulch, Blue Slide, etc., to remain roadless and undeveloped.

Some prefer a balance between commodity use and roadless recreation based on suitability and multiple use. Wilderness proponents support the management of the roadless areas to maintain their potential for future additions to the Wilderness Preservation System.

The rate and level of development and the need for undeveloped recreation are parts of this problem. Some people are concerned about the effect of non-development on timber harvest levels and the levels of other resources such as range and minerals. There are also conflicts about what types of recreation opportunities should be provided in roadless areas (motorized or non-motorized).

PLANNING PROBLEM:

3. What rivers and streams should be recommended to Congress for inclusion into the Wild and Scenic Rivers system, and at what level of classification?

This planning problem was considered a part of planning problem #1 (suitability of lands for recreation use) in the DEIS, but due to public response to the Draft, the Wild and Scenic Rivers section was greatly expanded in the 1988 Supplement to the DEIS.

Some people believe that all of the rivers and many streams on the Forest should be included in a preliminary administrative recommendation to Congress for consideration under the Wild And Scenic Rivers Act. Other people are strongly opposed to the recommendation of some or all rivers and streams (or certain segments), particularly rivers or segments of rivers with private lands within the river corridor. Some are also concerned with the level of classification proposed for those river segments outside wilderness.

Issues and concerns associated with this planning problem include: recreation use and opportunity, amount of timber harvest, management of scenery, and the protection of most amenity values including wildlife, fisheries, plants, soils and water. A very important issue is the perceived threat to land owners concerned with condemnation, zoning and/or acquisition of easements on their land within the eligible river(s).

PLANNING PROBLEM:

4. How should water quality and quantity be maintained or enhanced?

The public is sensitive of the need to protect soil and water resources. Many people realize that improperly conducted management activities can cause damage to these resources. Logging, road construction, and off-road vehicle use were the focus of the public's concerns. It was frequently suggested that these activities be limited or modified to reduce their damaging effects.

Issues involved in the problem are: proper management in municipal supply watersheds such as Domerie Creek; reduction or elimination of water quality degradation; and management direction needed to maintain or enhance water quality and quantity.

Although water quality and quantity is of particular concern to people living in or near the Forest it is also of concern to people living many miles downstream. These people may be dependent on water for irrigation, such as those in the Wenatchee and Yakima valleys. Other people, including the Yakima Indians, are concerned about fish habitat and instream needs for fish migration.

PLANNING PROBLEM:

5. Where are the essential wildlife habitats, how should they be managed, and what direction should be taken to maintain or enhance wildlife diversity?

Some people believe that wildlife and fish management has not received appropriate attention within the Forest. Others believe there should be more emphasis on wildlife needs through coordinated timber or range management activities. Some people are very concerned about the effects of roads on wildlife. The future management of anadromous fish habitat and old-growth forest dependent species such as the northern spotted owl, pileated woodpecker, and marten is a major concern of another segment of the public.

Other public issues and management concerns related to this planning problem include the identification of essential habitats; the need for a road closure program to protect and enhance wildlife; wildlife and fish habitat needs; wildlife diversity; and fishery management including enhancement of flood-damaged streams.

Wildlife management requires close coordination with the Washington Department of Wildlife. Many comments expressed the need to better coordinate other Forest management activities with wildlife. Prescribed burning, timber harvest, including clearcutting and road construction, and road and trail management were identified as specific activities needing consideration. There are opportunities to use these tools to enhance wildlife habitat and hunting opportunities.

PLANNING PROBLEM:

6. How should Old Growth be treated? How much should be preserved and how much should be made available for timber harvest?

This planning problem was originally considered a part of planning problem #5 (essential wildlife habitats) in the DEIS, but due to public response to the Draft and Supplement, it was decided to make this a separate planning problem.

Some people believe that all existing old growth on the Forest should be preserved for biological diversity, dependent wildlife species, scenery or aesthetic values, and/or because they feel that no more old-growth forest will remain in a few years. Others believe that both existing and potential old growth within designated wilderness is more than enough to meet all future needs.

Public issues and concerns related to the planning problem include: natural biological diversity, timing of timber harvest and the amount of timber that can be harvested, protection of scenery, and management of old-growth dependent wildlife species.

Many respondents to the DEIS either grouped old growth with a list of amenity values that they felt needed more protection, or felt that protection of old growth would add further protection to water quality, wildlife, native plants (Threatened, Endangered and Sensitive species), and would preserve old growth for future generations.

PLANNING PROBLEM:

7. Where are the key or unique scenic resources on the Forest and how should they be managed?

Recreation visitors to the Forest are concerned about maintaining or enhancing the visual quality of the environment. Others would like to see the Forest managed for wood fiber with no or very few visual considerations. Some favor the maintenance of visual quality only in key travel corridors such as the I-90, Highway 2 and 97 corridors and the Pacific Crest National Scenic Trail. Others stress the multiple use benefits of maintaining scenery in combination with wildlife habitat, timber, water, recreation, and cultural resources. This segment of the public often favors maximum protection of scenic values.

Public issues and management concerns associated with this planning problem include: the effect of visual resource objectives on other resource uses, the effect of differing management philosophies on National Forest scenery resulting from the effect of intermingled landowners on National Forest scenery, and opportunities to maintain, restore, or enhance scenery.

Timber harvesting can be used to improve the scenery along travel routes and recreation areas. Timber harvesting can also be used to improve wildlife habitat and at the same time enhance scenery. There are opportunities to improve views or develop views of nearby features such as lakes, rivers, and mountains by opening vistas along travel routes.

PLANNING PROBLEM:

8. How much timber should be produced and where should it be produced?

Most people support timber management and harvesting on the Wenatchee National Forest. However, there is a concern about harvest location and logging practices used and their effects on other resources. Some people want increased emphasis on protection or preservation of scenery with little or no development. Others want increased wildlife habitat emphasis while management of commercial timber species, with full development of consumptive uses.

Public issues and concerns related to this planning problem address: the timing of timber harvest; the volume of timber that can be produced, the logging system and type of regeneration to be used; potential deviation from non-declining even flow; and the identification of the commercial forest land base (CFL). Availability of firewood is included in the problem.

Some people are concerned about the effects of timber harvest on water runoff and hydrologic balance. This concern is greatest where there are large percentages of intermingled private land, such as the I-90 and U.S. 2 Highway corridors and the Little Naches River watershed. There are opportunities to enhance visual quality, wildlife habitat, and recreation sites and areas by using various planned intensities of timber harvest. Timber harvest also provides opportunities for developing transitory range for livestock and providing wood for home heating and campers.

PLANNING PROBLEM:

9. What level of livestock grazing should the Forest provide?

Opinions differ on the use of public land for livestock grazing. Some feel that cattle and sheep cause *unacceptable damage to Forest resources and that commercial grazing is not a cost-effective use of the Forest's resources*. Others strongly favor grazing as a viable use of available forage and would expand this use. Timber harvest practices to increase available forage are favored by some.

Public issues and management concerns related to this planning problem referred to the proper level and intensity of grazing use considering range suitability. The competition between livestock and wildlife for forage is a related issue. Another related issue is water quality maintenance and the effect of grazing on the riparian-aquatic protection zone. There are opportunities to utilize livestock to control undesirable plant (brush and grass) competition in forest plantations and along trails.

PLANNING PROBLEM:

10. Where are the cultural resource sites on the Forest and how should they be managed?

The Native American community has strong concerns about the preservation of Native American cultural resource sites and use areas. There are also local community concerns about the protection and interpretation of cultural resource sites. There are 597 known and suspected cultural sites that have been identified on the Forest. Many of these are unique and provide the sole record of former habitats, ways of life, and past human activities.

Public issues and management concerns on this problem relate to finding and evaluating cultural resource sites prior to any site disturbing activities. A central concern is to provide a balance between other resource uses and the protection of individual cultural resource sites.

Impacts to cultural properties may be natural, project related, or the consequence of public use. The probability of loss of the cultural resource increases as lands are designated to uses involving land modifying activities such as timber harvest, road construction, range improvements and use, mineral exploration and development, and recreation development.

11. Other Planning Problems

There are a number of other issues that can be addressed primarily through the development of standards and guidelines. Six of these issues, #3, "Transportation System Development and Management;" #5, "Mixed Ownership Management;" #10, "Energy;" #11, "The Role of Fire;" #13, "Minerals;" and #15, "Cumulative Effects" are partially affected by land allocation decisions and therefore, must be considered in making these decisions. For instance, the issue "Management Direction for the Proposed Naches Pass Road" is included in Issue #3. Such a question would be resolved through the allocations in the alternatives which set the management direction for this area.

APPENDIX B

DESCRIPTION OF THE ANALYSIS PROCESS

I. INTRODUCTION

A. The General Planning Problem

The Forest Service is responsible for determining how to best manage National Forest System lands based on public desires and land capabilities. The Wenatchee National Forest is a highly diverse area with an equally diverse mix of users.

The Forest is located on the east slope of the Cascade Mountains in Central Washington. It stretches 140 miles from upper Lake Chelan on the north to the Yakima Indian Reservation on the south. It varies from 25 to 55 miles east to west, with 2,457,379 acres of land within its boundaries. Of this, 2,164,180 acres are National Forest System lands, the remainder are private, State or other Federal lands.

Vegetation varies from grass-shrub along the lower east side to subalpine parkland and alpine meadows along the crest of the Cascades. Ponderosa pine - Douglas-fir forest lands are found in the drier areas in between. True firs, hemlock, and western red cedar are predominant in the wetter areas. More than 790,000 acres were found to be tentatively suitable for timber production.

The Wenatchee's clear eastside weather and proximity to large population centers account for its recreational popularity. It is one of the most heavily visited National Forests in the Nation with almost four and one-half million recreation visitor days recorded in 1984.

Major east-west highways on the Forest include U.S. 12 - White Pass, I-90 - Snoqualmie Pass, and U.S. 2 - Stevens Pass. U.S. Highway 97 is a major north-south route that crosses Swauk Pass and then parallels the east side of the Forest from Wenatchee to Chelan. Much of the Forest is less than a three hour drive for the 2,290,000 people who live in the Puget Sound region.

Major sources of employment and income in the local area (Chelan, Yakima, and Kittitas Counties) are agriculture, service, and trade industries. Recreational use of the Forest and timber harvesting make important contributions to the local economy. Some of the smaller communities are particularly dependent on the Forest.

Public interest includes divergent viewpoints about the use of market commodities such as timber, grazing, energy, and nonmarket commodities such as wilderness, unroaded recreation, scenery, wildlife, old-growth, and habitat diversity. The Forest's major planning goal is to provide enough information to help decision makers determine which combination of goods, services, and land uses will maximize net public benefit. (This concept is further discussed in Section IV of this Appendix.) The National Forest Management Act (NFMA) and the regulations developed under NFMA (36 CFR 219) provide the analytical framework to address this objective, they also state that the requirements of the National Environmental Policy Act (NEPA) and its regulations (40 CFR 1500-1508) must be applied in this analysis process.

B. Changes Made Between Draft and Final

A new Alternative, Alternative J, was added in response to public comment. This Alternative was developed by timber industry representatives who referred to it in the public input as the "Essential Alternative."

In all Alternatives the Mature/Old Growth MR network was revised. The number of Spotted Owl Habitat Areas (SOHA's) was increased in response to the Supplement to the Regional Guide EIS. Management of the SOHA's changed from a "managed" to a "dedicated" prescription which now allows no timber harvest at all.

Alternatives A, C, E, F, G, H, and I all have different proposals for Wild and Scenic Rivers classification than shown in the DEIS. Alternatives C, E, and F have the new prescription MP-1 for the Mather Memorial Parkway on the Naches Ranger District.

Alternative C, the preferred, has numerous changes in allocation boundaries as well as the addition of two additional prescriptions: RE-4 Roadless Harvest, and EW-3 Roadless Wildlife.

A number of changes were also made in the modeling used for analysis of the alternatives:

- a. Growth was updated on existing timber yield tables to reflect new growth since the original yield tables were constructed. Acres that were cut-over since the original model was built were changed to reflect this in the FORPLAN runs for the final.
- b. The original FORPLAN model had a commercial thinning constraint that limited commercial thinning volume to 29 percent of the total volume for the first decade. After the first decade, commercial thinning volume could not vary by more than ± 50 percent from the previous decade. It was discovered that this constraint also applied to shelterwood entries. After examination of this constraint, it was discovered that there was no need to limit shelterwood entries, and that commercial thinning entries were a very small portion of first decade harvest. This constraint was, therefore, dropped from the model for the FEIS.
- c. The 1978 version of IMPLAN was used to predict changes in jobs and income. For the FEIS, the updated 1982 version of IMPLAN was used.
- d. Deer and elk winter range (EW-1) was originally managed under Special Prescription Yield Tables 2 and 3. These yield tables included managing the timber on a fairly long rotation. Since cover and early forage production were considered more important, Yield Table RM-1 was considered to be more appropriate for winter range in the FEIS.
- e. In the DEIS, the spotted owl, pine marten, three-toed woodpecker, and pileated woodpecker were managed using the same prescription and modeled with the same yield table. For the FEIS, a separate prescription was written for the spotted owl. The Spotted Owl Yield Table changed from managed old growth to dedicated old growth (no scheduled timber harvest). The prescription for the pine marten, three-toed and pileated woodpeckers was changed to one that produces the mature timber requirements for these species.

C. Planning Process

The planning and environmental analysis process brings a new outlook and a new technology to National Forest land management. Principally: (1) processes formerly used to make individual resource decisions are now combined to help make integrated resource management decisions; and (2) new mathematical modeling techniques are used to analyze alternative land management scenarios, including identifying the most cost-efficient pattern of land management. The 10-step planning process is discussed in the NFMA regulations and in Chapter I of this document. The steps are briefly summarized below:

Step 1: Identification of issues, concerns, and opportunities (ICO'S) - In any systematic approach to problem solving, the first step is to identify the problem. In this step, the Interdisciplinary Team (ID Team) identifies and evaluates public issues, management concerns, and resource use and development opportunities. *What does the public want? What does the Forest Service want? What needs to be done?*

Step 2: Planning Criteria - Criteria are designed to guide collection and use of inventory data and information, analysis of the management situation, and the design, formulation, and evaluation of alternatives. *This step sets the guidelines for accomplishing the next 5 steps.*

Step 3: Inventory data and information collection - The type of data and information needed is determined in step 2 based on the ICO's. The data is then collected and assembled in a manner meaningful for answering planning problems.

Step 4: Analysis of the management situation - This step is a determination of the ability of the planning area to supply goods and services in response to society's demands. This provides a basis for formulating a broad range of reasonable alternatives.

Step 5: Formulation of alternatives - A broad range of reasonable alternatives is formulated according to NEPA procedures. Alternatives are formulated in a manner which provides an adequate basis for identifying the one that comes nearest to maximizing net public benefits.

Step 6: Estimated effects of alternatives - The physical, biological, economic and social effects of implementing each alternative considered in detail are estimated and compared according to NEPA procedures.

Step 7: Evaluation of alternatives - Significant physical, biological, economic and social effects of implementing alternatives are evaluated with respect to the planning criteria.

Step 8: Preferred alternative recommendation - The Forest Supervisor reviews the Interdisciplinary Team's evaluation and recommends a preferred alternative to the Regional Forester. This is identified in the Draft Environmental Impact Statement and displayed as the proposed Plan.

Step 9: Plan approval - The Regional Forester reviews the proposed plan and Final Environmental Impact Statement and either approves, or disapproves, the Plan

Step 10: Monitoring and evaluation - The plan establishes a system of monitoring at established intervals to determine how well objectives have been met and how closely management standards and guidelines have been followed. Based on these evaluations, the plan will be revised or amended as necessary.

Appendix B describes the analysis phase of the planning process, covering steps 3, 4, 5, and 6. The judgment phase, steps 1, 2, 7, and 8, is described in Chapters I, II, and IV and in Appendix A. The execution phase, steps 9 and 10, is presented in the Forest Plan.

The following is the change in the process used to develop the No-Change Alternative:

Step 1: A public issue is a subject of widespread public interest identified through public involvement. Management concerns and opportunities are identified by the Forest Service. After issues, concerns, and opportunities are identified, the interdisciplinary team evaluates the responses and decides which ones will be considered. Current issues of widespread interest and existing management concerns and opportunities were not used in the development of Alternative NC.

Step 2: Planning Criteria - Planning criteria used to develop the No Change Alternative were not necessarily the same as those used to develop other alternatives. Alternative NC is based upon the 1963 Wenatchee Timber Management Plan and the 1969 Naches-Tieton Timber Management Plan. These plans predate important guiding legislation such as the National Environmental Policy Act of 1969, the Resources Planning Act of 1974, and the National Forest Management Act of 1976.

Step 3: Inventory Data and Information Collection - The No Change Alternative was based on resource inventory data available prior to 1977. Estimates of suitable acres for timber management were revised following passage of the Washington State Wilderness Act of 1984.

Step 4: The visual resource for Alternative NC used the concept of Landscape Management Units rather than the Visual Resource Management System that was used to define the visual resource for the rest of the alternatives.

Step 5: Formulation of Alternatives - Alternative NC, unlike other alternatives, does not necessarily use the most "cost effective methods of achieving resource objectives." It did not consider priced and non-priced outputs in the same analytical approach as the other alternatives. Alternative NC was developed by combining the existing direction in the multiple-use and unit plans with the timber outputs projected in the 1963 Wenatchee Working Circle Timber Management Plan and the 1969 Naches-Tieton Working Circle Timber Management Plan.

Step 6: Estimated Effects of Alternatives - The current Forest Service Planning models were not used to estimate the physical and economic effects of Alternative NC. Because of the lack of data it is not possible to use the current planning models to estimate environmental effects for Alternative NC beyond the first decade of the planning horizon.

II. INVENTORY DATA FOR INFORMATION COLLECTION

A summarization of the processes, events and actions occurring during planning step 3, Inventory Data and Information Collection, is outlined below. Inventory items and information used in this planning process are the most current and reliable available at this time. The primary objective was to use the best available sources. New field data was collected only if such information was specifically lacking in existing sources and the data was required to address issues.

A. Forest Data Base

Inventory data was assembled for many resources so that issues could be addressed, limitations defined, and capabilities determined. A portion of this data was necessary to develop the Forest Planning Model (FORPLAN) and to determine management and analysis areas.

The Wenatchee National Forest is using a computer mapping system known as Land Inventory Mapping (LIM). This system provides two alternative mapping methods. Each is available for use through the USDA's Fort Collins Computer Center, Fort Collins, Colorado. One of these, the Polygon Mapping System, has not been fully operational and is not used by this Forest. The second, the "GRID" Mapping system, has been used extensively by the Forest Service and has been adopted by the Wenatchee National Forest as the primary data storage and retrieval system for the Forest Plan. This system, known as R2MAP, uses basic information layers as initial input, then by overlaying two or more basic layers, other layers can be generated. Data summaries and/or maps can be created from either the primary or "generated" layers.

The LIM-R2MAP System setup for the Wenatchee National Forest uses a base map scale of 1 inch = 1 mile. Each grid is composed of a two digit code. Using the standard printer format of 10 characters per inch on each line and six lines per inch, each two character grid equals approximately 21 acres. Therefore, 21 acres is the smallest size area represented by R2MAP without changing the primary map scale of 1 inch = 1 mile. To change the R2MAP primary map scale would require reconstructing all inventory layers.

Once the basic inventory layers are available in R2MAP, numerous combinations of machine generated layers can be developed within a day or so. Complex overlays requiring more than one R2MAP run take proportionately longer.

R2MAP can provide site specific data from various inventories such as timber size classes, slope and soil data, ownership, political boundaries, watersheds, livestock allotments, developed campgrounds, recreation sites, critical big game winter range, and many other inventory and computer generated items.

Inventory data used to develop Alternative NC was different from that which was used to develop all other alternatives. Data collected prior to 1969 for the Naches area and 1963 for the rest of the Forest was used to develop the No Change Alternative. Data collected between 1977 and 1982 was used for the other plan alternatives. Significant differences exist in the amount and accuracy between data used to develop Alternative NC and what was used to develop other alternatives.

1. Delineation of Capability Areas

Capability areas are specific, contiguous areas of land which respond similarly to management practices in terms of certain outputs and effects. They are developed by overlaying maps of various physical, biological and administrative characteristics. Capability areas were originally mapped for the Forest with the intention of aggregating similar, noncontiguous ones together to form analysis areas. These analysis areas would then be used as the basic land stratification in FORPLAN.

The use of capability areas was found to be an inefficient and unnecessary step in the process, however. Given the type of computer mapping system available to the Forest, it was more efficient to go directly from the basic characteristics from which capability areas were developed to analysis areas. The mapping system and its application in analysis area development is explained in the following paragraphs.

Capability areas were not used to develop Alternative NC.

2 Stratification of the Forest into Analysis Areas

The Forest was stratified into analysis areas by overlaying various R2MAP layers. The specific analysis areas are described in Section III.C of this appendix. The inventory data used to build them are described below.

The first level of analysis area identifiers in FORPLAN specifies management status and roading status. Existing utility corridors, administrative sites, special use areas, cultural sites of known significance, arterial and collector roads, bodies of water over 21 acres, Tumwater Botanical Area, Entiat Experimental Forest, and Wilderness areas were mapped in various R2MAP layers. Roading status was derived from the Recreation Opportunity Spectrum (ROS) R2MAP Layer.

The next two levels of analysis area identifiers specify vegetative type and, for tentatively suitable timber lands, size class. This information was derived from R2MAP. The Vegetative Condition Class Layer was created in R2MAP to represent the Forest ecoclass condition, including timber size class. Tentatively suitable timber lands are also identified in the second level of analysis area identifiers. Timber suitability analysis is described in Section II.A.4 of this appendix.

It was noted during the construction process of this layer that the amount of mapping detail lost by using a 21 acre minimum size mapping unit appears to represent the original inventory detail within reasonable limits of error.

The original ecoclass inventory used as the foundation of this layer was guided, in part, by the following minimum photo mapping acreages for contrasting types on the Wenatchee National Forest (an extract from an attachment to Jorgenson's July 16, 1975, 1630/2410 memo "Stand Mapping and Classification," dated July 15, 1975):

- between nonforest or unproductive forest and commercial forest land - two acres,
- between ecoclasses in commercial forest land - five acres; in nonforest and unproductive forest - 10 acres,
- between maturity classes, size classes, or stocking within ecoclasses - 10 acres,

The forest-wide ecoclass mapping project done during 1976 and 1977 utilized black and white aerial photos taken just before the destructive wildfires that occurred during the summer of 1970. These photos were used to map all the Forest except the 1970 burn areas. A special flight of color aerial photos was taken shortly after the 1970 fires. These photos were used to map the ecoclasses within the burned areas.

This initial ecoclass mapping identified a considerable number of acres of tentatively suitable land as bare ground (denuded of trees). Most of these acres lie within the burned over areas.

The combined effect of intense wildfire and after-burn site deterioration from surface erosion has caused a number of acres to change from a "tentatively suitable" condition to a "non-forest" or "unsuitable" condition. Also, the intensity of the wildfires was so great that the normal aids to photo identification of tentatively suitable lands (stumps, logs, and snags) are missing or not visible on the color aerial photography. Because of this, the potential for incorrectly classifying the severely burned areas was increased considerably. Early reforestation survey activities within the burned over areas indicated a need to remap the ecoclass potential of the burns.

Most of these burned areas are on the Chelan Ranger District. A District field survey of the burned-over areas was initiated in 1978 and continued through 1983. This survey provided new ecoclass designations which provided the basis for revising that portion of the Forest-wide ecoclass mapping project within the burned over areas. These revisions are included in the Vegetative Condition Class Layer in R2MAP.

The basis for this layer was the Total Resource Inventory (TRI) Ecoclass Subsystem. TRI is a System 2000 (S2K) computer database used to store site specific resource data.

The TRI Ecoclass Subsystem had to be updated from the photo mapping base of 1970. This was necessary to more accurately represent the actual conditions of timber removal or timber stand modification resulting from commercial timber sales since 1970.

All timber sale activity from 1970 through January 1, 1989, was included in the revised inventory base map used to update the Vegetative Condition Class Layer. The cutoff date of January 1, 1989, represents the most current inventory of harvest activity for this planning effort.

The Wenatchee developed a biological model for timber planning purposes early in 1976. A group consisting of the Forest Silviculturists, Timber Management Planner, and other timber management personnel developed the model with consultation and guidance from Allan Lampi, John Teply, Dave Bernstein and Carl Puuri of the Regional Office. Since its development, we have re-evaluated the model several times and feel confident in its applicability.

The foundation of the model is the stand and ecoclass mapping done during 1974 and 1975 under supervision of Tom Beebe, Silviculturist, with the guidance of Dave Bernstein, R.O Timber Planning and Photo Interpretation Specialist. This mapping process utilized the stand classification system, as developed by Dave Bernstein, entitled Stand Mapping and Classification, C.G. Jorgensen, 1630 (2410) memo dated July 16, 1975, and the ecoclass identification system, developed by Fred Hall, entitled Pacific Northwest Ecoclass Identification, USDA-FS-R6 Regional Guide 1-1 and Codes for Pacific Northwest Ecoclass Identification, USDA-FS-R6 Regional Guide 1-2. Both of these publications are dated January 1974. Also included in the mapping process was a study of methods to determine site productivity, so as to be better able to separate productive from non-productive forest land. Oral advice and written information on this subject were received from Fred Hall, Colin Maclean, and Charles Bolsinger, Pacific Northwest Experiment Station, Portland, Oregon. A further refinement of the mapped mature stands was done by Bob Pederson in 1977. It was determined that the mature stands as mapped were too broadly stratified. Under the advice of Al Lampi and John Teply, these stands were further delineated to break out areas containing photo identifiable immature seedlings and saplings, poles and small sawlogs under mature overstory. Immature understory had to meet minimum density levels considered to be fully stocked in order to qualify. Two storied stands with understocked immature trees were classified with mature stands without understory. Documentation of the stand mapping procedure and codes used is available at the Forest Supervisor's Office in Wenatchee.

Stand productivity was modeled by grouping ecoclasses of broadly similar capability. This method was decided upon because it is the best existing mapped data available. The preliminary model had three groupings:

I. Dry sites represented by CP and CD ecoclasses.

II. Moist, more productive sites represented by CE, CF, CH, CW and CS ecoclasses.

III. A group containing CL and CM found at higher elevations.

Legend:^{1/}

“C” - Conifer Climax Plant Community

“P” - Ponderosa Pine Major Climax Species

“D” - Douglas-Fir Major Climax Species

“E” - Alpine Fir/Englemann Spruce Closed Forest Major Climax Species

“F” - Silver or Noble Fir Major Climax Species

“H” - Western Hemlock Major Climax Species

“W” - White or Grand Fir Major Climax Species

“S” - Spruce Major Climax Species

“L” - Lodgepole Pine Major Climax Species

“M” - Mountain Hemlock Major Climax Species

^{1/} From “Ecoclass Coding System for Pacific Northwest Plant Associations, USDA FS, PNR, R6 ECOL 173-1984, January 1984.

Group III was subsequently combined with group II because of a very small acreage (approximately 5,000 acres) and because only one inventory plot is located within the group. The 1977 timber inventory plot layout used the previous Forest-as-a-whole sample plot locations. A description of the process used follows:

The 1977 timber management inventory utilized the Field Instructions for Timber Management Inventories Region 6, U.S.D.A., Forest Service, Portland, Oregon, 1976. On the Wenatchee National Forest the field sample consists of field plots located on a systematic grid 1.7 miles square. The inventory grid does not cover reserved forest lands. Reserved includes forest lands withdrawn from timber utilization by statute, administrative regulation (Code of Federal Regulations), or by designation in land use plans approved by the Regional Forester.

The field plot consists of 10 sample points distributed over approximately one acre and located at the apexes of equilateral triangles with 70 foot sides. At each of these points data are collected on the species, size, and quality characteristics of the trees present. If no trees are present at a point, a record is made of the ground conditions which influence current or prospective stocking.

Dispersion of the 10 sample points over the sample acre permits calculating not only the total or average stocking or other condition for the sample acre, but permits evaluation of the variation within the acre. This makes it possible to evaluate how effectively the trees present are using the available growing space.

At each field plot location, the land is first classified as commercial forest, noncommercial forest, or nonforest. If the land is commercial forest, a field plot is established; if not, no plot is taken.

A variable radius plot is taken at each of the 10 points. Trees 5.0 inches d.b.h. and larger are tallied.

A 1/300-acre fixed radius plot is established at each of the 10 points. Trees 1.0 inch d.b.h. to 4.9 inches d.b.h. are tallied.

A tally is made of all established seedlings (under 1.0 inch d.b.h.).

On sample points 1, 2, 3, extra data are taken to provide information on rates of growth and mortality. On these points diameter is recorded to the last 0.1 inch for all trees 1.0 inch d.b.h. and larger, and trees over 5.0 inches d.b.h. are bored to obtain growth data.

The last level of analysis area identifiers specifies slope and soil hazard. These factors were derived from Soil Resource Inventory (SRI) data which was mapped into R2MAP.

This layer was constructed from two Forest Soil Resource Inventory (SRI) mapping projects:

- The Naches/Tieton portion of the Mt. Baker-Snoqualmie Eastside SRI project was completed April 15, 1973. Field mapping was conducted from July through October 1970 by Soil Scientists Robert V. Snyder, John M. Wade, and Raymond Lavine.

- The Wenatchee SRI project was completed in 1976. Field mapping was conducted from April 1972 to October 1975 by Phillip D. McColley.

The Wenatchee National Forest's Soil Scientist, Phillip McColley, provided the expertise to assemble the soil codes from both of the above SRI's into groupings of similar soil types and to edge-match soil types along adjacent boundaries.

Analysis areas were not used to develop Alternative NC.

3. Determination of Production Coefficients

The processes used to develop production coefficients are described in Section III.F of this appendix. Data used in these processes are summarized below.

<u>R2MAP Layer</u>	<u>Activity/Output</u>
Vegetative Condition Class	timber livestock forage wildlife forage water sediment old-growth
Soil Resource Inventory	livestock forage wildlife forage sediment logging costs road construction
Recreation Opportunity Spectrum	dispersed recreation sediment

(See section 7B of this Appendix for sources of the data.)

4. Determination of Suitability for Management Practices

The suitability of specific areas of the Forest for various management practices was examined at several levels. When management prescriptions were developed, the types of areas to which they were applicable was specified. FORPLAN prescriptions were also screened to determine which analysis areas were appropriate. For example, a range management prescription emphasizing vegetative manipulation is inappropriate for non-vegetated analysis areas.

The NFMA Regulations require the identification of lands which are not suited for timber production (36 CFR 219.14). A three stage screening process is employed. The last two stages are determinations of economic efficiency and interactions with other resource objectives. The first stage is a determination of tentative suitability. Lands are eliminated based on four criteria. These are outlined below, along with the specific factors used to identify them on the Wenatchee National Forest:

a. The land is not Forest land.

This criteria was met through the use of the Forest timber inventory conducted in 1977.

b. Technology is not available to ensure timber production from the land without irreversible resource damage to soils productivity or watershed conditions.

Avalanche Paths:

-Areas that have a series of avalanche chutes which occupy more than 50 percent of the area.

Mass Failure Areas (Rotational Slump/Earth Flows):

-Areas where there is a well defined escarpment at the uppermost elevation where the slide mass has pulled away from the slope.

-Areas where the surface of the slide is irregular and undulating. Wet areas, springs, and ponds are also characteristic of this landform.

-Areas where the slide possesses a readily recognizable "toe" or "snout," rounded in form, and coming in contact with the underlying surface at a sharp break in the slope.

-Areas where the slide has not come to rest as defined by its position on the slope.

-Areas where management activities can be expected to increase the risk factor (WRENS) by two.

-Areas which are 20 acres or more in size.

Debris Flow:

-Areas which, when viewed stereoscopically, indicate slopes of 60 percent or greater adjacent to the stream channel.

-In association with the above criteria, areas where 40 percent or more of the area have active or previously active slides.

-Areas which are 20 acres or more in size.

c. There is no reasonable assurance that such lands can be adequately restocked within 5 years after final harvest.

Rocky Soils:

-Areas where the rock content of the soils exceeds the limits suggested by Boyer.

Droughty Soils:

- Areas of droughty soils with low field capacity or other indicators of moisture availability.

This criteria will apply only to dry forest and low productivity areas. It applies to soils where the available water holding capacity of the upper 18 inches of soil is 2.5 inches or less.

Wet Areas:

- Areas of wet soils and/or high water table.

Serpentine Soils:

- Areas where serpentine soils are found in over 45 percent of the area.

High Elevation:

- Areas above the 6,000 foot elevation.

Excessive Slopes:

- Areas having slopes greater than 10 percent.

Regeneration Problem Areas:

-Areas of "open park-like" subalpine larch, subalpine fir, and white bark pine mapped as unproductive CA type.

-All areas mapped as unproductive dry ecotypes "CD/U" and/or "CP/U".

-Dry types above 5,000 feet in elevation on slopes over 40 percent facing south, southwest, and west.

-Sites mapped as marginal due to regeneration difficulty in original ecotype mapping.

-Swampy soil and wetlands.

-All ecotypes above 6,000 feet.

-All mountain hemlock dominated ecotypes (not those with a minor component of mountain hemlock).

-Slopes over 99 percent.

- d. The land has been withdrawn from timber production by an Act of Congress, the Secretary of Agriculture or the Chief of the Forest Service.

This criteria was met by the delineation of the applicable lands.

The characteristics identified above were mapped into several different R2MAP layers. Lands which met the above criteria and the remaining lands which were tentatively suitable for timber production were identified by overlaying these layers. The results of this analysis are summarized in Table B-II-1.

The No Change Alternative was based on a different concept of suitability for timber management than the other alternatives. For Alternative NC, commercial forest land (land considered suitable for timber management) included all lands capable of producing crops of wood with growth in excess of 20 cubic feet per acre per year that were not withdrawn from timber production by statute or by administrative regulation. Biological criteria for regeneration of trees following harvesting, and consideration for avoiding irreversible or irretrievable damage, were not included in the definition of Commercial Forest Land used to develop Alternative NC.

TABLE B-II-1
LAND TENTATIVELY SUITABLE FOR TIMBER PRODUCTION

	Not Suited For Timber Production	Totals
I Total National Forest Area		2,457,379
Other Ownerships		293,199
II. Net National Forest		2,164,180
A Water	11,024	
B Non-Forest (not stocked with 10 percent tree cover)	666,828	
C. Lands developed for other than timber production purposes*		
Ski areas, developed recreation, administrative areas, improved roads, special uses.	35,230	
III Forested Lands		1,451,098
A.. 1. Wilderness	430,788	
2. Research Natural Areas	1,038	
3 Other such as:		
Tumwater Botanical Area	784	
Entiat Experimental Forest	<u>4,219</u>	
Subtotal	436,829	
B. Lands growing less than 20 cu ft./ac./yr.		
1. Lands classified as unsuitable	137,717	
2. Lands classified as suitable		(6,148)
3. Lands classified as separate suitability component	0	
C. Irreversible resource damage (219.14(a)(2))	18,720	
D. Regeneration Difficulty (Reforestation cannot be guaranteed) (219.14(a)(2))	65,933	
E. Regeneration difficulty (lands classified as a separate suitability component)	0	
IV Tentatively suitable Forest Land		791,899
	<u>Total Non-Suitable</u>	<u>Total Tentatively Suitable</u>
V. Totals of Suitable and Non-Suitable Lands	1,372,281 ^{1/}	791,899 ^{1/}
VI Land Status under Current Timber Management Plan Revised/Approved 10/19/84	<u>Timber Component</u>	<u>Acres</u>
	Standard	682,251
	Special	<u>105,500</u>
	Subtotal	787,751

^{1/} Includes Alpine Lakes Management Area Non-harvest land allocations

The second stage of the timber suitability analysis involves examining the present net value of all timber harvesting options on a per acre basis. Present net value was calculated for each analysis area/management prescription/timing option combination using only timber benefits and costs. The options for each analysis area were ranked in order of decreasing present net value. Examination of this information provided insights into which prescriptions were likely to be selected in FORPLAN runs with an objective of present net value maximization. Options which had negative present net values were noted.

GF-4, the General Forest Management Prescription involving clearcutting and planting with no precommercial or commercial thinnings, had the highest PNV in most cases. GF-3 and GF-1, more intensive versions of the General Forest Management Prescription, often had only slightly lower present net values. On seedling/sapling analysis areas, GF-4 and GF-6 were the only options with positive PNV's. Bare ground analysis areas had no positive PNV's.

5. Development of Allocations and Scheduling Alternatives

The Forest was stratified into analysis areas as described in Sections II.A.2 and III.C of this appendix. Management prescriptions were developed as described in Section III.D. Timing options and yield coefficients are described in Sections III.E and III.F, respectively. The application of different management prescriptions to analysis areas, with varying schedules of activities and outputs, defined the alternatives. The analysis process is detailed in Section III.B and alternative development is discussed in Section III.

6. Monitoring of Implementation

A Monitoring Plan is included as Chapter VI of the Forest Plan. It addresses monitoring of specific management prescription allocations and their associated practices to determine if they are causing a significant deviation from the predicted outputs, effects, and costs, and if standards, guidelines, and activity statements have been met.

7. Development of Subsequent Programs for Plan Implementation

Much of the data used to develop alternatives can be used to prepare programs and projects for implementing the plan. Some projects may need a higher degree of resolution than the 21 acre minimum size of much of the Forest planning data, however. Other inventory data is available for project purposes, particularly in the Total Resource Inventory (TRI) system.

B. Sources of Existing Data

The Wenatchee National Forest used or considered the following sources of data during the analysis process:

Recreation Information Management System (RIM)

This locally collected data provides recreation facility, site inventory and maintenance data as well as recreation activity use statistics. It also contains field estimates of hunting, fishing, and non-game wildlife use.

Visual Quality Objectives (VQO)

This R2MAP data shows inventoried visual resource data used for depicting the current situation June, 1980.

Existing Visual Condition (EVC)

This map shows the present state of visual alteration of the landscape measured in degrees of deviation from the natural appearing landscape (map overlay 2"/mile, used in conjunction with existing ROS classes). 1984

Visual Absorption Capacity (VAC)

This map overlay shows the relative ability of the landscape to absorb management manipulations without significantly affecting its visual character. 1980.

It was developed to provide data to rate viewsheds ability for long-term visual condition.

Viewsheds

Delineation of the Forest's 34 viewsheds was done to give more specificity of visual resource information for tracking how these changed in the alternatives (R2MAP). September, 1984.

Wildlife Habitats in Managed Forest's, the Blue Mountains of Oregon and Washington USDA Handbook No. 553. USDA, 1979

This report contains data on species distribution, use of forested habitats, and the influence of forest management on wildlife.

Wildlife of the Pacific Northwest: Occurrence and Distribution by Habitat, BLM District, and National Forest.

Guenther, Keith and Thomas E. Kucera, USDA, 1978.

This report features a table format that displays wildlife species occurrence in the Northwest

Inventory data used to develop Alternative NC differ greatly from data used to develop other alternatives.

Timber volume outputs for Alternative NC were based upon data collected in the 1961 inventory for the Wenatchee Working Circle and 1968 timber inventory for the Naches area. Management areas identified in District Multiple Use Plans were also used.

Strategies For Washington Wildlife

Washington Department of Game, 1982.

This report contains a comprehensive framework for the management of Washington wildlife and game fish resources until 1995. It sets statewide goals and objectives.

Big Game Status Reports, 1980-1981-1982.

Washington Department of Game, 1983.

Populations and harvest by management units are displayed.

Management Strategies for Region 3 Wildlife (Draft)

Washington Department of Game

This report establishes specific goals and objectives for herd units or management units.

Non-Game Data Base

Washington Department of Game, 1985

A computer printout of threatened, endangered, and sensitive species locations was obtained from this data base.

Threatened, Endangered, and Sensitive Plants.

Washington Natural Heritage Program, 1985.

This printout lists locations and sighting information for threatened, endangered, and sensitive species.

Maps of Anadromous and Resident Fish Distribution on the Wenatchee National Forest, by Ranger District

This map was prepared by Districts with coordination from Steve Kessler.

Estimated "existing," "current potential," and "potential with enhancement" fish production data for streams and lakes on the Wenatchee National Forest

Wischnofske, Merle (updated by Steve Kessler)

Information from this report was also updated based on input from the Washington Department of Fisheries, Washington Department of Game, Yakima Indian Nation and U.S. Fish and Wildlife Service.

-Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern Washington

Hall, Frederick C., 1973

This publication describes plant communities in portions of Oregon and Washington, and includes production of forage within the communities.

Forested Plant Associations of the Okanogan National Forest

Williams, Clinton K. and Terry R. Lillybridge, 1983

This publication describes plant associations on the Okanogan National Forest and the amount of forage produced within these associations.

Coefficient Development for Forage Production

McCutchen, Edwin L., 1981

In a memo to the 1920 Land and Resource Management Planning files, the author describes a process used to develop Forage Production Coefficients for use with Version I FORPLAN for the Wenatchee National Forest.

Soil Survey of Chelan Area, Washington, Parts of Chelan and Kittitas Counties

USDA, Soil Conservation Service in cooperation with Washington Agricultural Experimental Station, 1969

This publication is a soil survey of lands within and adjacent to the Wenatchee National Forest and contains forage production on certain vegetative types in the lower elevations of the Forest.

Overstory - Understory Relationships in Western Forests

Western Regional Research Publication No. 1

This publication describes certain vegetative relationships resulting from timber harvest on National Forests in the West. Types of overstory and understory vegetation including the amount of forage produced depending on percent of overstory removed is discussed.

Total Resource Inventory (TRI)

This is a regional system for storing data on current stand conditions and activities planned or accomplished in those stands.

1977 Wenatchee Forest Inventory

This inventory provided data on tree volume, species, growth, age classes, and stand sizes. This information is the basis for the Forest's existing timber yield tables.

1984 Reforestation and Timber Stand Improvement Report

This report gives the amount of needed, proposed, and accomplished reforestation and timber stand improvement. It has also been used to annually track the progress of backlog reforestation.

1985 Timber Yield Table Documentation

Managed timber yield tables were based on Prognosis model variant 640 version 4.2 developed by Wykoff, Croohston and Stage.

Empirical Yield Tables for the Wenatchee

These were prepared by John Teply, Region 6 Biometrician, from 1977 timber inventory data.

Local Mill Capacities

Developed by telephone survey conducted by Timber Staff Officer Fred Walk in 1985.

An Approach to Water Resources Evaluation of Non-Point Silvicultural Sources (pp. 49-63).

E.P.A. - 600/8 - 80 - 012, August, 1980

This process was used in conjunction with the Warrington procedure, for estimating soil erosion for forest land management planning.

A Perspective on the Cumulative Effects of Logging on Streamflow and Sedimentation

Rice, Raymond M., Research Hydrologist, Pacific Southwest Forest and Range Experiment Station, Forest Service, USDA, Berkeley, Calif., 1980

This paper discusses strategies for mitigating cumulative effects. It also describes the synchronized effects and some of the causes of the problem.

A Watershed's Response to Logging and Roads

Rice, Raymond M., Forest B. Tilley, and Patricia A. Datzman, Pacific Southwest Forest and Range Experiment Station, Forest Service, USDA, Berkeley, Calif. 1979

This paper discusses the mechanics of soil movement and talks about soil loss and water quality. The focus is on road construction and selective timber harvest in watersheds.

Are Forest Residues Needed Assets for Soil Protection and Maintaining Future Site Productivity?

Klock, G.O., Research Soil Scientist, Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Wenatchee, Wa.

This paper discusses the importance of maintaining some forest residues in place, nonwettability conditions, and other factors that may affect soil productivity.

Designing Skid Trail Systems to Reduce Soil Impacts from Tractor Logging Machines

Froehlich, H.A., Professor, Forest Engineering, OSU; D.E. Aulerich, President, Forest Engineering Incorporated, Corvallis, Ore; and R. Curtis, Forest Engineer, Land Management Services, Springfield, Ore., 1981

Effects of Logging and Logging Roads on Erosion and Sediment Deposition from Steep Terrain

Megahan, W.F., Forest Hydrologist, Intermountain Forest and Range Experiment Station, Forest Service, USDA, Ogden, Utah; and W.J.Kidd, N.E.Area, State and Private Forestry, Columbus, Ohio., 1972

This paper compares different ground disturbance activities associated with logging (skyline, jammer, and road construction).

Effects of Fire on the Long-Term Maintenance of Forest Productivity

Klock, G.O., Research Soil Scientist, Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Wenatchee, Wa.; and C. C. Grier, College of Forestry, University of Washington, Seattle, Wa.

This paper discusses the effects that fire can have on the soil resource.

Erosion over Time on Severely Disturbed Granitic Soils: A Model, USDA, Forest Service Research Paper, INT - 156

Megahan, W.F., Forest Hydrologist, Intermountain Forest and Range Experiment Station, Forest Service, USDA, Ogden, Utah., 1974

This process was used in conjunction with the Warrington process for determination of the delivered sediment index values.

Erosion Processes and Control Methods in North America

Swanston, Douglas N., Principal Geologist, Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Corvallis, Ore., 1978

This paper describes the different kinds of erosional processes that affect forested lands. It also discusses methods of controlling erosion.

Estimating Soil Erosion on Forest Land Management Planning: A Procedure: In Forest Soils and Land Use

Warrington, G.E., Soil Scientist, Forest Service, USDA, Fort Collins, Colo., 1978

This publication describes the process used for the determination of delivered sediment index values.

Logging, Erosion, Sedimentation - Are They Dirty Words?

Megahan, Walter F., Research Hydrologist, Intermountain Forest and Range Experiment Station, Forest Service, USDA, Ogden, Utah., 1972

This paper discusses the effect of road construction on the total amount of sediment produced.

Predicting Soil Compaction on Forested Land

Froehlich, Henry A., Professor, Forest Engineering; J. Azevedo, Research Assistant, Peter Cafferata, Graduate Research Assistant; and Dave Lysne, Graduate Research Assistant, Oregon State University, Corvallis, Ore., 1980

This publication discusses the mechanics of soil compaction, duration of effect, and tests for the determination of soil compaction.

Slope Stability Problems Associated With Timber Harvesting in Mountainous Regions of the Western States.

Swanston, D. N., Principal Geologist, Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Portland, Ore., 1974

This publication discusses the classification of mass failures, and the interrelationships between principal factors that produce landslides on timbered slopes. It also covers the effect of different forest operations and some methods to use to predict, prevent, and control landslides.

Soil Monitoring Project Report on Payette National Forest and Boise Cascade Lands

Froehlich, Henry A., Professor, Forest Engineering Dept.; D.W.R. Miles, Research Assistant; R.W. Robbins, Graduate Research Assistant; and J.K. Lyons, Former Research Assistant, Oregon State University, Corvallis, Ore., 1983

This paper discusses the cumulative effect of repeated trips over a soil, and the duration of the compacted layers in several different textured soils.

Soil Resource Inventory (SRI), Wenatchee National Forest

McColley, Phillip D., Soil Scientist, Wenatchee National Forest, USDA, 1976

This publication presents broad soil information, identifies physiographic land types, and gives soil interpretations for planning purposes based on probable hazards or suitability for management.

Soil Resource Inventory (SRI), Snoqualmie National Forest - Eastside

Snyder Robert V., and John M. Wade, Soil Scientists, Snoqualmie National Forest, USDA, Seattle, Wa., 1973

This publication presents broad soil information, identifies physiographic land types, and gives soil interpretations for planning purposes based on probable hazards or suitability for management.

Soil, Vegetation and Watershed Management of the Douglas-Fir Region

Fredricksen, R.L., Research Soil Scientist, and R.D. Harr, Research Hydrologist, Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Corvallis, Ore.

This publication describes the processes of mass failure and surface erosion processes in the forest environment.

Some Soil Erosion Effects on Forest Soil Productivity

Klock, G.O., Research Soil Scientist, Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Wenatchee, Wa., 1982

This publication discusses the effects of soil erosion on nutrient availability, as well as the importance of maintaining the organic matter content in forest soils. It also discusses the location of most of the available plant nutrients in forested soils.

The Influence of Soil Compaction on Young Tree Growth on the Yakima Indian Reservation

Froehlich, Henry A., Professor, Forest Engineering, and Richard W. Robbins, Graduate Research Assistant, Oregon State University, Corvallis, Ore., 1983

This publication discusses changes in soil bulk density associated with logging. It also talks about the effect of soil displacement and the removal of the nutrient-rich surface soil during logging and slash disposal.

Water-Repellent Soils: Their Implications in Forestry

DeBano, L.F., Research Soil Scientist, and R.M. Rice, Research Hydrologist, Pacific Southwest Forest and Range Experiment Station, Forest Service, USDA, Berkeley, Calif.

This paper discusses the effect on increased runoff and soil erosion resulting from fire caused water-repellent soils.

U.S. Bureau of Mines Mineral Industry Location System (MILS)

U.S. Bureau of Mines, 1980

This is an inventory system which provides location and related information on metallic or non-metallic mineral occurrences, prospects, mines, geothermal wells, and on mineral processing plants

Availability of Federal Land for Mineral Exploration and Development in the State of Washington

Banister, D'Arcy, Donald J. Barnes, Warren D. Lungwill, State of Washington, Department of Natural Resources, Division of Geology and Earth Resources, 1984.

This reference provides maps depicting: (1) the availability of public lands for mineral exploration and development; and (2) the significant known metallic deposits with their associated geologic Terranes and areas underlain by reported coal deposits.

Inventory of Washington Minerals, Part I and Part II

Hutting, Marshall T., State of Washington Department of Conservation and Development Division of Mines and Geology Bulletin No. 36, 1956.

This publication provides a brief annotated list of all the metallic mineral occurrences in Washington known to the Division of Mines and Geology.

Mineral Resource Analysis Study on United States Forest Service Land, State of Washington

Grant, Alan Roberts, 1976

This provides a review of short and long range mineral potential on Forest Service lands in the State of Washington.

Map of the Economic Mineral Potential Areas, Wenatchee National Forest
Meschter, Daniel Y., Mining Engineer, 1983

This inventory provides broad mineral resource information and indicates, on a Forest-wide basis, the probability of mineral resource occurrences and their relative potential for development.

Map of Areas of Critical Mineral Potential, 1st Edition
Bee, S., 1983

The map indicates, on a scale of 1:500,000, those areas nominated as areas of "critical mineral potential" in a Bureau of Land Management nomination process.

U.S. Geological Survey Leasable Mineral Classification Maps
Lands Valuable for Geothermal Resources, Oct. 1979
Lands Valuable for Oil and Gas, Aug. 1979
Lands Valuable for Coal, February 1983.

Lands Valuable for Sodium and Potassium, February 1978

These maps show, on a scale of 1:500,000, those lands that are classified as being "prospectively valuable" for oil and gas, "prospectively valuable" for geothermal or are "known geothermal resource areas", "prospectively valuable" for coal or as a "coal" area and as being "prospectively valuable" for sodium and potassium resources.

Wilderness Mineral Potential Assessment of Mineral Resource Potential in U.S. Forest Service Lands Studied 1964-1884
U.S. Geological Survey, Professional Paper 1300, 1984

This report provides a summary of the mineral resource assessment completed on a number of the wilderness, primitive and roadless areas within the Wenatchee National Forest.

Mineral Resource Potential Map of the Glacier Peak Wilderness and Adjacent Areas, Chelan, Skagit and Snohomish Counties, Washington

Church and others, U.S. Geological Survey Miscellaneous Field Studies Map MF-1652-A, 1984)

This report provides a summary of the mineral resource evaluation of the subject area. The report includes a map (scale of 1:100,000) depicting the mineral resource potential of the area and a narrative summarizing the result of the evaluation.

Mineral Resources of the Cougar Lakes - Mount Aix Study Area, Yakima and Lewis Counties, Washington

Simmons, George C., Ronald M. Van Noy and Nicholas T. Zilka, U.S. Geological Survey Open-file Report 74-243, 1974.

This report provides a mineral resource evaluation of the subject area.

Mining Claim Recordation Index

Bureau of Land Management, May 10, 1985 (latest index)

This index provides an inventory of all mining claims located on the Wenatchee National Forest which have been recorded with the BLM as is required by law.

Economic Analysis Revision of November 10, 1983 Regional Direction Package
USDA, Region 6, April 27, 1984.

This direction package specifies benefit values, base year dollars and conversion factors, and a methodology for reflecting price-diameter relationships for timber values.

The Derivation of Cut Stumpage Values from the Timber Sale Statement of Accounts Data-Base for National Forests in Region 6 and Cut Stumpage Values provided by Hays and Barranco
Hays, James F. and Gary Barranco, unpublished manuscript, Rogue River National Forest, March 15, 1984.

These stumpage values by species were the basis of the timber values used in FORPLAN.

FORPLAN Harvest Costs

These were the basis of the logging costs used in FORPLAN. They were estimated by John Malone and Charlie Stansel, Wenatchee National Forest, by making hypothetical timber sale appraisals.

Wenatchee National Forest Cost Estimates

These are estimates of Forest Service costs by MIH code. They were estimated by Forest specialists for each resource and reviewed by the responsible staff officers. These costs were used in budget estimation and economic efficiency analysis.

1961 Timber Inventory Data for the Wenatchee Working Circle.

1968 Timber Inventory Data for the Naches-Tieton Working Circle.

The above documents are on file at the Wenatchee National Forest Supervisor's Office.

III. THE FOREST PLANNING MODEL

A. Overview

Forest Planning is a very complex process in which an enormous amount of information and interdependent decisions must be considered before an alternative management plan can be recommended as the one which best addresses the issues, concerns, and opportunities that were identified at the outset of the planning problem. Because of this, several interrelated computer models and analytical tools have been developed and utilized to help determine the decision space within which alternatives can be developed and to evaluate their associated outputs and effects. These tools are also helpful in determining the most efficient means of meeting the goals and objectives of alternatives.

The major model used is called FORPLAN, an acronym for FOREst PLANning model. FORPLAN is a linear programming based computer modeling system. It has its roots in earlier systems such as RAM (Resource Allocation Model) and MUSYC, (Multiple-Use Sustained Yield Calculations); however, it is much broader in scope. FORPLAN consists of three components:

- 1) a matrix generator to translate the Interdisciplinary Team's input into the proper format for the linear programming component to use,
- 2) a linear programming solution system (FMPS, Functional Mathematical Programming System),
- 3) a report writer to translate the linear programming solution into useful information for decision making.

The majority of the Forest's analysis, including the final alternative runs, was done using Version II, Release 12 of FORPLAN. The system is maintained and operated on the Department of Agriculture's Univac computer at Fort Collins, Colorado.

Linear Programming (LP) is a mathematical modeling technique used to solve a series of simultaneous linear equations, such that one criterion is maximized or minimized, subject to meeting all specified constraints. Pertinent information about the Forest must be translated into linear equations in order to apply linear programming to the planning problem. This task was performed by the Interdisciplinary Team.

The FORPLAN model for the Wenatchee was specifically designed to aid the Interdisciplinary Team in analyzing how the various alternatives addressed the identified issues, concerns, and opportunities.

The first step in building the FORPLAN model was deciding what factors needed to be incorporated to accomplish this. For example, land stratification included roading status because that was directly related to an issue and strongly influenced costs. On the other hand, land stratification didn't include elevation because that didn't relate to an issue and didn't strongly influence cost or output estimation.

The Forest was divided into "analysis areas." These are tracts of land with relatively homogeneous responses to management activities in terms of the outputs and effects that are being analyzed in the FORPLAN model. They are non-contiguous. A given analysis area can consist of a number of tracts of land scattered across the Forest.

Management prescriptions were developed to represent alternative ways of managing portions of the Forest. These prescriptions are unique combinations of scheduled activities and practices.

The application of management prescriptions to analysis areas results in various streams of costs, resource outputs, and associated benefits over time. These were estimated by the Interdisciplinary Team. FORPLAN's matrix generator translates these factors into coefficients for the linear programming model

Management prescriptions are allocated to analysis areas by FORPLAN, resulting in various mixes of goods and services. The mix of goods and services and the timing with which they are produced depends upon the constraints applied and the objective function specified. Constraints could be in the form of land allocations (e.g., a certain portion of the Forest must be assigned to a dispersed, non-motorized management prescription), output levels (e.g., a certain number of acres of old growth must exist), input levels (e.g., budget cannot exceed a certain amount), or fluctuation in output levels (e.g., timber harvested in one decade can't be less than the amount harvested in a previous decade). The objective function is one criterion (e.g., maximization of present net value) which is optimized subject to first meeting all constraints.

The final versions of all alternatives and benchmarks used an objective function of maximization of present net value over the 15 decade modeling horizon. Some alternatives and benchmarks were highly constrained, leaving little decision space available for meeting this criterion; others were not. In any case, the maximization of present net value, subject to meeting all constraints, provided a cost-efficient means of achieving objectives.

The FORPLAN model was not used to develop the No Change Alternative.

B. The Analysis Process and Analytical Tools

1. Analysis prior to FORPLAN

Public issues, management concerns, and resource use and development opportunities (ICO's) were identified over the entire period that the Land and Resource Management Plan was being developed. Most of the ensuing analysis was driven by these issues, concerns, and opportunities.

Much of the analysis prior to using the FORPLAN model involved determining how to build the model. Analysis areas were delineated, management prescriptions were developed, timing options were analyzed for prescriptions that harvested timber, and yield coefficients were developed. These processes are detailed in Subsections C, D, E, and F, respectively, of Section III of this Appendix. Costs, benefit values, and demands for various outputs were developed as described in Section IV. Minimum management requirements were developed as described in Section VI.B. The Forest was stratified according to its tentative suitability for timber harvest as described in Section II.A.

A socioeconomic overview of the Forest was prepared by a private consultant. Historic socioeconomic conditions were identified. IMPLAN, an input-output model for economic impact assessment, was developed. This is described and summarized in Section V.

Alternative NC is neither an integrated alternative, nor was cost efficiency explicitly addressed when it was developed. For this reason, requirements of 36 CFR 219.12(f)(8) may not be met.

Calculation of harvest level is based on the Austrian Formula for the ponderosa pine in the Wenatchee Working Circle. The Hanzlik's formula approach was used on the other species.

Stand table projection methods described later in this chapter were used to estimate timber yields and to develop harvest projection for Alternative NC on the Naches-Tieton Working Circle.

2 Use of FORPLAN in Analysis

FORPLAN was used to determine cost-efficient allocations and scheduling of resources for benchmarks and alternatives. Estimates of resource output levels, costs, benefits, and present net value were either derived directly from FORPLAN or in secondary models which used inputs derived from FORPLAN.

FORPLAN was used during the analysis of the management situation to determine the maximum production potentials of various Forest resources, the most cost-efficient ways of managing the Forest, and the impacts of certain laws, policies, and economic assumptions. This information was then used in the development of alternatives. FORPLAN was used to determine the most cost-efficient mix and timing of management activities, given certain land allocations, during the formulation and estimation of effects of alternatives. Both uses are explained in more detail below.

Some of the benchmarks examined during the analysis of the management situation determined the production level of Forest resources. A physical resource such as unroaded recreation capacity was first maximized. FORPLAN would then be constrained to produce that output level, while maximizing present net value. The first step determined the maximum ability of the Forest to produce a given resource. The second step determined the most cost-efficient allocation of management prescriptions and scheduling of activities and outputs necessary to achieve that production level.

Other benchmarks maximized present net value without having to first meet output targets. These benchmarks contained varied legal and policy constraints and economic assumptions in order to test their impacts. Among those things tested were minimum management requirements, nondeclining even flow and rotation age policies, and assumptions as to benefit values, costs, and price trends. Another benchmark was developed to simulate the current management of the Forest projected into the future.

Detailed descriptions of the benchmarks, their constraints and assumptions, and the results of the analysis can be found in Sections III and VIII of this appendix.

Preliminary work with the FORPLAN model indicated that it did not contain enough site-specific detail to make meaningful land allocation decisions. Inventory data was not available for every specific acre of the Forest. Much of the data available was accurate as an average over a broad area of the Forest but not for any one specific spot. Also, many of the factors important to allocation decisions, particularly those involving spatial juxtaposition, could not be meaningfully specified as linear equations for FORPLAN. Because of these reasons, land allocation decisions were made outside of the FORPLAN model.

The Forest Management Team, in some cases with input from various citizens groups and industry, developed six alternative land allocations. The alternatives are described in detail in Chapter II of the FEIS and in Section VII of this appendix. These were first drawn on paper, then input into R2MAP. The land allocations were overlaid with analysis areas in R2MAP to determine the number of acres of each analysis area which were allocated to a given management prescription in each alternative. This information was used to constrain the FORPLAN model to those allocations.

Choices as to management intensity and timing of management practices were still available within the more general land allocations. For example, lands allocated to the General Forest Management Prescription had five different intensities (different levels of precommercial thinning, commercial thinning, regeneration harvest, and reforestation) available and a broad range of timing choices within each intensity.

This technique ensured spatial feasibility and land allocation boundaries which made sense to the on-the-ground managers who would have to implement them. The land allocation decisions could be made

better outside of FORPLAN. Management intensity and scheduling choices involved information which could be more accurately portrayed in FORPLAN. Therefore FORPLAN was used to optimize management intensity and scheduling for each alternative's land allocation, given other goals and objectives.

A number of outputs and effects were directly estimated using FORPLAN. These include:

- allowable sale quantity (ASQ) by timber species
- total available forage
- livestock forage
- wildlife forage
- visual quality objectives (VQO's)
- recreation opportunity spectrum (ROS) class
- dispersed recreation capacity by ROS class
- background sediment
- activity sediment
- water yield increase

Much of this information was reported by Management Area, as well as Forest-wide. Timber management activities and outputs were reported by treatment type, working group, and in some cases, by species.

3. Analysis in Addition to FORPLAN Analysis

FORPLAN outputs were used as inputs for other analysis processes in some cases. Also some analysis was done totally independent from FORPLAN.

Changes in employment and income were estimated using IMPLAN, an input-output model. Changes in timber harvest, livestock forage production, and dispersed recreation use were developed with FORPLAN. Changes in developed recreation use and firewood gathering were estimated outside of FORPLAN. Changes in these physical outputs were translated into changes in employment and income using an electronic spreadsheet and coefficients generated with IMPLAN. The Forest's IMPLAN model is discussed in Section V of this appendix.

Discounted costs and benefits by major resource group and present net value were estimated using an electronic spreadsheet. The variable costs and benefits which influenced allocation and scheduling decisions were taken from FORPLAN. Other costs and benefits were handled outside of FORPLAN. Economic efficiency analysis is detailed in Section IV of this appendix.

Budgets, returns to the U.S. Treasury, and payments to local governments were estimated using electronic spreadsheets. Some of the inputs to these calculations were taken directly from FORPLAN, others were estimated by hand. More detail can be found in Sections IV and V of this appendix.

The arterial and collector road system was estimated outside of FORPLAN based on the land allocation of each alternative. A more generalized estimate was made for all benchmarks. Local road construction was adjusted after FORPLAN analysis to reflect additional access requirements of currently unroaded areas.

Other outputs and effects estimated outside of FORPLAN included:

- developed recreation capacity and use
- wilderness recreation capacity and use
- firewood
- trail construction and reconstruction
- wildlife and fish habitat, improvements, and populations
- range improvements
- watershed improvements
- human resource programs
- minerals and energy development and access
- fire effectiveness index

C. Identification of Analysis Areas

One of the first steps in the development of FORPLAN was to divide the Forest into analysis areas.

Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed within the FORPLAN model. They serve as the basic unit of land in the model, for which a range of prescriptions are developed to achieve various multiple use objectives. Their delineations were intended to capture the significant social, biological, and economic differences in the way the land responds to alternative management strategies, and to keep the model size reasonable so that projected analysis steps could be completed quickly and at a reasonable expense. The focus of delineating analysis areas was upon addressing certain issues, concerns, and opportunities identified at the outset of the planning process.

The following discussion presents the rationale behind the identification and delineation of the analysis areas according to six FORPLAN categories or levels of identifiers. The organization of identifiers within each level is designed to generate the least number of analysis areas consistent with the complexity of the Forest and the planning problem. Each FORPLAN level identifier becomes an increasingly more detailed description of the division of lands in the previous level.

Analysis areas were not used to develop Alternative NC as they were with other alternatives.

Level 1

Level 1 provides the legal and mutually exclusive management status identifier for each analysis area. The first 14 identifiers are for areas of the Forest that were not analyzed in detail by the subsequent identifier levels. The last two identifiers reflect the roading status of the remainder of the Forest.

<u>LEVEL 1</u>	<u>MANAGEMENT STATUS</u>
1	NATIONAL FOREST LAKES AND RIVERS WITHIN WILDERNESS
2	NATIONAL FOREST LAKES AND RIVERS WITHIN ROADED AREAS
3	NATIONAL FOREST LAKES AND RIVERS WITHIN UNROADED AREAS
4	WILDERNESS - TRAILLESS MANAGEMENT
5	WILDERNESS - TRAIL ASSOCIATED MANAGEMENT - PRIMITIVE
6	WILDERNESS - TRAIL ASSOCIATED MANAGEMENT - SEMI PRIMITIVE
7	WILDERNESS - TRAIL ASSOCIATED MANAGEMENT - TRANSITION
8	UTILITY CORRIDORS
9	ADMINISTRATIVE SITES - OTHER THAN UTILITY CORRIDORS
10	SPECIAL USES
11	ACRES IN ARTERIAL AND COLLECTOR ROADS AS OF 1984
12	BOTANICAL AREAS
13	EXPERIMENTAL FOREST
14	SIGNIFICANT CULTURAL SITES
15	UNROADED AREAS (EXISTING)
16	LANDS ACCESSIBLE BY ROADS

The "unroaded area" delineation indicates areas that would have to incur up-front road construction costs for access before any timber management activities could be scheduled in them. Unroaded areas have different roading costs based on slope and soil hazard conditions. Their delineation also facilitates the tracking of scheduled activities in unroaded areas.

Level 2

Level 2 is not used in this version of the Wenatchee model. This level was reserved for use in case the FORPLAN Coordinated Allocation Choice feature was used for geographic locators. Specific geographic areas such as Ranger Districts and watersheds were not used since yield coefficients available for this round of planning are not accurate to that level of detail.

Level 3

Level 3 provides the vegetative type identifier for each analysis area. These identifiers are important for predicting timber, forage, water, and sediment yields.

<u>LEVEL 3</u>	<u>VEGETATIVE TYPES</u>
1	NO ADDITIONAL VEGETATIVE TYPE SPECIFIED
2	NON-VEGETATED LANDS
3	VEGETATED NON-FOREST LANDS
4	FOREST LAND UNSUITABLE FOR TIMBER PRODUCTION
5	FOREST LAND - DRY MODEL COMPONENT
6	FOREST LAND - WET MODEL COMPONENT

Level 4

Level 4 provides the existing timber stand condition classification for lands tentatively suitable for timber production. This level describes the current status of both vegetated and nonvegetated lands. It is used primarily to identify which silvicultural systems and timing options were appropriate to consider on tentatively suitable and available forested lands. It also is used to help monitor the effects of alternative harvest schedules on the vegetative successional stages as related to wildlife habitat requirements.

<u>LEVEL 4</u>	<u>CONDITION CLASS</u>
1	NO ADDITIONAL CONDITION CLASS SPECIFIED
2	MATURE TIMBER STANDS - CFL
3	IMMATURE SINGLE STORY TIMBER STANDS - CFL
4	IMMATURE UNDERSTORY W/SCATTERED MATURE OVERSTORY TIMBER STANDS - CFL
5	SEEDLING AND SAPLING TIMBER STANDS - CFL
6	BARE GROUND AVAILABLE FOR REFORESTATION ACTIVITIES - CFL

Level 5

Level 5 provides three slope classifications and two soil hazard classifications for each analysis areas. Slope is included as an identifier due to it's effect on logging costs, sediment yields, wildlife and livestock AUM's, and costs and miles of road construction. Soil hazard influences sediment yields.

<u>LEVEL 5</u>	<u>SLOPE AND SOIL HAZARD</u>
1	NO ADDITIONAL SLOPE OR SOIL SPECIFIED
2	GENTLE SLOPE <40% - LOW TO MODERATE SOIL HAZARD
3	GENTLE SLOPE <40% - HIGH SOIL HAZARD
4	MODERATE SLOPE 40-60% - LOW TO MODERATE SOIL HAZARD
5	MODERATE SLOPE 40-60% - HIGH SOIL HAZARD
6	STEEP SLOPE >60% - LOW TO MODERATE SOIL HAZARD
7	STEEP SLOPE >60% - HIGH SOIL HAZARD

Level 6

Level 6 is not used in this version of the Wenatchee model. No further differentiation of land characteristics was needed.

Analysis areas used in the FORPLAN model are listed in Table B-III-1 Outputs and effects for the first 14 analysis areas were estimated outside of FORPLAN. These areas were subdivided as needed to estimate each output. They are also included in the FORPLAN model so that all net National Forest acres are accounted for.

**TABLE B-III-1
FORPLAN ANALYSIS AREAS**

ANALYSIS AREA	DESCRIPTION	ACRES
001	NATIONAL FOREST LAKES AND RIVERS WITHIN WILDERNESS	3,244
002	NATIONAL FOREST LAKES AND RIVERS WITHIN ROADED AREAS	7,123
003	NATIONAL FOREST LAKES AND RIVERS WITHIN UNROADED AREAS	657
004	WILDERNESS - TRAILLESS MANAGEMENT	724,095
005	WILDERNESS - TRAIL ASSOCIATED MANAGEMENT-PRIMITIVE	30,163
006	WILDERNESS - TRAIL ASSOCIATED MANAGEMENT-SEMI-PRIMITIVE	51,822
007	WILDERNESS - TRAIL ASSOCIATED MANAGEMENT - TRANSITION	31,710
008	UTILITY CORRIDORS	1,420
009	ADMINISTRATIVE SITES - OTHER THAN UTILITY CORRIDORS	106
010	SPECIAL USES	127
011	ACRES IN ARTERIAL AND COLLECTOR ROADS AS OF 1984	4,982
012	BOTANICAL AREAS	1,145
013	EXPERIMENTAL FOREST	4,770
014	SIGNIFICANT CULTURAL SITES	1,251
015	ROADED NONVEG OTHER GEN-LM	2,014
016	ROADED NONVEG OTHER GEN-HI	5,300
017	ROADED NONVEG OTHER MOD-LM	1,696
018	ROADED NONVEG OTHER MOD-HI	14,777
019	ROADED NONVEG OTHER STP-LM	5,152
020	ROADED NONVEG OTHER STP-HI	8,226
021	ROADED VEG-NF OTHER GEN-LM	1,463
022	ROADED VEG-NF OTHER GEN-HI	12,148
023	ROADED VEG-NF OTHER MOD-LM	6,551
024	ROADED VEG-NF OTHER MOD-HI	31,715
025	ROADED VEG-NF OTHER STP-LM	2,120
026	ROADED VEG-NF OTHER STP-HI	7,505
027	ROADED UNSUIT OTHER GEN-LM	4,410
028	ROADED UNSUIT OTHER GEN-HI	15,285
029	ROADED UNSUIT OTHER MOD-LM	9,052
030	ROADED UNSUIT OTHER MOD-HI	57,029
031	ROADED UNSUIT OTHER STP-LM	3,095
032	ROADED UNSUIT OTHER STP-HI	14,480
033	ROADED FORDRY MATURE GEN-LM	1,102
034	ROADED FORDRY MATURE GEN-HI	4,388
035	ROADED FORDRY MATURE MOD-LM	2,947
036	ROADED FORDRY MATURE MOD-HI	15,476
037	ROADED FORDRY MATURE STP-HI	3,328
038	ROADED FORDRY IM1STY GEN-LM	2,056
039	ROADED FORDRY IM1STY GEN-HI	12,339
040	ROADED FORDRY IM1STY MOD-LM	5,872
041	ROADED FORDRY IM1STY MOD-HI	40,450
042	ROADED FORDRY IM1STY STP-HI	8,416
043	ROADED FORDRY IM2STY GEN-LM	1,548
044	ROADED FORDRY IM2STY GEN-HI	13,717
045	ROADED FORDRY IM2STY MOD-LM	4,028
046	ROADED FORDRY IM2STY MOD-HI	42,655
047	ROADED FORDRY IM2STY STP-HI	12,593

TABLE B-III-1 (continued)
FORPLAN ANALYSIS AREAS

ANALYSIS AREA	DESCRIPTION	ACRES
048	ROADED FORDRY S&SAPS GEN-LM	1,548
049	ROADED FORDRY S&SAPS GEN-HI	3,286
050	ROADED FORDRY S&SAPS MOD-LM	6,169
051	ROADED FORDRY S&SAPS MOD-HI	35,765
052	ROADED FORDRY S&SAPS STP-HI	1,569
053	ROADED FORDRY BARGND GEN-HI	21
054	ROADED FORDRY BARGND MOD-HI	21
055	ROADED FORWET MATURE GEN-LM	3,032
056	ROADED FORWET MATURE GEN-HI	32,352
057	ROADED FORWET MATURE MOD-LM	4,812
058	ROADED FORWET MATURE MOD-HI	35,532
059	ROADED FORWET MATURE STP-HI	5,660
060	ROADED FORWET IM1STY GEN-LM	2,671
061	ROADED FORWET IM1STY GEN-HI	20,903
062	ROADED FORWET IM1STY MOD-LM	2,968
063	ROADED FORWET IM1STY MOD-HI	35,341
064	ROADED FORWET IM1STY STP-HI	3,032
065	ROADED FORWET IM2STY GEN-LM	2,883
066	ROADED FORWET IM2STY GEN-HI	22,939
067	ROADED FORWET IM2STY MOD-LM	3,774
068	ROADED FORWET IM2STY MOD-HI	41,913
069	ROADED FORWET IM2STY STP-HI	6,424
070	ROADED FORWET S&SAPS GEN-LM	1,696
071	ROADED FORWET S&SAPS GEN-HI	14,098
072	ROADED FORWET S&SAPS MOD-LM	5,130
073	ROADED FORWET S&SAPS MOD-HI	25,546
074	ROADED FORWET S&SAPS STP-HI	2,141
075	ROADED FORWET BARGND GEN-HI	21
076	ROADED FORWET BARGND MOD-HI	21
077	UNROAD NONVEG OTHER GEN-LM	382
078	UNROAD NONVEG OTHER GEN-HI	1,738
079	UNROAD NONVEG OTHER MOD-LM	4,664
080	UNROAD NONVEG OTHER MOD-HI	41,319
081	UNROAD NONVEG OTHER STP-LM	10,939
082	UNROAD NONVEG OTHER STP-HI	57,050
083	UNROAD VEG-NF OTHER GEN-LM	615
084	UNROAD VEG-NF OTHER GEN-HI	2,480
085	UNROAD VEG-NF OTHER MOD-LM	1,569
086	UNROAD VEG-NF OTHER MOD-HI	14,162
087	UNROAD VEG-NF OTHER STP-LM	3,837
088	UNROAD VEG-NF OTHER STP-HI	19,971
089	UNROAD UNSUIT OTHER GEN-LM	1,208
090	UNROAD UNSUIT OTHER GEN-HI	6,063
091	UNROAD UNSUIT OTHER MOD-LM	10,812
092	UNROAD UNSUIT OTHER MOD-HI	67,798
093	UNROAD UNSUIT OTHER STP-LM	7,017
094	UNROAD UNSUIT OTHER STP-HI	54,209

TABLE B-III-1 (continued)
FORPLAN ANALYSIS AREAS

ANALYSIS AREA	DESCRIPTION	ACRES
095	UNROAD FORDRY MATURE GEN-HI	933
096	UNROAD FORDRY MATURE MOD-LM	1,717
097	UNROAD FORDRY MATURE MOD-HI	14,777
098	UNROAD FORDRY MATURE STP-HI	2,417
099	UNROAD FORDRY IM1STY GEN-HI	678
100	UNROAD FORDRY IM1STY MOD-LM	954
101	UNROAD FORDRY IM1STY MOD-HI	12,874
102	UNROAD FORDRY IM1STY MOD-HI	3,392
103	UNROAD FORDRY IM1STY GEN-HI	1,230
104	UNROAD FORDRY IM2STY MOD-LM	1,781
105	UNROAD FORDRY IM2STY MOD-HI	19,907
106	UNROAD FORDRY IM2STY STP-HI	3,646
107	UNROAD FORDRY S&SAPS GEN-HI	615
108	UNROAD FORDRY S&SAPS MOD-HI	10,155
109	UNROAD FORDRY S&SAPS STP-HI	509
110	UNROAD FORWET MATURE GEN-LM	1,526
111	UNROAD FORWET MATURE GEN-HI	17,151
112	UNROAD FORWET MATURE MOD-LM	9,731
113	UNROAD FORWET MATURE MOD-HI	64,809
114	UNROAD FORWET MATURE STP-HI	11,618
115	UNROAD FORWET IM1STY GEN-LM	996
116	UNROAD FORWET IM1STY GEN-HI	5,894
117	UNROAD FORWET IM1STY MOD-LM	5,745
118	UNROAD FORWET IM1STY MOD-HI	46,301
119	UNROAD FORWET IM1STY STP-HI	6,954
120	UNROAD FORWET IM2STY GEN-LM	996
121	UNROAD FORWET IM2STY GEN-HI	4,982
122	UNROAD FORWET IM2STY MOD-LM	3,795
123	UNROAD FORWET IM2STY MOD-HI	30,655
124	UNROAD FORWET IM2STY STP-HI	4,282
125	UNROAD FORWET S&SAPS GEN-HI	1,251
126	UNROAD FORWET S&SAPS MOD-LM	1,145
127	UNROAD FORWET S&SAPS MOD-HI	5,724
128	UNROAD FORWET S&SAPS STP-HI	657
129	UNROAD FORWET BARGND GEN-HI	382
130	UNROAD FORWET BARGND MOD-HI	1,378

Major factors which affected the delineation of analysis areas are summarized below.

1. Economic Factors

Timber working groups are composed of different mixes of species. Values vary by species. Splitting the tentatively suitable timber lands into two working groups allowed more specific values to be used. A more detailed split was not feasible due to the stratification of the timber inventory used.

An important function of slope class identifiers is to reflect cost differences. Logging costs are strongly influenced by slope due to its influence on the type of logging system used. Road construction costs vary significantly between slope classes.

2. Inventory and Data Reliability

Greater geographic specificity was not included in the analysis areas due partially to a lack of site specific data. Forest-wide yield coefficients were all that was available for many resources. It is important to have specific differences in coefficients between analysis areas. Otherwise an element of randomness is introduced into model linear programming solutions which can make interpretation difficult.

Timber vegetative types could not be stratified in greater detail due to the location of sample plots. A third vegetative type consisting of lodgepole pine and mountain hemlock was desired but only one inventory plot would have been located in this vegetative type. Approximately 5,000 acres of lodgepole pine and mountain hemlock was combined with the forest-wet vegetative type.

3. Computer Model Characteristics

The FORPLAN software placed no limitations on analysis area delineation. The Forest did not even approach the software limitations. The cost of processing FORPLAN on the USDA's Fort Collins Computer Center did influence analysis area delineation. Analysis areas of less than 1,000 acres were aggregated with other analysis areas with similar characteristics when possible.

A model size which allowed fairly quick computer turn-around time and reasonable cost was considered an advantage in being able to do more analysis within a given timeframe and budget. A small enough model to allow clear comprehension and analysis was also desired.

4. Reporting Needs

The roaded versus unroaded analysis area split is in response to the issue of roadless area management as well as to reflect cost differences. The working group and slope classes allow easier ties back to the ground.

5. Legal or Policy Constraints

Analysis area delineation was not influenced by legal or policy constraints.

6 Spatial versus Biological Factors

The analysis areas were considered to be the minimum necessary to reflect biological and economic factors which strongly influenced allocation and scheduling decisions. The addition of additional spatial information would have greatly increased model size and cost. The necessary data to reflect many spatial relationships was also not available.

D. Identification of Prescriptions

1. Overview

National Forest Management Act regulations define management prescriptions as “management practices selected and scheduled for application on a specific area to attain multiple use and other goals and objectives” (36 CFR 219.3). They consist of a goal statement which establishes the purpose of the prescription, and a compatible set of management practices designed to develop and/or protect some combination of resources and create or perpetuate a desired condition. They were constructed within the requirements specified in 36 CFR 219.27, which guide the development, analysis, approval, implementation, monitoring and evaluation of Forest Plans with regard to resource protection, vegetative manipulation, silvicultural practices, even-aged management, riparian areas, soil, water, and diversity.

The process of identifying and subsequently developing management prescriptions began with an Interdisciplinary Team review of the issues, concerns, and opportunities (ICO’s). Prescriptions were then identified which would help address those ICO’s which were related to decisions regarding standards and guidelines, scheduling, or land allocations. There were other ICO’s which were to be addressed through policy statements for which it was not appropriate to develop prescriptions.

Once the need and purpose for certain types of prescriptions was identified, goal statements for each management prescription were designed to respond to the questions raised by the ICO’s. The Interdisciplinary Team then used professional judgment, evaluated existing policy, legislative direction, and research for guidance in developing multiple use management prescriptions. Regional Office and Ranger District personnel, representatives from other agencies, and interested members of the public participated in this process. The resulting management prescriptions then received thorough review, with some modification, by the Forest Management Team.

The resulting set of prescriptions represents a broad range of resource management emphases, practices, and capital investment levels. Forest-wide standards and guidelines were also developed by the Interdisciplinary Team and Management Team to cover practices common to all prescriptions and resource management situations that are Forest-wide in scope.

In addition to addressing issues, concerns, and opportunities, the process of designing management prescriptions was also guided by the following criteria: (1) prescriptions should be achievable and contain realistic practices, (2) they are to be general enough to accommodate the variable site specific conditions on the ground, (3) they should be specific enough for the Interdisciplinary Team to develop accurate resource and economic output and effects coefficients, and (4) to the extent practical, they should be the most cost effective means of achieving the intent of the prescription.

Each management prescription developed by the Interdisciplinary Team was modeled in FORPLAN. Analysis areas were screened to determine which were appropriate to be managed under each prescription. The full range of prescriptions was available to most analysis areas, with the exception of specially designated areas and their prescriptions such as wilderness or administrative sites. FORPLAN was then used to evaluate the implications of alternative land allocation and scheduling choices.

Prescriptions were not developed for Alternative NC according to criteria in 36 CFR 219.11 and 36 CFR 219.27. Five classifications were used in the 1969 Naches-Tieton and 1963 Wenatchee Timber Management Plans. They corresponded with appropriate classifications in District Multiple Use Plans.

Industrial. Lands managed under “standard” rotations that have “a reasonable probability of demand under the accessibility and economic conditions projected for the plan period” and that “can be logged under the contract constraints necessary to protect the resource.”

Modified. Lands that should receive special attention mainly because of landscape management considerations. This component is divided into two classes:

Modified-Full Yield. Areas which require constraints on harvest associated with higher costs, but where full yield will occur.

Modified-Partial Yield. Areas which require constraints on harvest operations that will reduce per acre yields or lengthen rotations. For the 1969 Naches-Tieton Timber Management Plan, Modified-Partial Yield produced 50 percent of industrial yield volumes. The Wenatchee Timber Management Plan used estimated gross annual growth of 131 board feet per acre for landscape management areas.

Marginal. Areas where harvesting is silviculturally desirable but that has a low probability of being purchased. Lodgepole pine and commercial thinnings were placed in the Marginal component on the Wenatchee Working Circle. This cut component was not used on the Naches-Tieton Working Circle.

Deferred. The areas where harvesting is precluded pending legislation.

Unregulated. Areas where unscheduled harvest is permitted such as recreation sites, administrative areas, or experimental forests. Also included is material that does not meet utilization standards and presently economically inoperable areas.

2. Purpose, Criteria, and Assumptions

The activities composing each prescription represent the most cost efficient means of achieving the goals of the prescription. The use of cost efficient prescriptions in combination with maximizing present net value as an objective of FORPLAN, contributes to cost efficient alternatives. Each prescription, including standards and guidelines, and activity statements, is found in the Forest Plan. A detailed examination of prescriptions by analysis area can be found in the planning records at the Forest Supervisor's Office. The prescriptions are summarized below.

a. EF-1 (Experimental Forest)

GOAL STATEMENT: Provide opportunities to study the effects of Forest management and fire on vegetative, soil, and water resources occurring on the east side of the Cascade Mountains. Maintain the area in a form that will not compromise the opportunities for research.

DESCRIPTION: The Entiat Experimental Forest was designated under the authority of the Chief of the Forest Service in 1970. Burned by wildfire in 1970, and rehabilitated and reforested in subsequent years, the area has been the subject of numerous scientific investigations. Currently the Experimental Forest is being managed for a wide range of multiple uses in coordination with the Forestry Sciences Laboratory in Wenatchee. Periodic monitoring will occur until vegetation reaches such a size as to have a significant effect on water production. New studies will be initiated at that time.

Objectives following the Entiat Burn in August 1970 were to study the effects of fire on complete hydrologic units.

b. EW-1

GOAL STATEMENT: Manage deer and elk winter range to meet habitat requirements for sustaining optimum carrying capacity.

DESCRIPTION: Deer and elk winter ranges are generally on the edge of the Forest, adjacent to or intermingled with, other land ownerships, at low elevations, south and/or east facing slopes with reduced snow depth and early melt-off of snow. Because of these conditions these areas are highly desired for winter and/or early spring recreation activities and dry out early to become high fire danger areas. These habitats have openings covering 10 to 60 percent of the area (used by big game for foraging), containing shrubs, grasses, and forbs with scattered conifer trees, and 20 to 80 percent covered by conifer stands (used by big game for cover). The quality of the forage and the amount of thermal cover combined with the amount of human disturbance are the factors that determine the carrying capacity of these areas for big game in winter.

c. EW-2

GOAL STATEMENT: Maintain and enhance riparian management areas to perpetuate their distinctive resource values to (a) achieve and maintain habitat conditions necessary to maximize long-term natural production opportunities for desired fish species, (b) maintain water quality that meets or exceeds State Standards and (c) provide diverse wildlife habitat.

DESCRIPTION: This prescription applies to the land and vegetation adjacent to fish bearing streams, lakes and wetlands. The Riparian Management Area (RMA) shall correspond to at least the recognizable area dominated by riparian vegetation (true Riparian Zone) and sufficient upland area (influence area) to assure adequate protection to achieve riparian management objectives and standards. The minimum area of consideration is 100 feet horizontal distance from both the ordinary high water line associated with banks of fish bearing streams and the perimeter of lakes and wetlands.

Riparian Management Area boundaries and specific riparian management objectives will be established for all projects within an RMA. Riparian management objectives will be established based upon analysis of RMA habitat conditions, objectives and standards both within the sub-drainage (generally 1,000-10,000 acres) and at the project site.

Within Riparian Management Areas, management decisions will be made in favor of riparian dependent resources (water quality, fish and wildlife habitat) when conflicts exist with man's use.

Refer to the Forest-wide Standards and Guidelines for Riparian Areas for overall direction on the planning and administration of management activities in RMAs. The interim quantitative standards applicable to EW-2 are also listed under the heading RIPARIAN in the following prescription, along with some of the operational considerations associated with the standards (under "MANAGEMENT PRACTICE"). Refer to the "Administration" section in the Forest-wide Standards and Guidelines for Riparian Areas for a discussion of the use and refinement of these interim standards.

d. EW-3

GOAL STATEMENT: Manage deer, elk, and mountain goat winter range and key summer range to meet habitat requirements for sustaining optimum carrying capacity in an unroaded setting.

DESCRIPTION: Deer and elk winter ranges are generally at low elevations, on south and/or east facing slopes with reduced snow depth and early melt-off of snow. Because of these conditions, these areas are highly desirable for winter and early spring recreation activities, and dry out early to become high fire danger areas. These habitats have 10-60 percent of the area in openings (used by big game for foraging)

containing shrubs, grasses, and forbs with scattered conifer trees, and 20-80 percent of the area in conifer stands (used by big game for cover). The quality of the forage and the amount of thermal cover combined with the amount of human disturbance are the factors that determine the carrying capacity of these areas for big game in winter. Mountain goat summer and winter ranges are generally adjacent to each other at high elevations, well within the Forest, and just above and below the line separating suitable and unsuitable timber harvesting stands. Summer range consists of dense stands of old conifer trees intermingled with small meadows that provide food and shelter. Winter range consists of open, steep, rocky ridges with grasses, forbs, and shrubs dominating a landscape containing scattered conifer trees. Human activity, reductions in winter habitat, and lack of quality forage in summer range limit the populations of mountain goats.

e. GF (General Forest)

GOAL STATEMENT: Provide for the greatest long-term growth and production of commercially valuable wood products at a level of investment in timber cultural practices that maximizes net public benefits.

DESCRIPTION: Future stands will vary from intensive timber management typified by regular spacing, relatively even age and height, to those that are similar to natural stands. Regenerated stands will have a high ratio of genetically superior stock and may receive cultural treatments throughout the rotation. The cultural practices will be determined on a site specific basis depending on the biological and economic conditions of the stand. Regeneration harvest will generally occur at culmination of mean annual increment. Logging will be by the most economical methods compatible with silvicultural requirements, soil and water standards and landform. Road densities and standards would also be dependent upon these conditions. In the General Forest area, the relative intensity of management is set by the Forest Plan. However, site specific details and locations of treatments will be determined in the prescription written or field reviewed by a certified silviculturist.

e. MP-1

GOAL STATEMENT: Manage area to maintain and enhance its outstanding scenic and recreation qualities.

DESCRIPTION: This is an area classified by executive order, encompassing a zone extending 1/2 mile either side of U.S. Highway 410, to be managed primarily for scenic and recreational purposes. Developments and management activities within the allocation generally are not visually evident. The natural existing or established landscape will generally have vegetation on forested lands that is composed of large old growth trees in the overstory or in groves intermixed with a variety of age classes in the understory. The general perception of the landscape is a natural appearing environment. Motorized use is permitted within these areas to the extent it is compatible with the management intent.

f. OG-1

GOAL: Manage for old growth habitat to achieve "ecosystem diversity, preservation of aesthetic qualities", and/or "wildlife and plant habitat".

DESCRIPTION: The Regional Guide for the Pacific Northwest Region directs all Forests to use a standard definition of old growth. Following are the descriptions of the characteristics needed to meet the requirements of this prescription.

1. **ECOSYSTEM DIVERSITY:** Ecosystem diversity is a representation of the variety that exists in biotic communities and is characterized by the number of species on a site and by the number of communities at all sites. The variety of management prescriptions will provide many and varied stand conditions and species, helping to maintain ecosystem diversity in managed, younger stands. However, enough of all types of old growth are required to maintain species dependent on old growth and preserve the various kinds of old growth communities found on the Forest.

2. **PRESERVATION OF AESTHETIC QUALITIES:** People using the forest for recreation purposes enjoy old growth trees for their aesthetic and awe-inspiring qualities. Old trees represent a living link with the past and provide an important visual reference to the natural successional process of the forest environment.

Old growth stands are typically thought of as having an atmosphere that is peaceful, cathedral-like, and park-like or an atmosphere of being small, closed in, dominated and encompassed. The stand feels cool and refreshing, and smells musty from the decaying vegetation (rotting logs, snags, fruiting bodies of fungus and underbrush). The trees have deep furrowed bark, large diameters at the base of the tree (generally 21" in diameter or larger), tall and straight boles, (over 100 feet tall) rotten cracks, broken limbs, mosses, lichens, and rounded tops that create the illusion of being old.

3. **WILDLIFE AND PLANT HABITAT:** The indicator species for old growth and mature habitat is the spotted owl. Habitat for spotted owls includes mature and overmature trees dominant in the overstory, a multi-layered canopy, trees of several age classes, large amounts of standing dead trees and down material present, canopy crown closure of 45 percent or greater, and elevations between 1500 and 5000 feet

The 2200 acres (more or less depending upon local circumstances) of suitable habitat may be contiguous, or scattered over a area of about 9000 acres. There is usually unsuitable habitat (either naturally occurring or from harvest) intermingled with the suitable habitat. It is common to find logging activities next to suitable spotted owl habitat. Road use and recreation activities will often be taking place within the habitat site.

Maintenance of reproduction of spotted owls is of high concern. Therefore, activities that may affect reproduction will be limited.

g. OG-2

GOAL STATEMENT: Manage for mature to old growth habitat for wildlife and plant species dependent upon this habitat.

DESCRIPTION: The indicator species for this prescription are the marten/northern three-toed woodpecker and pileated woodpecker. These indicators plus the spotted owl are designed to provide a mature and old growth network. The network is to provide habitat for all species dependent upon mature or old growth habitat. The habitat for the marten/northern three-toed woodpecker and pileated woodpecker is described as mature or overmature trees in the overstory, a multi-layered canopy of trees in several age classes, large amounts of dead standing and down trees present, and a canopy closure of 45 percent or greater. Habitat for marten/northern three-toed woodpeckers is at elevations of about 2000 to 7000 feet, and for the pileated woodpecker, about 1500 to 5000 feet in elevation.

The marten/northern three-toed woodpecker habitat is a 160 acre contiguous habitat. One site will be found every 4000 to 5000 acres and it will be overlapped with spotted owl and pileated woodpecker sites when possible. An additional 160 acres of habitat is needed for developing future marten/northern three-toed woodpecker habitat. This additional acreage may be in any successional stages. The location of the 160 acres of mature habitat will change through time in the 320 acre site.

The pileated woodpecker habitat is 300 acres, made of stands of no less than 50 acres within a 1000 acre area. One site will be found every 12,000 acres and these sites should be overlapped with spotted owls when possible. An additional 300 acres of habitat is needed for pileated woodpecker sites that may be in any successional stage but must have a high number of snags to provide food. The location of the 300 acres of mature habitat will change through time in the 600 acre site.

h. RE-1

GOAL STATEMENT: Provide developed recreation in an Urban to Semi-Primitive Recreation Opportunity Spectrum (ROS) setting.

DESCRIPTION: This prescription is applicable to existing and potential developed recreation sites within the full spectrum of ROS settings. The areas allocated to this use include only the specific site on which development takes place. This prescription is also applicable to existing and potential Alpine (downhill) ski areas including runs, tows or lift facilities, shelters, lodges, services and parking lots. Associated developments such as skating rinks, toboggan runs, etc., may also be present. Potential sites allocated to this prescription will be managed to protect or enhance the future values and conditions desired.

i. RE-2

GOAL STATEMENT: Provide dispersed, unroaded recreation in a semi-primitive motorized recreation opportunity setting.

DESCRIPTION: This prescription is for application to unroaded areas in which trails are evident and maintained for the following types of uses:

RE-2A. Areas having existing or potential trails for motorbikes, hikers and horseback riders.

RE-2B. Areas having existing or potential 4x4 routes in addition to trails for motorbikes, hikers and horseback riders.

They are generally located in a natural appearing landscape setting. Winter motorized use is permitted where appropriate.

j. RE-3

GOAL STATEMENT: Provide dispersed recreation in an unroaded, semi-primitive, non-motorized or primitive setting.

DESCRIPTION: This prescription is for application to unroaded areas in which trails are evident and maintained for non-motorized users. Landscape changes are generally not evident to those walking through the area. The area is essentially a natural or natural appearing environment. There is little evidence on-site of other users.

k. RE-4

GOAL STATEMENT: Provide for dispersed recreation, as well as long-term growth and production of commercially valuable wood products at a very low level of investment in timber cultural practices while maintaining the unroaded characteristics.

DESCRIPTION: *Approximately 90 percent of future stands would come from natural regeneration. The remaining 10 percent would be regenerated by planting, after failure of natural regeneration to establish the stand. No stand improvements are planned between regeneration and harvest, future stands will closely resemble unmanaged conditions and will be typified by a tendency towards small irregularly spaced groups. Stands will generally have poor crown ratios and a wide range of age and height. Mortality due to tree competition, disease, and insects can be expected. Logging will generally be by aerial system to protect the unroaded characteristics of the area. Roads will not be constructed, except to protect adjacent resources.*

l. **RM-1**

GOAL STATEMENT: Provide for maximum forage production and utilization by commercial livestock with a high level of investment in range cultural practices.

DESCRIPTION: Management seeks to optimize production and utilization of forage allocated for livestock use consistent with maintaining the environment and providing for multiple use of the range. Cultural practices such as brush control or seeding may be combined with fencing and water developments to implement complex grazing systems.

m. **RN-1**

GOAL STATEMENT: Provide for; (1) Preservation of examples of all significant natural Ecosystems for comparison with the influenced by man, (2) educational research areas for ecological and environmental studies, and (3) preservation of gene pools for typical and rare and endangered plants and animals.

DESCRIPTION: Research Natural Areas (RNA) contain either examples of typical natural ecosystems or unique kinds of vegetation, animals, and land which are reserved for scientific and educational use. This use is restricted to non-manipulative and non-destructive research. On the Wenatchee National Forest there are two established RNAs: Meeks Table and Thompson Clover. Two additional areas have been studied and are candidates for addition to the system. They are: Fish Lake, a marsh-bog community, and Eldorado Creek, a montane serpentine community. Several new areas on the Forest are candidates as Research Natural areas to meet regional cell (ecosystem) needs. A Research Natural Area establishment report will be prepared for each recommended area when the Forest Plan is implemented. These reports will describe the boundaries of the areas. Until the reports are signed by the Chief of the Forest Service, the areas designated in this Plan are recommendations. They will be managed to maintain their suitability as RNAs.

n. **SI-1**

GOAL STATEMENT: Manage Special Areas for recreation use, substantially in their natural conditions.

DESCRIPTION: These areas are classified under 36 CFR 294.1 and managed for recreation use substantially in their natural condition. The purpose of classifying these areas is to protect the natural beauty and, where appropriate, foster public use and enjoyment of the feature or environment (scenic areas possess outstanding or unique natural beauty). They occupy large areas of land where some multiple use activities may be compatible. Motorized use is permitted within these areas to the extent it is compatible with the management intent. Developments such as resorts, parking areas, campgrounds, etc., are located outside of the Special Area whenever possible.

o. SI-2

GOAL STATEMENT: Manage areas of significant cultural, geological, botanical, zoological, paleontological, or other special characteristics so as to protect, preserve, and enhance their intrinsic values.

DESCRIPTION: Special Interest Areas are classified under 36 CFR 294.1 and managed for recreation use substantially in their natural condition. The purpose of classifying these areas is to protect, and where appropriate, foster public use and enjoyment of the feature or environment. This prescription includes the following:

- Cultural-Historic Area Lands possessing prehistoric or historical sites, buildings, or objects of National Register significance or having special cultural associations to the American Indian community.
- Geologic Area Lands having unique geologic features of the earth's development including caves and fossils.
- Botanical Area Lands containing specimens or group exhibits of plants, plant groups, and plant communities which are significant because of form, color occurrence, habitat location, life history, arrangement ecology, environment, rarity and/or other features.
- Zoological Area Those lands having authentic, significant and interesting evidence of our American National heritage as it pertains to fauna. The areas are meaningful because they embrace animals, animal groups, or animal communities which are natural and important because of occurrence, habitat, location, life history, ecology, environment, rarity or other features.
- Paleontological Areas Areas containing relic specimens of fauna and flora. These are the plant and animals (non-human) that span geologic time between periods when life first appeared on earth and the age of man. Significant specimens may include Precambrian rocks; shellfish, early vertebrates, coal swamp forest; early reptiles, dinosaurs; and Cenozoic mammals.

Management of these areas is aimed at preserving the features and environment of the area to be classified. Developments such as resorts, parking areas, campgrounds, etc., are located outside the special interest area whenever possible.

p. ST-1

GOAL STATEMENT: To retain or enhance the viewing and recreation experiences along scenic travel routes.

DESCRIPTION: Development and permitted uses will meet the "Retention" Visual Quality Objective in foreground and middleground areas viewed from developed recreation sites and designated roads and trails. Developments and management activities within the allocation generally are not visually evident. The natural existing or established landscape will generally have vegetation on forested lands that is composed of large old growth trees in the overstory or in groves intermixed with a variety of age classes in the understory. The general perception of the landscape is a natural appearing environment.

q. ST-2

GOAL STATEMENT: Provide a natural appearing foreground and middleground along scenic travel corridors.

DESCRIPTION: Development and permitted uses will meet the "Partial Retention" Visual Quality Objective in the foreground and middleground viewed from developed recreation sites and designated roads and trails. The foreground of the main use routes will generally have vegetation that is composed

of some large trees in the overstory or in groves intermixed with a variety of age classes in the understory. The middleground viewed areas from the main travel routes will generally have the perception of a natural appearing environment. The proposed uses and vegetation management within the allocation will be integrated with the natural landscape so that activities are visually subordinate to the characteristic landscape.

r. UC-1 (Utility Corridors)

GOAL STATEMENT: Provide and manage utility corridors to accommodate energy transmission needs.

DESCRIPTION: This prescription is applicable to existing and potential utility and transmission corridors. It includes the land directly under and adjacent to the pipeline or powerline facility (clearing limits). Compatible facilities are combined in the same corridor whenever possible. Resource uses, such as grazing, and dispersed recreation activities, such as camping, mushroom and berry picking, Christmas tree cutting, etc., may be compatible in some areas.

s. WI-1

GOAL STATEMENT: Preserve and protect the natural character for future generations, and provide opportunities for solitude, challenge, inspiration, and scientific study.

DESCRIPTION: This prescription is for application to the following Wildernesses: Alpine Lakes, Chelan-Sawtooth, Glacier Peak, Henry M. Jackson, Norse Peak, William O. Douglas, and Goat Rocks. Also, refer to the Alpine Lakes Area Management Plan for specific direction for the Alpine Lakes Wilderness.

Each wilderness is delineated into four wilderness Recreation opportunity classes. These classes are Pristine, Primitive, semi-primitive and transition. Each class represents a specific physical, biological, social and managerial setting and degree of isolation and solitude that can be experienced. Experiences range from the maximum solitude and freedom found in the Pristine Class to the more human impacted acres near wilderness boundaries and trailheads that are classified transition.

t. WS-1

GOAL STATEMENT: Preserve the Scenic River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

DESCRIPTION: This prescription is for application to those river segments on the Forest that are free of impoundments, and have largely primitive watersheds or shorelines but are accessible by road in places.

u. WS-2

GOAL STATEMENT: Preserve the Recreational River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

DESCRIPTION: This prescription is for application to those river segments on the Forest that are readily accessible by road or railroad, may have some development along their shorelines, and may have undergone some impoundment or diversion in the past.

GOAL STATEMENT: Preserve the Wild River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

DESCRIPTION: This prescription is applicable to those river segments that are free of impoundments and generally inaccessible except by trail, with watersheds or shoreline essentially primitive and waters unpolluted. These represent vestiges of primitive America.

E. Development of Timber Options

Timber harvest options and management intensities were developed to: (1) Portray a range of investment levels and silvicultural treatments that are technologically feasible and sound for each vegetative type and condition class; and (2) to evaluate the yield and economic consequences utilizing the FORPLAN model.

A range of silvicultural prescriptions was developed and analyzed for each vegetative type and management prescription combination. This included the development of both empirical and managed yield tables. Once the management prescriptions were identified which were needed to address issues, concerns, and opportunities, the Interdisciplinary Team determined which of them could have their objectives achieved through scheduled (regulated) timber harvesting.

Based on an analysis of the Continuous Forest Inventory (CFI) plot data, forested areas were stratified according to their existing inventory characteristics. Empirical yield tables are used to portray alternative silvicultural treatment options for existing mature sawtimber stands, immature two-storied stands, and immature pole stands. The silvicultural prescriptions, and their associated yield tables as developed, are based on regression analyses of the CFI plot data plus professional judgment. As would be expected, the older the stand, the fewer the silvicultural options that are realistically available to manage it. Managed yield tables were developed for existing seedling/sapling stands and future managed stands using a growth simulation model.

Once the vegetative management objectives were identified for each management area, the appropriate Interdisciplinary Team members worked together to develop a range of harvest scheduling options. The overriding criterion in this process was that the silvicultural prescription and its associated yield table achieve the vegetative management objectives of the management prescription in a cost-efficient manner.

FORPLAN prescriptions are identified and described in terms of "management emphasis" and "management intensity." In most cases, the management emphasis name in FORPLAN is the same as the management prescription name used in the FEIS and Forest Plan. For example, ST-1 (Scenic Travel Retention) is the name of a management prescription and a FORPLAN management emphasis.

FORPLAN timber management options were developed for every combination of management prescriptions which called for scheduled harvesting and analysis areas which contained tentatively suitable acres. For each prescription, the several timing combination of choices were available to implement various practices. Also, for each management emphasis and analysis area that allowed timber harvesting, an option was available which called for no programmed harvest.

The silvicultural options that were developed for each of the management emphasis are referred to as "management intensities" in FORPLAN. They reflect different combinations of practices. In essence, they represent alternative investment levels in timber management to achieve the objectives of a management prescription.

A range of timing choices, rotation ages, and investment levels was developed for regenerated stands and existing seedling/sapling stands. The growth Prognosis Model (Wykoff and others 1981) was utilized to predict timber yields for various silvicultural systems and intensities for each combination of vegetative type and condition class.

The management intensities developed for General Forest management emphases evolve from three basic silvicultural schemes:

Extensive: Following satisfactory reforestation, no further treatment would be planned until final harvest [GF-4 (clearcut) and GF-6 (shelterwood)].

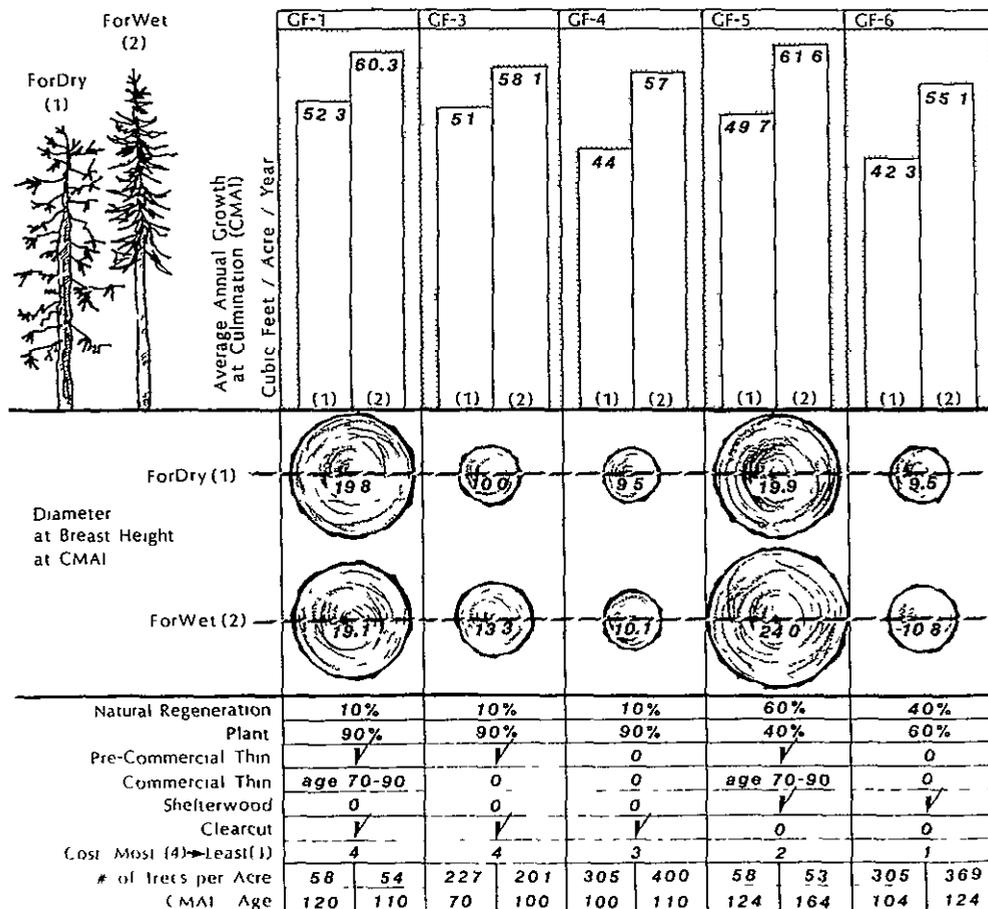
Moderate Intensity: Following satisfactory reforestation, stands would be precommercially thinned or weeded as needed to achieve early stocking level control; then no further treatment would be planned until final harvest [GF-3 (clearcut)].

Intensive: Management practices would include all reforestation treatments, removal of overtopping or severely competing brush or grass, precommercial thinning, and commercial thinning as needed to cost efficiently optimize timber production [GF-1 (clearcut) and GF-5 (shelterwood)].

Commercial thinning without prior precommercial thinning (originally labeled as GF-2) was investigated but was not among the options available for FORPLAN because of low yield, high cost, and operational problems. Stands would not reach an adequate size for commercial thinning in a reasonable time period without prior stocking control by precommercial thinning.

Figure B-III-1 depicts the General Forest Prescription timber regimes.

FIGURE B-III-1



Timber options for Alternative NC were developed in the 1963 and 1969 Timber Management Plans. They differ considerably from options developed for all other alternatives. Timber options for Alternative NC are very broadly described for specific treatments such as reforestation or timber stand improvement.

Management emphases other than General Forest were restricted to silvicultural regimes designed to achieve specific resource objectives such as wildlife habitat or scenic viewsheds.

The Intensive Range Management (RM-1) Prescription assumes the same silvicultural practices as GF-1, but with a 10 year regeneration lag. Three extended-rotation timber yield regimes were developed for use with the following prescriptions:

Prescription

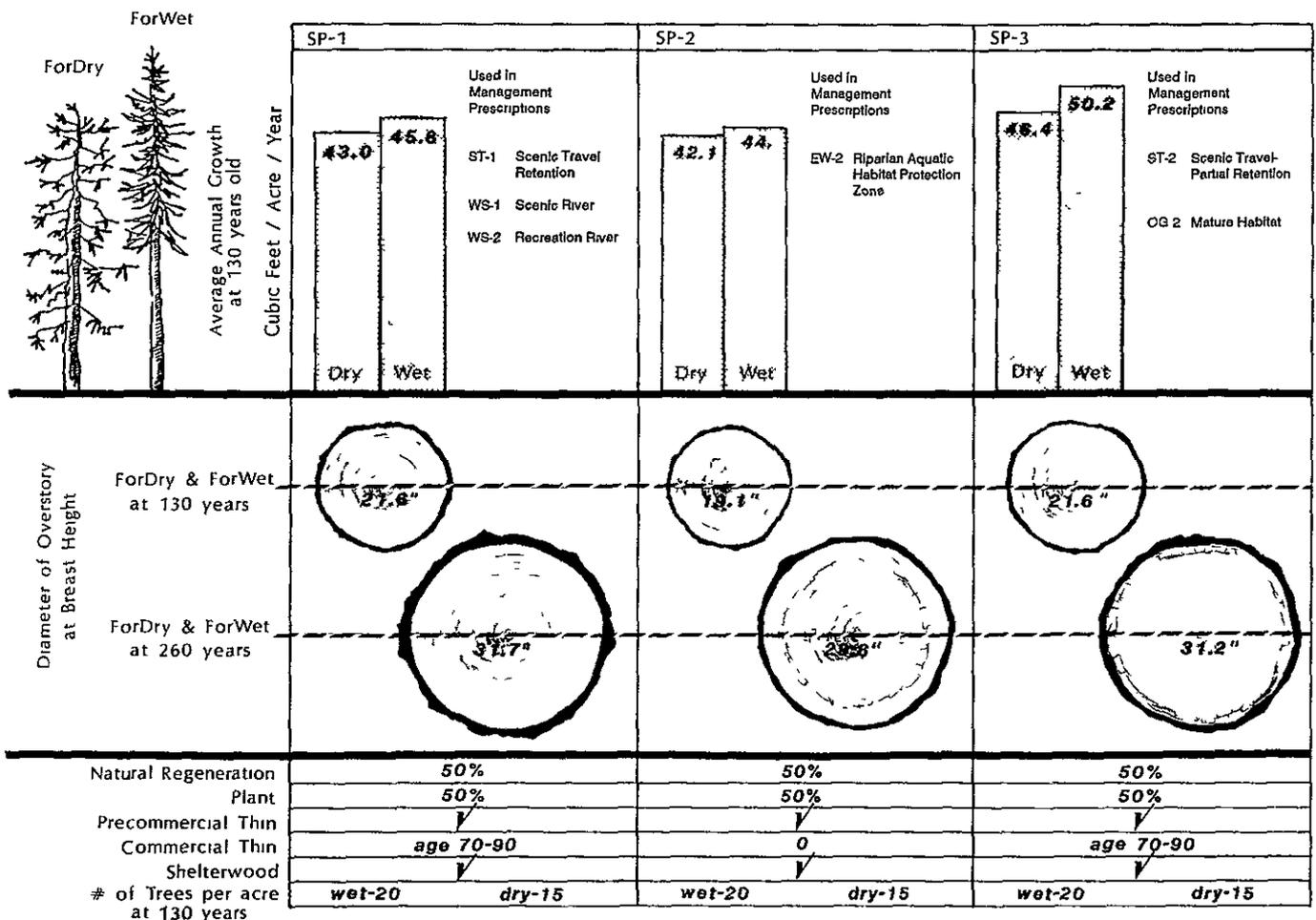
- Key Deer and Elk Habitat (EW-1)
- Riparian-Aquatic Habitat Protection Zone (EW-2)
- Old-Growth Dependent Species (OG-2)
- Scenic Travel-Retention (ST-1)
- Scenic Travel-Partial Retention (ST-2)
- Scenic River (WS-1)
- Recreational River (WS-2)

Yield Table

- RM-1(wet sites)
- SP-2
- SP-1
- SP-1
- SP-3
- SP-1
- SP-1

Figure B-III-2 depicts the extended-rotation timber yield regimes.

FIGURE B-III-2



A wide range of timing options for implementing silvicultural activities was available under the General Forest and Range Management Prescriptions so that harvest scheduling was not limited by a lack of available options. Stands could be regeneration harvested at any point from the period in which they reached culmination of mean annual increment (CMAI) through the end of the modeling horizon. Commercial thinning, if appropriate, could occur as soon as the minimum volume of economically feasible merchantable trees existed. The last entry age for commercial thinning was generally two decades prior to culmination of mean annual increment. Other management prescriptions had more restrictive timing options in order to meet other resource objectives. However, several timing choices were available for these prescriptions to reduce scheduling inflexibility.

As part of the benchmark analysis, rotations were also identified at the ages when stands first reach the minimum merchantability standards. These rotations were used to analyze the constraint of not harvesting prior to stands reaching 95 percent of CMAI.

Each of the management intensities include all management practices necessary to establish future stands; i.e., site preparation, animal control, reforestation (planting and natural), and release.

A list and brief description of the management intensities for timber harvesting emphases used in FORPLAN follows. A legend is presented first for clarification.

LEGEND:

FH	Final regeneration timber harvest
PLT	Reforest by planting and natural.
PCT	Stocking level control by precommercial thinning and release of competing vegetation
CT	Stocking level control by one or more commercial thinnings.
EXT. ROTATION	Extended rotation with shelterwood harvest occurring at age 130 years and final overstory removal at age 180 or 260 years
POR	Partial Overstory Removal

If an existing stand is mature, immature one-story, or immature two story, the management options are:

<u>EXISTING STAND</u>	<u>REGENERATED STAND</u>
FH	(GF-1) PLT,PCT,CT,FH
FH	(GF-3) PLT,PCT,FH
FH	(GF-4) PLT,FH
FH	(GF-5) PLT,PCT,CT,FH
FH	(GF-6) PLT,FH
FH	(RM-1) PLT,PCT,CT,FH
FH	(SP-1) PLT,PCT,CT,FH - EXT. ROTATION
FH	(SP-2) PLT,PCT,FH - EXT ROTATION
FH	(SP-3) PLT,PCT,CT,POR,FH - EXT ROTATION
EXTENSIVE MANAGEMENT (NO TIMBER HARVEST)	

If an existing stand is immature one or two-story, additional management options are:

<u>EXISTING STAND</u>	<u>REGENERATED STAND</u>
CT+FH	(GF-1) PLT,PCT,CT,FH
CT+FH	(GF-3) PLT,PCT,FH
CT+FH	(GF-4) PLT,FH
CT+FH	(GF-5) PLT,PCT,CT,FH
CT+FH	(GF-6) PLT,FH
CT+FH	(RM-1) PLT,PCT,CT,FH
CT+FH	(SP-1) PLT,PCT,CT,FH - EXT ROTATION
CT+FH	(SP-3) PLT,PCT,CT,POR,FH - EXT ROTATION
EXTENSIVE MANAGEMENT (NO TIMBER HARVEST)	

If an existing stand is seedling or sapling, the management options are:

<u>EXISTING STAND</u>	<u>REGENERATED STAND</u>
PCT+CT+FH	(GF-1) PLT,PCT,CT,FH
PCT+FH	(GF-3) PLT,PCT,FH
FH	(GF-4) PLT,FH
PCT+CT+FH	(GF-5) PLT,PCT,CT,FH
FH	(GF-6) PLT,FH
PCT+CT+FH	(RM-1) PLT,PCT,CT,FH
PCT+CT+FH	(SP-1) PLT,PCT,CT,FH - EXT ROTATION
PCT+FH	(SP-2) PLT,PCT,FH - EXT. ROTATION
PCT+CT+FH	(SP-3) PLT,PCT,CT,POR,FH - EXT. ROTATION
EXTENSIVE MANAGEMENT (NO TIMBER HARVEST)	

If an existing stand is bare ground, the management options are:

<u>EXISTING STAND</u>	<u>REGENERATED STAND</u>
PLT+PCT+CT+FH	(GF-1) PLT,PCT,CT,FH
PLT+PCT+FH	(GF-3) PLT,PCT,FH
PLT+FH	(GF-4) PLT,FH
PLT+PCT+CT+FH	(GF-5) PLT,PCT,CT,FH
PLT+FH	(GF-6) PLT,FH
PLT+PCT+CT+FH	(RM-1) PLT,PCT,CT,FH
PLT+PCT+CT+FH	(SP-1) PLT,PCT,CT,FH - EXT ROTATION
PLT+PCT+FH	(SP-2) PLT,PCT,FH - EXT. ROTATION
PLT+PCT+CT+FH	(SP-3) PLT,PCT,CT,POR,FH - EXT. ROTATION
EXTENSIVE MANAGEMENT (NO TIMBER HARVEST)	

The Wenatchee National Forest Tree Improvement Plan calls for a mixed level of tree improvement depending on species, tentatively suitable acres per seed zone, and cooperators interest. Availability of planting stock from select trees is expected to provide 85 percent of the total planting stock needed.

Planting of minor species not planned for tree improvement expenditures is expected to account for the remaining 15 percent. Planting grand-fir, Engelmann spruce, western red cedar, lodgepole pine, and subalpine fir as minor species is appropriate for the Wenatchee.

Natural regeneration is quite variable. According to regeneration surveys, stocking by natural regeneration ranges from zero to a high of almost 30 percent in the most favorable years with moisture following good seed production.

Assumptions as to natural regeneration versus planting were:

<u>Management Regime</u>	<u>Percent Natural</u>	<u>Percent Planted</u>
GF-1	10	90
GF-3	10	90
GF-4	10	90
GF-5	40	60
GF-6	60	40
SP-1	50	50
SP-2	50	50
SP-3	50	50

F. Development of Yield Tables and Coefficients

This section describes how the yields for each resource, road construction, and sediment production were developed. Some yields were developed for analysis in FORPLAN and some were developed for analysis outside of the model. Only those yields used for analysis in FORPLAN are discussed here, except for portions of the recreation, water, and road yields, to clarify which yield segments were analyzed in the model and which were not.

1. Recreation Capacity

Recreation capacity by Recreation Opportunity Spectrum (ROS) class for dispersed recreation and wilderness was analyzed in the FORPLAN model.

Developed recreation was analyzed outside of FORPLAN. Capacity estimates were based on actual people at one time capacities for developed sites. Those capacities were converted to recreation visitor days through use of a formula developed to account for variables in demand for weekday versus weekend use, length of stay, and length of season.

Coefficients for Dispersed Recreation were developed first by tying the dispersed ROS classes to various recreation activities identified in the Recreation Information Management (RIM) System. Estimates of capacity by activity were made through consultation with specialists throughout the area in addition to experienced capacities on the Forest. A final check was made to determine if the results were within the range of capacities applicable to the Pacific Northwest Region.

The coefficients used for Alpine Lakes Wilderness were those developed for and used in the *Alpine Lakes Management Plan*.

For other wildernesses on the Forest, coefficients were similar to those used in Alpine Lakes except that further breakdowns in the trailed and trailless portions were based on updated ROS class terminology developed for wilderness.

A more detailed explanation of recreation coefficients is contained in the 1920 Land and Resource Management Files (14-4 Coefficient Analysis).

2 Forage Yields

In the development of forage yields, an average production was assigned to each vegetative type. The yield in pounds per acre was estimated from actual production measurements found on similar types on the Forest in addition to those documented in publications from Chelan County (S.C.S.), and Washington and Oregon ecotyping. The production figures were considered baseline production and were applied to analysis areas as background forage. Changes from baseline production levels due to vegetation manipulation were estimated. Yields were modeled to depict production after thinning, clearcut, shelterwood, or extended shelterwood silvicultural treatments.

Allowable utilization of forage by slope and soil hazard class was established. The percent utilization allowed was proportioned between wildlife and livestock based on the emphasis in a given management strategy. Some resource mitigation is reflected in the percent utilization allowed for other environmental factors such as scenery and recreation settings. In addition, the allowable utilization reflects needs for soil and watershed protection, as well as individual plant requirements. Yields produced through the analysis were measured in animal unit months (AUM's) for both wildlife and livestock.

A detailed description of the establishment of forage yields are contained in a March 29, 1985, memo to the Planning Team leader, subject 1920 (20-1), "Range Coefficients."

3. Timber Yields

An Interdisciplinary Team which included wildlife and fisheries biologists, landscape architects, soil scientists, hydrologists, economists, silviculturalists, and timber management personnel at the Ranger District, Forest, and Regional Office levels were involved in the process. The yield tables were reviewed at several points.

Yield coefficients were developed for each management prescription and analysis area combination which permitted regulated timber harvest. This involved the development of both empirical yield tables for existing mature, immature one-storied, and immature two-storied timber stands and managed yield tables for seedling/sapling stands and future stands created by harvesting existing stands. Each of these yield coefficient categories will be discussed separately in the following sections.

Prior to prescriptions being loaded into FORPLAN, economic analysis of timber prescription feasibility and efficiencies, (Stage II economic analysis) was done by Joan (Krzak) Zieglertrum, the Forest economist at that time. This analysis disclosed that it was uneconomical to reforest non-stocked lands. It also concluded that all analysis areas that were to be used for FORPLAN modeling that contained merchantable volume were economical to harvest and reforest.

After making the first trial FORPLAN runs, it became apparent that the yield table did not precommercially thin but attempted to commercial thin, which was not economical. At this point, that table (GF-2) was dropped from future consideration.

a. Timber Yield Coefficients for Existing Timber Stands

Volume projection for existing stands is very important because predicted yields are critical in the determination of allowable sale quantity. Allowable sale quantity (ASQ) is the quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for a time period specified by the Plan. These yields, when stratified by specific silvicultural regimes are termed "empirical yields." Volumes were calculated in cubic feet. The associated cubic foot yield coefficients were entered into the relevant yield tables in the FORPLAN yield file. The cubic foot outputs were converted by FORPLAN to Scribner Decimal C board foot measurements based on vegetative type and diameter class specific conversion ratios. Harvest schedules were based on cubic foot measurements.

This section summarizes the empirical yield table estimation process. Additional details can be found in the forest planning document titled "Timber Yield Table Documentation", dated February 1985.

Empirical yield tables were computed by John Teply in the Regional Office using 1977 timber inventory data. Data was stratified according to Forest biological model components and yields were computed using a method developed by John Teply (J. L. Teply. October 6, 1976. Rough Draft: The Development and Projection of Standing Yield Tables, Region 6). Copies of Teply's rough draft, the biological model matrix showing inventory plot distribution, and the basic empirical tables are included in Jim Opdycke's 1920 (26-2) memo titled "Timber Yield Tables for Existing Stands", dated October 7, 1981.

The basic tables were reviewed by the Timber Management Planner and the Forest Silviculturist for reasonableness as suggested in Teply's paper. Projected basal areas, cubic foot volumes and rates of growth were compared with Technical Bulletins 201 (Douglas-fir) and 630 (ponderosa pine), P. H. Cochran's PNW 263 (Eastside Douglas-fir and white or grand fir), and local plot data. All tables except number 0301 were found to be reasonable.

A table was not produced for two-story stands with seedling and sapling understory in Model Group II (moist sites) because there were only two inventory plots in this component. These stands were combined with the two-story with the poles component of Group II (table 0402).

There was difficulty in developing regressions for the two-story/seedling and sapling understory in Group I (dry sites). The resulting table (0301) was found to be unsatisfactory because of an unaccounted for decline in growth in the early future decades. The Forest Silviculturist and Timber Management Planner examined stand exams and plot data and with phone consultations with John Teply, R6 Biometrician, decided to combine this component with the two story/poles. The examined data showed very little difference in understory sizes, plus there were only nine inventory plots in the seedling and sapling strata.

A combined table (0301-0401) was created. Upon examination, this table was found to be satisfactory for the first nine future decades. From the tenth decade on, the rate of volume decline was far too rapid and did not appear to be biologically sound. Jim Odycke, the Timber Management Planner, discussed this problem by phone with John Teply on September 1, 1981. It was decided that the problem was probably due to either a lack of plot data for a critical period, a few plots with extremely low volume, or both. Teply recommended that the table be adjusted by using the rate of decline of table 0402 for a similar period. This was done. The adjustment worksheet is included in Opdycke's October 7, 1981 memo on file in the Wenatchee National Forest Supervisor's Office.

Harvest projections for the No Change Alternative were developed using the Stand Table Projection Method. Briefly, this method involves the following steps.

1. The existing stand structure was developed and summarized from 1961 and 1968 inventory statistics. Stands are listed according to age and standing volume.
2. Growth and mortality rates were calculated for existing stands based upon measured plot data
3. Growth and mortality rates for future stands were projected from using normal yield table data.
4. Present and predicted future stand tables were developed by applying appropriate growth and mortality rates to the existing stand structures.
5. Periodic stand yields were estimated as the difference between the yield of existing stands and future stands under management.

Yields were adjusted in some instances where modified harvest practices were required to meet management objectives for maintaining visually appealing landscapes.

More specific details relating to the two different working circle methods are found in the allowable cut calculation descriptions in the Timber Management Plans.

(1) Basic Empirical Volumes

The empirical base tables represent all the net volume in trees, 9 inches DBH or larger, measured in the 1977 inventory. This volume does not differentiate by maturity of the trees or by their position in the stand. In two-story stands there is a need to separate residual overstory and excess tree volume from future crop tree volume and to establish crop tree age. In immature pole and small sawlog stands, the available excess tree volume has to be identified and an equivalent crop tree age established for application of managed yield tables. In addition, disease, insect, and logging damage have to be dealt with in both cases.

In consulting with Regional Timber Planners, we found there is no established method to develop empirical yield tables for existing two-story and immature stands. The Forest Timber Management Planner and Silviculturist therefore developed the process discussed in the following sections.

(a) Single-Story Mature Stands

Basic empirical volumes are used as originally computed. The first entry in these stands will be a regeneration harvest.

(b) Two-Story Stands

It appears as though, based on examination of inventory plots and timber stand examinations, the computed empirical volume includes all trees, 9 inches DBH and greater, in both overstory and understory. Analysis of timber stand examinations further indicates that understory in some stands is inadequate for further management because of low stocking, dwarf mistletoe, or severe insect damage. In addition, the overstory in some stands is so heavy most of the understory would be destroyed during removal of the overstory. These stands would require regeneration harvest on their first entry.

The Forest Silviculturist analyzed timber stand examinations taken during the 1977 inventory and determined what proportion of the stands should be regenerated without saving the understory for further management. This was done by considering the interrelationships of heavy overstory volume per acre (usually 25 MBF+), growth rate of crop trees, dwarf mistletoe, spruce budworm, and lack of sufficient stocking in the understory. Stands with more than 50 percent of the timber stand examination plots needing regeneration were classified as such in their entirety. The regeneration ratio was calculated as a percent of the total number of stands in the particular biological model component. Basic empirical volumes as computed by Teply are applicable to these stands.

The understory in other stands indicates a reasonably good expression of crop tree dominance. The understory in these stands is manageable as future crop trees. This may be due in part to differences in actual ages and species mixture. Level of crop tree stocking, equivalent crop tree age, and probable crop tree loss in the overstory removal operation must be estimated. The volume of merchantable understory excess trees which could be removed along with the overstory must also be determined. In addition, a point must be established at which overstory removal and further management of the understory will no longer be considered. This is done to allow for the prolonged effects of overstory suppression if not removed in a reasonable time.

The proportion of empirical volume available for harvest at first entry in stands suitable for understory management consists of overstory volume, merchantable excess understory volume, and merchantable crop trees lost in logging. Overstory and understory volume available is determined from stand exams

Crop tree loss during final overstory removal is commonly experienced on the Forest but we have no measured data. J. W. Barrett made and published a case study (PNW-273, 7/76) addressing a similar problem in ponderosa pine. He found that on an average in his study area, 20 percent of the crop trees on 75 percent of the area (25 percent not stocked) were lost in overstory removal. In the judgment of the Forest Silviculturist, this figure is also applicable to our conditions and is the best information available at this time. The first entry leave volume is reduced by 20 percent and this amount is added to the cut volume in anticipation of required removal of damaged merchantable trees.

It is necessary to determine effective crop tree age and stocking in order to estimate growth after the first entry. The Silviculturist used a combination of understory age, crop tree DBH, excess tree DBH and volume in comparison with the high intensity managed yield tables to establish stand characteristics between first entry and regeneration harvest. The crop tree stocking ratio was also estimated from the timber stand examinations. This allows for unstockable voids and lack of understory stocking due to overstory clumps, disease, etc. Losses from logging are also included.

Stands were only considered for further management of the understory for the first three decades. At this point, the average empirical age will have reached or exceeded the culmination of mean annual increment of managed stands, much of the understory will be of merchantable size (7 inches DBH), and the prolonged effect of overstory competition will have slowed understory growth to the point where regeneration is more feasible than management of the understory.

(c) Single-Story Immature Stands

Computed empirical volume for stands mapped as immature poles or small sawlogs is made up of crop tree volume, excess tree volume, and volume from unmapped mature sawlog inclusions. An analysis of inventory plots and timber stand examinations indicates that a portion of this type is not adequately stocked for further management and should be regenerated at the first entry.

The same general premises used in two-storied stands, for determination of regeneration needs and adaptation to management, were used here. One basic difference is the assumption used for determining the first entry volume for the further management stands. In this case, the proportion of the existing volume to be removed is considered to be similar to a commercial thinning instead of a combined overstory removal and thinning. Adjustments in gross yields are for crop tree stocking and estimated defect. No significant logging damage is anticipated in the first entry because of the size of the trees and the nature of the harvest.

Considering the average empirical age, these stands will be available for management of the understory for the first three decades only. The same basic rationale used for two-storied stands applies.

b. Timber Yield Coefficients for Managed Stands

“Managed yield tables” are built to reflect regeneration (natural or planted) after harvest, precommercial thinning when appropriate and early suppression of competing vegetation. No such stands exist that have been under such management throughout an entire rotation in eastern Oregon and Washington (P. H. Cochran 1979). Therefore, to predict growth of newly established stands, many assumptions must be made. These assumptions are derived from measurements of existing stands, research findings from other areas, and broad-based yield tables.

The purpose of managed yield tables is to estimate the standing inventory of wood fiber on existing plantations and future managed stands, and to predict how it would grow according to weighted average site conditions and alternative silvicultural regimes. Yield tables were developed for all management prescriptions which permit regulated timber harvest. They were calculated in cubic feet. This section summarizes the managed yield table development process. A more in-depth discussion can be found in a 1920 memo titled "Stand Prognosis Adjustment-Development of Managed Yield Tables, dated February 7, 1984."

For planning purposes, the timber inventory of the Wenatchee National Forest was categorized into two vegetative types, wet forest and dry forest.

A National group of experts studied the timber yield tables used for Forest planning during 1983. As a result of the group's findings it was decided to update Wenatchee National Forest's managed timber yield tables for regenerated stands by using the latest version of Prognosis.

On July 19, 1983, Ralph Johnson, Mensurationist assigned to State and Private Forestry in Missoula, Walt Knapp, Region 6 Yield Table Specialist, and Jim Opdycke, Timber Planner for the Okanogan and Wenatchee National Forests, met in the Regional Office to map out a process. The basic process was to: (1) establish a young stand data base individually for the wet forest and dry forest vegetation type, (2) predict the growth of the young stands using Prognosis and (3) calibrate Prognosis to reasonably fit known Forest data.

Documentation of Prognosis is in General Technical Report INT-133, "User's Guide to the Stand Prognosis Model", William R. Wykoff, Nicholas L. Crookston and Albert R. Stage, Intermountain Forest and Range Experiment Station, Ogden, Utah, September 1983.

The 1977 Continuous Forest Inventory (CFI) was used as a data source. The 1977 CFI computer file was screened for relatively even-aged plots using a computer routine developed by Ralph Johnson. The selection of plots from this inventory was not intended to provide a statistical sample, but rather to establish some actual data for use as a ground identified base from which to make Prognosis growth predictions for regenerated stands. The following plots were used in prognosis to develop all managed timber yield tables.

<u>Vegetative Type</u>	<u>1977 CFI Plot #</u>
Dry Forest	286
	459
	462
	607
Wet Forest	284
	1424

The following is the basic data used to develop managed timber yield tables for tentatively suitable timber lands.

DETAIL COMMON TO ALL PROGNOSIS RUNS:

<u>KEYWORD</u>	<u>GRP I (DRY)</u>				<u>GRP II (WET)</u>	
BAMAX	183				313	
HABITAT CODE	260				260	
VERSION	16				16	
NUMCYCLE	26				26	
PLOTS	286,459,462,607 ^{1/}				284,1424 ^{1/}	
INVYEAR	5	5	5	27	5	7
TIMEINT	+5	+5	+5	+1	+5	+3
TIMEINT	+10	+10	+10	+1	+10	+10
TIMEINT	+10	+10	+10	+1	+10	+10
	30	30	30	30	30	30 ^{2/}

^{1/} Species composition of plots 286, 459, 284, and 1424 was adjusted to represent Forest average conditions.

^{2/} The average age of the selected base plots were converged to a common age of 30 by making cycle length adjustments in the first three cycles in Prognosis

The selected plots were entered individually in Prognosis. Variant 16 with species habitat 260, was used as recommended by Johnson. Region 6 Variant 16 contains both cubic feet and board feet volume formulas but only cubic output was used. Variant 16 has been calibrated to North Central Washington even though no habitat types have been identified in North Central Washington at this time.

Prompt reforestation is the objective on the Wenatchee. The primary site preparation tool on many sites is YUM yarding, so there is no need for delay between harvest and planting. In addition, many sites have at least partial stocking of natural or residual seedlings or saplings after logging. On these sites there may be a slight minus regeneration lag. For these reasons, the Wenatchee doesn't show a regeneration lag when using the prognosis generated yield tables calling for planting.

A four year regeneration lag is used in yield tables calling for natural regeneration. Seed production of the principle species, especially ponderosa pine and Douglas-fir, is very unpredictable. The last large seed crop in ponderosa pine was 1971. The last good Douglas-fir crop was 1978. A poor crop is predicted again in 1984 for both species. Therefore, we think the four year total difference between regeneration by planting and waiting for natural regeneration, considering the cyclic nature of seed crops, is reasonable.

Several of the plots used for the basis tables were in areas of natural lodgepole regeneration. With low to moderate investment levels these stands would remain in lodgepole pine through the rotation. On plots where planting and precommercial thinning are proposed, Douglas-fir will be planted and a species preference against lodgepole pine will be used at commercial thinning entries.

On wet ecotypes, mortality rates for thinned plantations is historically low. Because adequate moisture is available, mortality rates are expected to be only 50 percent of the default level in Prognosis if competition is controlled. This would approximate the mortality rate found for Douglas-fir at a 12-foot spacing (Reukena, 1979).

In order to adjust the base age of the Prognosis tree lists to DBH age, 10 years were added. This is the average time found to get trees to a 4.5 foot height where the age for inventory plots was measured

The individual Prognosis predictions were run under the sums-to-date option which stores separate results and produces combined summary tables. A number of comparisons were then made to determine the reasonableness of the results.

The Prognosis analysis process was done by Monte Bickford, Forest Silviculturist, Bob Pederson, LMP Analyst, and Jim Opdycke. The height/DBH relationships for the various growth projections of the young stands compared very favorably with older stands.

All regenerated stand timber yield tables must be adjusted from the Prognosis predictions of gross volumes to net volumes. This is because Prognosis doesn't account for factors such as defect and break-age, less than 100 percent stocking, or greater growth of genetically superior planting stock.

Existing stand (empirical) timber yield tables for roaded analysis areas must be adjusted to account for a reduction in stocking due to roads. This is due to the design of the survey used to develop the empirical tables. Any plots which would have contained roads were relocated. Arterial and collector roads are coded in R2MAP. The acreage they encompass will be removed from the tentatively suitable timber lands during the analysis area sort process in R2MAP. Existing stand timber yield tables are reduced by a factor reflecting the average area of existing local roads

No adjustments are made to the existing tables for new local roads (i.e., additional roads in the roaded analysis areas and all roads constructed in the unroaded analysis areas). This assumes that trees removed for road rights-of-way are utilized. The regenerated stands on all analysis areas are adjusted to reflect the reduction in stocking due to these roads.

Tables B-III-2, B-III-3, and B-III-4 display the adjustments used to revise the appropriate yield tables developed using Prognosis.

**TABLE B-III-2
TIMBER YIELD TABLE ADJUSTMENTS**

Table	Ecotype	Defect and Breakage	Non-stocked Other Than Roads	Non-stocked Roads	Genetics	Total
Unroaded,existing Mature & Immature	Dry	0	0	0	0	0
	Wet	0	0	0	0	0
Unroaded,existing GF-1	Dry	-4.0	-4.0	0	+7.7	-0.3
	Wet	-5.0	-4.0	0	+7.7	-1.3
Unroaded,existing GF-2	Dry	-4.0	-4.0	0	+7.7	-0.3
	Wet	-5.0	-4.0	0	+7.7	-1.3
Unroaded,existing GF-3	Dry	-4.0	-3.0	0	+7.7	+0.7
	Wet	-5.0	-3.0	0	+7.7	-0.3
Unroaded,existing GF-4	Dry	-4.0	-3.0	0	+7.7	+0.7
	Wet	-5.0	-3.0	0	+7.7	-0.3
Unroaded,existing GF-5	Dry	-5.0	-13.0	0	+5.1	-12.9
	Wet	-6.0	-6.0	0	+5.1	-6.9
Unroaded,existing GF-6	Dry	-5.0	-13.0	0	+3.4	-14.6
	Wet	-6.0	-6.0	0	+3.4	-8.6
Unroaded,existing SP-1*	Dry	-6.0	-4.0	0	+5.0	-5.0
	Wet	-7.0	-4.0	0	+5.0	-6.0
Unroaded,existing SP-2**	Dry	-8.0	-3.0	0	+5.0	-6.0
	Wet	-9.0	-3.0	0	+5.0	-7.0
Unroaded,existing SP-3	Dry	-5.0	-4.0	0	+5.0	-5.0
	Wet	-6.0	-4.0	0	+5.0	-5.0

* Defect increased 1 percent for trees left to 260 years.

**Defect and breakage increased 3 percent due to no intermediate harvest to salvage blowdown and mortality.

TABLE B-III-3
TIMBER YIELD TABLE ADJUSTMENTS

Table	Ecotype	Defect and Breakage	Non-stocked Other Than Roads	Non-stocked Roads	Genetics	Total
Roaded,existing	Dry	0	0	-3.3	0	-3.3
Mature & Immature	Wet	0	0	-3.3	0	-3.3
Roaded,existing	Dry	-4.0	-4.0	-3.3	+7.7	-3.6
GF-1	Wet	-5.0	-4.0	-3.3	+7.7	-4.6
Roaded,existing	Dry	-4.0	-4.0	-3.3	+7.7	-3.6
GF-2	Wet	-5.0	-4.0	-3.3	+7.7	-4.6
Roaded,existing	Dry	-4.0	-3.0	-3.3	+7.7	-2.6
GF-3	Wet	-5.0	-3.0	-3.3	+7.7	-3.6
Roaded,existing	Dry	-4.0	-3.0	-3.3	+7.7	-2.6
GF-4	Wet	-5.0	-3.0	-3.3	+7.7	-3.6
Roaded,existing	Dry	-5.0	-13.0	-3.3	+5.1	-16.2
GF-5	Wet	-6.0	-6.0	-3.3	+5.1	-10.2
Roaded,existing	Dry	-5.0	-13.0	-3.3	+3.4	-17.9
GF-6	Wet	-6.0	-6.0	-3.3	+3.4	-11.9
Roaded,existing	Dry	-6.0	-4.0	-3.3	+5.0	-8.3
SP-1*	Wet	-7.0	-4.0	-3.3	+5.0	-9.3
Roaded,existing	Dry	-8.0	-3.0	-3.3	+5.0	-9.3
SP-2**	Wet	-9.0	-3.0	-3.3	+5.0	-10.3
Roaded,existing	Dry	-5.0	-4.0	-3.3	+5.0	-7.3
SP-3	Wet	-6.0	-4.0	-3.3	+5.0	-8.3

* Defect increased 1 percent for trees left to 260 years.

**Defect and breakage increased 3 percent due to no intermediate harvest to salvage blowdown and mortality.

TABLE B-III-4
TIMBER YIELD TABLE ADJUSTMENTS

Table	Ecotype	Defect and Breakage	Non-stocked Other Than Roads	Non-stocked Roads	Genetics	Total
Regenerated GF-1	Dry	-4.0	-4.0	-4.4	+7.7	-4.7
	Wet	-5.0	-4.0	-4.4	+7.7	-5.7
Regenerated GF-2	Dry	-4.0	-4.0	-4.4	+7.7	-4.7
	Wet	-5.0	-4.0	-4.4	+7.7	-5.7
Regenerated GF-3	Dry	-4.0	-3.0	-4.4	+7.7	-3.7
	Wet	-5.0	-3.0	-4.4	+7.7	-4.7
Regenerated GF-4	Dry	-4.0	-3.0	-4.4	+7.7	-3.7
	Wet	-5.0	-3.0	-4.4	+7.7	-4.7
Regenerated GF-5	Dry	-5.0	-13.0	-4.4	+5.1	-17.3
	Wet	-6.0	-6.0	-4.4	+5.1	-11.3
Regenerated GF-6	Dry	-5.0	-13.0	-4.4	+3.4	-19.0
	Wet	-6.0	-6.0	-4.4	+3.4	-13.0
Regenerated SP-1*	Dry	-6.0	-4.0	-4.4	+5.0	-9.4
	Wet	-7.0	-4.0	-4.4	+5.0	-10.4
Regenerated SP-2**	Dry	-8.0	-3.0	-4.4	+5.0	-10.4
	Wet	-9.0	-3.0	-4.4	+5.0	-11.4
Regenerated SP-3	Dry	-5.0	-4.0	-4.4	+5.0	-8.4
	Wet	-6.0	-4.0	-4.4	+5.0	-9.4

* Defect increased 1 percent for trees left to 260 years.

**Defect and breakage increased 3 percent due to no intermediate harvest to salvage blowdown and mortality.

4. Sediment Yields

Sediment yield estimates were developed as part of the information used to determine the relative risk between alternatives. The Modified Universal Soil Loss Equation (MUSLE) was used as the basic process for determining soil losses. The Soil Resource Inventories for the Wenatchee National Forest (1976) and for the Snoqualmie National Forest-Eastside (1973) provided most of the basic data used in the sediment modeling process.

Sediment delivery factors were developed using percentages provided by the Intermountain Forest and Range Experiment Station located at Boise, Idaho. Background erosion rates (natural erosion from the forest without man's activities), were developed using data from published studies, in combination with local soil resource inventory information. Erosion rates were also developed for those management activities having the greatest potential for accelerated sedimentation (timber harvest activities and associated road construction).

A modeling process was developed to estimate both background and management induced sediment production, by alternative, within FORPLAN. Using the five biologic zone groupings in the forest planning process as a base, a fourteen step process was developed to estimate background and management activity sediment yields. Background sediment yield was obtained directly from FORPLAN. Basic output on management activity delivered sediment was obtained from FORPLAN and adjusted to reflect that most of the new road development on the Forest would be completed within the first three decades

This systematic approach was used to develop estimates of increased sediment yield from management activities in order to indicate trends and to compare alternatives. These model outputs do not represent absolute quantities of sediment. Natural systems are simply too complex for completely accurate predictions given our present state of knowledge. This modeling effort was just one of the tools that the Forest used in the analysis leading to a reasoned choice among alternatives.

Additional information on the sediment modeling process may be found in the planning records on file in the Supervisor's Office, Wenatchee National Forest.

5. Water Yields

The natural water production, or background water yield, was not analyzed in FORPLAN, but was developed by using experienced water yield data. The existing water yields were reduced to reflect the existing manipulated vegetation through man's activities, primarily timber harvest.

The basis for increased water yield due to vegetative manipulation was primarily from a series of reports prepared in 1974 by Washington State University and the University of Washington. The report titled "Model Development and System Analysis of the Yakima Basin" provided the data base.

The water yield increases are based on vegetation manipulation by silvicultural prescriptions only, and are directly proportional to the amount of vegetation removed. The water yield recovery assumed that reforestation would be achieved within a five-year period after timber harvest.

Additional formation on the water yield modeling process may be found in the Planning records and the document entitled "Coefficient Documentation for Water Yield Increases" (#2 Rough Drafts 1920, 11/9/81, Gran Rhodus).

6. Local Road Construction

Local road densities were developed from fiscal year 1980 and 1981 timber sale data. Average skidding distances were calculated for each logging method used in the timber sale, and used to model logging settings. Gentle slopes were modeled for 100 percent tractor logging, while moderate slopes were modeled for 75 percent skyline and 25 percent highlead settings. Steep slopes were modeled at 58 percent longspan skyline and 42 percent helicopter settings. The setting widths determined road spacing. Road spacing for the model settings was expanded to determine road density per section (640 acres) of land and per acre. Road construction was assumed to occur at these densities in currently unroaded areas during the first entry for timber harvesting. Currently roaded areas were assumed to need additional road construction to reach these densities during the first entry during the modeling horizon for timber harvesting. Twenty-five percent of the roads were assumed to need reconstruction during the first entry in currently roaded areas and subsequent entries in all areas.

Arterial and collector road outputs were analyzed outside of FORPLAN and were based on a transportation plan by alternative.

More detail on procedure for local roads can be found in a September 22, 1981, memo, subject 1920, "WNF FORPLAN Road Density Analysis" by John Malone.

7. Anadromous Fish

Anadromous fish outputs and smolt habitat capability were estimated using coefficients outlined in the April 22, 1987 letter to Regional Foresters, Regions 1,4,6 titled "Anadromous Fish Planning Coefficients". Coefficients outlined in this letter were used along with information obtained from other agencies to generate current and potential smolt habitat capability and associated outputs.

Increases in smolt production were based upon assumptions for adult returns, success of management prescriptions in maintaining habitat, and success of the habitat improvement program. A more detailed description is contained in a document by Ken MacDonald, titled "Documentation for the Formulation of Fisheries Outputs for the Wenatchee Forest Plan".

IV. ECONOMIC EFFICIENCY ANALYSIS

This section describes the costs and benefits, as well as some concepts, involved in economic efficiency analysis, how they were derived, and how they were used in the Forest Planning process. Economic efficiency analysis is required by the National Forest Management Act Regulations (36 CFR 219) and played an important role in the development and evaluation of Forest Planning benchmarks and alternatives. Specifically, the Regulations (36 CFR 219.12(f)) state that:

“The primary goal in formulating alternatives, besides complying with NEPA procedures, is to provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits.”

They follow up in 36 CFR 219.12(f)(8) by stating that:

“Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative.”

The requirements of 36 CFR 219.12(f) may not be met by Alternative NC. It is not possible to evaluate the present net value of this alternative. Evaluation of non-priced benefits and costs may require use of different methods than for other alternatives.

A. Descriptions of Some Concepts Related to Efficiency Analysis

Before we get into the specifics of how economic efficiency analysis was used in the development of the FEIS and Forest Plan, a few concepts and terms related to efficiency analysis in general need to be explained.

1. Priced Outputs

Priced outputs are those that are, or can be, exchanged in the market place. The dollar values for these outputs fall into one of two categories: market or nonmarket (assigned). The market values constitute the unit price of an output normally exchanged in a market, and are expressed in terms of what people are willing to pay as evidenced by actual sales transactions. Nonmarket values constitute the unit price of an output not normally exchanged in a market and must be estimated by using some comparable sales transaction data in combination with various theoretical techniques. They are valued in terms of what reasonable people would be willing to pay (above participation costs) rather than go without the output.

Priced outputs with market values include timber, firewood, and non-recreation special uses. Priced outputs with nonmarket values include recreation, wildlife and fish, and range.

Timber values are expressed in terms of dollars per thousand cubic feet (MCF) paid by purchasers at the time of harvest. They are based upon transactions which occurred on the Wenatchee National Forest. Prices were developed for key individual species sold on the Forest. Prices vary by tree size as well as by species.

Firewood and non-recreation special uses are valued in terms of fees actually paid for these goods and services on the Forest. Permit fees are also charged for other goods and services such as grazing, camping, summer homes, and ski areas. These outputs have nonmarket values developed for them that are considered better estimates of their actual value. Permit fees are not included in benefit calculations for these outputs to avoid double-counting.

Forest-based recreation is not normally bought and sold in the market place. The values for recreation are based upon the 1985 RPA Program, and were ultimately determined by examining comparable market transaction data in conjunction with some theoretical estimation techniques. The values are expressed in terms of dollars per recreation visitor day (RVD), and were specific to different types and qualities of recreation activities that may be experienced on the Forest.

Range outputs represent the amount of forage permitted to be grazed and are measured in terms of animal unit months (AUMs). While the Forest receives grazing permit fees, the value received for the AUMs is not based on market transactions. Therefore, the dollar values per AUM used in the analysis of the benchmarks and alternatives were market price estimations based on the contribution of National Forest grazing to the net income of ranchers.

Priced outputs do not include minerals. Substantial mineral resources are known to exist on the Forest, but the timing of their development and the quantities that will be extracted are highly speculative. Variation in mineral benefits could possibly occur among alternatives, however. Water is also not priced in this analysis. The Forest contributes a great deal of water to the "water short" area of eastern Washington. Increases in water yield above naturally occurring levels vary between alternatives but their benefits were not quantified.

2. Nonpriced Outputs

Nonpriced outputs are those for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs. Subjective non-dollar values must be attributed to the production of these outputs.

Present net value is used to compare alternatives with regard to their output levels for priced resources, and their efficiency in producing them. However, the production of nonpriced outputs also influences the decision making process. The importance of the need to consider these subjectively valued benefits is addressed in the NFMA Regulations which charge the Forest Service with identifying the alternative which comes nearest to maximizing net public benefits (36 CFR 219.12(f)). Net public benefits (NPB) include both priced and nonpriced resource outputs, less all costs associated with managing the area. As stated earlier, all priced outputs and all costs associated with managing the Forest are included in the calculation of present net value. To this, the net subjective values of the nonpriced outputs must be added in order to arrive at the overall net public benefit of an alternative.

In some cases, the importance of providing nonpriced benefits can outweigh the advantages of producing higher levels of priced outputs. The provision for many of the nonpriced benefits is achieved by applying constraints to the production of priced outputs (i.e., such as timber harvesting constraints in FORPLAN). These constraints usually result in a decrease in PNV based upon the priced outputs. Subjective judgments are then necessary in assessing whether the benefits of producing the nonpriced outputs exceed the opportunity costs associated with producing fewer priced outputs. If a PNV tradeoff induced by the provision of a nonpriced output is judged acceptable, then a positive contribution to net public benefit has resulted, and the alternative is more efficient overall.

The nonpriced outputs considered during the development and evaluation of alternatives are discussed below. These are outputs and effects which are influenced to a large degree by decisions regarding how to manage the Forest. They are the topic of one or more issues and concerns which were identified at the outset of the planning process. While the quantitative dollar values of each cannot be determined, they can generally be evaluated by examining such quantitative indicators as acres of appropriate allocations, resource inventories, or timber production related activities and outputs. Some of the most important nonpriced outputs and effects addressed during the Wenatchee National Forest planning process revolve around maintaining or enhancing the following:

Water Quality and Quantity - A number of cities and towns near the Forest use water coming from the Wenatchee National Forest for domestic purposes. This use is expected to increase in the future as the area's population increases. The demand for sediment-free irrigation water is increasing as new lands are cultivated. The quantity of water flowing off the Forest is affected somewhat by vegetative manipulation on the Forest. Water quality is also affected by vegetative manipulation and road construction.

Wildlife Habitat and Diversity - The Forest sustains a wide variety of fish and wildlife species because of its variety of habitats. Activities which affect habitat can have a direct influence on fish and wildlife. Timber harvesting, recreation, livestock grazing, road management and fire management can affect wildlife habitat. Small hydroelectric projects and irrigation impoundments can affect fish habitat. Water quality also greatly affects fish habitat. Recreational use of wildlife and fish, and commercial harvest of anadromous fish, are priced outputs. The issue of wildlife habitat and diversity is broader than what is represented by the priced outputs. The manner in which alternatives maintain wildlife habitat and diversity is reflected as a nonpriced component of net public benefit.

Visual Quality - The Forest is well known for its variety of scenery and natural appearing environment. About 13 percent of the recreational use on the Forest is driving for pleasure and viewing scenery. The quality of most other types of recreational use is also strongly affected by the scenic quality of the recreational setting. The visual quality of alternatives has been quantified in terms of the number of acres meeting various visual quality objectives. Visual quality is also strongly correlated to estimates of each alternatives capacity to provide various types of recreational experiences.

Minerals and Energy Resources - Interest in mineral resources on the Forest has been high since a major gold discovery took place in March 1983. There is also continuing interest in energy resources. More than one-fourth of the Forest had existing or pending oil and gas leases as of February 1985. Recreational mining also takes place on the Forest. The alternatives will be ranked according to their mineral potential and accessibility.

Cultural Resources - There is an ongoing program to identify and evaluate historic and prehistoric cultural resources. Over 500 cultural resource sites have been identified to date within, or adjacent to, the Forest. These sites represent a broad cross-section of uses, spanning a period of several thousand years. Possible loss or degradation of these sites increases with land modifying activities and increased public use of the Forest.

3. Discounting

Financial analyses of alternative investment options usually involve cash flows over different periods of time in the future. Inherently, there is a time value associated with money. Due to man's propensity to consume now, a dollar today is worth more than a dollar ten years from now. Discounting is a process for adjusting the dollar values of costs and benefits which occur at different periods in the future to dollar values for a common time period so that they may be compared. Usually the common time period is the present, in which case, the discounted cash flow is referred to as the present value. The primary discount rate used for the PNV calculations was four percent. An alternate rate of 7 1/8 percent was also used to evaluate the sensitivity of the results to higher discount rates.

4. Present Net Value

Present net value (PNV), on the other hand, is a dollar measure of economic efficiency. It was the quantitative criterion used to help ensure that each alternative consisted of the most economically efficient combination of priced outputs and management activities needed to meet the objectives of the alternatives. Present net value is the difference between the discounted value of all priced outputs (benefits) less all costs associated with managing the planning area, regardless of whether they were incurred for the production of priced outputs, nonpriced outputs, or overhead expenses for general maintenance of the organization. Therefore, PNV is an estimate of the current value of the priced Forest resources after all costs of producing both priced and nonpriced outputs and meeting other multiple-use objectives have been considered.

5. Opportunity Costs

Opportunity costs are defined as the value of a resource's foregone net benefit in its most economically efficient alternative use (FSM 1970.5). In relation to the economic analysis performed for Forest Planning, it represents the decrease in PNV of an alternative or benchmark when some alternative level of resource outputs are forced into solution. Therefore, opportunity costs measure the change in PNV for priced resource outputs, and can be used to measure the relative value traded off in order to produce the nonpriced benefits included in net public benefits.

6. Net Public Benefits

The maximization of net public benefits is a goal of the Forest Planning process. Net public benefits is the overall value to the nation of all outputs and positive effects (benefits) less all inputs and negative effects (costs), whether they can be quantitatively valued or not. Conceptually, net public benefits is the sum of the present net value of priced outputs plus the net value of all nonpriced outputs. Net public benefits are maximized by the alternative which has the greatest excess of priced and nonpriced benefits over costs. A major objective of the Forest Planning process is to provide information that helps determine which alternative provides the mix of outputs and effects that best responds to the ICO's while maximizing the net public benefit of managing the National Forest. Net public benefits cannot be expressed as a numeric quantity because it includes the qualitatively valued nonpriced outputs. Therefore, identifying the alternative which maximizes net public benefits is a subjective decision.

7. Net Cash Flow

Cash payments are actually received for some Forest outputs such as timber, livestock forage, camping at some developed sites, mineral leases, and special uses. These payments represent a return to the U.S. Treasury as opposed to other benefits, such as those for dispersed recreation, which represent a value to society in general. Cash payments can be contrasted to the Forest Service budget to examine net cash flows to the U.S. Treasury.

8. Welfare Distribution Effects and Impacts

There is another level of effects which is also a concern of National Forest Policy and Management. These are the welfare distribution effects influenced by the mix and level of outputs produced by the National Forest. They can be either positive or negative. Their impacts can also be local, regional, or national in scope. Some distributive effects such as changes in consumer prices or taxpayer costs have

national level impacts. Others, such as induced jobs and income, or payments in lieu of taxes are more local or regional in nature. They are more related to questions of equity (i.e., who pays and who benefits) rather than efficiency. They are not assessed in the context of the efficiency criteria associated with the PNV and net public benefit concepts. However, these positive and negative distributive effects need to be assessed in conjunction with the net public benefit measures, since equity objectives often influence efficiency objectives and vice versa. These will be discussed in more detail in Section V of this appendix.

B. Parameters and Assumptions Used For Economic Efficiency Analysis

In order to calculate the present net value for each alternative, several assumptions had to be made regarding discount rates, demand curves, real dollar adjustments, and real price and cost trends. This section will summarize these decisions and their resulting parameters. A more detailed discussion can be found in various process records in the Supervisor's Office.

1. Discount Rates

Discounting requires the use of a discount rate, an interest rate that represents the cost or time value of money, in determining the present value of future costs and benefits. Two discount rates were used to calculate the present net values for each benchmark and alternative. Both of them were real discount rates meaning that they were adjusted to exclude the effects of inflation (Real dollar adjustments will be discussed more below). According to FSM 1971.71:

For evaluations of long-term investments and operation in land and resource management in the 1980-1985 planning period, a four percent real discount rate shall be used. Evaluations should also discount benefits and costs at the real discount rate used in the most recent RPA to determine sensitivity of alternatives to variations in the discount rate.

The four percent rate approximates the "real" return on corporate long-range investments above the rate of inflation (Row and others 1981). The four percent rate was used to solve FORPLAN and calculate the PNV for each benchmark and alternative. The 1985 RPA program used a real discount rate of 7-1/8 percent. An analysis of the sensitivity of the Preferred Alternative to the discount rate was performed by solving FORPLAN using both the four percent and the 7-1/8 percent discount rates. For all other benchmarks and alternatives, the present net values were merely recalculated using this second discount rate (FSM 1971.71). Finally, all costs and benefits were discounted from the midpoint of the decade in which they were incurred.

2. Demand Curves and Real Price Trends

As specified by the Washington Office (1920 letter to Regional Forester, "Downward Sloping Demand curves", 2/3/81) and in keeping with FSM 1971.65, horizontal demand curves for timber and nontimber resources were used to analyze the benchmarks and alternatives for the FEIS. Many factors can influence the demand for stumpage from any one Forest (Adams and Haynes 1985). Some of these factors include trends in (1) interest rates, (2) the species and products mix of forest products consumption, (3) use of wood for energy, (4) forest products exports, (5) the cost of wood in Canada, (6) the rate of technical improvements in wood and fiber processing, and (7) the levels of other National Forests harvests. All of these contain some degree of uncertainty regarding their future states. Neither the empirical nor the theoretical bases have been well enough developed to derive reasonable estimates of the demand functions for the resources offered at the Forest level. Evidence does exist, however, that suggests that the elasticity in the the portion of the timber demand curve for which the Forest can

influence output levels is such that prices would be relatively insensitive to some “reasonable” range of quantity offerings. In other words, it appears that the timber demand curve for the range of output levels analyzed during the development of alternatives is nearly horizontal.

Real price trends were developed and used to represent the rate at which resource values will change over time as a result of anticipated supply and demand interactions in the market place. As specified by the Regional Office (1920 letter to Forest Supervisors, “Timber Price Trends, Values, and Costs”, 9/15/84), a one percent per year real price trend for stumpage was used for FORPLAN harvest scheduling analysis. These were applied for the first 50 years, and then a zero percent price trend was assumed for the remaining 100 years of the harvest scheduling planning horizon. These imply that nominal stumpage prices (i.e., those which include the effects of inflation) will increase during the next 50 years at a rate of one percent greater than the general rate of inflation, and equal to the general rate of inflation after that.

Since price trends are reflections of expected futures, there is an inherent uncertainty involved with making such projections. In recognition of this uncertainty, we performed a sensitivity analysis by rerunning RUN #3 of the benchmarks using alternative stumpage price trends of zero, two, and three percent. The results of these runs are quite complex and are discussed in detail in the Forest Planning Document titled “Analysis of the Management Situation.” Generally, higher price trends make silvicultural investments economically more attractive, but they also tend to delay timber harvest until later decades.

Based on Washington Office direction, a zero percent real price trend for all other resources was used during the development of the benchmarks and the alternatives. In other words, their future nominal values will change at rates equal to inflation.

3. Real Cost Trends

Based on Washington Office direction, zero percent real cost trends were used for all future costs used in the development of the benchmarks and alternatives. In other words, the costs of labor, fuels, materials, and all other factors of production involved with managing the Forest are assumed to change at a rate equal to the rate of inflation.

4. Real Dollar Adjustments

Future prices and costs can be expressed in both nominal and real terms. The projection of nominal values includes the effects of inflation on these values. The projection of real values does not. For example, assume that the future prices for a commodity are projected to increase annually by eight percent. Also assume that the rate of inflation is anticipated to be five percent. In real terms, the prices are increasing by only three percent per year above and beyond the rate of inflation. Real value changes are the result of the interactions of supply and demand forces in the market place. They do not include the effects of inflation.

All future values and costs used in the Forest Planning process were expressed in real 1982 dollars, consistent with the 1985 RPA program. The GNP implicit price deflator index was used to convert both historical and future nominal prices and costs to this common base (FSM 1971.32b).

C. Costs Considered for Economic Efficiency Analysis

The cost of an alternative or benchmark is the sum of the costs of implementing the various mixes of management prescriptions over the Forest plus additional fixed costs and overhead. The cost of implementing a management prescription is the sum of the costs of the activities (i.e., road construction, fence building, cultural resource inventory, etc.) which would occur. Many of these costs for a given activity vary depending on characteristics of the land or the overall goals of the management prescription. Costs for disposal of logging slash, for instance, are higher in prescriptions emphasizing visual quality in scenic corridors. Road construction is more expensive on steeper slopes.

Costs were identified by their Management Information Handbook (MIH) codes as described in FSH 1309.11a. Each cost was categorized as either fixed or variable. Costs were also categorized as either capital investments or operational and maintenance. For budget estimates, costs were further categorized according to the source of funding, whether appropriated from Congress or allocated from other sources.

Costs were estimated by the Interdisciplinary Team using historical data, projections made for the 1985 RPA, and contract estimates. Professional judgment was an important factor in assessing the relationship between historical costs and anticipated future costs. Costs were originally estimated in 1982. They were re-estimated in June 1984. Costs were reviewed by the appropriate staff officers.

1. Costs in FORPLAN

No fixed costs were included in FORPLAN. These costs do not vary by alternative or benchmark. Therefore they have no effect on model solution. All variable costs which were associated with activities modeled in FORPLAN were included in the model. Variable costs associated with timber management were directly included.

2. Costs Outside of FORPLAN

All overhead and fixed costs were handled outside of FORPLAN. Variable costs which did not relate to activities modeled in FORPLAN were also handled outside. Computer spreadsheets were used to estimate total present net value, discounted costs, and budgets. The spreadsheets included costs derived from FORPLAN runs as well as all other costs.

3. Real Cost Increases

Based on Washington Office direction, zero percent real cost increases were used for all future costs in both benchmarks and alternatives. In other words, all costs were assumed to change at a rate equal to the general rate of inflation.

4. Cost Summary

Table B-IV-1 summarizes Forest Service budget costs considered in economic efficiency analysis and calculation of budgets. Each cost item is summarized as to whether or not it is included in FORPLAN, varies significantly between alternatives, and is categorized as a capital investment or operations and maintenance cost. Items which are indicated as being both inside FORPLAN and outside FORPLAN, have only a portion of their cost in FORPLAN.

TABLE B-IV-1

COST ITEM BY MIH CODE	INSIDE FORPLAN	OUTSIDE FORPLAN	SIGNIFICANT VARIATION	INSIGNIFICANT VARIATION	CAPITAL INVESTMENT	OPERATIONS & MAINTENANCE
A01 Recreation Planning		X		X		X
A02 Recreation Inventory		X		X		X
A03 Cultural Resource Evaluation & Assessments	X		X			X
A04 Cultural Resource Protection & Enhancement		X		X		X
A05 Facility & Site Reconstruction		X		X	X	
A06 Facility & Site Construction		X		X	X	
A07 Facility & Site Management		X		X		X
A08 Recreation Use Administration	X	X		X		X
A10 Trail Reconstruction		X		X	X	
A11 Trail Construction		X		X	X	
A12 Trail System Maintenance & Operation		X		X		X
B01 Wilderness Planning		X		X		X
B02 Wilderness Inventory		X		X		X
B03 Wilderness Use Administration		X		X		X
C01 Wildlife & Fish Surveys, Planning, Monitoring, & Administration	X		X			X
C02 Non-Structural Habitat Improvement		X		X	X	
C03 Structural Habitat Improvement	X	X		X		
C04 Structural Habitat Maintenance		X		X		X
D01 Range Resource Planning	X		X			X
D02 Range Resource Inventory	X		X			X
D03 Range Non-Structural Improvement	X		X		X	
D05 Range Structural Improvement	X		X		X	
D07 Range Administration and Management	X		X			X
D12 Control of Noxious Farm Weeds	X	X		X		
E00 Timber Resource Management Planning & Inventories		X		X		X
E03 Silvicultural Examination & Prescription	X		X			X
E04 Reforestation	X		X		X	
E05 Timber Stand Improvement	X		X		X	
E06 Timber Sale Preparation	X		X			X
E07 Timber Harvest Administration	X		X			X
E09 Genetic Forest Tree Improvement Program		X		X	X	
F01 Water, Soil, & Air Inventory		X		X		X

TABLE B-IV-1 (continued)

COST ITEM BY MIH CODE	INSIDE FORPLAN	OUTSIDE FORPLAN	SIGNIFICANT VARIATION	INSIGNIFICANT VARIATION	CAPITAL INVESTMENT	OPERATIONS & MAINTENANCE
F02 Water, Soil, & Air Planning	X		X			X
F03 Watershed & Soil Improvements		X		X		X
F04 Water, Soil & Air Administration, & Management		X		X		X
F08 Watershed & Soil Improvements Maintenance		X		X		X
F09 Water, Soil, & Air Monitoring		X		X		X
F19 Water Resource Research		X		X		X
G01 General Technical Inventory & Evaluation		X		X		X
G02 Site-Specific Technical Investigations	X		X			X
G03 Processing of Exploration Proposals		X		X		X
G04 Processing of Lease Applications		X		X		X
G05 Processing of Site-Specific Development Proposals		X		X		X
G06 Administration of Operations		X		X		X
G07 Contests, Hearings, & Appeals		X		X		X
G08 Reserved & Outstanding Rights		X		X		X
H04 Senior Community Services		X		X		X
H06 Volunteers in the National Forests		X		X		X
J01 Special Use Management		X		X		X
J03 Licences & Permits		X		X		X
J04 Withdrawals, Modifications, & Revocations		X		X		X
J06 Property Boundary Location		X		X		X
J07 Property Boundary & Corner Maintenance		X		X		X
J09 Title Claims		X		X		X
J10 Encroachment		X		X		X
J12 Land Adjustment Planning		X		X		X
J13 Land Exchange		X		X		X
J15 Land Acquisition		X		X		X
J16 Land Transfers		X		X		X
J17 Land Sales, Grants & Selections		X		X		X
J18 Rights-of-Way Acquisition		X		X		X
J19 Rights-of-Way Cost-Share Agreements		X		X		X
J22 Forest Level Planning		X		X		X
J24 RPA Program		X		X		X

TABLE B-IV-1 (continued)

COST ITEM BY MIH CODE	INSIDE FORPLAN	OUTSIDE FORPLAN	SIGNIFICANT VARIATION	INSIGNIFICANT VARIATION	CAPITAL INVESTMENT	OPERATIONS & MAINTENANCE
L01 Transportation System Planning & Inventory		X		X		X
L05 Arterial Road Reconstruction		X	X		X	
L06 Collector Road Preconstruction		X	X		X	
L07 Collector Road Construction Engineering		X	X		X	
L08 Collector Road Construction		X	X		X	
L09 Collector Road Reconstruction		X	X		X	
L10 Local Road Preconstruction		X	X		X	
L11 Local Road Construction Engineering		X	X		X	
L14 Timber Purchaser Road Construction	X		X		X	
L18 Bridge & Culvert Construction/ Reconstruction		X		X	X	
L19 Road Operation	X	X	X			X
L21 Trail Preconstruction		X		X	X	
L24 FA&O Construction/Reconstruction		X		X	X	
L25 FA&O Facility Maintenance		X		X		X
L28 Dam Administration & Management		X		X		X
P01 Fire Management Planning & Analysis		X		X		X
P02 Fire Prevention		X		X		X
P03 Fire Detection		X		X		X
P04 Primary--Initial Attack Forces		X		X		X
P05 Secondary Attack Forces		X		X		X
P06 Fire Reinforcements		X		X		X
P07 Forest Fire Support		X		X		X
P08 Initial Attack Fire Suppression		X		X		X
P10 Fuel Management Inventory		X		X		X
P11 Treatment of Activity Fuels	X		X		X	
P12 Treatment of Natural Fuels		X		X		X
P14 Fuel Treatment Area Maintenance		X		X		X
P19 Aerial Transportation of Personnel		X		X		X
P20 Aerial Transportation of Goods		X		X		X
P21 Aerial Application of Materials		X		X		X
P22 Aerial Platform		X		X		X
P23 Noise Abatement		X		X		X
P24 Law Enforcement		X		X		X
P25 Cooperative Law Enforcement		X		X		X
P35 Forest Pest Management--Suppression		X		X		X
T01 Line Management		X		X		X
T02 Program Support		X		X		X
T03 Common Services		X		X		X

5. Logging Costs

The point of valuation for timber in economic efficiency analysis for the FEIS is before harvesting; in other words, as stumpage. However, logging costs cannot be ignored because they occur after the point of valuation. The value of stumpage (i.e., the price consumers would be willing to pay for the timber still standing on the stump) is indirectly influenced by how much it would cost to harvest it and transport it to the mill for further processing. Two identical logs would be worth the same amount when in the mill yard. If one log cost significantly more to deliver to the mill than the other (perhaps due to helicopter logging versus tractor logging), a timber purchaser would be willing to pay less for the unharvested tree. Therefore, stumpage values are a function of logging costs, as well as values of finished products derived from the logs.

The Wenatchee National Forest's FORPLAN model portrays timber mill values rather than stumpage values. Analysis area and prescription specific logging costs are also included. The net effect is to value timber as stumpage, with adjustments for analysis area characteristics and harvest methods.

Logging costs were developed by the Forest's Logging Engineer by making hypothetical timber sale appraisals. Cost estimates varied by slope class, harvest method, logging system, and average size of harvested trees. These factors were all portrayed in FORPLAN.

Logging costs were trended at the same rate as mill values. This adjustment was necessary to net out price trends applied to average logging costs included in the mill values. The net result is to have price trends apply to high bid stumpage.

D. Benefits Considered for Economic Efficiency Analysis

This section describes both the prices and nonpriced benefits which were incorporated in the economic efficiency analyses for each benchmark and alternative considered during the development of the FEIS.

Resource outputs to which dollar values were assigned constitute the priced benefits included in the present net value calculations. Like all of the costs included in the analyses, only those benefits incurred during the 50 year RPA planning horizon were incorporated in the PNV calculations. The economic efficiency analysis for each alternative also considered nonpriced benefits. These are outputs for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs. In these cases, a subjective qualitative value must be attributed to their production. Conceptually, the addition of the nonpriced benefits to PNV is used to derive the net public benefits associated with each alternative. Both priced and nonpriced outputs and their associated values are summarized below.

Priced outputs are those that are, or can be, exchanged in the market place. The dollar values for these outputs fall into one of two categories: market or nonmarket (assigned). The market values constitute the unit price of an output normally exchanged in a market, and are expressed in terms of what people are willing to pay as evidenced by actual sales transactions. Nonmarket values constitute the unit price of an output not normally exchanged in a market and must be estimated by using some comparable sales transaction data in combination with various theoretical techniques. They are valued in terms of what reasonable people would be willing to pay (above participation costs) rather than go without the output.

Benefits are based on the value of outputs on the production site. If off-site values are used for an output, all costs incurred and profits earned after the output leaves the site are deducted.

Priced outputs with market values include timber, firewood and non-recreation special uses. Priced outputs with nonmarket values include recreation, wildlife and fish, and range.

Nonpriced outputs are those for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs. Subjective non-dollar values must be attributed to the production of these outputs. Nonpriced outputs include such things as water quantity and quality, wildlife habitat, visual quality, minerals and energy resources, and cultural resources.

1. Benefits in FORPLAN

Timber, livestock forage, and unroaded dispersed recreation were valued in the FORPLAN model. Other benefits were added to these, after FORPLAN analysis in computer spreadsheet programs, to calculate total present net value. Outputs which were valued in FORPLAN are discussed below. Outputs which were valued outside of FORPLAN are discussed in the subsequent section. More detailed documentation of the specific values and the process used to develop them can be found at the Supervisor's Office.

Timber values were expressed in terms of dollars per thousand cubic feet (MCF) paid by purchasers at time of final harvest. Timber values were market prices based on transactions which occurred on the Forest. Values were developed for key tree species found on the Forest and by two inch diameter classes.

Timber stumpage prices were calculated based on prices paid for timber on the Wenatchee National Forest at the time of harvest during the period April 1977 through September 1983 (Hays and Barranco 1984). The source of this data was computer tapes from the Timber Sale Statement of Accounts. All prices were converted to constant 1982 dollars. Prices per thousand board feet (MBF) were developed by individual species by weight-averaging prices by the volume sold at that price.

Stumpage prices based on actual payments at time of harvest, as above, are sometimes referred to as "cut" values. "Sold" values, on the other hand, reflect the original bid price of the contract. The two sometimes vary due to escalation clauses in contracts which vary the price of timber through time. Cut values were used to maintain consistency with the 1985 RPA assumptions.

The stumpage values were converted from dollars per MBF to dollars per MCF using a conversion factor of 5.45 board feet per cubic foot. Average logging costs, determined from a statistical analysis of 2400-17 Timber Sale Report data for 1973 to 1982, were added to stumpage values to derive the value of timber delivered to the mill. Species specific values were then further refined by two inch diameter classes based on assumptions as to the average diameters of timber used in the stumpage valuation and price/diameter relationships developed by the Pacific Northwest Forest and Range Experiment Station. Timber values were expressed in FORPLAN as mill values by species by diameter class. These were tied to the two timber working groups in FORPLAN, dry forest and wet forest, by assumptions as to the species composition of each working group. Dry forest was assumed to consist of 40 percent Douglas-fir, 40 percent ponderosa pine, and 20 percent other coniferous species. Wet forest was assumed to consist of 34 percent Douglas-fir, 22 percent true firs, and 44 percent other coniferous species.

Site specific logging costs were developed as explained in Section IV.C.5 of this appendix. These costs were included in the FORPLAN model. The net effect of including mill values and logging costs in FORPLAN is to value the timber as stumpage. This point of valuation is consistent with that of other outputs included in the present net value calculations.

Table B-IV-2 below presents average working group stumpage prices by diameter class. These values are based on Forest-wide average logging costs and are shown here just as a frame of reference. Much more specific logging costs, reflecting analysis area and tree size characteristics, were used in the FORPLAN model. This resulted in a wide variation in stumpage values.

**TABLE B-IV-2
WORKING GROUP STUMPAGE VALUES (\$/MCF)**

<u>DBH Class</u>	<u>Dry Forest</u>	<u>Wet Forest</u>
7-9	150.48	222 44
9-11	225.51	287 36
11-13	300.53	329 65
13-15	363.27	399.85
15-17	419 86	447.49
17-19	471.59	490 98
19-21	514.61	525.50
21-23	558.89	555.87
23-25	587 34	577.98
25-27	604.75	595.96
27-29	619.61	604 95
29-31	634.46	613 94
31-33	646.75	613 94
33-35	652.90	613.94
35+	659.05	613 94

A financial analysis of yield tables and prescription combinations completed in 1982 found that all existing stands used in modeling were economically feasible if a regeneration harvest method was used. Later analysis in the FORPLAN model showed that commercial thinning in overstocked stands that had not been previously thinned was uneconomical. As a result, the GF-2 yield table which proposed commercial thinning without a previous precommercial thinning was no longer used in FORPLAN. The general forest yield table that maximizes Present Net Value on a per acre basis is GF-3. This is also the most biologically sound prescription for tree species where precommercial thinning is needed for early stocking control. Stands where commercial thinning is economically and biologically sound include those on relatively level ground and especially where ponderosa pine and Douglas-fir are the major species.

Special management areas where large trees are desired, such as travel corridors, must be thinned in order to achieve the desired size. No other options were entered in FORPLAN. An analysis was done to determine whether longer rotations or increased entries were the most feasible. It was determined that for visual management areas mandatory thinning instead of long rotations was the best approach to creating large diameter trees.

Under maximum Present Net Value, some densely stocked stands in special management areas which require precommercial thinning, and some non-stocked or bareground acres, do not go into FORPLAN solution under the costs and benefits used.

Range outputs represent the amount of forage permitted to be grazed and are measured in terms of animal unit months (AUMs). While the Forest receives grazing permit fees, the value received for the AUMs is not based on market transactions. Therefore, the dollar values per AUM used in the analysis of the benchmarks and alternatives were market price estimations based on the contribution of National Forest grazing to the net income of ranchers.

The Forest Service entered into a cooperative agreement with the USDA, Economic Research Service to develop livestock enterprise budgets for each National Forest. The range budget approach was used for this analysis. Because Forest AUMs are not actually priced in a free competitive market, the calculated price is an estimate of market value. First, returns from all ranch products were determined. Then, all costs of production were subtracted. The remaining returns plus the cost of the Forest Service permits became the residual value of the AUM. The residual value of an AUM to ranch livestock production is comparable to conversion surplus timber value. Based on the information provided in the RPA 1985 Program analysis for the DEIS, and a Regional Office Memo (2340, 9/30/83), the AUM value for the Forest in 1982 dollars is \$7.31.

Range benefits were entered into FORPLAN as net values rather than entering benefits and costs per AUM separately. This was done to utilize the "demand" feature in FORPLAN Version II. A horizontal demand curve was used which depicted one benefit value over the full range of AUMs which would be consumed, and a value of zero for any AUM production beyond that point. Net benefits were utilized so that per AUM costs would also be cut off at this point.

The non-wildlife related recreation and wilderness outputs represent the amount of use consumed on the Forest and are measured in terms of recreation visitor days (RVDs). The wildlife related recreation use is measured in terms of wildlife and fish user days (WFUDs). The values used for these priced outputs were derived directly from the 1985 RPA program assessment. This discussion is a summary of the write-up found in Appendix F the 1985 RPA DEIS.

The development of recreation, wilderness, and wildlife values for the 1985 RPA Program analysis consisted of two steps: (1) development of recreation and wildlife benefit values by activity per RVD or WFUD; and (2) adjustment of values to reflect standard and less-than-standard levels of management.

The Resource Evaluation Group at the Rocky Mountain Forest and Range Experiment Station conducted an extensive literature search to develop the 1985 activity values for recreation. Benefit values for recreation, wilderness, and wildlife activities were developed from recent travel cost models and contingent valuation research (Loomis and Sorg 1982). In-service and academic specialists reviewed the research and activity values and adjusted the initial values to achieve methodological consistency to apply them to regional conditions. The values represent total willingness-to-pay for an additional recreation site, herd unit, or wilderness area. The RVD value by recreation activity that were generated by this study can be found in Table F.4 of the 1985 RPA DEIS.

For program evaluation purposes, these values were subsequently adjusted downwards because:

- The travel cost method represents a total willingness-to-pay. Other resource values in the RPA evaluation represent market price or value of the marginal product. Consequently, the willingness to-pay values were adjusted in an effort to make the recreation values more compatible with values used for other resource outputs.
- The travel cost method estimates values on a site-by-site basis. The method does not address the question of whether regionally or nationally a given quantity of RVDs will, in fact, be consumed if that price were changed.

-It is believed that the travel cost studies are typically done at higher quality sites, do not take into account substitutes to individual sites, and do not accurately measure trip length; consequently, values from these studies may be on the high side when applied to average situations on a region-wide basis.

In response to the first concerns, the values were adjusted based on the relationship between the proportion of recreation provided by the Forest Service and estimates of an average nation-wide demand elasticity for outdoor recreation. It is estimated that nationally, roughly a five percent increase in price will result in a one percent decrease in quantity demanded (Levis 1977). It is also estimated that in 1982 the Forest Service provided 7.5 percent of all outdoor recreation. Consequently, it is roughly estimated that there will be a five percent decrease in price for each percent of the 7.5 percent Forest Service market share or a total decrease of 37.5 percent for clearing the market. Therefore, the initial willingness-to-pay values were reduced 37.5 percent for use in comparing resource allocation choices.

In response to the quality factor, the concept of standard and less-than-standard service was introduced, and the resulting impact on the value of the experience to the recreationist was estimated. If recreation facilities are not fully maintained, the quality of the experience will be lowered. Two different sets of values were developed to account for the standard and less-than-standard outputs. A special study showed that on the average the less-than-standard RVDs are valued at about 53 percent of the value of standard RVDs.

Finally, these values were expressed in terms of the recreation opportunity spectrum (ROS) activity categories in accordance with the way were developed and tracked during the process of analyzing alternatives. The resulting values are depicted in the following table.

TABLE B-IV-3
1985 RPA RECREATION BENEFIT VALUES (1982 \$)

<u>Recreation</u>	Value(\$/RVD)
Primitive (STD)	11.25
Primitive (LSTD)	5.96
Semi-Primitive Non-Motorized (STD)	13.25
Semi-Primitive Non-Motorized (LSTD)	7.02
Semi-Primitive Motorized (STD)	12.13
Semi-Primitive Motorized (LSTD)	6.43
Roaded Natural (STD)	4.97
Rural (STD)	8.47
Rural (LSTD)	4.49
Urban (STD)	11.38
Urban (LSTD)	6.03
<u>Wilderness</u>	<u>Value(\$/RVD)</u>
Primitive (STD)	17.50
Primitive (LSTD)	9.28
Semi-Primitive Non-Motorized (STD)	17.50
Semi-Primitive Non-Motorized (LSTD)	9.28
<u>Wildlife and Fish</u>	<u>Value(\$/WFUD)</u>
Big Game	30.00
Nongame	25.00
Resident Fish	15.00
Other Game	19.00
Wildlife and Fish (STD)	21.00
Wildlife and Fish (LSTD)	14.00

Roaded recreation was not valued in FORPLAN because all alternatives had a greater capacity to supply roaded recreation than was demanded throughout the planning horizon. Therefore it had no effect on allocation or scheduling.

Unroaded recreation, including wildlife and fish related recreation, was valued in FORPLAN. Separate values were used for primitive, semi-primitive non-motorized and semi-primitive motorized recreation. The values in the model reflect the recreation values plus the wildlife and fish values listed above, weight averaged based on historical levels of participation. Per RVD costs were subtracted from these values to produce net benefits. This was done to make better use of the "demand" feature in FORPLAN as explained above for range values.

2. Benefits Outside FORPLAN

Priced benefits not included in FORPLAN were added to FORPLAN benefits using computer spreadsheet programs. Nonpriced benefits were considered in addition to present net value to determine present net benefit.

Wilderness and roaded recreation, including wildlife and fish related recreation, were valued outside of FORPLAN. The values developed for RPA, described in the preceding section, were used.

Commercial harvest of anadromous fish was valued at \$1,050 per thousand pounds of fish harvested. The source of this value was the 1985 RPA.

Firewood was valued at \$2.50 per cord. This is the price charged by the Forest for firewood.

Non-recreation special uses were valued in terms of fees actually paid for these goods and services. These same total benefits for non-recreation special uses were used in all alternatives based on historical data.

Permit fees are also charged for other goods and services such as grazing, camping, summer homes and ski areas. These outputs have nonmarket values developed for them that are considered better estimates of their actual value. Permit fees are not included in benefit calculations for these outputs to avoid double-counting.

The priced outputs, whether included in FORPLAN or added later in a spreadsheet, are used to calculate present net value. Not all benefits can be quantified in dollar terms for use in PNV calculations, however. These benefits must be subjectively evaluated in conjunction with present net value to determine present net benefit. Nonpriced outputs are discussed in more detail in Section A.2 of this chapter.

V. SOCIAL AND ECONOMIC IMPACT ANALYSIS

A. Overview

1. Forest Influence Zone

A "Forest Influence Zone" was delineated to assess current social and economic conditions and to estimate potential changes. The Forest Influence Zone is the geographic area where the majority of forest resources such as recreation, range, timber, water, and wildlife are first used and where public concern is concentrated. Chelan, Kittitas, and Yakima Counties comprise the Forest Influence Zone for this analysis.

2. Population

The 1983 population of the Forest Influence Zone was 248,400 persons. This is almost six percent of the State's population. About one-half of the population lives in rural settings; the other half lives in urban settings. This area has an older age distribution than the State average. Chelan and Kittitas counties have proportionately lower minority populations than the State. Yakima County has a proportionately higher minority population due to the Yakima Indian Nation and a large Spanish-American population. The rate of population growth in the three-county area has been slower than Statewide over the last 40 years. This trend is expected to continue in the future.

3. Economy

Economic activities in Chelan, Kittitas, and Yakima Counties are closely tied to the activities of the Wenatchee National Forest. A large proportion of the residents of this area rely on the commodity and amenity resources of the Forest. Economic activities affecting local individuals include logging, sawmill operations, commercial livestock operations, tourism, and various recreational pursuits. Residents of the study area also have the unique opportunity to participate in nearby forest recreation activities such as hunting, fishing, hiking, and a range of winter sports; thereby generating demand for recreation-related goods and services.

The service, government, agriculture, forest products, and construction industries are the most important in Central Washington. Because the make-up of the service-related and government sectors is influenced to a large extent by the composition and relative influence of the primary (agriculture and forestry) and secondary (manufacturing and processing) sectors, emphasis is placed on describing the importance of these latter industries in the region.

Employment and income data on Central Washington's economy are presented in the following sections. Additional information is provided on the agricultural sector, the region's most important; forest industries, an important sector that is highly influenced by the Wenatchee National Forest, and the local tourist industry, which is related to the recreation influence of the Forest.

In 1984, about 1,575,314 individuals were employed in Washington State. Combined employment for Chelan, Kittitas, and Yakima Counties of about 83,872 people represented six percent of the State's total work force. Employment data for major industrial sectors in the State and the Central Washington counties are presented in Table B-V-1.

TABLE B-V-1
EMPLOYMENT IN MAJOR INDUSTRIAL SECTORS - 1984
 (Number of Persons)

<u>Industrial Sector</u>	<u>Washington</u>	<u>Chelan County</u>	<u>Kittitas County</u>	<u>Yakima County</u>
Total Employment	1,575,314	20,649	7,216	56,007
Agriculture, Forestry and Fishing	32,965	2,241	--	8,017
General Building Construction	64,002	740	128	1,764
Manufacturing (Total)	270,184	2,552	531	6,708
Food and Kindred Products	28,356	644	284	2,530
Lumber and Wood Products	38,367	325	82	1,145
Furniture and Fixtures	2,981	N/A	N/A	143
Paper and Allied Products	15,406	N/A	N/A	436
Primary Metals	11,969	Not listed separately	N/A	N/A

Source: Washington Employment Security Department. 1985. Employment and Payrolls in Washington State by County and by Industry. No. 150 First Quarter 1984.

The unemployment rate is an important indicator of the health of a local economy. Due to the relative shortage of jobs in the Forest Influence Zone, the unemployment rates in Chelan, Kittitas, and Yakima Counties were consistently higher than the unemployment rate Statewide (Table B-V-2). (These data on unemployment are recorded by county of residence, not by county of work place. Data on Chelan and Douglas Counties have been aggregated because these two counties represent one labor market.)

TABLE B-V-2
UNEMPLOYMENT RATES 1970, 1975, 1979, 1981, 1983, 1984
 (Percent)

<u>Year</u>	<u>Washington</u>	<u>Chelan-Douglas Counties</u>	<u>Kittitas County</u>	<u>Yakima County</u>
1970	9.1	10.9	9.5	10.7
1975	9.6	10.8	10.5	10.4
1979	6.8	10.5	9.0	9.7
*1981	9.5	12.8	12.7	12.0
*1983	11.2	14.5	13.1	14.9
*1984	9.5	12.3	13.0	14.4

Source: Washington Employment Security Department, Research and Statistics Section. 1980. Personal Communication.

*Washington Employment Security Department, Wenatchee, Personal Communication 1981, 1983, 1984.

Per capita personal income data are available for 1970 and 1978 from the Bureau of Economic Analysis (U.S. Department of Commerce, Bureau of Economic Analysis 1980). In 1970 the per capita income in Washington was \$3,997. Personal income in the Forest Influence Zone was lower. Chelan County ranked highest at \$3,665. The 1970 Kittitas County figure was well below this at \$2,975.

Since 1970 per capita personal income Statewide increased by 178 percent to \$11,110 in 1981. The rank order among the three counties has remained constant, but all three registered larger percentage increases than the State. Personal income increased at a rate of 195 percent in Chelan and Kittitas counties, 192 percent in Yakima County. Table B-V-3 contains data on per capita income for the years 1970, 1978, and 1981.

TABLE B-V-3
PER CAPITA PERSONAL INCOME
(Dollars)

<u>Year</u>	<u>Washington</u>	<u>Chelan Counties</u>	<u>Kittitas County</u>	<u>Yakima County</u>
1970	3,997	3,665	2,975	3,248
1978	8,553	9,181	6,454	7,628
1981	11,110	10,826	8,773	9,482
Percent Change 1970-1981	178	195	195	192

Source: U.S. Department of Commerce, Bureau of Economic Analysis. 1980. Regional Economics Information System. Washington State Data Book, 1983

The economy in the area east of the Wenatchee National Forest rests heavily upon agricultural production. Yakima County is the State's leading agricultural county with a diversified farm base. Its principal products include apples and soft fruit, cattle, hops, potatoes, and wheat. The economy of Chelan County depends primarily upon deciduous orchard crops, with apples being the predominant crop. Kittitas is primarily an agricultural county producing crops and livestock.

The Central Washington area is very important to the State's economy because of its agricultural base. These counties support 36 percent of the State's agricultural employment with Yakima County alone supporting 27 percent (ESD 1984).

The agricultural sector will remain the dominant force in the economy of Central Washington. The strong demand for agricultural products abroad as well as the anticipated strength of domestic demand will, if anything, increase the importance of agriculture in Central Washington. This trend should continue at least through 1990 and may become even more pronounced in the future.

The lumber and wood products industry in the Forest Influence Zone represented 3.7 percent of the State's employment for that industry in 1983 (ESD 1984). Yakima County has the largest lumber and wood products work force among the Central Washington counties, with 1,048 workers in 1983. This represented 17 percent of manufacturing employment in the county, and two percent of total employment. Chelan County's lumber and wood products industry employed 293 workers in 1983, for respective manufacturing and total county employment shares of 14 percent and 1.5 percent. The lumber and wood products work force of 72 in Kittitas County was much smaller in absolute terms, but still accounted for 17 percent of all manufacturing jobs in the county and 1.1 percent of total employment.

Industries in the Forest Influence Zone accounted for eight percent of the State's timber consumption. Specifically, seven percent of all timber used in the Washington lumber industry was consumed by the

seven sawmills located in Chelan, Kittitas, and Yakima Counties. The veneer and plywood industry has a relatively small economic importance in the study area since one mill is located in each Kittitas and Yakima Counties.

The forest products sector of the economy will likely decrease in importance in the future. The extent of this decline, however, will be influenced by several factors. Most notably, the reduction in timber available from private land may cause an overall slump in timber production in the region, and could very likely contribute to a reduction in capacity or closure of local mills. This reduction could lead to further pressure for increasing the harvest from National Forest System lands. This pressure could become particularly intense in the 1990's, or earlier, should housing demand rebound substantially from its low levels in the early 1980's.

Visitors to the Wenatchee National Forest have an impact on the local economy because of expenditures they make for goods and services at establishments nearby. Data on the number of retail trade establishments are available from the U.S. Census Bureau for States and counties. The variables selected as indicators of local economic dependency on recreational use include the following: 1) hotels, motels, and recreational vehicle parks; and 2) eating and drinking establishments. While these components of the services industry receive a significant amount of business from nontourists, the trends in these two service industries reflect growth or decline in the tourist industry.

In Chelan County, there were 44 hotels and motels and 108 eating and drinking establishments in 1972. In 1983, the number of restaurants increased by 16 percent to 125 and the number of hotels/motels increased by 6 percent to 45 establishments. Most growth has been concentrated in the Wenatchee area. Collectively, these establishments supported about 1,890 jobs, or about 10 percent of total employment in the county. Most of the additions include larger motels and restaurants employing more personnel than in 1972. There were only 1,400 jobs in these categories in 1978.

In Kittitas County, the number of eating/drinking establishments decreased in the period during the 1972 to 1983 period, from 78 to 67 establishments in 1983. The number of hotels/motels decreased from 27 to 19. Total employment supported by these retail and service outlets was approximately 1,020 jobs, up from 900 in 1978, or nearly 13 percent of all Kittitas County employment.

In Yakima County, the number of eating and drinking establishments decreased in the period from 1972 to 1983. There were 44 hotels and motels and 309 eating and drinking establishments in 1983. This decrease is misleading, however, because a number of facilities have expanded their capacity. This is particularly true in the City of Yakima where increased capacity has resulted from attempts to increase convention activity.

A particularly active sector of the regional economy will be the tourism sector. An increase in summer and winter recreation activities, particularly along the major travel routes, is expected in the 1980's. The increase in the cost of energy will likely focus the greatest recreational demand near the transportation corridors leading from the Puget Sound area population centers. Recreational demand will be greatest in those areas closest to the Everett-Seattle-Tacoma metropolitan area.

4. Social Structure

The social system surrounding the Wenatchee National Forest is best characterized by its complexity and propensity for change. The complexity is due to the size of the Forest and its proximity to a major metropolitan area in the Puget Sound region, diverse manufacturing and agricultural communities in the Central Washington region, and recent nonmetropolitan growth in the immediate vicinity of the Forest. Change is attributable to rapid metropolitan and nonmetropolitan population growth in the Puget Sound

region and localized growth in nonmetropolitan areas and towns in the Central Washington region. But more significant than population growth is the rapidly changing character of the traditional rural and wildland communities immediately adjacent to the Forest.

The influence of a changing society upon the Wenatchee National Forest can be interpreted by viewing these ongoing changes against those of an emerging advanced-industrial social system. An advanced-industrial social system is a type of society based on advanced complex technology, theoretical knowledge, extensive public regulation of private property and markets, pervasive communication, and social services (Bradshaw and Blakely, 1976).

The original migrants to Washington were drawn by opportunities in extractive industries associated with ranching, mining, agriculture, and wood production, as well as the transportation, trade, and service industries which facilitated resource extraction and industrial development (Johansen and Gates, 1957). Farming, ranching, wood production, and some mining provided the primary economic base for the formation of towns along the eastern base of the Cascades in the major stream drainages. Communities such as Ellensburg, Yakima, Wenatchee, Cle Elum, and Chelan grew in response to markets for basic materials that could be produced from an abundant stock of fertile soils, forage, wood, and coal or minerals.

The populations of these small communities fluctuated with the viability of extraction-based economies. Farming and ranching were relatively stable. Early population growth based upon timber and mining on private land subsided when these natural resources were exhausted.

The Yakima River Project brought about the development of irrigation and hydroelectric power beginning in the first decade of this century, and may have been the single most important factor in the growth of the region. The economic base established by the Yakima Project and other agricultural development provided the basis for long-term population changes in the region. As agricultural production increased, creating additional activity in processing, distribution and services, small towns such as Yakima and Wenatchee grew into regional manufacturing and service centers. Expanding trade, facilitated by rail and water transport, provided increased access to markets for farm products and other regional exports.

Over the last century, the proportion of employment in the primary extractive industries, particularly agriculture, forest utilization, and mining, has declined sharply in contrast with the service sector of the economy. *The shift in emphasis from resource extraction to services has made recreation and tourism a new economic base for some communities.* This shift also places increasing emphasis on public goods such as recreation resources, clean air and water, scenery, and wilderness preservation. *Emphasis on consumption of public goods and services necessitates greater use of political processes for allocating resources.* Government increasingly supercedes market institutions for purposes of allocating public goods, delivering services, and regulating the use of wildland resources.

The dynamic evolutionary status of the advanced-industrial social system also transforms the social environments of many communities in the Forest Influence Zone. Communities demonstrate a mixture of attitudes, some more closely associated with an advanced, emerging technology-oriented social system and others with maintaining their former position as "extractive-industrial" communities. Conflicts within communities often occur as areas grow because of such a mixture of attitudes.

Traditional ranching, farming, and logging communities in the Central Washington region were typified by a way of life in which most people knew one another personally and interacted frequently. Self-reliance and individualism were central values of people living in these communities; outsiders were mistrusted and formal procedures or organizations were not automatically used to resolve differences or local problems.

Residents of agricultural and timber based communities also exhibit certain patterns of behavior that are different from their advanced-industrial counterparts. Specifically, recreational activities of this group tend to be focused on active pursuits such as hunting, fishing, and snowmobiling. The Forest Service has traditionally responded to these local interests in its day-to-day management activities. The favored activities of these groups contrast with advanced-industrial interests in activities such as hiking, cross-county skiing, river rafting, and wilderness camping. Obviously, many urban and suburban residents hunt and fish and otherwise engage in activities similar to those undertaken by the local population, but to a lesser degree.

Pursuit of recreational activities becomes one of the primary means by which citizens in an advanced-industrial social system are exposed to forest lands and management activities. A view of forests emphasizing mainly recreation or tourism is typical for metropolitan residents and even for some of the most recent immigrants to rural and wildland communities. Therefore, it is not surprising that there are often conflicts in rural communities between locals and outsiders, including newcomers. Local residents often feel they have a greater right than outsiders to use the National Forests for recreation, firewood, Christmas trees, and hunting.

The conflict between local and non-local residents over restrictions on traditional private property rights illustrates a key feature of the emerging advanced-industrial social system. The challenge to traditional property rights, whether they are held by the government or by a private person, represents the assertion of the concept of rights found in an advanced-industrial social system. Members of the public increasingly claim common rights to environmental quality, recreation, public health, and other collective goods. These claims are often asserted by organizations which claim to represent the public's interest in the environment. Thus, members of a public interest group or class of citizens may feel they can legitimately make claims which supercede those of the private or public landowner.

Intermixed ("checkerboard") land ownership patterns on the Wenatchee National Forest could increasingly become a source of conflict. The expanding set of public goods assigned to National Forest lands by an advanced-industrial social system will be increasingly inconsistent with intensive forest management on adjacent private lands. Forest users and interest groups are likely to become increasingly concerned with inconsistent land uses along these ownership boundaries.

Emergence of an advanced-industrial social system in the Puget Sound and Central Washington regions has also changed decision-making institutions. Non-market political and administrative processes have enjoyed expansion in both their jurisdiction and authority. While the role of markets in allocating resources has suffered from increasing regulatory limitation, this trend is closely related to the changing concepts of land tenure and signals the increasing success of groups organized to pursue particular interests. Interest group formation and political action has increasingly replaced economic behavior as the force driving resource decisions. The Forest Service has accommodated this trend by incorporating opportunities for public involvement in its planning and decision-making processes.

Use of interest groups and political influence as instruments to shape decisions related to environmental quality and other public goods is not simply an urban or suburban phenomenon. Interest group action has replaced traditional person-to-person influence on resource allocation in many rural communities.

Most of the preceding information in this chapter is excerpted from a socio-economic overview of the Wenatchee National Forest, updated in 1984, that was prepared by the Envirosphere Company of Bellevue, Washington. This document is on file in the Forest Supervisor's Office.

B. Sources of Data

Impacts of alternatives and benchmarks on employment and income in the Forest Influence Zone were estimated using input-output analysis. Returns to the federal Treasury and payments to counties were estimated based on anticipated receipts for goods and services.

1. Economic Impact Analysis

IMPLAN was used to perform the economic impact analysis for the FEIS. IMPLAN is an input-output model software program which resides on the micro computer at the Wenatchee National Forest Supervisor's Office in Wenatchee. It is not the purpose of this discussion to describe IMPLAN in detail. This can be ascertained in the User's Manual (August 1982) and several other papers which describe the IMPLAN system in detail.

Economic input-output (I-O) analysis is a procedure for describing the structure of inter-industry dependencies in a regional economy. The region, in this case, is Chelan, Kittitas, Douglas and Yakima Counties. I-O analysis is based upon the interdependence of the production and consumption sectors of the economy for the area being studied. Its foundation rests on the concept that industries must purchase inputs from other industries, as well as from primary sources (e.g., natural resources), for use in the production of outputs which are then sold either to other industries or to final consumers. Thus, a set of I-O accounts can be thought of as a "picture" of an impact areas economic structure at one point in time. In this case, the point in time is 1982. This structure is represented as a mathematical transactions matrix of buyers and sellers in the economy.

The proposed output levels associated with each alternative are represented as changes in the current levels of final demand for these outputs in the IMPLAN model. The resulting production requirements needed to satisfy these changes in final demand and the flow of industrial inputs and outputs can then be traced via the I-O accounts to show the linkages between, and the impacts on the different industries composing the regional economy. Through mathematical matrix manipulations, the estimated direct, indirect, and induced impacts can be evaluated. The impacts concerning most people in the local economy are those dealing with the changes in employment and personal income.

a. IMPLAN Data Base

The IMPLAN model has a database consisting of: (a) a national level technology matrix, and (b) a file of estimated activity levels for total gross output, 6 final demand components, 3 final payment indicators, and employment estimates for 466 industrial/business sectors (Alward and Palmer, date unknown). The national level technology matrix is based on a 1972 Department of Commerce I-O model that was converted to an "industry by industry" basis and updated to 1977 using the RAS procedure (Clopper, Almon, and others, 1974).

b. National Data Base Reduction to Impact Area

The county level information is based on a 1982 data set constructed by Engineering Economics Associates of Berkeley, California. Utilizing the national technology matrix and the control totals for Chelan, Kittitas, Douglas, and Yakima Counties, a data reduction method is employed to develop the input-output table for the economic impact area. The method used exploits the property of "openness" displayed by smaller regional economies when compared to the National economy (Richardson, H.W 1972). Smaller regional economies exhibit much greater tendencies to import and export goods and services than does the national economy. Therefore, they are more "open" than the national economy. Based on the assumption that trade balances are the principal difference between national and regional purchase patterns (e.g., industry production functions are identical but regional imports and exports make local inter-industry transactions different), the supply-demand pool technique for data reduction was adopted

Once this step was done, input-output model of the 1982 local economy was compared against alternate sources of information regarding employment by sector in order to verify its reasonableness.

c. Final Demand Expenditures

For each alternative, the I-O model was used to translate proposed changes in resource output levels from their current levels of production into changes in employment and income for the Forest Influence Zone.

An intermediate step in this process was to equate the changes in the respective resource outputs to changes in final demand expenditures by sector. Final demand expenditures are different from the values used in the PNV efficiency analysis. The PNV efficiency analysis examines only the market value of the raw material that leaves the Forest. For the case of timber outputs, this would be the stumpage values. On the other hand, final demand expenditures represent the dollars spent by the ultimate consumer at the point of final consumption. The point of final consumption is the sector from which the ultimate consumer purchases a product, or the sector beyond which the output is exported from the region. For example, the point of final consumption for an output of timber might be in the construction sector because the timber is used in the construction of a house which a consumer may purchase. However, if the timber is exported following processing at the sawmill, the point of final consumption is the primary wood processing sector. By identifying the final consumption point, the transactions of all industries involved in processing the output are considered.

Table B-V-4 lists outputs for which final demand expenditures were estimated. A more detailed documentation of the input-output analysis can be found in the planning records.

**TABLE B-V-4
OUTPUTS USED IN I-O ANALYSIS**

<u>Output</u>	<u>Unit of Measure</u>
Softwood Sawtimer	MMBF
Livestock Grazing	MAUM
Developed Recreation	MRVD
Motorized Recreation	MRVD
Non-Motorized Recreation	MRVD
Fishing	MWFUD
Hunting	MWFVD
Viewing Wildlife	MWFVD

2. Returns to the U.S. Treasury and Local Governments

Returns to the U.S. Treasury and payments to local governments were estimated in a manner compatible with the 1980 RPA and the draft 1985 RPA. Returns to the Treasury are based on receipts for Forest goods and services.

Timber receipts include cash payments for timber, required cooperative deposits (K-V), brush disposal, salvage fund, cooperative road maintenance, and purchaser credit for road construction. This was estimated using timber revenues from FORPLAN minus logging costs.

Grazing receipts were based on the average grazing fee from 1977 through 1983. This was multiplied by the estimated number of animal unit months (AUMs) which would be demanded by period.

Minerals receipts were based on royalty payments for oil and gas leases, geothermal leases, and out-service use of common minerals. Mineral receipts were assumed to be constant among alternatives due to the uncertainties involved in estimating the timing of development and the quantities that would be extracted.

Recreation receipts were based on campground fees and charges for special use permits. Campground fees were based on an average charge of \$5.00 per unit times the anticipated use by period. Recreation and non-recreation special use permit receipts were based on historical levels.

Payments to local governments were estimated as a percentage of total receipts. Twenty-five percent of the receipts for all commodities except minerals, and 50 percent of minerals receipts, were assumed to be payments to local governments. These funds are paid to the State of Washington which distributes them to the county in which they originated. These funds are often referred to as payments in lieu of taxes.

C. Information Generated from the Social and Economic Impact Analysis

Chapters II and IV of the FEIS present the details of the anticipated socio-economic impacts associated with the implementation of each alternative. In particular, Table II-3a displays the estimated impacts associated with each alternative for the first, second, and fifth decades (as represented by the individual years 1986, 2000, and 2030) with regards to jobs, personal income, total returns to the U.S. Treasury, and payments to counties. A generalized brief narrative of the findings is presented here.

Since the early 1980's we have been in a economic and technological transition in the wood products industry. There are trends that indicate that employment per unit of output is declining, and this would cause a change in the 1982 coefficients used to generate future employment estimated for the alternatives. The current table numbers should be used in a relative sense only, and not the absolute.

The modeling of economic impacts was based on the proposed changes in resource output levels between each respective alternative and the output levels upon which the current economy is based. These changes were used as input to the I-O model and it, in turn, would provide the estimated direct, indirect, and induced impacts on jobs and income among other things. Table B-V-5 presents the current output levels for each resource, and the total jobs and income response coefficients that would result from an output change of one unit for each resource. For example, 144.8 MMBF of sawtimber has historically been harvested on the Forest annually. If an alternative proposed to change this by 1 MMCF, a potential change of 11.28 jobs and \$.3073 MM (in 1982 dollars) could be realized in the local economy after all direct, indirect, and induced effects are accounted for.

**TABLE B-V-5
EMPLOYMENT AND INCOME RESPONSE COEFFICIENTS BY RESOURCE**

<u>Output</u>	<u>Current Output level</u>	<u>Change in Output</u>	<u>Change in Employment(jobs)</u>	<u>Change in Income(MM\$)</u>
Softwood Sawtimber	144.8 MMBF	1 MMBF	11.28	0 3073
Livestock Grazing	21.6 MAUM	1 MAUM	0.50	0 0093
Developed Recreation	2313.25 MRVD	1 MRVD	0 07	0.0021
Motorized Recreation	1942.60 MRVD	1 MRVD	0.44	0.0108
Non-Motorized Recreation	492 50 MRVD	1 MRVD	0 33	0 0068
Fishing	294 80 MWFUD	1 MWFUD	0 13	0.0033
Hunting	183.13 MWFUD	1 MWFUD	0.32	0.0076
Viewing Wildlife	245.77 MWFUD	1 MWFUD	0.20	0.0054

In general, alternatives which emphasize commodity outputs tend to produce the most jobs, income, returns to the U.S. Treasury, and payments to local governments. Recreation accounts for the most employment and income in total, but doesn't vary significantly between alternatives. The management of the Forest in terms of recreation varies considerably between alternatives, but the number of estimated recreation users does not. Timber receipts are by far the greatest source of returns to the U.S. Treasury and payments to local governments.

With regards to lifestyles and social organization, different groups will be affected differently depending on the nature of the alternative being considered. Commodity oriented alternatives tend to do well with regards to maintaining the economic aspects of the social structure in the area. Increased supplies of timber, in particular, provide the wherewithal for the local wood processing industry to respond to regional and national markets, which in turn means more relatively higher paying jobs. To the extent that some communities are more dependent upon the wood products industry than others, they will benefit. In addition, more timber means more revenues to the counties which is also an asset when it comes to implementing and maintaining public projects in the local communities, whether they be timber dependent or not. Some communities are much more dependent on recreation and tourism, however. Maintenance or enhancement of scenery and recreation opportunities may be more important to community stability in these cases.

Finances aside, other types of Forest Service decisions can influence the attitudes, beliefs, and values of Forest dependent communities. Generally, those groups or communities who view or use the Forest from an amenity standpoint are positively impacted by amenity-oriented alternatives and negatively affected by those alternatives with a commodity emphasis. Decisions regarding whether or not to develop roadless areas for timber harvesting and how much timber should be harvested at the expense of scenic quality, wildlife, and other noncommodity types of resources will tend to polarize groups with different values and pull together groups with common values. The composition of the groups may change with regards to different issues.

Almost all groups and communities can adapt to slow changes in their environment. However, rapid and dramatic changes in the way the Forest is managed are likely to result in broad levels of social disruption.

VI. ANALYSIS PRIOR TO DEVELOPMENT OF ALTERNATIVES

A. Introduction

The primary analysis prior to development of alternatives was the "Analysis of the Management Situation" (AMS). This step examines the ability of the Forest to supply goods and services in response to society's demands. The primary purpose of this analysis is to provide a basis for formulating a broad range of reasonable alternatives. This is accomplished by defining the "decision space" within which the Forest can operate to address issues, concerns, and opportunities. This planning step is documented in a planning document titled "Analysis of the Management Situation and Proposed Alternatives." Most of the relevant information is also found in this appendix.

A series of benchmarks were developed in accordance with Regional direction (November 10, 1983). FORPLAN was the major analytical tool used in this process. A few benchmarks were estimated outside of FORPLAN. Electronic spreadsheets were used to calculate present net value, budgets, returns to the Treasury and payments to local governments. IMPLAN was used to estimate impacts on employment and income. Use of these analysis tools has been explained in prior sections of this appendix.

The primary analysis performed prior to the development of all alternatives except the No Change Alternative was the "Analysis of the Management Situation" (AMS). It is unknown what analysis was performed prior to the development of the TM Plans. Provisions of 36 CFR 219.12(e) may not have been met in the development of Alternative NC.

B. Development of Management Requirements

The Pacific Northwest Region developed direction to assure that the management requirements (MR's) of the National Forest Management Act (36 CFR 219.27) were applied consistently across all Forests within the Region. This direction (letter from Jeff Sirmon, designation 1920, dated February 9, 1983, on "Regional Guidelines for Incorporating Minimum Management Requirements in Forest Planning") is on file in the Regional Office in Portland and the Supervisor's Office in Wenatchee.

Application of the standards and guidelines is sufficient to achieve most management requirements without impacting the levels of goods and services provided by the Forest. Some management requirements for timber, soil, water, and wildlife required special modeling constraints, however. These constraints were developed such that they were not compounding. In other words, one constraint might accomplish more than one requirement. These are discussed in more detail below.

The size of created openings is generally limited to 40 acres in size with logical cutting units left in between [36 CFR 219.27(d)]. It was necessary to model this management requirement in FORPLAN because linear programming solutions tend to allocate entire decision variables (in this case, analysis area/management prescription/timing choice options) rather than split them. This results in entire analysis areas which often include contiguous blocks of much more than 40 acres being harvested in one decade. FORPLAN was constrained such that no more than one-fourth of an analysis area could be regeneration harvested in any given decade. This constraint was also considered helpful in meeting soil and water management requirements [36 CFR 219.27(f)]. The dispersion factor is based on the professional judgment of the Interdisciplinary Team.

Special attention must be given to land and vegetation near water [36 CFR 219.27(e)]. A management prescription, the Riparian-Aquatic Habitat Protection Zone (EW-2) Prescription, was developed for areas immediately surrounding the riparian zone. This prescription applies to a variable width area based on slope, soil hazard, and vegetative type.

The portion of each analysis area that would be comprised of the riparian protection zone was estimated based on Stream Classes. These acres were assigned to the Riparian-Aquatic Habitat Protection Zone Prescription in each FORPLAN run that meet management requirements.

The wildlife management requirements used in this plan were developed by the Region and revised several times between 1983 and 1986. Information relating to the revisions and the final management requirements can be found in the document "A Background Document on the Development and Review of Minimum Management Requirements for Forest Planning on the National Forest of the Pacific Northwest Region, USDA Forest Service, June 1986." In the Regional management requirements, the Wenatchee National Forest is part of the "Eastside Cascades Zone." The species or habitats with management requirements are: bald eagles, peregrine falcons, grizzly bears, gray wolves, northern spotted owls, pileated woodpeckers, pine marten, northern three-toed woodpeckers, primary cavity excavators, and riparian. Between the Draft EIS and the Final EIS the strategies for these species were changed. The information on specific requirements is contained in Chapter IV of the FEIS, and Appendix I.

Allocations of habitat for the above species have been made to provide suitable habitat for the species and secondarily to minimize the effects on other resources. Where possible, habitat for wildlife has been overlapped with other resource goals to get the best for all resources. Some of these overlaps include wildlife overlapping with wildlife (pileated woodpecker habitat overlapping with spotted owl habitat) as well as wildlife overlapping with other resources (spotted owl habitat overlapping with wilderness).

The Forest has used the following strategies for meeting the management requirements for the listed wildlife species.

Bald Eagle: The recovery goal for the Forest is for the establishment and/or protection of 8 nest sites, protection of all roost sites and providing high quality feeding and perching habitat. Forest-wide Standards and Guidelines for all alternatives provide for the recovery of this species.

Peregrine Falcon: The Forest-wide Standards and Guidelines provide management direction to meet the recovery objectives of this species in all alternatives.

Grizzly Bear: The Forest is participating in a study to see what the habitat conditions are for this species and where management for the species may be feasible. When this study is completed, the USFWS will decide where the recovery area will be and what management strategies and requirements will be needed. If part of the recovery area is on the Forest, then the Final EIS and LRMP will be revised to incorporate the recovery plan objectives to manage for Grizzly Bears.

Gray Wolves: At present there is no recovery goal for this species on the Wenatchee National Forest. Therefore there have been no requirements established for maintaining habitat. The Forest will continue to monitor and evaluate reported sightings in coordination with Washington Department of Wildlife and U.S. Fish and Wildlife Service.

Spotted Owl: Spotted owl sites have been identified according to the management direction provided in the Regional Final Supplement on spotted owls. Spotted owl habitat will be maintained by the Old Growth Management prescription and Forest-wide Standards and Guidelines. All alternatives but Alternative NC meet or exceed the requirements for this species.

Pileated Woodpecker: Establish one habitat area for every 12,000 to 13,000 acres. The habitat area requirements are:

Within a 1,000 acre unit maintain 300 acres of conifers in a mature and/or old growth seral stage as breeding and nesting habitat. Within this reproductive area maintain a minimum average of 2 hard snags (12 inch DBH or larger) per acre; 45 of these snags should be 20 inch DBH or larger. When possible, maintain reproductive areas in contiguous acres. If that is not possible, habitat may be arranged in blocks of no less than 50 acres each and no more than 1/4 mile apart. Maintain a minimum average of 2 hard snags per acre (10 inch DBH or larger) on an additional 300 acres as feeding habitat.

Pine Marten/Northern Three-Toed Woodpecker: Establish one habitat area every 4,000 to 5,000 acres. The habitat requirements are:

Maintain 160 contiguous acres of conifers in mature and/or old growth seral stages with a crown closure of 50 percent or more. Within this area maintain an average of 2 hard snags (12 inch DBH or larger) per acre; 24 of these snags should be 20 inch DBH or larger. Maintain a minimum of 6 down logs per acre, 12 inch diameter or larger and at least 20 feet in length.

Primary Cavity Excavators: The management requirements for these species is to maintain a 20% or higher level, distributed per 40 acres of suitable habitat across the Forest. All alternatives plan to maintain at least the 40% potential population and at least 20% potential population per 40 acres. Each prescription has a potential population goal that is compatible with the resource outputs objectives. This varies from 20% potential population in the General Forest Prescription to 100% potential population in the Old Growth Management Prescription. There are Forest-wide Standards and Guidelines to establish additional distribution criteria and sideboards for management.

Riparian Habitat: Indicator species for the riparian habitat are beaver and ruffed grouse (see FEIS Chapter III, Wildlife for selection criteria). The habitat requirements for these species has been incorporated into Forest-wide Standards and Guidelines and the riparian prescription (EW-2). The requirements apply to all alternatives except Alternative NC.

An analysis was performed to determine the opportunity costs of different ways of meeting Management Requirements (MR's) for key resource outputs. This analysis was made and the information developed after the Forest Service held discussions with the Northwest Forest Resource Council, which had filed Appeal No. 1770 on September 18, 1986. Although the appeal was dismissed, the concerns addressed were important. Details of the analysis are reported in Appendix I of this document. The MR's were applied to all alternatives, except NC, described in the Final Environmental Impact Statement.

C. Displayed Benchmarks

The role of benchmark analysis in the analysis of the management situation is specified in 36 CFR 219.12(e). Benchmark analysis serves a variety of purposes, including:

- defining the range within which alternatives can be constructed;
- defining the maximum economic and biological resource production potentials;
- estimating the mix of resource uses, as well as a schedule of outputs and costs, associated with the objectives of each benchmark;
- analyzing the potential to resolve issues and concerns,
- analyzing the implications of continuing current management direction and whether a need to change current direction exists,

- analyzing the implications of existing laws and policies;
- analyzing the implications of economic assumptions;
- evaluating the complimentary and conflicting production relationships between the goods and services provided by the Forest.

Eleven benchmarks are presented in detail in this report. These benchmarks can be grouped into five general types:

- the current direction benchmark which simulates management of the Forest under currently existing direction;
- the minimum level benchmark which simulates the minimum level of custodial management necessary to keep the Forest in public ownership;
- economic benchmarks which maximize present net value to define the most efficient levels of resource outputs;
- single resource emphasis benchmarks which define maximum production levels;
- benchmarks which analyze the implications of existing laws and policies, and economic assumptions.

Changes in the alternative formulation and modeling parameters resulted in the benchmark data displayed in the DEIS being no longer comparable to the alternatives displayed in the FEIS.

The benchmarks displayed in this section are updated to be comparable with the alternatives displayed in the FEIS. This update was done outside the FORPLAN model. The planning records contain the analytical records used to update the benchmarks.

A discussion of individual benchmarks follows. The purpose of the benchmark, assumptions, and constraints are examined. The results of the benchmarks are summarized subsequently in Section VI.F.

Based upon benchmark analysis performed during the Analysis of the Management Situation, Alternative NC falls within the decision space available for managing the National Forest.

1. Current Direction Benchmark

a. Description

The current direction benchmark simulates the management most likely to be carried out into the future if current direction is followed. It is based on plans formulated and approved prior to the passage of the National Forest Management Act and existing policies, standards, and guidelines.

The current direction benchmark forms the basis for the “no-action” alternative required by the National Environmental Policy Act. It provides an analysis base to determine whether a need for change exists when contrasted with other benchmarks and demands for various outputs.

b. Formulation

- Objective function used is to maximize present net value for the entire modeling horizon, including both market values and assigned values.

- Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).
- Timber harvest cannot exceed the long-term sustained-yield capacity in any decade.
- Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (nondeclining flow).
- Sufficient timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained-yield capacity.
- Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.
- Regeneration harvests are dispersed to meet Regional guidelines for size and separation of harvest units.
- Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.
- Old-growth units are dedicated according to Regional guidelines for distribution and amount to meet management requirements for old growth dependant species.
- No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription, or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription, can be harvested per decade.
- Land allocations used are those specified in the Alpine Lakes Management Plan, the Chelan and Kittitas Unit Plans and the Ranger District multiple use plans.

2. Minimum Level Benchmark

a. Description

The minimum level benchmark specifies the minimum level of management which would be needed to maintain the Forest as part of the National Forest System and to manage uncontrollable outputs and uses. Minimum environmental constraints and an obligation to protect the life, health, and safety of the casual visitor must be met. This benchmark ignores the transition period which would be required to move from current to minimum level management.

The purpose of this benchmark is to determine the minimum costs and resultant outputs associated with maintaining the Forest in Federal ownership. This cost level is not discretionary in the programing and budgeting process.

b. Formulation

- Practices and costs are only those necessary to keep the Forest in public ownership.

- Some costs are necessary to protect the life, health, and safety of incidental users, to prevent environmental damage to lands or resources of adjoining ownerships; administer unavoidable special uses; and not allow significant impairment of the productivity of the land.

-Outputs associated with this benchmark include only uncontrollable outputs and uses, such as naturally occurring water runoff, wildlife and fish, and dispersed recreation.

-Costs for a transition "close down" are not included as per Regional direction (11/10/83).

3. Benchmark Run #1

a. Description

Benchmark Run #1 establishes the highest level of sustainable timber production possible on the Forest under a policy of nondeclining flow and in the absence of management requirements. Timber rotation age restrictions (95 percent CMAI) are imposed.

This benchmark is initially used to verify that the FORPLAN model is reasonable in terms of timber information. When contrasted to the maximum timber resource benchmark, it provides an estimate of the maximum possible impact of management requirements on timber harvest levels.

b. Formulation

-Three objective functions are used sequentially: 1) timber harvest is maximized for the first decade; 2) timber harvest is maximized for the 15 decade modeling horizon, subject to meeting the first decade timber harvest level established in step 1; 3) present net value is maximized for the 15 decade modeling horizon, subject to meeting the first decade and 15 decade timber harvest levels established in steps 1 and 2.

-Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).

-Timber harvest cannot exceed the long-term sustained yield capacity in any decade.

-Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (nondeclining flow).

-Sufficient ending inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained yield capacity.

-Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.

-No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription, or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription, can be harvested per decade.

-Existing wilderness, existing developed recreation sites, proposed research natural areas, and the Mather Memorial Highway corridor are constrained to their current land allocations.

4. Benchmark Run #2

a. Description

Benchmark Run #2 provides a basis for formulating and evaluating management requirements. The opportunity cost of harvest floors can be evaluated. The combined effect of departing from nondeclining flow and not restricting rotations to 95 percent of culmination of mean annual increment can be observed by contrasting this benchmark with Benchmark Run #3.

b. Formulation

- Objective function used is to maximize present net value for the entire modeling horizon, including both market values and assigned values.
- Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).
- Timber harvest cannot fluctuate by more than plus or minus 20 percent from one decade to the next.
- Regeneration harvests can be scheduled as soon as minimum merchantability limits are met.
- Sufficient ending timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained yield capacity.
- No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription, or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription, can be harvested per decade.
- Existing wilderness, existing developed recreation sites, proposed research natural areas, and the Mather Memorial Highway corridor are constrained to their current land allocations.

5. Benchmark Run #3

a. Description

Benchmark Run #3 provides an estimate of the mix of resource uses and a schedule of outputs and costs which maximize the present net value of those major outputs that have an established market price or an assigned monetary value. Management requirements need not be met. Timber rotation age restrictions (95 percent CMAI) and nondeclining flow constraints are imposed.

Management requirements can be analyzed by comparing this benchmark with Benchmark Run #7. It can also be compared with Benchmark Run #2 to analyze the impact of nondeclining flow and rotation age restrictions in the absence of management requirements.

b. Formulation

- Objective function used is to maximize present net value for the entire modeling horizon, including both market values and assigned values.
- Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).
- Timber harvest cannot exceed the long-term sustained yield capacity in any decade.
- Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (nondeclining flow).
- Sufficient timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained yield capacity.

-Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.

-No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription, or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription, can be harvested per decade.

-Existing wilderness, existing developed recreation sites, proposed research natural areas, and the Mather Memorial Highway corridor are constrained to their current land allocations.

6. Benchmark Run #4

a. Description

Benchmark Run #4 provides a basis for evaluating management requirements when contrasted with Benchmark Run #2. This benchmark provides an estimate of the mix of resource uses and a schedule of outputs and costs which maximize the present net value of those major outputs that have an established market price or an assigned monetary value, subject to meeting management requirements. Timber rotation age restrictions and nondeclining flow constraints are not imposed.

b. Formulation

-Objective function used is to maximize present net value for the entire modeling horizon, including both market values and assigned values.

-Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).

-Timber harvest cannot fluctuate by more than plus or minus 20 percent from one decade to the next.

-Sufficient ending inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained yield capacity.

-Regeneration harvests can be scheduled as soon as minimum merchantability limits are met.

-Regeneration harvests are dispersed to meet Regional guidelines for size and separation of harvest units.

-Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

-Old-growth units are dedicated according to Regional guidelines for distribution and amount to meet management requirements for old-growth dependent species.

-No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription, or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription, can be harvested per decade.

-Existing wilderness, existing developed recreation sites, proposed research natural areas, and the Mather Memorial Highway corridor are constrained to their current land allocations.

7. Benchmark Run #5

a. Description

Benchmark Run #5 provides a basis for evaluating rotation age restrictions (95 percent CMAI) in the absence of nondeclining flow assumptions when contrasted with Benchmark Run #4.

b. Formulation

-Objective function used is to maximize present net value for the entire modeling horizon, including both market values and assigned values.

-Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).

-Timber harvest cannot fluctuate by more than plus or minus 20 percent from one decade to the next.

-Sufficient ending inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained yield capacity.

-Regeneration harvest cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.

-Regeneration harvests are dispersed to meet Regional guidelines for size and separation of harvest units.

-Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

-Old-growth units are dedicated according to Regional guidelines for distribution and amount to meet management requirements for old growth dependent species.

-No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription, or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription, can be harvested per decade.

-Existing wilderness, existing developed recreation sites, proposed research natural areas, and the Mather Memorial Highway corridor are constrained to their current land allocations.

8. Benchmark Run #6

a. Description

Benchmark Run #6 provides a basis for evaluating nondeclining flow constraints in the absence of rotation age restrictions when contrasted with Benchmark Run #4.

b. Formulation

-Objective function used is to maximize present net value for the entire modeling horizon, including both market values and assigned values.

-Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).

-Timber harvest cannot exceed the long-term sustained yield capacity in any decade.

-Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (nondeclining flow).

-Sufficient ending inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained yield capacity.

-Regeneration harvests are dispersed to meet Regional guidelines for size and separation of harvest units.

-Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

-Old-growth units are dedicated according to Regional guidelines for distribution and amount to meet management requirements for old growth dependent species.

-No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription, or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription, can be harvested per decade.

-Existing wilderness, existing developed recreation sites, proposed research natural areas, and the Mather Memorial Highway corridor are constrained to their current land allocations.

9. Benchmark Run #7

a. Description

Benchmark Run #7 provides an estimate of the mix of resource uses and a schedule of outputs and costs which maximize the present net value of those major outputs that have an established market price or an assigned monetary value. This is required by 36 CFR 219.12(e)(1)(iii)(B). Management requirements must be met. Timber rotation age restrictions (95 percent CMAI) and nondeclining flow constraints are imposed.

The purpose of this benchmark is to serve as a basis for comparison with other benchmarks and alternatives. Opportunity costs of meeting certain resource objectives as well as impacts of legal and policy constraints can be evaluated in these comparisons.

b. Formulation

-Objective function used is to maximize present net value for the entire modeling horizon, including both market values and assigned values.

-Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).

-Timber harvest cannot exceed the long-term sustained yield capacity in any decade.

-Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (nondeclining flow).

-Sufficient timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained yield capacity.

-Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.

-Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

-Old-growth units are dedicated according to Regional guidelines for distribution and amount to meet management requirements for old growth dependant species.

-No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription can be harvested per decade.

-Existing wilderness, existing developed recreation sites, proposed research natural areas, and the Mather Memorial Highway corridor are constrained to their current land allocations.

10. Maximum Timber Benchmark

a. Description

The maximum timber benchmark provides an estimate of the mix of resource uses and a schedule of outputs and costs which maximize the capability of the Forest to produce timber. Management requirements must be met. Timber rotation age restrictions (95 percent CMAI) and nondeclining flow constraints are imposed.

This benchmark shows the highest sustainable level of timber production possible given existing laws and policies. A comparison of the maximum timber level benchmark with other benchmarks shows the implications to timber of meeting other resource and economic objectives.

b. Formulation

-Three objective functions are used sequentially: 1) timber harvest is maximized for the first decade, 2) timber harvest is maximized for the 15 decade modeling horizon, subject to meeting the first decade timber harvest level established in step 1; 3) present net value is maximized for the 15 decade modeling horizon, subject to meeting the first decade and 15 decade timber harvest levels established in steps 1 and 2.

-Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).

-Timber harvest cannot exceed the long-term sustained yield capacity in any decade.

-Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (nondeclining flow).

- Sufficient timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained yield capacity.
- Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.
- Regeneration harvests are dispersed to meet Regional guidelines for size and separation of harvest units.
- Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.
- Old-growth units are dedicated according to Regional guidelines for distribution and amount to meet management requirements for old-growth dependant species.
- No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription, or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription, can be harvested per decade.
- Existing wilderness, existing developed recreation sites, proposed research natural areas, and the Mather Memorial Highway corridor are constrained to their current land allocations.

11. Maximum Unroaded Recreation Benchmark

a. Description

The maximum unroaded recreation benchmark provides an estimate of the mix of resource uses and a schedule of outputs and costs which maximize the capability of the Forest to provide unroaded recreation opportunities. Management requirements must be met. Timber rotation age restrictions (95 percent CMAI) and nondeclining flow constraints are imposed.

The maximum unroaded recreation level benchmark estimates the maximum capability of the Forest to provide primitive, semi-primitive non-motorized, and semi-primitive motorized recreation opportunities given existing laws and policies. A comparison of this benchmark to other benchmarks shows the implications to unroaded recreation of meeting other resource and economic objectives.

b. Formulation

- Objective function used is to maximize present net value for the entire modeling horizon, including both market values and assigned values.
- Timber harvest can be scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Chapter III for acreages).
- Timber harvest cannot exceed the long-term sustained yield capacity in any decade.
- Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (nondeclining flow).
- Sufficient timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long-term sustained yield capacity.

-Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.

-Regeneration harvests are dispersed to meet Regional guidelines for size and separation of harvest units.

-Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

-Old-growth units are dedicated according to Regional guidelines for distribution and amount to meet management requirements for old-growth dependant species.

-No more than 7.2 percent of areas allocated to the Scenic Travel-Retention Prescription, or 10 percent of areas allocated to the Scenic Travel-Partial Retention Prescription, can be harvested per decade.

-Existing wilderness, existing developed recreation sites, proposed research natural areas, and the Mather Memorial Highway corridor are constrained to their current land allocations.

-Timber harvest can be scheduled only in areas which are currently roaded.

-No unroaded areas will be accessed by road for any purpose.

- No existing roads will be closed to create additional unroaded area.

D. Benchmark Analysis

Analysis of benchmarks was conducted in accordance with the Chief's 1920 memo of May 13, 1983. The terminology used corresponds to Cargell's 1920 memo of May 31, 1983, and the Regional Direction Package. This facilitates comparison of benchmark analysis between National Forests.

1. Constraint Sets

Detailed description of the assumptions and constraints found in each benchmark are found in Section VI.C. Table B-VI-1 summarizes the constraint sets found in each benchmark. Impacts of these constraints can be examined by comparing the constraint sets to the results of the benchmarks. Benchmark results follow in Section VI.F.

**TABLE B-VI-1
Benchmark Constraint Sets**

RUN	OBJECTIVE FUNCTION	LAND BASE	ENDING INVENT	MR's	SEQ U+L FLOORS CEILINGS	NDY	ROT BASED ON UTIL STDS.	ROT BASED ON 95% CMAI
Run #1	max timber lands	tentatively suitable lands	x			x		x
Run #2	max PNV (assigned)	tentatively suitable lands	x		x		x	
Run #3	max PNV (assigned)	tentatively suitable lands	x			x		x
Run #4	max PNV (assigned)	tentatively suitable lands	x	x	x		x	
Run #5	max PNV (assigned)	tentatively suitable lands	x	x	x			x
Run #6	max PNV (assigned)	tentatively suitable lands	x	x		x	x	
Run #7	max PNV (assigned)	tentatively suitable lands	x	x		x		x
Run #8	max PNV (market)	tentatively suitable lands	x	x	x		x	
Run #9	max PNV (market)	tentatively suitable lands	x	x	x			x

TABLE B-VI-1 (Continued)

RUN	OBJECTIVE FUNCTION	LAND BASE	ENDING INVENT	MR's	SEQ U+L FLOORS CEILINGS	NDY	ROT BASED ON UTIL STDS	ROT BASED ON 95% CMAI
Run #10	max PNV (market)	tentatively suitable lands	x	x		x	x	
Run #11	max PNV (market)	tentatively suitable lands	x	x		x		x
Maximum timber	max timber	tentatively suitable lands	x	x		x		x
Maximum unroaded recreation	max PNV (assigned)	tentatively suitable lands	x	x		x		x
Current	max PNV (assigned)	tentatively suitable lands	x	x		x		x

E. Sensitivity Analysis of Assigned Values Versus Market Values

Benchmark Runs #4, #5, #6, and #7, four versions of the maximum present net value benchmark, were formulated two ways: 1) both market and assigned values (timber, livestock forage, recreation, fish, and wildlife); and 2) using only market values (timber and livestock forage). These later runs were labeled as Benchmark Runs #8, #9, #10, and #11 respectively.

The value of the FORPLAN objective function varied between the two sets of runs due to having different outputs valued. Allocation, scheduling, and output levels did not vary between the runs. The FORPLAN model, as formulated, is not sensitive to the inclusion of recreation, fish, and wildlife values. This is probably due to recreation capacity estimates exceeding demand projections except in later decades of benchmarks or alternatives which have high levels of timber harvest.

An analysis of the effects MR's have on certain resource outputs was performed. Results of the analysis are discussed in detail in Appendix I. The analysis involves the opportunity costs associated with each MR when compared to the maximum PNV benchmark.

F. Results of Benchmark Analysis

Management objectives of benchmarks and alternatives were modeled in FORPLAN by applying the assumptions and constraints listed in Sections VI and VII of this appendix. Opportunity costs of constraints were determined by comparing FORPLAN runs with a constraint and without it. Most discussion of opportunity costs focuses on changes in present net value. Changes in other outputs and effects (e.g., timber volume or old-growth habitat) can also be considered.

Constraints which are specific to individual alternatives are analyzed in Sections VII.C. and VIII D. Constraints and assumptions common to benchmarks and alternatives are discussed below. An earlier formulation of the Forest's FORPLAN model was used in some of the benchmark analysis discussed below than was used for alternatives and major benchmarks. Information from these early runs is identifiable by the letter "A" in the benchmark name (e.g., Benchmark Run #7A). The early runs have slightly different outputs and effects than the current model formulation but the relative effects of constraints is still applicable.

Certain legal and policy constraints and economic assumptions were analyzed as part of the analysis of the management situation. Those items considered were:

- Harvest floors;
- Management requirements;
- Restricting harvests to 95 percent culmination of mean annual increment (CMAI),
- Nondeclining flow;
- Nondeclining flow and restricting harvests to 95 percent CMAI in combination,
- Price trend assumptions;
- Cost assumptions.

1. Harvest Floors

Benchmark Run #2A was originally done without a harvest floor. It harvests well above 80 percent of the current harvest level in the first decade. A first decade harvest floor would have had no impact on timber harvest volume or any other factors.

2. Management Requirements

Management requirements (MR's) are represented in FORPLAN by several types of constraints. Riparian areas and a variable width zone around them are assigned to the Riparian-Aquatic Habitat Protection (EW-2) Prescription. Spotted Owl Habitat Areas (SOHA's) are assigned to the Old-Growth Management (OG-1) prescription. Pileated woodpecker, marten, and three-toed woodpecker habitat is assigned to the Mature Habitat (OG-2) prescription. A harvest dispersion constraint is imposed to ensure that harvest units can be laid out to meet Regional guidelines and for soil and water protection. No more than 25 percent of any analysis area can be harvested per decade

The effects of management requirements varies significantly depending upon the type of benchmark examined.

These basic types of benchmarks were analyzed:

- Maximization of present net value, not subject to nondeclining flow (Benchmark Runs #2A, #4A, and variations);

-Maximization of present net value, subject to nondeclining flow (Benchmark Runs #3A, #7A, and variations);

-Maximization of timber volume, subject to nondeclining flow (Benchmark Run #1A, the maximum timber benchmark, and variations).

Four versions of each of the three types of benchmarks were examined:

-No management requirements included;

-Dispersion constraints included but riparian protection and old-growth constraints not included;

-Riparian protection and dispersion constraints included but old-growth constraints not included,

-Old-growth, riparian protection and dispersion constraints included.

An important consideration in interpreting this analysis is the synergistic relationship between constraints. The total effect of the entire constraint package is often different from the sum of its parts. *Estimated effects of all management requirements versus no management requirements are fairly accurate.* However the changes in output levels associated with particular management requirements could have differed had the constraints been added to the FORPLAN model in a different order.

The effects associated with these benchmarks may vary considerably from the effects of management requirements on alternatives. Prescriptions which do not harvest timber or which utilize longer rotation ages similar to the old-growth and riparian protection prescriptions may already be allocated to much of the area affected by management requirements. This lessens the impact on timber harvest levels and present net value considerably.

Table B-VI-2 summarizes the effects of management requirements when present net value is maximized, not subject to nondeclining flow. These benchmarks used 20 percent upper and lower limits on timber volume fluctuations between decades.

TABLE B-VI-2
EFFECTS OF MR's WHEN PRESENT NET VALUE IS MAXIMIZED,
NOT SUBJECT TO NONDECLINING FLOW

<u>MR Mix</u>	<u>LTSY</u> <u>(MMCF)</u>	<u>1st Decade ASQ</u> <u>(MMCF/YR)</u>	<u>PNV</u> <u>(MM\$)</u>
No MR's Included (Benchmark Run #2A)	35.1	55.5	1,804
Dispersion Included	35.3	34.4	1,484
Change from no MR's	+0.6%	-38.0%	-17.7%
Riparian MR's and Dispersion Included	34.4	33.9	1,422
Change from no MR's	-2.0%	-38.9%	-21.2%
Old-Growth and Riparian MR's and Dispersion Included (Benchmark Run #4A)	33.0	32.2	1,342
Change from no MR's	-5.8%	-42.0%	-25.6%

Long-term sustained yield (LTSY) is reduced 5.8 percent when management requirements are imposed. The effect of the dispersion constraint is probably just coincidental. There is no direct linkage between long-term sustained yield and harvest levels in this set of benchmarks. Old-growth and riparian protection MR's affect long-term sustained yield in two ways. Dedicated old-growth areas remove tentatively suitable lands from timber production. Managed mature and riparian protection areas utilize timber harvest regimes which have a smaller contribution to long-term sustained yield than some of the prescriptions which otherwise would have been available for selection.

First decade harvest levels are greatly reduced in this set of benchmarks when management requirements are imposed, particularly harvest dispersion constraints. Harvest levels start high and then decline by the maximum allowable percentage for the first six decades in the absence of dispersion constraints. Harvest levels begin lower and do not fluctuate nearly as much when dispersion constraints are present. Portions of analysis areas which would be harvested in earlier decades in order to maximize present net value must be deferred until later decades to meet dispersion constraints. Old-growth and riparian protection constraints reduce first decade harvest levels slightly but not as much as under nondeclining flow.

Present net value is reduced by 25.6 percent when management requirements are imposed. The dispersion constraint prevents 75 percent of those analysis areas which have the highest contribution to present net value, from being harvested in the first decade when the effect of discounting is minimized. Other effects on present net value are due to the lower level of timber harvest and the change in the mix of prescriptions selected. The old-growth and riparian protection prescriptions involve relatively high costs and longer rotation ages.

Table B-VI-3 below, summarizes the effects of management requirements when present net value is maximized, subject to nondeclining flow. This set of benchmarks are formulated identically to the previously examined set except that timber harvests in any decade cannot be less than that in the preceding decade.

TABLE B-VI-3
EFFECTS OF MR'S WHEN PRESENT NET VALUE IS MAXIMIZED,
SUBJECT TO NONDECLINING FLOW

<u>MR Mix</u>	<u>LTSY</u> <u>(MMCF)</u>	<u>1st Decade ASQ</u> <u>(MMCF/YR)</u>	<u>PNV</u> <u>(MM\$)</u>
No MR's Included (Benchmark Run #3A)	37.8	34.2	1,635
Dispersion Included	37.3	30.1	1,413
Change from no MR's	-1.3%	-12.0%	-13.6%
Riparian MR's and Dispersion Included	36.5	29.0	1,350
Change from no MR's	-3.4%	-15.2%	-17.4%
Old Growth and Riparian MR's and Dispersion Included (Benchmark Run #7A)	34.6	28.0	1,262
Change from no MR's	-8.5%	-18.1%	-22.8%

Long-term sustained yield is reduced 8.5 percent when management requirements are imposed. The dispersion constraint had no effect on the number of acres of suitable timber lands. It did result in a very slight shift in prescription mix with somewhat fewer acres receiving precommercial thinning. This had a small impact on long-term sustained yield. Old-growth and riparian protection constraints reduced long-term sustained yield by reducing the number of suitable acres and utilizing timber management regimes with smaller contributions to long-term sustained yield.

First decade harvest levels were reduced by 18.1 percent when management requirements were added. The dispersion constraint accounted for much of this reduction. The dispersion constraint allows not more than 25 percent of an analysis area to be harvested per decade. Thus, many of the acres that would otherwise be harvested in the first decade are pushed back until later decades. These acres are replaced to a large extent with harvests on other analysis areas.

However, given the shifts of first decade harvest to other analysis areas, a lower level of first decade harvest better met the criterion of maximizing present net value. First decade harvest is reduced somewhat by the old-growth core areas being withdrawn from timber production. It is also reduced by the substitution of long rotation, extended shelterwood timber regimes for shorter rotation clearcuts. The effect on first decade harvest is more pronounced in this set of benchmarks than in those which were not subject to nondeclining flow. Impacts on harvest levels in later decades can reduce first decade harvests under nondeclining flow.

Present net value is reduced by 22.8 percent when management requirements are included. Much of this can be attributed to the delay in harvesting many of the acres with the highest contribution to present net value to meet dispersion constraints. Lower levels of timber harvest and introduction of higher cost prescriptions also have an impact.

Table B-VI-4 below, summarizes the effects of management requirements when timber is maximized, subject to nondeclining flow. This set of benchmarks is formulated identically to the second set except for the objective function used. First decade timber harvest was first maximized. Timber harvest for the entire modeling horizon was then maximized, subject to meeting the first decade harvest level of the previous run. Present net value for the entire modeling horizon was then maximized, subject to meeting the harvest levels set in the previous two runs.

**TABLE B-VI-4
EFFECTS OF MR's WHEN TIMBER VOLUME IS MAXIMIZED,
SUBJECT TO NONDECLINING FLOW**

<u>MR Mix</u>	<u>LTSY (MMCF)</u>	<u>1st Decade ASQ (MMCF/YR)</u>	<u>PNV (MMS\$)</u>
No MR's Included (Benchmark Run #1A)	41.9	41.2	1,506
Dispersion Included	41.9	41.2	1,138
Change from no MR's	0%	0%	-24.4%
Riparian MR's and Dispersion Included	41.1	40.4	1,104
Change from no MR's	-1.9	-1.9%	-26.7%
Old Growth and Riparian MR's and Dispersion Included (Max Timber Benchmark)	39.2	38.5	1,069
Change from no MR's	-6.4%	-6.6%	-29.0%

Long-term sustained yield and first decade harvest are equal in all versions of this set of benchmarks. Both are reduced 6.4 percent when management requirements are imposed. Dispersion had no effect on these factors. Economically inefficient means of scheduling timber harvest were acceptable under the primary criteria of this run. All of the displaced harvest due to the dispersion constraint was replaced by harvests from other analysis areas. This did not happen in the benchmarks whose primary criterion was to maximize present net value. Dedicated old growth core areas reduced these factors by removing some tentatively suitable lands from the timber base. Managed old-growth and riparian protection areas utilize timber harvest regimes which have a smaller contribution to long-term sustained yield.

Present net value is reduced 29 percent when management requirements are added. The effect on present net value is less meaningful with this set of benchmarks than the previous two sets due to the difference in formulation. Timber maximization criteria are completely satisfied before present net value is considered.

3. Harvest Restrictions (95 percent CMAI)

Two versions of the present net value maximization benchmarks were tested for the impacts of harvest restrictions:

-Those with 20 percent sequential upper and lower bounds on timber flow (Benchmark Runs #4 and #5);

-Those with nondeclining flow (Benchmark Runs #6 and #7).

Benchmark Runs #5 and #7 have harvest restrictions until 95 percent of mean annual increment has been reached. Benchmark Runs #4 and #6 have no harvest restrictions other than meeting minimum merchantability limits.

Table B-VI-5 illustrates how selected outputs vary between these benchmarks.

**TABLE B-VI-5
EFFECT OF HARVEST RESTRICTIONS ON SELECTED OUTPUTS**

<u>Benchmark</u>	<u>LTSY (MMCF)</u>	<u>1st Decade ASQ (MMCF/YR)</u>	<u>PNV (MM\$)</u>
Run #4	33.2	32.8	2,239
Run #5	34.5	32.7	2,230
Change from #4 to #5	+3.9%	-0.3%	-0.4%
Run #6	33.5	29.9	2,132
Run #7	34.8	29.0	2,132
Change from #6 to #7	+3.9%	0%	0%

*for other decades see Table B-VI-12

Rotation ages prior to 95 percent CMAI were selected extensively in Benchmark Runs #4 and #6. This resulted in very few other differences between these sets of benchmarks, however. Long-term sustained yield is 3.9 percent higher in Benchmark Runs #5 and #6 due to the harvests occurring closer to CMAI. Long-term sustained yield has little effect on anything else in these benchmarks, however.

4. Nondeclining Flow

Two sets of the present net value maximization benchmarks were tested for the impacts of nondeclining flow constraints:

-Those with harvest when minimum utilization standards are reached (Benchmark Runs #4 and #6),

-Those with harvest at 95 percent CMAI (Benchmark Runs #5 and #7).

Benchmark Runs #4 and #5 have 20 percent upper and lower bounds on timber flow. Benchmark Runs #6 and #7 have nondeclining flow constraints. Table B-VI-6 illustrates how selected outputs vary between these benchmarks.

TABLE B-VI-6
EFFECT OF NONDECLINING FLOW ON SELECTED OUTPUTS

<u>Benchmark</u>	<u>LTSY</u> <u>(MMCF)</u>	<u>1st Decade ASQ</u> <u>(MMCF/YR)</u>	<u>PNV</u> <u>(MM\$)</u>
Run #4	33.2	32.8	2,239
Run #6	33.5	29.9	2,132
Change from #4 to #6	+0.9%	-8.6%	-4.6%
Run #5	39.5	32.7	2,230
Run #7	34.8	29.0	2,132
Change from #5 to #7	+0.9%	11.3%	-4.4%

* for other decades see Table B-VI-12

Imposition of nondeclining flow constraints results in a slight increase in long-term sustained yield. However, in the departure runs (Benchmark Runs #4 and #5) there is no direct link between long-term sustained yield and allowable sale quantity. There is a substantial decrease in first decade harvest and present net value with the imposition of nondeclining flow constraints. The four percent discount rate offers an incentive to capture as high a level of benefits as possible in the first decade when present net value is maximized. Nondeclining flow constraints limit the opportunity to do so.

5. Harvest Restrictions (95 Percent CMAI) and Nondeclining Flow in Combination

Two sets of the present net value maximization benchmarks were tested for the impacts of harvest restriction (95 percent CMAI) and nondeclining flow in combination:

- Those without management requirements (Benchmark Runs #2 and #3),
- Those with management requirements (Benchmark Runs #4 and #7).

Benchmark Runs #2 and #4 allow harvest when minimum utilization standards are reached and have 20 percent upper and lower bounds on timber flow. Benchmark Runs #3 and #7 have harvest at 95 percent CMAI and nondeclining flow constraints.

Table B-VI-7 illustrates how selected outputs vary between these benchmarks.

TABLE B-VI-7
EFFECT OF HARVEST RESTRICTIONS AND
NONDECLINING FLOW IN COMBINATION

<u>Benchmark</u>	<u>LTSY</u> <u>(MMCF)</u>	<u>1st Decade ASQ</u> <u>(MMCF/YR)</u>	<u>PNV</u> <u>(MM\$)</u>
Run #2	33.3	53.0	2,568
Run #3	38.0	34.3	2,497
Change from #2 to #3	+14.1%	-35.3%	-2.8%
Run #4	33.2	32.8	2,239
Run #7	34.8	29.9	2,132
Change from #4 to #7	+4.8%	-8.8%	-4.8%

* for other decades see Table B-VI-12

In benchmarks with management requirements, the impact of harvest restrictions and nondeclining flow in combination is very similar to that of nondeclining flow by itself. This is not surprising because harvest restrictions had very little impact alone. First decade harvest and present net value are higher without the constraints due to the incentive from the discount rate to accrue benefits as early as possible. This effect is much greater in benchmarks which do not contain management requirements.

6. Analysis of Price Trends and Costs

A one percent per year real price trend was applied to stumpage and a zero percent trend was applied to other resource values and costs in present net value calculations as per Regional direction. A sensitivity analysis was performed on these assumptions by running Benchmark Run #7A with zero, two, and three percent real price trends on stumpage as well as the one percent trend. Other resource values and costs remained at zero percent in all cases. Run #7A was used rather than Run #3A because it includes management requirements. Run #7A is formulated the most closely to an alternative of any of the benchmarks. A comparison of these four runs gives a good indication of the effects price trend assumptions have on land allocations and timber intensities selected when present net value is maximized.

This discussion will focus only on the timber resource because it is directly affected. Other resources are indirectly affected, however, by changes in timber harvest levels and intensities.

Table B-VI-8 illustrates the effect of price trends on timber volumes. The long-term sustained yield (LTSY) capacity increases slightly as price trends increase. This is due to two factors. The amount of economically suitable timber land increases with an increase in price trends as does the intensity of the timber management regimes selected.

**TABLE B-VI-8
EFFECT OF PRICE TRENDS ON TIMBER VOLUMES**

Price Trend	Allowable Sale Quantity (MMCF/YR)					LTSY (MMCF/YR)	Percent Change
	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5		
0%	27.0	27.0	27.0	27.0	27.0	33.7	-2.6
1%	28.0	28.0	28.0	28.0	28.0	34.6	0
2%	16.4	33.0	33.0	33.0	33.0	35.1	+1.4
3%	15.7	32.4	35.5	35.5	35.5	36.4	+5.2

The effect on first decade harvest is more startling and counterintuitive. A zero percent trend results in a 3.6 percent decrease in first decade harvest compared with a one percent trend. A two percent and three percent trend result in 41 percent and 44 percent decreases in first decade harvest compared with a 1 percent trend. A high rate of growth for sawtimber in the first decade, particularly in the wet ecotypes, combined with the higher real price trends offset the incentive of the four percent discount rate to harvest as soon as possible.

The drop in first decade harvest levels is probably more a reflection of the structure of the Forest's FORPLAN model than a real reflection of the effects of price trends. Tentatively suitable timber lands are not broken out by either stocking levels or site productivity in the FORPLAN model because inventory data to do so was unavailable. The timber yields therefore reflect very broad averages across the Forest. For these "average timber stands" modeled in FORPLAN, deferring first decade harvest increased present net value at two and three percent price trends. However, the Forest in reality consists of many diverse stands, some of which would have been better deferred and some of which would have been better harvested in the first decade. It would probably be more accurate to ignore the counterintuitive first decade effects and concentrate on the trends from the second decade on.

Table B-VI-9 illustrates the effect of price trends on economic suitability of lands for timber production and the intensity of management regimes selected. Both of these factors correlate positively with an increase in price trends. The effect on suitability is much smaller than the effect on management intensity.

**TABLE B-VI-9
EFFECT OF PRICE TRENDS ON SUITABILITY AND MANAGEMENT INTENSITY**

Price Trends	Suitable Timber Lands (Acres)*	Average Annual Precommercial Thinning (Acres)	Average Annual Planting (Acres)
0%	713,991	1,045	4,133
1%	725,798	1,765	4,508
2%	726,158	3,536	5,211
3%	729,318	5,111	5,555

*791,899 acres were found to be tentatively suitable.

Economic suitability of lands for timber production does not appear to be very sensitive to price trend assumptions on this Forest. Choices of appropriate intensities of timber management regimes do seem highly sensitive to price trend assumptions. This is significant in that the level of timber management intensity affects the level of investments for precommercial thinning and the magnitude of the allowable sale quantity.

A sensitivity analysis similar to that done for price trends was done for variable costs contained in the Forest's FORPLAN model. Benchmark Run #7A was rerun once with 20 percent higher costs and once with 20 percent lower costs.

Table B-VI-10 illustrates the effect of cost assumptions on timber volumes. Long-term sustained yield decreases slightly with a 20 percent cost increase and increases slightly with a 20 percent cost decrease. First decade harvest is increased 13 percent with a 20 percent cost decrease, and is decreased 9 percent with a 20 percent cost increase.

**TABLE B-VI-10
EFFECT OF COST ASSUMPTIONS ON TIMBER VOLUMES**

Cost Level	Allowable Sale Quantity (MMCF/YR)					LTSY (MMCF/YR)	Percent Change
	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5		
-20%	31.6	31.6	31.6	31.6	31.6	35.1	+1.4
Base	28.0	28.0	28.0	28.0	28.0	34.6	0
+20%	25.4	27.5	27.5	27.5	27.5	34.4	-0.6

Table B-VI-11 illustrates the effect of cost assumptions on economic suitability of lands for timber production and the intensity of management regimes selected. The effect on suitability is negligible. The effect on management intensity is much greater.

**TABLE B-VI-11
EFFECT OF COST ASSUMPTIONS ON SUITABILITY AND MANAGEMENT INTENSITY**

Cost Level	Suitable Timber Lands (Acres)*	Average Annual Precommercial Thinning (Acres)	Average Annual Planting (Acres)
-20%	726,159	3,759	5,490
Base	725,798	1,765	4,508
+20%	725,313	1,146	4,476

*791,899 acres were found to be tentatively suitable

Economic suitability does not appear to be very sensitive to cost assumptions. However, choice of management intensity does appear sensitive to cost assumptions. As was mentioned previously, choice of management intensity affects the level of investments in precommercial thinning and the magnitude of the allowable sale quantity.

7. Benchmark Summary

Table B-VI-12 summarizes the benchmarks in terms of selected outputs and effects. A more detailed display of benefits and costs by major resource groups can be found in Section VIII of this appendix.

**TABLE B-VI-12
BENCHMARK OUTPUT AND EFFECT SUMMARY (AVERAGE ANNUAL OUTPUTS)**

Output or Effect	BENCHMARK							Minimum Level	Maximum Timber	Maximum Unroaded Recreation	Current Mngmt
	Run #1	Run #2	Run #3	Run #4	Run #5	Run #6	Run #7				
Present Net Value (Million Dollars)	1902	2568	2497	2239	2230	2132	2132	-153	1850	1667	1976
Discounted Costs (Million Dollars)	324	308	284	283	283	266	266	27	317	167	329
Discounted Benefits (Million Dollars)	2226	2876	2781	2572	2513	2398	2398	180	2167	1834	2305
Change in Employment (jobs)	+970	+2001	+826	+732	+725	+549	+549	-2935	+862	-338	+39
Change in Income (Million Dollars)	+26.0	+54.1	+22.1	+19.5	+19.4	+14.6	+14.6	-76.8	+23.1	-9.6	+65
Allowable Sale Quantity (MMCF)											
Decade 1	40.4	53.0	34.3	32.8	32.7	29.9	29.9	0	38.5	15.8	21.8
Decade 2	40.4	42.4	34.3	39.0	39.1	29.9	29.9	0	38.5	15.8	21.8
Decade 3	40.4	33.9	34.3	37.0	37.2	29.9	29.9	0	38.5	15.8	21.8
Decade 4	40.4	27.1	34.3	29.6	29.7	29.9	29.9	0	38.5	15.8	21.8
Decade 5	40.4	21.7	34.3	23.7	23.8	29.9	29.9	0	38.5	15.8	21.8
Long-term Sustained Yield (MMCF)	41.1	33.3	38.0	33.2	34.5	33.5	34.8	0	39.2	19.8	27.7

VII. FORMULATION OF ALTERNATIVES

A. Overview

Each Forest Plan alternative is a unique combination of land allocations, management prescriptions, and activity schedules. As a result, each alternative would generate a different mix of goods, services, and environmental effects. According to NFMA (36 CFR 219.12f) alternatives must:

- be distributed within the minimum and maximum resource potentials to reflect to the extent practicable the full range of major commodity and environmental resource uses and values that would be produced from the Forest;
- reflect a range of resource outputs and expenditure levels;
- be formulated to facilitate analysis of opportunity costs, and of resource use and environmental trade-offs among alternatives and between alternatives and benchmarks;
- be formulated to facilitate evaluation of effects on present net value, benefits, and costs of achieving various outputs and nonpriced benefits;
- provide different ways to address and respond to major public issues, management concerns, and resource opportunities identified during the planning process;
- be formulated to require changes in existing laws and policies, to implement if reasonable and necessary, to address major public issues, management concerns, or resource opportunities;
- respond to and incorporate the RPA Program tentative resource objectives for the Forest in at least one alternative;
- reflect the current level of goods and services provided by the unit, and the highest level of goods and services that would be provided in the future if current management direction continues in at least one alternative (the “no action” alternative pursuant to NEPA);
- represent, to the extent practicable, the most cost efficient combination of management prescriptions examined that can meet the objectives established in each alternative;
- state the condition and uses that will result from long-term application of the alternative,
- state what goods and services will be produced, including timing and flow of outputs, and associated costs and benefits;
- state resource management standards and guidelines,
- state the purposes of the proposed management direction.

Formulation of Alternatives, planning step five, followed the Analysis of the Management Situation. Benchmarks from this analysis defined the range within which alternatives were developed. In addition, five alternatives were required:

-Current Direction (No Action): This is the alternative of “no-action” required by the Council of Environmental Quality (CEQ) regulations (40 CFR 1502.14). This alternative would continue the management of the Forest as defined by existing direction in approved

management plans. It assumes continuation of existing policies, standards, and guidelines; current budget levels updated for changing costs over time; and, to the extent possible, production of current levels and mixes of resource outputs.

Alternative A/NFMA is the current direction alternative (or the “no-action” alternative) in this FEIS.

-Emphasis on the Current RPA Program: This alternative will determine how the current (1980) RPA program distributed to the Forest through the Regional Guide could best be implemented.

Alternative B is the current RPA program alternative in this FEIS.

-Emphasis on Market Opportunities: This alternative has an emphasis on outputs that have an established market price (timber, livestock forage, commercial fish, developed recreation opportunities, and minerals). Management for other resources will be at economically and environmentally feasible levels consistent with the emphasis on market-oriented outputs.

Alternative D is the alternative in this FEIS which emphasizes market opportunities.

-Emphasis on Non-Market Opportunities: This alternative has an emphasis on amenity outputs such as visuals, dispersed recreation and roadless areas. Management for other resources will be at economically and environmentally feasible levels consistent with the emphasis on non-market outputs.

Alternative E is the alternative in this FEIS which emphasizes non-market opportunities.

-Emphasis on Dispersed Unroaded Recreation and Intensified Management: This alternative designates a large portion of the roadless areas on the Forest as dispersed unroaded recreation while increasing commodity production on those areas already roaded. Its purpose is to balance the economic effects of not beginning commodity production in roadless areas. It also attempts to reduce potential cumulative effects of management activities on National Forest and adjacent forest lands.

Alternative G is the alternative which best emphasizes dispersed unroaded recreation and intensified management in this FEIS.

-Departure Alternative: One alternative is a “departure” alternative. It has the same land allocation and resource management prescriptions as the alternative that it was based upon. However, the timber harvest schedule has been modified from the base sale schedule which resulted in nondeclining flow of timber, never exceeding the long-term sustained yield capacity of the Forest. In most cases, management under a departure alternative results in higher volumes of timber harvested in the near future and lower volumes of timber available in the intermediate future. The ability of the Forest to produce timber in the long run is no less than that of the alternative upon which the departure was based.

Alternative I is the departure alternative in this FEIS.

The process used to derive alternatives is outlined below as a series of steps. Some of these took place concurrently.

-Major public issues, management concerns, and opportunities were identified through public and internal meetings and Forest Plan Reports. See Appendix A for additional detail.

-A comprehensive multi-resource data base was formed based on the identified issues and concerns and stored in a computer mapping system.

-A set of management prescriptions was prepared to represent a variety of possible ways and intensities to manage the Forest in response to the issues, concerns, and opportunities. These prescriptions represent the most cost efficient set of activities which meet the goals and objectives of each prescription.

-Analysis areas which represent similar physical and biological attributes were identified and mapped. The capability, suitability, and management opportunities of specific areas of the Forest were considered in this step.

-A determination of the appropriate management prescriptions for consideration on each analysis area was made.

-The costs of applying management prescriptions to analysis areas, and the outputs and resource values which would result, were estimated.

-Demand for various outputs was estimated.

-A FORPLAN model was developed for the Forest incorporating the information developed in the preceding steps. A detailed description of the FORPLAN model is found in Section III of this Appendix.

-During the Analysis of the Management Situation, supply potentials were determined using the FORPLAN computer model and other techniques. Various assumptions, constraints, and objectives were used to establish benchmarks for supply potentials of each resource. A benchmark was established for maximum present net value. Existing resource supply and projected demand was compared. Opportunities to resolve issues and management concerns were explored by comparing existing and projected demand to potential production levels. These potentials, when compared to the Current Direction, indicate opportunities and/or need for change.

-Alternative goals and objectives were established to provide a broad range of options for future management of the Forest and to provide a broad range of responses to the Forest's planning problems.

-Seven alternative land allocations (Alternatives A/NFMA, C, D, E, F, G and J) were mapped to meet the goals and objectives established above. These alternatives, as well as Alternatives B, H, and I, are described in detail in Chapter II of this FEIS. These land allocations were modeled in FORPLAN. Additional objectives were modeled as constraints. FORPLAN computer runs were made on these alternatives using an objective function of maximization of present net value over the 15 decade modeling horizon. This objective function was the final one used for all alternatives to assume that the most cost efficient solution possible, given the other goals and objectives of the alternatives, was achieved.

-Other RPA targets could be more easily met. The land allocation developed for Alternative D, the commodity emphasis alternative, was used in conjunction with a maximize timber FORPLAN constraint, subject to this and other resource constraints, to produce Alternative B, the RPA alternative.

-A version of the current management alternative that harvested as much timber as the current Timber Management Plan for the Forest was desired. The Alternative A/NFMA land allocation, which reflects current management projected into the future was used in FORPLAN with an objective of timber maximization to find the highest level of timber production possible under the current land allocation. The three step process described above for Alternative G was used. The level of timber harvest called for in the Timber Management Plan was found to be unobtainable. The attempt to meet it was carried forward as a viable alternative however, Alternative H.

-Alternative I was developed as a departure based on Alternative C, the preferred alternative. A number of departures from the base sale schedule developed for Alternative C were examined. The version that emerged as Alternative I has a first decade harvest level equal to the average quantity sold during the period FY 1975 through FY 1984. This gradually declines to the harvest level found in Alternative C.

Alternative NC may not meet the requirements of 36 CFR 219.12(f). It was not formulated in a manner that facilitates analysis of opportunity costs, resource uses, and environmental tradeoffs compared to other alternatives. It was not formulated in a manner that permits evaluation of present net value or the benefits and costs of achieving various outputs and non-priced benefits. Alternative NC does not necessarily represent the most cost efficient combination of management prescriptions to meet the objectives of the alternative. It is not possible with this alternative to project the flow of goods and services beyond the first decade. Resource management Standards and Guidelines for the No Change Alternative are contained in several documents including the 1963 and 1969 Timber Management Plans, the District Multiple Use Plans, and the Chelan and Kittitas Unit Plans. Direction in these documents is not integrated, thus resource outputs are often unattainable.

B. Constraints Common to all Alternatives

Some constraints and prescriptions were common or constant in all the alternatives. These were necessary to meet planning requirements, existing laws or policies, or the objectives of prescriptions. First is a discussion of those items which were constant. Next is a discussion of those that were common, but the amount of area they applied to varied by alternative.

1.Constraint: Some areas on the Forest will not vary by alternative. These include congressionally designated wilderness, two established research natural areas, and the Entiat Experimental Forest.

Purpose: To perpetuate and protect the values and resources for which these areas were established.

Rationale: The management of these areas was well established and we did not have the authority to consider a wide range of choices or prescriptions.

Tradeoff: Impacts of this assumption were not analyzed because it was beyond the scope of this planning process. Also, detailed inventory data did not exist for wilderness areas established

prior to 1984. Present net value and commodity production would increase if this constraint was removed; amenity production would decrease. The amounts are unquantified, however.

2.Constraint: The Alpine Lakes Management Unit will be managed as directed by the Alpine Lakes Area Land Management Plan in all alternatives.

Purpose: Maintain the direction recently developed for the area as directed by the Alpine Lakes Area Management Act of 1976.

Rationale: A congressionally mandated study produced a management plan for the area in 1981. This plan was an interdisciplinary product with a great deal of public involvement. Incorporation of the direction provided in special area plans, such as this, into the Forest Plan is in accordance with 36 CFR 219.2(b).

Tradeoff: The impact of this constraint would vary among alternatives. It was tested against the maximum PNV benchmark (Benchmark Run #7). Present net value decreased by four percent and allowable sale quantity decreased by seven percent when this constraint was added. Un-roaded recreation capacity was increased in the long-run but not in the first decade. Effects on other resources was minor.

3.Constraint: Timber harvest can be scheduled only on lands classified as tentatively suitable for timber harvest through the Stage I suitability analysis. See Chapter III, of this FEIS for acreages.

Purpose: To meet the timber resource land suitability requirements of NFMA (36 CFR 219.14).

Rationale: The Allowable Sale Quantity (ASQ) must be determined using only tentatively suitable lands.

Tradeoff: Impacts of this assumption were not analyzed. Adequate data did not exist to predict timber yields from much of the unsuitable lands.

4.Constraint: All alternatives except Alternative I have nondeclining flow constraints on sawtimber. This means that the harvest in any given decade cannot be less than that of the preceding decade.

Purpose: To meet the timber scheduling requirements of NFMA [36 CFR 219.16(a)(1)].

Rationale: To provide a steady supply of timber.

Tradeoff: The impact of this constraint would vary among alternatives. It was tested against the maximum PNV benchmark (Benchmark Run #7). It resulted in a three percent reduction in PNV, a nine percent reduction in first decade allowable sale quantity, and a two percent increase in total allowable sale quantity over 150 years.

5.Constraint: The harvest level of the last harvest period will be less than or equal to long-term sustained yield (all alternatives except Alternative I).

Purpose: To meet the timber scheduling requirements of NFMA [36 CFR 219.16(a)(1)].

Rationale: This constraint, in combination with the nondeclining flow constraint, insures that timber harvest will never exceed the long-term ability of the Forest to supply timber.

Tradeoff: The impact of this constraint was not analyzed separately. It was analyzed in conjunction with the nondeclining flow constraint discussed above. Allowable sale quantity exceeded long-term sustained yield capacity in 4 out of 15 decades in Benchmark Run #5 (Maximum PNV benchmark without constraints for nondeclining flow, never to exceed long-term sustained yield capacity). This constraint may reduce PNV and allowable sale quantity in certain decades but the actual amounts are unquantified.

6.Constraint: Control the amount of inventory volume left at the end of the planning horizon.

Purpose: Assure that the total inventory volume left at the end of the planning horizon will equal or exceed the volume that would occur in a regulated forest.

Rationale: The ending inventory constraint controls age class distribution through the planning horizon to assure the base harvest schedule concludes with a regulated volume in perpetuity.

Tradeoff: PNV and allowable sale quantity may be reduced in certain decades due to maintaining the proper age class distribution for future harvests. The specific impacts are unquantified, however.

7.Constraint: Timber stands could not be scheduled for harvest prior to reaching 95 percent of culmination of mean annual increment (CMAI).

Purpose: To comply with the NFMA regulations [36 CFR 219.16(a)(2)(iii)].

Rationale: Timber stands could potentially be scheduled for harvest as soon as they met minimum merchantability requirements, particularly under an objective of PNV maximization.

Tradeoff: The impact of this constraint would vary among alternatives. It was tested against the maximum PNV benchmark (Benchmark Run #7). This constraint delayed timber harvest by at least one decade in most stands which were not already beyond 95 percent of CMAI. This had an insignificant effect on PNV and all outputs other than long-term sustained yield capacity which increased by four percent. This is due to older stands with more volume per acre being harvested.

8.Constraint: A dispersion constraint was used in all alternatives to achieve cutting unit sizes that did not exceed 40 acres in size and left logical cutting units in between.

Purpose: To comply with the NFMA regulations [36 CFR 219.27(d) and (f)].

Rationale: The model potentially could have harvested an entire analysis area in one decade without such a constraint.

Tradeoff: The impact of this constraint would vary among alternatives. It resulted in a 14 percent reduction in PNV and a 12 percent reduction in first decade allowable sale quantity when added to Benchmark Run #3 (maximum PNV benchmark without MMR's). It resulted in a 24 percent reduction in PNV but had no effect on first decade allowable sale quantity when added to Benchmark Run #1 (maximum timber benchmark without MMR's). Visual quality, recreational settings, wildlife habitat, sedimentation, and water quality would be adversely affected without the constraint. However, these factors are not quantified in the PNV calculation.

9.Constraint: The Riparian-Aquatic Habitat Protection Zone (EW-2) Prescription was applied to a variable width area around riparian zones. See the Forest-wide Standards and Guideline and Management Prescriptions in the Forest Plan for a detailed description.

Purpose: To meet management requirements for soil and water [36 CFR 219.27(e)].

Rationale: Less intensive management practices than might otherwise be applied are necessary in these areas to meet management requirements.

Tradeoff: The impact of this constraint would vary among alternatives. It resulted in a four percent reduction in first decade allowable sale quantity when added to Benchmark Run #3 (maximum PNV benchmark without MR's). It resulted in a two percent reduction in both PNV and first decade allowable sale quantity when added to Benchmark Run #1 (maximum timber benchmark without MR's). The additional costs associated with this constraint are included in the PNV calculation. However, the benefits are not. They must be considered as subjective additions to present net benefits.

10.Constraint: Old-growth/mature units are dedicated and managed according to Regional guidelines for distribution and amount to meet management requirements for old-growth/mature dependent species. See the Old-Growth Dependent Species (OG-1) and Mature (OG-2) Prescription in the Forest Plan for a detailed description.

Purpose: To meet management requirements for old-growth dependent species [36 CFR 219.27(e)].

Rationale: Old-growth units of the proper size and distribution might not have been maintained without this constraint. This was the most efficient way to meet management requirements for old-growth dependent species.

Tradeoff: The impact of this constraint would vary among alternatives. It resulted in a five percent reduction in PNV and a three percent reduction in first decade allowable sale quantity when added to Benchmark Run #3 (maximum PNV benchmark without MMR's). It resulted in a two percent reduction in PNV and a five percent reduction in first decade allowable sale quantity when added to Benchmark Run #1 (maximum timber benchmark without MMR's). Impacts would be smaller for alternatives than for benchmarks because some of the areas assigned to the Old-Growth/Mature Species Prescription would already be assigned to prescriptions which either do not harvest timber or utilize similar silvicultural systems.

11.Constraint: Harvest scheduling constraints were applied to Scenic Travel-Retention (ST-1) and Scenic Travel-Partial Retention (ST-2) Prescriptions in every alternative. The constraints were the same in every alternative; however, the amount of area that they applied to varied widely among alternatives. No more than 7.2 percent of the area allocated to the Scenic Travel-Retention Prescription or 10 percent of the area allocated to the Scenic Travel-Partial Retention Prescription could be harvested in any given decade.

Purpose: To meet the visual quality objectives of the prescriptions.

Rationale: The model could have scheduled a level of timber harvest that would not have met the objectives of these prescriptions without the constraints.

Tradeoff: There is no tradeoff involved with this constraint. It is part of the definition of the two prescriptions. Tradeoffs do occur when either of these prescriptions are allocated to the ground. Timber yields and PNV are reduced compared to some prescriptions. Visual quality and many other nonpriced benefits are enhanced, however.

None of the common constraints were applied during the development of Alternative NC.

The items discussed above were common to all the alternatives. The variation in the alternatives occurred largely as a result of applying different management prescriptions to different areas of the Forest.

C. Development of Alternatives

Benchmarks defined the minimum and maximum output levels of Forest resources and the outputs associated with current management. The maximum PNV benchmark (Benchmark Run #7) identified the most efficient land allocation and schedule of activities and outputs, given the information quantified in FORPLAN. This provided a starting point for the formulation of each alternative. Land allocations and output levels were varied by alternative to better resolve mixes of issues, concerns, and opportunities. This resulted in a decrease in present net value compared to the maximum PNV benchmark. However, many of the changes which lower PNV result in increases in net public benefits due to improving factors which are not valued in the PNV calculation. The constraints associated with each alternative reflect the Forest Management Team's best estimate of the most cost efficient method of achieving the goals and objectives of the alternative.

The following discussions focus on the development of each alternative. Numerous iterations occurred for some alternatives where prescriptions or schedules were adjusted to better accomplish goals and objectives. The results of these runs are on file in the planning records at the Wenatchee National Forest Supervisor's Office. The final sets of constraints and objectives for each alternative follow. Detailed descriptions of the alternatives are found in Chapter II of this FEIS.

Alternative NC was developed by a very different process than any other alternative. Alternative NC is based upon timber outputs prescribed in the 1963 and 1969 Timber Management Plans and upon management direction contained in other plans listed in Chapter I of the FEIS and in Section VI of Appendix B. Unlike other alternatives, interactive testing of various prescriptions and schedules was not done during development of the NC Alternative.

1. Alternative A/NFMA

This is the no action alternative. It was formulated to maintain the current management direction for the Forest. Sources of that direction were the Alpine Lakes Area Land Management Plan, the Chelan and Kittitas Unit Plans, and Ranger District multiple use plans. Alternative A/NFMA portrays how these plans would influence the flow of goods and services over the life of this plan (10-15 years) based upon the use of current National Forest Management Act of 1976 (NFMA) planning data. It also approximates the current budget.

This alternative does meet the management requirements for that habitat as presently required for NFMA planning.

a. The criteria and assumptions underlying the development of this alternative are:

- Achieve the common alternative constraints discussed earlier.
- Simulate the management most likely to be carried out into the future if current direction is followed.
- Land allocation is defined by currently approved plans (Alpine Lakes Area Land Management Plan, the Chelan and Kittitas Unit Plans, and Ranger District Multiple Use Plans).
- Meets minimums for old-growth dependent species as required by NFMA.
- Visual quality objectives reflect the current management of the Forest.
- Suitability for timber production is based on latest study, not the currently approved Timber Management Plan.
- The Dispersed Recreation, Unroaded, Motorized (RE-2) Prescription was not split into trail bike versus four-wheel-drive areas.
- The Classified Special Areas - Scenic and/or Recreation (SI-1) Prescription was applied to the portion of the Chelan Scenic Study Area which remains outside of wilderness.
- The Chiwawa and White Rivers, and a portion of the Wenatchee River, are proposed for classification under the Wild and Scenic Rivers Act.

b. In addition to the common alternative constraints, the constraints utilized to meet the criteria and assumptions are:

(1)Constraint: Prescriptions were constrained to analysis areas to reflect the current land allocation. The acreage by management prescription is shown below.

<u>Management Prescription</u>	<u>Acre</u>
Water	7,780
EF-1	4,770
EW-1	17,151
EW-2	53,849
GF	393,306
OG-1	66,823
OG-2	56,074
RE 1	4,494
RE-2a/RE-2b	64,597
RE-3	59,551
RM-1	33,708
RN-1	1,717
SI-1	136,911
SI-2	382
ST-1	125,484
ST-2	286,733
WI-1	841,034
WS-1	6,742
WS-2	3,074
WS-3	6,636

Purpose: This allocation depicts the current management situation.

Rationale: This alternative simulates the current management of the Forest projected into the future.

Tradeoff: Present net value is reduced by 7.3 percent compared to the maximum PNV benchmark (Benchmark Run #7). Many factors which are not accounted for in the PNV calculation are significantly improved. Table II-3a in Chapter II of this FEIS presents a wide range of outputs and effects for this alternative and the maximum PNV benchmark. The differences between them are due to differences in land allocations.

<u>FORPLAN Run</u>	<u>Discounted PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>1st Decade Benefits (\$MM)</u>	<u>ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative A/NFMA with land alloca- tion constraints	1,976	329	2,305	21.8

2. Alternative B

This alternative was developed in an attempt to meet the 1980 Resources Planning Act program which has been assigned to the Forest through the Regional Guide.

The 1980 RPA timber target strongly influenced our approach. This alternative uses the Alternative D land allocations. It portrays the Forest's maximum timber producing capability while considering other resource needs. This alternative would result in the second greatest amount of development of the Forest.

a. The criteria and assumptions underlying the development of this alternative are:

- Achieve the common alternative constraints discussed earlier.
- Achieve 1980 RPA targets as allocated to the Forest by the Regional Guide.
- Expansion could take place at Chelan, Chinook Pass, Mission Ridge, and White Pass ski areas.
- No rivers are recommended for classification study under the Wild and Scenic Rivers Act.
- All tentatively suitable timber lands were assigned to General Forest Management Prescriptions, except where there were too small and isolated to be manageable or in the most critical travel corridors.

-Blue Slide, Rimrock, and Goose Egg Mountain proposed Geological Areas and the Lake Creek proposed Botanical Area are assigned to the Classified Special Interest Area - Other (SI-2) Prescription.

b. In addition to the common alternative constraints, the constraints utilized to meet the criteria and assumptions are:

(1)Constraint: Prescriptions are constrained to analysis areas to reflect a high commodity emphasis (same land allocation as Alternative D). The acreage by management prescription is shown below.

<u>Management Prescription</u>	<u>Acre</u>
Water	7,780
EF-1	4,770
EW-1	77,784
EW-2	58,046
GF	613,344
OG-1	71,063
OG-2	55,671
RE 1	8,544
RE-2a	69,706
RE-2b	7,865
RE-3	84,462
RM-1	81,663
RN-1	2,247
SI-1	72,950
SI-2	2,056
ST-1	55,163
ST-2	50,032
WI-1	841,034
WS-1	0
WS-2	0
WS-3	0

Purpose: This allocation reflects a high commodity emphasis which is feasible to implement.

Rationale: The RPA target which was most difficult to achieve was timber production. The land allocation which emphasized timber production was the most logical starting point in developing this alternative.

Tradeoff: Present net value is reduced by nine percent compared to the maximum PNV benchmark (Benchmark Run #7). Many factors which are not accounted for in the PNV calculation are significantly improved. Table II-3a in Chapter II of this FEIS presents a wide range of outputs and effects for this alternative and the maximum PNV benchmark. The differences between them are due to differences in land allocations and the harvest constraint described below.

<u>FORPLAN Run</u>	<u>PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>Discounted Benefits (\$MM)</u>	<u>1st Decade ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative B with land allocation constraints	1,756	503	2,259	33.5

3. Alternative C

This alternative is an attempt to adjust the current direction (Alternative A) to a land allocation which would maximize net public benefits and would provide a balanced program in response to the issues and concerns.

Alternative C allocates many more acres to key big game range, increases the acreage allocated to roadless management, and provides greater protection of the scenic values.

a. The criteria and assumptions underlying the development of this alternative are:

-Achieve the common alternative constraints discussed earlier.

-Resolve problems identified by the Forest Management Team with the current land allocation.

-Segments of the American, Chiwawa, Cle Elum, Entiat, Icicle, Napeequa, Waptus, Wenatchee, and White Rivers are recommended for classification under the Wild and Scenic Rivers Act.

-Expansion could take place at Chinook Pass, Mission Ridge, and White Pass ski areas.

b. In addition to the common alternative constraints, the constraints utilized to meet the criteria and assumptions are:

(1)Constraint: Prescriptions were constrained to analysis areas to resolve problems perceived with the current land allocation. The acreage by management prescription is shown below.

<u>Management Prescription</u>	<u>Acres</u>
Water	7,780
EF-1	4,770
EW-1	118,742
EW-2	47,361
EW-3	19,059
GF	389,089
OG-1	79,840
OG-2	49,015
RE 1	6,021
RE-2a	79,607
RE-2b	16,748
RE-3	116,092
RE-4	6,614
RM-1	17,702
RN-1	2,247
SI-1	70,512
SI-2	2,798
ST-1	83,635
ST-2	174,880
WI-1	841,034
WS-1	5,554
WS-2	11,363
WS-3	23,426
MP-1	13,717

Purpose: This allocation reflects corrections of problems that the Forest Management Team perceived with the current land allocation. It resolves issues, concerns, and opportunities as perceived by the Forest Management Team.

Rationale: The Forest Management Team has a vast amount of on-the-ground experience on the Wenatchee. This alternative captures their knowledge of the capability of the Forest to resolve issues, concerns, and opportunities.

Tradeoff: Present net value is reduced by 10.4 percent compared to the maximum PNV benchmark (Benchmark Run #7). Many factors which are not accounted for in the PNV calculation are significantly improved. Table II-3a in Chapter II of this FEIS presents a wide range of outputs and effects for this alternative and the maximum PNV benchmark. The differences between them are due to differences in land allocations.

<u>FORPLAN Run</u>	<u>PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>Discounted Benefits (\$MM)</u>	<u>1st Decade ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative C	1,910	409	2,319	24.3

4. Alternative D

This alternative emphasizes the production of resources such as timber, range forage, developed recreation, minerals, and other resources which have the potential to return revenue to the Federal Treasury and local Counties. Management of other resources is at economically and environmentally feasible levels consistent with the emphasis on market oriented outputs.

The Forest was assisted in the development of this alternative by local representatives of the timber industry.

a. The criteria and assumptions underlying the development of this alternative are:

-Achieve the common alternative constraints discussed earlier.

-Expansion could take place at Chelan, Chinook Pass, Mission Ridge, and White Pass ski areas.

-No rivers are recommended for classification under the Wild and Scenic Rivers Act.

-All tentatively suitable timber lands were assigned to General Forest Management Prescriptions except where they were too small and isolated to be manageable and the most critical travel corridors.

-Blue Slide, Rimrock, and Goose Egg Mountain proposed Geological Areas, and the Lake Creek proposed Botanical Area are assigned to the Classified Special Interest Area - Other (SI-2) Prescription.

-The area along the south side of Lake Chelan is assigned to the Key Big Game Habitat (EW-1) Prescription.

b. In addition to the common alternative constraints, the constraints utilized to meet the criteria and assumptions are:

(1)Constraint: Prescriptions are constrained to analysis areas to reflect a high commodity emphasis. The acreage by management prescription is shown below.

<u>Management Prescription</u>	<u>Acres</u>
Water	7,780
EF-1	4,770
EW-1	77,784
EW-2	58,046
GF	613,344
OG-1	71,063
OG-2	55,671
RE 1	8,650
RE-2a	69,706
RE-2b	7,865
RE-3	84,462
RM-1	81,663
RN-1	2,247
SI-1	72,950
SI-2	2,056
ST-1	51,163
ST-2	50,032
WI-1	841,034
WS-1	0
WS-2	0
WS-3	0

Purpose: This allocation reflects a high commodity emphasis which is feasible to implement.

Rationale: This land allocation is shifted as far towards a commodity emphasis as possible, while still remaining implementable.

Tradeoff: Present net value is reduced by nine percent compared to the maximum PNV benchmark (Benchmark Run #7). Many factors which are not accounted for in the PNV calculation are significantly improved. Table II-3a in Chapter II of this FEIS presents a wide range of outputs and effects for this alternative and the maximum PNV benchmark. The differences between them are due to differences in land allocations.

<u>FORPLAN Run</u>	<u>PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>Discounted Benefits (\$MM)</u>	<u>1st Decade ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative D	1,937	410	2,347	25.6

5. Alternative E

This alternative allocates all currently roadless areas, outside of the existing wilderness and the Alpine Lakes Management Area, to a management prescription which will maintain their roadless status. It also emphasizes the protection of natural scenery, fish and wildlife habitat, and other amenity values. Management of other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

a. The criteria and assumptions underlying the development of this alternative are:

-Achieve the common alternative constraints discussed earlier.

-Retain roadless character of all inventoried roadless areas outside of the Alpine Lakes Management Area and the Entiat Experimental Forest.

-Balance the areas assigned to unroaded management between motorized and non-motorized recreation opportunities.

-Segments of the American, Chiwawa, Cle Elum, Entiat, Icicle, Napeequa, Waptus, Wenatchee and White Rivers are recommended for classification under the Wild and Scenic Rivers Act.

-The Lake Creek proposed Botanical Area is assigned to the Classified Special Interest Area - Other (SI-2) Prescription.

-Retain natural appearing landscapes, particularly where viewed from roads and trails.

b. In addition to the common alternative constraints, the constraints utilized to meet the criteria and assumptions are:

(1)Constraint: Prescriptions are constrained to analysis areas to reflect a high amenity emphasis. The acreage by management prescription is shown below.

<u>Management Prescription</u>	<u>Acres</u>
Water	7,780
EF-1	4,770
EW-1	148,083
EW-2	37,206
GF	153,956
OG-1	62,901
OG-2	14,862
RE 1	4,388
RE-2a	94,002
RE-2b	38,754
RE-3	320,038
RM-1	6,106
RN-1	2,247
SI-1	74,010
SI-2	6,402
ST-1	185,544
ST-2	132,816
WI-1	841,034
WS-1	14,416
WS-2	3,816
WS-3	26,926
MP-1	8,459

Purpose: This land allocation has a strong amenity emphasis, with 100 percent of the inventoried roadless area outside of the Alpine Lakes Management Area and the Entiat Experimental Forest allocated to unroaded management.

Rationale: This land allocation is shifted as far towards an amenity emphasis as possible, while still remaining implementable.

Tradeoff: Present net value is reduced by 14 percent compared to the maximum PNV benchmark (Benchmark Run #7). Many factors which are not accounted for in the PNV calculation are significantly improved. Table II-3a in Chapter II of this FEIS presents a wide range of outputs and effects for this alternative and the maximum PNV benchmark. The differences between them are due to the land allocation.

<u>FORPLAN Run</u>	<u>PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>Discounted Benefits (\$MM)</u>	<u>1st Decade ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative E	1,834	368	2,202	12.9

6. Alternative F

This alternative emphasizes unroaded recreation, protection of natural scenery, fish and wildlife habitat, and other amenity values. It allocates approximately 80 percent of the currently inventoried roadless area outside of the existing wilderness and Alpine Lakes Management Area to roadless management prescriptions with heavy emphasis to non-motorized recreation. Management of other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

The Forest was assisted in the development of this alternative by a coalition of environmental groups from throughout the state.

a. The criteria and assumptions underlying the development of this alternative are:

- Achieve the common alternative constraints discussed earlier.
- Retain roadless character of approximately 82 percent of the inventoried roadless areas outside of the Alpine Lakes Management Area and the Entiat Experimental Forest.
- Emphasize non-motorized recreation opportunities in the areas assigned to unroaded management.
- Segments of the American, Chiwawa, Cle Elum, Entiat, Icicle, Nepeequa, Waptus, Wenatchee and White Rivers are recommended for classification under the Wild and Scenic Rivers Act.
- The Domke Lake area is allocated to non-motorized use in this alternative only.
- Expansion could take place at Chinook Pass and White Pass ski areas.

-Rimrock, Goose Egg Mountain, and Kloochman Rock proposed Geological Areas, and the Lake Creek proposed Botanical Area are assigned to the Classified Special Interest Area - Other (SI-2) Prescription.

-The Bumping Lake corridor is assigned to the Classified Special Interest Area - Scenic and/or Recreation (SI-1) Prescription.

-An area in the Little Wenatchee River drainage is assigned to the Old-Growth Management (OG-1) Prescription, in addition to the areas needed to meet management requirements.

b. In addition to the common alternative constraints, the constraints utilized to meet the criteria and assumptions are:

(1) **Constraint:** Prescriptions are constrained to analysis areas to reflect an unroaded, non-motorized emphasis. The acreage by management prescription is shown below.

<u>Management Prescription</u>	<u>Acres</u>
Water	7,780
EF-1	4,770
EW-1	140,083
EW-2	39,793
GF	202,949
OG-1	69,028
OG-2	15,688
RE 1	7,356
RE-2a	91,373
RE-2b	38,754
RE-3	259,088
RM-1	7,166
RN-1	2,247
SI-1	74,010
SI-2	6,233
ST-1	167,842
ST-2	147,129
WI-1	841,034
WS-1	15,561
WS-2	3,752
WS-3	26,776
MP-1	13,102

Purpose: This land allocation emphasizes unroaded non-motorized recreation opportunities, with 80 percent of the inventoried roadless area outside of the Alpine Lakes Management Area and the Entiat Experimental Forest allocated to unroaded management.

Rationale: This land allocation was developed with the cooperation of various environmental groups. It has a strong unroaded, non-motorized emphasis, while still remaining implementable.

Tradeoff: Present net value is reduced by 11 percent compared to the maximum PNV benchmark (Benchmark Run #7). Many factors which are not accounted for in the PNV calculation are significantly improved. Table II-3a in Chapter II of this FEIS presents a wide range of outputs and effects for this alternative and the maximum PNV benchmark. The differences between them are due to the land allocation.

<u>FORPLAN Run</u>	<u>PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>Discounted Benefits (\$MM)</u>	<u>1st Decade ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative F	1,897	312	2,209	13.6

7. Alternative G

This alternative is an attempt to balance the land allocations between amenity and commodity production emphases. Of the currently roadless areas outside of existing wilderness and the Alpine Lakes Management Area which are suitable for timber production, approximately half was allocated to roadless management with a heavy emphasis toward motorized recreation and the remainder was allocated to commodity production.

The Forest was assisted in the development of portions of this alternative by representatives of off-road vehicle users groups from throughout the State.

a. The criteria and assumptions underlying the development of this alternative are:

- Achieve the common alternative constraints discussed earlier.
- Retain roadless character of approximately 69 percent of the inventoried roadless areas outside of the Alpine Lakes Management Area and the Entiat Experimental Forest.
- Emphasize motorized recreation opportunities in the areas assigned to unroaded management.
- The Chiwawa and White Rivers and a portion of the Wenatchee River are recommended for classification under the Wild and Scenic Rivers Act.
- Expansion could take place at Chinook Pass, Mission Ridge, and White Pass ski areas
- The Lake Creek proposed Botanical Area is assigned to the Classified Special Interest Area - Other (SI-2) Prescription.
- A corridor along the south side of Lake Chelan is allocated to the Dispersed Recreation, Unroaded, Motorized (RE-2a) Prescription so that a bike trail is not precluded.
- Washington State Department of Wildlife recommendations for wildlife are incorporated.

b. In addition to the common alternative constraints, the constraints utilized to meet the criteria and assumptions are:

(1)Constraint: Prescriptions are constrained to analysis areas to reflect an unroaded, motorized emphasis. The acreage by management prescription is shown below.

<u>Management Prescription</u>	<u>Acres</u>
Water	7,780
EF-1	4,770
EW-1	146,493
EW-2	47,573
GF	224,743
OG-1	66,039
OG-2	45,071
RE 1	7,929
RE-2a	197,204
RE-2b	26,437
RE-3	100,362
RM-1	7,632
RN-1	2,247
SI-1	70,491
SI-2	742
ST-1	147,469
ST-2	210,476
WI-1	841,034
WS-1	6,614
WS-2	3,074
WS-3	6,632

Purpose: This land allocation emphasizes unroaded motorized recreation opportunities, with 70 percent of the inventoried roadless area outside of the Alpine Lakes Management Area and the Entiat Experimental Forest allocated to unroaded management.

Rationale: This land allocation was developed with the cooperation of various off-road vehicle groups. It has a strong unroaded, motorized emphasis, while still remaining feasible.

Tradeoff: Present net value is reduced by 11.4 percent compared to the maximum PNV benchmark (Benchmark Run #7). Many factors which are not accounted for in the PNV calculation are significantly improved. Table II-3a in Chapter II of this FEIS presents a wide range of outputs and effects for this alternative and the maximum PNV benchmark. The differences between them are due to differences in land allocations and timber harvest constraint described below.

<u>FORPLAN Run</u>	<u>PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>Discounted Benefits (\$MM)</u>	<u>1st Decade ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative G	1,889	371	2,260	17.5

8. Alternative H

This alternative was developed to portray the maximum timber producing capability of the Forest under the present land allocations of existing management direction. This alternative has about the same land allocations as Alternative A/NFMA.

a. The criteria and assumptions underlying the development of this alternative are:

- Achieve the common alternative constraints discussed earlier.
- Land allocation is defined by currently approved plans (Alpine Lakes Area Land Management Plan, the Chelan and Kittitas Unit Plans, and Ranger District Multiple Use Plans) except that all NFMA management requirements are met.
- Visual quality objectives reflect the current management of the Forest.
- Suitability for timber production is based on the latest study, not the currently approved Timber Management Plan.
- The Dispersed Recreation, Unroaded, Motorized (RE-2) Prescription was not split into trail bike versus 4-wheel-drive areas.
- The Classified Special Areas - Scenic/and or Recreation (SI-1) Prescription was applied to the portion of the Chelan Scenic Study Area which remains outside of wilderness.
- The public lands along segments of the following rivers are recommended for classification under the Wild and Scenic Rivers Act: American, Chiwawa, Cle Elum, Entiat, Icicle, Napeequa, Waptus, Wenatchee and White Rivers.
- The level of timber harvest specified in the current Timber Management Plans would be achieved if possible.

b. In addition to the common alternative constraints, the constraints utilized to meet the criteria and assumptions are:

(1)Constraint: Prescriptions were constrained to analysis areas to reflect the current land allocation, revised to meet all NFMA management requirements. The acreage by management prescription is shown below.

<u>Management Prescription</u>	<u>Acres</u>
Water	7,780
EF-1	4,770
EW-1	17,151
EW-2	52,301
GF	393,243
OG-1	66,823
OG-2	56,075
RE-1	4,494
RE-2	64,597
RE-3	59,551
RM-1	33,708
RN-1	1,717
SI-1	136,911
SI-2	382
ST-1	120,968
ST-2	286,733
WI-1	841,034
WS-1	12,423
WS-2	3,519
WS-3	23,426

Purpose: This allocation depicts the current management situation, revised to meet all NFMA minimum requirements.

Rationale: This allocation provides a legal and implementable version of current management.

Tradeoff: Present net value is reduced by 12.6 percent compared to the maximum PNV benchmark (Benchmark Run #7). Many factors which are not accounted for in the PNV calculation are significantly improved. Table II-3a in Chapter II of this FEIS presents a wide range of outputs and effects for this alternative and the maximum PNV benchmark. The differences between them are due to differences in land allocations and the timber harvest constraint discussed below.

<u>FORPLAN Run</u>	<u>PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>Discounted Benefits (\$MM)</u>	<u>1st Decade ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative H	1,864	435	2,299	27.5

9. Alternative I

Alternative I is a departure from the base sale schedule established under Alternative C, the preferred alternative. It has the same land allocation as Alternative C. The timber harvest schedule for Alternative C is based upon nondeclining flow, never exceeding long-term sustained yield. Alternative I has the same long-term sustained yield capacity as Alternative C but deviates from nondeclining flow. The level of timber harvest in the first decade approximates the amount programmed for FY 1986 as determined by the current Timber Management Plans. The level of timber harvest gradually declines in the second and third decades, equaling that of Alternative C in the fourth decade. This would allow local industry to

phase into a lower level of timber harvest more gradually than in Alternative C. The impacts on other resources would be greater in the early decades due to the accelerated rate of timber harvest under the departure.

a. The criteria and assumptions underlying the development of this alternative are:

-Achieve the common alternative constraints discussed earlier.

-Resolve problems identified by the Forest Management Team with the current land allocation.

-Depart from the base sale schedule established for Alternative C such that it starts at the current timber harvest level and gradually drops to the level established for Alternative C.

-Segments of the American, Chiwawa, Cle Elum, Entiat, Icicle, Napeequa, Waptus, Wenatchee and White Rivers are recommended for classification under the Wild and Scenic Rivers Act.

-Expansion could take place at Chinook Pass, Mission Ridge, and White Pass ski areas.

b. In addition to the common alternative constraints, the constraints utilized to meet the criteria and assumptions are:

(1)Constraint: Prescriptions were constrained to analysis areas to resolve problems perceived with the current land allocation. The acreage by management prescription is shown below.

<u>Management Prescription</u>	<u>Acres</u>
Water	7,780
EF-1	4,770
EW-1	118,742
EW-2	47,361
EW-3	19,059
GF	389,089
OG-1	79,840
OG-2	49,015
RE 1	6,021
RE-2a	79,607
RE-2b	16,748
RE-3	116,092
RM-1	17,702
RN-1	2,247
SI-1	70,512
SI-2	2,798
ST-1	83,635
ST-2	174,880
WI-1	841,034
WS-1	5,554
WS-2	11,363
WS-3	23,426
MP-1	13,717

Purpose: This allocation reflects corrections of problems that the Forest Management Team perceived with the current land allocation. It resolves issues, concerns, and opportunities as perceived by the Forest Management Team.

Rationale: The Forest Management Team has a vast amount of on-the-ground experience on the Wenatchee. This land allocation captures their knowledge of the capability of the Forest to resolve issues, concerns, and opportunities.

Tradeoff: Present net value is reduced by 13.8 percent compared to the maximum PNV benchmark (Benchmark Run #7). Many factors which are not accounted for in the PNV calculation are significantly improved. Table II-3a in Chapter II of this FEIS presents a wide range of outputs and effects for this alternative and the maximum PNV benchmark. The differences between them are due to differences in land allocations and the three timber harvest constraints described below.

(2)**Constraint:** Timber harvest cannot fluctuate by more than 20 percent from decade-to-decade between decades 1 and 4, or by more than five percent from decade-to-decade between decades 4 and 15.

Purpose: To limit decade-to-decade fluctuations in timber harvest to amounts that could be absorbed by local mills.

Rationale: Versions of this alternative without this constraint had drastic fluctuations in timber harvest level between decades.

Tradeoff: This constraint and the two subsequent constraints were not analyzed separately. In combination, they result in a three percent increase in PNV compared to the nondeclining flow constraint which they replaced. These three constraints are the only differences between Alternatives C and I. A comparison of outputs and effects of these two alternatives reveals the full impact of these constraints.

(3) **Constraint:** First decade allowable sale quantity could not fall below 28.275 MMCF per year.

Purpose: To set first decade harvests at a level equal to the past 10 years average sell volume.

Rationale: To minimize impacts on local mills.

Tradeoff: This constraint was not analyzed separately. See the tradeoff discussion for Constraint (2).

(4)**Constraint:** Allowable sale quantity could not fall below 23.8 MMCF per year after the first decade.

Purpose: To maintain timber harvest levels at or above those of Alternative C.

Rationale: The intent of this alternative is to gradually phase into the harvest levels of Alternative C.

Tradeoff: This constraint was not analyzed separately. See the tradeoff discussion for Constraint (2).

<u>FORPLAN Run</u>	<u>PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>Discounted Benefits (\$MM)</u>	<u>1st Decade ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative I	1,837	478	2,315	27.7

10. Alternative J

This alternative was developed by representatives of the timber industry after release of the Wenatchee DEIS. The goal of this alternative is to maintain harvest levels at their highest levels, while providing as much of the amenity outputs as possible without dropping ASQ below the level of the existing Timber Management Plan.

a. The criteria and assumptions underlying the development of this alternative are:

- Achieve the common alternative constraints discussed earlier.

- The highest acreage of General Forest land allocation of any of the alternatives with correspondingly lower roadless and scenic travel allocations.

- No scenic travel retention allocation outside of the Alpine Lakes Management Area. However, I-90 (Snoqualmie Pass), Highway 2 (Stevens Pass) and Highway 97 (Swauk Pass) are in the management unit.

- Limited partial retention allocations of Mather Memorial Parkway, Entiat River corridor, Lake Wenatchee and part of the Chiwawa River road.

- The deer and elk winter range allocation is managed under General Forest intensities, but with road closures and wildlife projects to benefit deer and elk.

- No rivers are recommended for classification under the Wild and Scenic Rivers Act

<u>FORPLAN Run</u>	<u>PNV (\$MM)</u>	<u>Discounted Costs (\$MM)</u>	<u>Discounted Benefits (\$MM)</u>	<u>1st Decade ASQ (MMCF/YR)</u>
Benchmark Run #7 (Maximum PNV)	2,132	266	2,398	29.9
Alternative J	1,835	452	2,277	34.1

11. Alternative NC (No Change):

This alternative is the No Change Alternative. This analysis was made and the information developed after the Forest Service held discussions with the Northwest Forest Resource Council, which had filed Appeal No. 1588 on May 19, 1986. Although the appeal was dismissed, the concerns addresses were important. The appeal centered on direction from the Regional Forester to incorporate management requirements (MR's) in the Current Direction Alternative for each Forest Plan. The Wenatchee National Forest published the Draft Environmental Impact Statement prior to the effective date of this direction and did not include MR's in the Current Direction Alternative. In response to the appeal, a No Change Alternative was developed to represent the existing Timber Management Plans. This alternative does not comply with all provisions of the National Forest Management Act of 1976 (NFMA) and regulations promulgated by the Secretary of Agriculture to implement NFMA. The following provisions of NFMA or other laws or regulations are not partially or fully complied with in current management plans represented by the No Change Alternative:

1. 36 CFR 219.14 - Timber resource land suitability: requires identification of land not suited for timber production based on risk of irreversible resource damage, lack of assurance of reforestation within five years.
2. 36 CFR 219.15 - Specifies a process for choosing vegetation management practices. Also ties to 36 CFR 219.27 which identifies required resource protection and silvicultural practices.
3. 36 CFR 219.16 - Required that all alternatives identify decadal timber harvest levels and long-term sustained yield levels, consistent with the requirements of the RPA program and Regional guide. Also specifies conditions under which departures from nondeclining flow will be considered.
4. 36 CFR 219.19 - Provides for viable populations of vertebrate wildlife species, the selection and monitoring of management indicator species, cooperation with wildlife management agencies, and protection of habitat critical to threatened or endangered species.
5. 36 CFR 219.20 - Requires that grazing resources be addressed, including identification of suitable lands, determination of range condition and trend, and the development of alternative range management prescriptions.
6. 36 CFR 219.21 - Requires to the degree consistent with needs and demands for all major resources, a broad spectrum of forest and rangeland related outdoor recreation opportunities shall be provided for in each alternative.
7. 36 CFR 219.23 - Requires full consideration of water and soil resources including estimates of current water uses, instream flow requirements, protection of water quality, watershed condition, and protection of wetland and floodplain values.
8. 36 CFR 219.25 - Requires that forest plans provide for the establishment of Research Natural Areas.
9. 36 CFR 219.26 - Provides for consideration of plant and animal community diversity.
10. 36 CFR 219.27 - Identifies specific management requirements to be used in the development, analysis, approval, implementation, monitoring, and evaluation of forest plans for management activities. These activities include silvicultural practices, resource protection, vegetative manipulation, protection of riparian areas, protection of soil and water, and maintenance of diversity.

11. 36 CFR 219.27(c) (7) (d) (1) - Requires that openings shall be located to achieve the desired combination of multiple use objectives. The blocks or strips cut shall be shaped and blended with the natural terrain, to the extent practicable, to achieve aesthetics, wildlife habitat, or other objectives established in the plan.

The No Change Alternative cannot be implemented or used in future management of the Forest under the Forest Plan without Congressional and/or Secretary of Agriculture action to change the law or regulation.

The timber management plans upon which the No Change Alternative is based were developed in 1963 and 1969. The Timber Management Plans were not integrated resource plans and, consequently, do not address all resource uses and outputs. The mission information in tables and figures presented in the supplement cannot be reasonably estimated since the original plans were based on yield tables and resource relationships which do not reflect the latest scientific techniques and information, do not reflect the standards in the NFMA regulations, or are otherwise inappropriate. Plan direction from the District Multiple Use Plans, and from other plans, was not reconciled with the timber management plans pending completion of the Forest Plan. Consequently, timber Potential Yield estimates used in the 1963 and 1969 Timber Management Plans and in the No Change Alternative may not be feasible under existing direction.

a. Key criteria and assumptions for this alternative provided by existing direction are listed below:

- Use a temporary inflation harvest schedule for the Naches-Tieton Working Circle. Yields are based upon the 1961 and 1968 inventories. Yield projection techniques are those that were used to develop the 1969 Timber Management Plan for the Naches-Tieton Working Circle and yield formulation methods for the Wenatchee Working Circle.

- Harvest 67.0 MMBF from the Naches-Tieton Working Circle and 103.8 MMBF from the Wenatchee Working Circle.

- Provide for 105,500 acres of Visual Management Areas in the Special Component.

- Provide for 102,200 acres of commercial forest land in the Marginal Component.

- Provide 787,751 acres of commercial forest land in the Standard and Special components from which timber will be harvested on a scheduled basis. The Wenatchee Working Circle has an additional 102,200 acres of marginal lands available for "unregulated" harvest if economics and operating methods are favorable.

VIII. ESTIMATING EFFECTS OF BENCHMARKS, DISCRETIONARY CONSTRAINTS, AND ALTERNATIVES

A. Introduction

This section provides a comprehensive description of each alternative and its associated outputs and effects. A comparative analysis of alternatives is the basis for evaluating alternatives and selecting a proposed action, planning steps 7 and 8. Present net value analysis is also described for major benchmarks.

The effects of discretionary constraints are summarized for each alternative. This discussion highlights the changes in present net value, discounted costs, and discounted benefits associated with these constraints, as well as nonpriced effects on net public benefit.

Alternative NC was not evaluated using FORPLAN. It is not possible to project outputs or to estimate effects in future decades for this alternative.

B. Process for Evaluating Significant Constraints

Management objectives of benchmarks and alternatives were modeled in FORPLAN by applying the assumptions and constraints listed in Sections VI and VII of this appendix. Opportunity costs of constraints were determined by comparing FORPLAN runs with a constraint and without it. Most discussion of opportunity costs focuses on changes in present net value. Changes in other outputs and effects (e.g., timber volume or old-growth habitat) can also be considered.

Legal and policy constraints and economic assumptions are analyzed in Section VI of this appendix. Opportunity costs of constraints associated with meeting resource objectives are analyzed in Section VII under each alternative.

C. Major Tradeoffs Among Alternatives

This section summarizes the relationships among economic values, community effects and the differing responses among alternatives to selected issues, concerns, and opportunities (ICO's). The purpose is to highlight major economic and noneconomic tradeoffs, or differences between alternatives, that can be quantified as indicators of response to ICO's among alternatives. However, a complete understanding of differences among alternatives requires reading Chapters II and IV of the FEIS. Appendix A discusses the ICO's in greater detail.

Tradeoffs between Alternative NC and other alternatives are evaluated for only the first decade. Trade-off analysis in future decades is not possible because Alternative NC cannot be projected into future decades.

1. ECONOMIC VALUES AND RESPONSES TO MAJOR ISSUES, CONCERNS, AND RESOURCE USE AND DEVELOPMENT OPPORTUNITIES

The major reason that alternatives differ is that each responds in different ways to the issues, concerns, and resource use and development opportunities (ICO's) identified for this Forest. This section summarizes many of these differences in responses by defining indicators of those responses that can be quantified. It also discusses indicators of central concern to the nation as a whole, as owner of this Forest. Appendix A fully discusses each of the ICO's. A less quantified comparison of the responsiveness of the alternatives is found in Table II-1 in FEIS Chapter II. The ICO's and indicators of responsiveness found in Table B-VIII-1 include:

- Recreation opportunities and use conflicts
 - Indicator: - percent of Forest by recreation opportunity spectrum (ROS) class at the start of the second decade
- Management of areas that are presently undeveloped
 - Indicator: - allocation of inventoried roadless areas to roaded versus unroaded management
- Water quality and quantity
 - Indicators: - first decade increased water yield
 - average annual sedimentation over the planning horizon
- Wildlife and fish
 - Indicators: - acres allocated to Key Big Game Habitat Management Area
 - acres of old-growth retained (fifth decade)
 - commercial harvest of anadromous fish
- Management of scenery
 - Indicator: - percent of Forest by visual quality objective (VQO).
- Timber Management
 - Indicators: - first decade average annual harvest (Programmed Timber Sales MMCF)
 - long-term sustained yield capacity
 - acres of suitable timber lands
- Minerals
 - Indicators: - lands that are withdrawn and relatively unrestricted by management prescriptions in terms of total forest area.
- Social/Economic
 - Indicators: - first decade payments to counties
 - first decade change in employment
 - first decade change in income

In addition, the nation as a whole has an interest in ensuring that the Forest is managed in a financially prudent manner while the quality of the physical environment is protected and enhanced. Indicators of national interest include:

- Present net value
- First and fifth decade net receipts (cash flows)
- First and fifth decade noncash benefits

TABLE B-VIII-1

**INDICATORS OF RESPONSIVENESS OF ALTERNATIVES
TO MAJOR ISSUES AND NATIONAL CONCERNS**

INDICATORS OF RESPONSIVENESS	ALTERNATIVES 1/										
	A/NFMA	D	C	F	G	H	I	E	J	B	NC
Present Net Value (million \$)	1976	1937	1910	1897	1889	1864	1837	1834	1825	1756	1/
Average Annual Net Receipts*											
Decade 1 (MM \$)	-10.5	-12.6	-15.0	-13.8	-15.3	-16.0	-16.3	-16.8	-25.1	-26.1	-2.4
Decade 5 (MM \$)	-6.2	-7.9	-8.5	-9.1	-9.7	-9.8	-14.2	-13.4	-1.6	-1.4	1/
Average Annual Non-cash Benefits.											
Decade 1 (MM \$)	81.3	81.2	81.3	80.3	81.4	81.3	81.2	81.3	81.2	81.2	1/
Decade 5 (MM \$)	115.4	114.1	115.3	114.9	115.8	115.4	115.0	115.9	114.9	114.2	1/
First Decade Payment to Counties (MM \$)	+3.0	+3.4	+3.3	+2.0	+2.5	+3.1	+3.7	+1.9	+2.1	+2.0	+3.8
First Decade Changes in Jobs Compared to 1982 Base Period	+39	+279	+203	-473	-225	+324	+413	-520	+630	+577	+378
First Decade Change in Income (MM \$)	+.65	+7.2	+5.14	-13.3	-6.54	+8.43	+10.86	-14.56	+16.76	+15.31	+12.1
Second Decade Area by ROS Class											
Wilderness	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%
Primitive	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	1/
Semi-Primitive											
Non-Motorized	6	7	8	14	6	5	8	15	7	7	1/
Semi-primitive											
Motorized	12	12	11	11	16	13	11	10	10	11	1/
Roaded Modified, or Natural or Rural	43	42	39	43	36	42	36	44	43	1/	
Allocation of Inventoried Roadless Areas											
Roaded Mgmt	55.2%	58.8%	46.4%	22.0%	31.0%	55.2%	46.4%	10.2%	62.4%	58.8%	93.3%
Unroaded Mgmt	44.8	41.2	53.6	78.0	69.0	44.8	53.6	89.8	37.6	41.2	6.7
First Decade Increased Water Yield (M Acre Ft)	13.8	15.7	15.5	8.7	11.2	19.1	17.3	8.2	29.1	28.5	24.4
Average Annual Activity Sediment (M Tons)	69.2	65.5	72.4	51.5	60.9	89.4	71.4	50.3	96.6	94.4	94.9
Key Wildlife Habitat (Acres)	17151	77784	118742	148189	146493	17151	118742	148189	123025	77784	0
Old-Growth Retained Decade 5 (M Acres)	261.6	254.5	261.2	275.7	254.3	258.4	261.2	277.7	250.1	250.4	1/

TABLE B-VIII-1 (continued)

**INDICATORS OF RESPONSIVENESS OF ALTERNATIVES
TO MAJOR ISSUES AND NATIONAL CONCERNS**

INDICATORS OF RESPONSIVENESS	ALTERNATIVES 1/										
	A/NFMA	D	C	F	G	H	I	E	J	B	NC
Anadromous Commercial Fish Harvest (M Lbs)	328	328	328	328	328	328	328	328	328	328	328
Visual Quality Objectives											
Preservation	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Retention	22.4	18.0	24.2	35.2	29.7	22.5	24.2	38.3	16.1	18.0	11.2%
Partial Retention	21.2	10.5	15.4	12.3	16.9	21.1	15.4	11.4	11.0	10.5	0
Modification	2.6	7.6	6.8	7.4	7.4	2.6	6.8	7.4	8.8	7.6	0
Maximum Mod	14.9	25.0	14.7	6.2	7.1	14.9	14.7	4.0	25.2	25.0	49.9%
									2/		
First Decade Average Annual Harvest - Programmed Timber Sales (MMCF)	23.4	27.4	26.1	14.6	18.7	28.9	29.6	13.8	36.5	36.0	32.4
											3/
Long-Term Sustained Yield (MMCF)	27.7	30.8	27.2	19.2	23.4	29.0	27.1	18.7	34.8	34.2	29.9
Suitable Timber Lands (Acres)	591794	643639	576074	421265	503326	603620	576074	410935	686918	681186	787751
Mineral Resource Accessibility											
Withdrawn as Wilderness (%)	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9
Withdrawn by Prescription (%)	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Open, but highly Sensitive (%)	19.0%	17.8%	22.3%	28.1%	24.8%	19.3%	22.3%	30.3%	16.9%	17.8%	19.0%
Open with Only Moderate to Few Constraints (%)	42.1%	43.3%	38.8%	33.0%	36.3%	41.8%	38.8%	30.8%	44.2%	43.3%	42.1%

1/ Alternatives are ranked in order of decreasing present net value (except for NC which does not have a PNV computed) All resource outputs cannot be reasonably estimated for Alternative NC because the TM plans were based on different yield tables and resource relationships.

2/ Alternative J has different standards and guidelines for key wildlife habitat areas and Retention/Partial Retention areas than the other alternatives Refer to Appendix D for more information.

3/ Alternative NC includes a 2.6 MMCF temporary inflation of the cut

2. DIFFERENCES AND SIMILARITIES OF INDIVIDUAL ALTERNATIVES

The alternatives are ranked in order of decreasing present net value (PNV) in Table B-VIII-1. They are discussed below in the same order.

a. ALTERNATIVE A/NFMA

Alternative A/NFMA is the No-Action Alternative. It is implementable as it now provides for the management requirements mandated by the National Forest Management Act of 1976 (NFMA).

Alternative A/NFMA has the highest present net value of the alternatives. One major contributor to the high PNV for this alternative is the low recreation budget, while recreation benefits remain high. Alternative A/NFMA has the highest net receipts (though still negative) of all the alternatives for the first decade. By the fifth decade, Alternative A/NFMA slips to third in net receipts because the intensive timber management practices in Alternatives B and J increase receipts over Alternative A/NFMA. It has non-cash benefits at a level slightly higher than the other alternatives.

Alternatives A/NFMA and H allocate the fewest acres of the inventoried roadless areas to unroaded management with the exception of Alternatives B, D, J, and the No-Change Alternative. Of those areas remaining roadless, a greater proportion is assigned to motorized use than most alternatives. By the end of the second decade, only Alternatives G and H have a greater percentage in the Semi-Primitive Motorized Recreation Opportunity Spectrum class.

With the exception of Alternative NC, alternative A/NFMA has the fourth lowest level of water yield and the fifth lowest level of sedimentation. Both factors are closely correlated to timber harvest levels, although they are also influenced by the location and type of harvest. The sedimentation level is higher than would be expected based on harvest level alone.

Alternatives A/NFMA and H have the fewest acres allocated to management for key big game species than other alternatives. Alternative A/NFMA, by the fifth decade, has greater amounts of old-growth remaining than any other alternatives, except for Alternatives E and F. Anadromous fish production is the same for all alternatives in the first decade.

Alternatives A/NFMA and H result in 17.5 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. This is near the middle of the range of alternatives as five alternatives modify the visual environment more with three alternatives modifying it less. The modification of the visual environment is directly proportional to the volume of timber harvest and its rate.

Alternative A/NFMA has the eighth highest timber harvest in the first decade with the sixth highest long-term sustained yield. It has the sixth highest acreage of suitable timberlands. The objective function in FORPLAN is to maximize present net value.

Alternatives A/NFMA and NC are fourth highest in acres open to mineral resources with only moderate to few constraints.

Alternative A/NFMA has the eighth highest level of jobs and income change from the 1982 base period. The change in jobs and income is directly related to the timber harvest level. The higher the timber harvest, the greater the gain in jobs and local income. Alternative A/NFMA has the sixth highest level of payments to counties. The payment to counties is somewhat related to the level of timber harvest. In general, there is a direct correlation, but for Alternatives B and J the payment to counties level is lower because these alternatives harvest less valuable timber in the early decades. For the later decades, the payment to counties increases for these alternatives.

b. ALTERNATIVE D

Alternative D has the second highest present net value of the alternatives. This is due to the high acreage allocated to some sort of timber management coupled with the use of the maximize present net value objective function in FORPLAN. Alternative D has the second highest net receipts of all the alternatives for the first decade. By the fifth decade, Alternative D is fourth in net receipts.

Alternatives D and B have the third lowest allocation of the inventoried roadless areas to unroaded management. Only Alternatives J and NC have less roadless areas allocated to unroaded management.

Alternative D has the sixth highest level of increased water yield and eighth highest level of sedimentation of the alternatives. This is closely correlated with timber harvest level. Alternative D also has the sixth highest level of timber harvest.

Alternatives D and B have the third fewest acres allocated to key big game species. By the fifth decade Alternative D has the fourth fewest acres of old-growth remaining. Anadromous fish production is the same as other alternatives.

Alternatives D and B result in 32.6 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. Only Alternatives J and NC end up with a more modified visual environment. Alternative D has the sixth highest timber harvest, but the third highest long-term sustained yield. It has the fourth highest suitable timberland base.

Alternatives D and B are second highest in acres open to mineral resources with only moderate to few constraints.

Alternative D has the sixth highest level of jobs and local income of the alternatives and the third highest level of payment to counties.

c. ALTERNATIVE C - Preferred

Alternative C has the third highest present net value of any alternative. Alternative A, which has the highest present net value, is 3.5 percent higher. Alternative C was constrained in FORPLAN to produce an allowable sale quantity of 136 MMBF. This resulted in a reduction of about one percent from the maximum PNV level for this alternative. Alternative C, however, maximizes net public benefits and was, therefore, selected as the preferred alternative.

For the first decade, Alternative C has the fifth highest level of net receipts. By the fifth decade, this ranking would likely slip to sixth highest level of net receipts. It has non-cash benefits at a slightly higher level than most of the other alternatives, but the difference is not significant.

Alternatives C and I allocate the fourth highest acreage of the inventoried roadless areas to roadless management. Alternative I, which is the departure alternative, has the same land allocations. Only Alternatives E, F, and G have greater allocations to unroaded management. Roadless areas allocated to roaded management would be developed faster under Alternative I than under Alternative C.

Alternative C has the seventh highest water yield and the fifth highest rate of sedimentation.

Alternatives C and I have the fifth highest acreage allocated to key big-game species. At the end of the fifth decade, Alternatives C and I will have the third highest level of old-growth remaining. At this point, there should be 261,200 acres of old growth remaining. Anadromous fish production is the same as other alternatives.

Under Alternatives C and I, 21.5 percent of the forest ends up in a modified visual environment over the 50-year planning horizon. In the range of alternatives, this is the fifth highest.

To maximize net public benefits, the allowable sale quantity for Alternative C was set at 136 MMBF. This is the seventh highest timber harvest level. It also has the seventh highest long-term sustain yield level and suitable timberland base.

Alternatives C and I have 38.8 percent of the land base open to mineral resources with only moderate to few constraints.

Alternative C has the seventh highest level of job increase and income. This alternative has the fourth highest level of payment to counties.

d. ALTERNATIVE F

Alternative F has the fourth highest present net value. It has a large portion of the inventoried roadless areas allocated to roadless management. This reduces the level of timber harvest, which reduces PNV. Most of the benefits of not roading these areas are unquantified and must be subjectively weighed to determine the net public benefits of the alternative.

Alternative F has the fourth highest net receipts in the first decade, dropping to the sixth highest net receipts by the end of the fifth decade. The non-cash benefits to users are slightly lower than the other alternatives, but the differences are not significant.

Alternative F allocates the second highest acres of the inventoried roadless areas to unroaded management. Only Alternative E has a greater allocation to unroaded management.

Alternative F has the next to lowest water yield of any alternative. It also has the next to lowest amount of sedimentation. Both factors are closely correlated to timber harvest levels.

Alternatives F and E have the highest acre allocation to management for key big-game species with. Alternative F maintains the second highest level of old-growth, only slightly lower than Alternative E. Anadromous fish production is the same as other alternatives.

Alternative F would have the second most natural appearing landscape of the alternatives. Only Alternative E would have a more natural appearing landscape.

Alternative F has the next to lowest level of timber production both in the first decade and long-term. It has the second fewest acres of suitable timberlands.

Alternative F has the second fewest acres available for relatively unconstrained mineral related activities

Alternative F has the next to lowest level of jobs and income of the alternatives. The job change is -473 jobs and the income change is -13.3 million dollars. The payment to counties level is the ninth highest at 2.0 million dollars.

e. ALTERNATIVE G

Alternative G has the fifth highest present net value. It has the sixth highest net receipts for the first decade; by the fifth decade the net receipts drop to the seventh highest. The non-cash benefits are slightly higher than the other alternatives for the first decade. By the fifth decade, this alternative drops to second highest in non-cash benefits. However, the differences are not significantly different between the various alternatives.

Alternative G has the third highest allocation of inventoried roadless areas to unroaded management. Only Alternatives E and F have more roadless areas allocated to roadless management. This alternative has the greatest amount of roadless area available for the trail bike use.

Alternative G has the ninth highest water yield sediment produced. These correspond fairly closely to the level of timber harvest.

Alternative G has the third highest allocation to key big-game species. It is only a couple of thousand acres below the maximum for Alternatives E and F. The old-growth acreage at the end of the fifth decade is the eighth highest of the alternatives. Anadromous fish production is the same as other alternatives.

Alternative G results in 14.5 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. Only Alternatives E and F have less acreage in a modified visual environment. This is because the modification of the visual environment is directly proportional to the volume of timber harvest and its rate.

Alternative G has the third lowest level of timber harvest and long-term sustain yield level. The suitable timberland base is also the third lowest of the alternatives.

Alternative G has the third lowest level of land open to mineral development with 36.3 percent of the land with only moderate to few constraints.

Alternative G has a net change of -225 jobs and -6.54 million dollars. The payment to counties level is 2.5 million dollars--the seventh highest level of the alternatives.

f. ALTERNATIVE H

Alternative H has the sixth highest present net value of the alternatives. This alternative has the same allocations as Alternative A/NFMA, except for the Wild and Scenic River recommendations which match Alternative C recommendations with private land removed from the recommended segments. Alternative A/NFMA produces a level of timber harvest that maximizes present net value, while Alternative H produces a level of timber harvest that maximizes first decade timber harvest subject to non-declining flow. Alternative H produces 24 percent more timber than Alternative A/NFMA in an attempt to meet historic levels of timber harvest. This results in a decrease in total present net value of 5.5 percent.

Alternative H has the fifth lowest net receipts for the first decade, dropping to the third lowest net receipts by the fifth decade. The level of non-cash benefits to users is similar to the other alternatives.

Only Alternatives NC, B, D and J have fewer acres of inventoried roadless area allocated to unroaded management. Alternative A has the same roadless allocation as Alternative H; the roadless areas, however, would be entered at a faster rate in Alternative H.

Alternative H would have the fourth highest increased water yield and sedimentation. Alternatives NC, B and J are the alternatives that would be higher.

Alternative H has the second fewest acres allocated to key big-game species of the alternatives. At the end of five decades, Alternative H does have the sixth highest level of old-growth remaining. Anadromous fish production is the same for all alternatives in the first decade.

Alternative H results in 17.5 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. This is in the middle of the range of alternatives. The modification of the visual environment is directly proportional to the volume of timber harvest and its rate. For this reason, modification of the visual environment would occur at a faster rate under Alternative H than Alternative A/NFMA.

Alternative H has the fifth highest harvest level in the first decade, and the fifth highest long-term sustain yield level. It also has the fifth highest acreage of suitable timberlands. The objective function in FORPLAN is to maximize first decade timber harvest subject to non-declining flow.

Alternative H is the sixth highest in acres open to mineral resources with only moderate to few constraints.

Alternative H has the fifth highest level of job increase, the sixth highest level of income increase, as well as the fifth highest level of payments to counties.

g. ALTERNATIVE I

Alternative I ranks seventh in present net value. This alternative has the same allocations as Alternative C. This is a departure alternative where higher timber harvest occur during the first two decades. The harvest level then starts declining in the third decade. For the first decade, Alternative I has the eighth highest net receipts, declining to the lowest net receipts by the end of the fifth decade. This is the result of having higher harvest levels for the first two decades. Alternative I has the same roadless allocations as Alternative C. This is the fourth largest level for the alternatives with 53.6 percent of the inventoried roadless areas remaining roadless. Only Alternatives E, F, and G have greater allocations to unroaded management. Rooding of the

roadless areas proceeds faster in Alternative I than in most of the other alternatives because of the higher levels of timber harvest in the first two decades.

Alternative I has the fifth highest water yield and the sixth highest sedimentation rate.

Only Alternatives E, F, G and J have greater allocations for management of key big-game species. Alternative I maintains the fourth highest level of old-growth at the end of the fifth decade. The level of anadromous fish production is the same as the other alternatives.

Under Alternative I, 21.5 percent of the Forest ends up in a modified visual environment over the 50-year planning horizon. In the range of alternatives this is the fifth highest.

Alternative I has the fourth highest harvest level of the Alternatives. The long-term sustained yield is only the eighth highest of the alternatives. This alternative has the seventh highest suitable timberland base.

The allowable sale quantity for Alternative I is a departure from the base sale schedule established for Alternative C. It equals the average timber volume sold between Fiscal Year 1975 and Fiscal Year 1984 gradually declining to the same level as Alternative C.

Alternative I has 38.8 percent of the land base open to mineral resources with only moderate to few constraints.

Alternative I has the third highest job and fourth highest income change from the 1982 base period. This alternative had the second highest payment to counties level of the alternatives.

h. ALTERNATIVE E

Alternative E has the third lowest present net value of the alternatives. It has the greatest allocation of unroaded management and the lowest level of timber production. This results in a greater proportion of its benefits being subjective contributions to net public benefits rather than being quantified as part of present net value.

Alternative E has the third lowest net receipts in the first decade dropping to the next to the lowest net receipts in the fifth decade. The non-cash benefits to users are comparable to the other alternatives in the first decade and slightly higher than the other alternatives in the fifth decade. The differences, however, are not significant.

All the inventoried roadless areas outside the Alpine Lakes Management Area are allocated to unroaded management (90 percent Forest-wide). This is the most of any alternative.

Alternative E has the least amount of increase in water yield of the alternatives. It also has the least amount of sedimentation and the highest water quality.

Alternatives E and F have the highest acre allocation to management for key big game species. Alternative E maintains the highest level of old-growth of all the alternatives. Anadromous fish production is the same as other alternatives

Alternative E would have the most natural appearing landscape of any alternative. Only 11.4 percent of the Forest would be managed under the visual quality objective of modification or maximum modification.

Alternative E has the lowest level of timber harvest both in the first decade and the lowest long-term sustained yield level. It has the fewest acres of suitable timberlands.

Alternative E has the fewest acres available for mineral-related activities. For the alternative, 30.8 percent of the land is open to mineral activities with only moderate to few constraints.

Alternative E shows the lowest level of jobs and income of all the alternatives. This alternative shows a change of -520 jobs and -14.56 million dollars. Alternative E also has the lowest payment to counties level at 1.9 million dollars.

i. ALTERNATIVE J

Alternative J has the next to the lowest present net value of all the alternatives. This is a result of heavy timber investments in the early decades which significantly reduced present net value for this alternative. Alternative J has the next to the lowest net receipts for the first decade. By the fifth decade, however, the early timber investments raise the net receipts to the second highest.

Alternative J allocates the second fewest acres of the inventoried roadless areas to roadless management. Of the inventoried roadless areas, 37.6 percent would remain roadless under this alternative.

Alternative J has the highest increased water yield and the highest sedimentation rate of the alternatives. This is closely correlated with timber harvest level. Alternative J has the highest timber harvest level of the alternatives.

Alternative J has the fourth highest allocation to key big-game species. The prescription for key big-game species is slightly different than the other alternatives in its treatment of thermal cover. The yield tables used in Alternative J are the same as that for general forest prescription, but it has road closures and other management activities to protect and enhance key big-game species habitat. By the fifth decade, Alternative J has the lowest acreage of old-growth remaining. Anadromous fish production is the same as other alternatives.

Alternative J results in 34.0 percent of the Forest ending in a modified visual environment over the 50-year planning horizon. This is the second highest level of the alternatives. It uses different standards and guidelines for visual treatment along roads and visual corridors. These guides do not correspond to the ST-1 or ST-2 prescriptions. See Appendix D.

Alternative J has the highest first decade harvest level, the highest long-term sustained yield, and the second highest acreage in suitable timberlands.

Alternative J has the largest amount of acreage open to mineral resources with only moderate to few constraints.

Alternative J has the highest gain in jobs and income of the alternatives. This is because this alternative has the highest timber harvest level. Alternative J has the eighth highest level of payment to counties.

j. ALTERNATIVE B

Alternative B has the lowest level of present net value of any alternative. It has the same land allocations as Alternative D, which has the second highest PNV of the alternatives. Alternative D produced the quantity of timber which achieved the highest level of PNV, subject to meeting other resource considerations. Alternative B produces 31 percent more timber than Alternative D, while still meeting other resource constraints. The costs of producing the additional timber exceed the benefits. This results in a PNV nine percent below the level of Alternative D.

Alternative B has the lowest net receipts in the first decade due to the high level of timber investments in the early decades. However, this investment results in Alternative B having the highest net receipts of all alternatives by the fifth decade.

Alternative B has the third lowest acres of inventoried roadless area allocated to unroaded management. Rooding of the areas allocated to rooded management would occur the fastest in this alternative and Alternative J.

Alternative B has the second highest level of increase water yield and third highest level of sedimentation of any alternative. This is a result of the level of timber harvest.

Alternative B has the seventh highest level of acreage allocated to management for key big-game species. Alternative B will have the second lowest level of old growth remaining by the fifth decade. Anadromous fish production is the same as for the other alternatives.

Alternative B would have the third least natural appearing landscape by the fifth decade. At that time, 32.6 percent of the landscape will appear modified. Alternative B would alter the landscape at the second fastest rate.

Alternative B harvests the second highest level of timber of the alternatives. It also has the second highest long-term sustained yield capacity and the third highest acres of suitable timberland. In Alternative D, which has a maximize present net value objective function and the same land allocations as Alternative B, not all the timber is harvested on land available for timber harvest. Some acres are not utilized because they are not economically efficient. Alternative B, however, harvests timber on lands that were not utilized in Alternative D. Alternative B also utilizes more intensive management with more precommercial and commercial thinning.

Alternative B has 43.3 percent of the land area open to mineral activities with only moderate to few constraints.

Alternative B is second to Alternative J in change of jobs and income increasing by 577 jobs and 15.31 million dollars. This alternative has the third lowest payment to counties level at 2.0 million dollars.

k. NO CHANGE (NC)

The No Change Alternative does not have a PNV computed. A comparison of resource outputs is not made for Alternative NC because the Timber Management plans were based on different yield tables and resource relationships.

3. PRESENT NET VALUE AND DISCOUNTED COSTS AND BENEFITS OF ALTERNATIVES

Table B-VIII-2 displays Present Net Value (PNV) and total discounted costs and benefits for the alternatives. PNV is the primary measure of economic efficiency used by the Forest Service. It is the sum of the priced benefits minus the sum of costs for the next 50 years, discounted to the present the present at the rate of four percent per year. An additional sensitivity analysis has been completed using a discount rate of 7-1/8 percent per year. Results of this analysis is shown in Appendix B.

The alternatives are ranked by decreasing present net value. Table B-VIII-3 displays the differences in PNV between adjacent pairs of successional ranked alternatives. The incremental changes in PNV are a measurement of the net economic values of the priced resources that would be foregone if a lower-ranked alternative is selected over a preceding one. This must be weighed against the nonpriced benefits of the alternatives.

TABLE B-VIII-2

**Present Net Value and Discounted Costs
and Benefits of Alternatives
(Million Dollars)**

Alternative	PNV Benchmark	Change	Discounted Costs	Change	Discounted Benefits	Change
Max PNV	2,132		266		2,318	
(Current Mgt)		-156		+63		-13
A/NFMA	1,976		329		2,305	
D	1,937	-39	410	+81	2,347	+42
C (Preferred)	1,910	-27	409	-1	2,319	-28
F	1,897	-13	312	-97	2,209	-110
G	1,889	-8	371	+59	2,260	+51
H	1,864	-25	435	+64	2,299	+90
I (Departure)	1,837	-27	478	+43	2,315	+16
E	1,834	-3	368	-110	2,202	-113
J	1,825	-9	452	+84	2,277	+75
B	1,756	-69	503	+51	2,259	-18
NC	<u>1/</u>		<u>1/</u>		<u>1/</u>	

1/ Resource outputs cannot be reasonably estimated because the TM plans were based on different yield tables and resource relationships for this reason PNV was not computed for the NC Alternative.

Alternative A/NFMA has the highest PNV at \$1,976 million. Alternative B has the lowest PNV at \$1,756 million. Alternatives A/NFMA, D, G, F, and E had a maximize PNV objective function in FORPLAN. Alternatives C, H, I, J, and B had either a timber volume target or were run under a maximize timber volume objective function in FORPLAN.

For the alternatives run under a maximize PNV objective function in FORPLAN, the greater the acreage allowing timber harvest the higher the PNV. The one exception is Alternative A/NFMA, which had a higher PNV because its recreation costs were significantly lower than for the (89 budget) other alternatives. The recreation benefits for Alternative A were similar to the other alternatives.

The present net values for Alternatives C, H, I, J, and B were directly related to the volume of timber produced in excess of the amounts that would maximize PNV for those alternatives' land allocations. That is, the value of the increased timber production in these alternatives is offset by less efficient production of timber.

Discounted costs equal the sum of all costs which would be incurred for an alternative during the 50 year planning horizon, discounted to their present values using a 4 percent discount rate. Alternative B has the highest discounted cost at \$503 million due to higher timber costs. As a general rule, costs were highest for those alternatives that produced the largest amounts of timber.

Discounted benefits equal the sum of all benefits which would be accrued for an alternative during the 50 year planning horizon, discounted to their present values using a 4 percent discount rate. Alternative D has the highest discounted benefits at \$2,347 million. Alternative F had the lowest discounted benefits at \$2,187 million. Alternative D has the highest benefits because of its economically efficient timber harvest levels.

4. DISCOUNTED COSTS AND BENEFITS BY RESOURCE GROUP

Table B-VIII-3 presents a more detailed breakdown of benefits and costs by resource groups. The alternatives are ranked in order of decreasing present net value. This display is only intended to give a broad indication of resource relationships. Many costs are nonseparable under multiple use management. It is difficult to attribute these costs to specific resources.

Resources having priced outputs are aggregated into groups for display in Table B-VIII-3. Timber refers to sawtimber. Recreation includes developed and dispersed recreation other than wildlife and fish related recreation. Wildlife and fish includes wildlife and fish related recreation and commercially harvested anadromous fish. Range refers to permitted grazing. "Other" includes water yield.

Arterial and collector roads are shown as a separate costs item rather than being attributed to specific resources. Costs that were not clearly associated with a specific resource are included under "other."

TABLE B-VIII-3
Present Net Value and Discounted Benefits
and Costs by Resource Group 1/
(Million Dollars)

<u>Alt</u>	<u>Present Net Value</u>	<u>Discounted Benefits</u>					<u>Discounted Costs</u>					
		<u>Rec.</u>	<u>Wild.</u>	<u>Tbr.</u>	<u>Range</u>	<u>Other</u>	<u>Rec.</u>	<u>Wild.</u>	<u>Tbr.</u>	<u>Roads</u>	<u>Range</u>	<u>Other</u>
A/NFMA	1,976	1,344	681	274	4	2	56	55	146	42	5	25
D	1,937	1,346	674	321	4	2	126	45	162	43	9	25
C	1,910	1,346	681	286	4	2	126	47	161	43	7	25
F	1,897	1,344	686	174	4	1	98	51	94	37	7	25
G	1,889	1,345	685	225	4	1	138	40	119	41	8	25
H	1,864	1,344	680	269	4	2	70	104	184	44	8	25
I	1,837	1,347	675	287	4	2	126	109	164	46	8	25
E	1,834	1,345	687	165	4	1	94	114	90	37	8	25
J	1,825	1,346	677	247	4	3	135	33	209	41	9	25
B	1,756	1,346	674	232	4	3	125	51	247	46	9	25
NC	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>

1/ Direct comparisons of benefits and costs by individual resource provide broad indications of relationships, but they may be misleading because many costs are nonseparable under multiple use management.

2/ Resource outputs cannot be reasonably estimated because the TM plans were based on different yield tables and resource relationships for this reason PNV was not computed for the NC Alternative.

Table B-VIII-3 reveals that almost all of the differences in present net value, discounted costs, and discounted benefits between alternatives is due to variations in the timber resource and changes in costs for the recreation and wildlife programs. The alternatives represent a wide range of timber harvest levels ranging from 81.6 MMBF to 186.6 MMBF for the first decade. With the exception of the departure alternative, discounted costs for timber rank in the same order as the timber harvest levels of the alternatives.

Present Net Value patterns are determined by whether the objective function in FORPLAN was maximize PNV or maximize timber volume objective or a timber volume target. Alternatives A/NFMA, D, E, F, and G had a maximize PNV objective function in FORPLAN. Alternatives B, C, H, I, and J had either a timber volume target or were run under a maximize timber volume objective function in FORPLAN. Alternative B was run under a maximize timber volume objective function to attempt to meet the RPA timber target assigned to the Forest by the Regional Guide for the Pacific Northwest Region. Alternative C had a 136 MMBF first decade target volume to meet local community needs. Timber harvest for Alternative H was set at the level which maximized timber production under the current land allocation in order to come as close as possible to the harvest level set by the Forest's current timber management plan. Alternative I is a departure alternative in which the first decade timber harvest is constrained to equal the average volume sold on the Forest from fiscal year 1975 to fiscal year 1984. Alternative J was run under a maximize timber volume objective function to reach a harvest level as close to 180 MMBF as possible. For all these alternatives, the timber volume level exceeds the PNV level. This results in higher harvest volume, but increases the ratio of costs to benefits. It is for this reason that the PNV's are lower for these alternatives.

Recreation benefits do not vary significantly between alternatives. All alternatives supply enough recreation capacity to exceed projected demand during the 50-year planning horizon. A shortage of unroaded recreation is projected for some alternatives beyond the planning horizon. The quality of the recreation experience would vary between alternatives even though the PNV benefits show little change. This effect was beyond the Forest's ability to quantify into dollar values and is considered as a nonpriced contribution to net public benefits. Recreation costs vary with the objectives of the alternative.

Wildlife and fish benefits vary slightly among alternatives due to different levels of investment in habitat improvements. The bulk of fish and wildlife benefits are recreation oriented and most of this recreation activity would occur regardless of the levels of investment in habitat improvement. The wildlife costs vary significantly by alternative. These costs are related to the goals and objectives for the alternative.

Range benefits and costs vary between alternatives, the differences between alternatives is small enough that it doesn't show up in Exhibit 2 where values are rounded to the nearest million dollars. For all alternatives, the cost of the range program exceeds the benefits.

5. NET CASH FLOWS OF ALTERNATIVES

Table B-VIII-4 compares the expected cash flows to and from the United States Treasury that would be associated with the alternatives. Receipts are fees collected for sawtimber, firewood, grazing, developed camping, recreation and other special uses, and mineral leases. Costs include only Forest Service budgetary costs. Net receipts equal total receipts less total costs. Non-cash benefits to the user are the difference between priced benefits and receipts actually collected for goods and services.

Alternatives are ranked by decreasing net receipts in Table B-VIII-4. All alternatives have negative net receipts for the first and fifth decade. This indicates negative net cash flows to the United States Treasury. Net receipts range from -10.5 million dollars for Alternative A to -26.1 million dollars for Alternative B for the first decade. Net receipts improved significantly by the fifth decade, but were still negative. Alternative B net cash flow improved to -1.4 million dollars, while Alternative I had the worst cash flow at -14.2 million dollars.

The reason for the negative cash flow is that both recreation and wildlife programs produced substantial benefits for which no revenue was collected for the Federal Government. For recreation, the only receipts are generated from campground fees and recreation special uses, all other users do not pay fees to the Federal Government. Likewise, the wildlife program produces substantial benefits for which no fees are collected. As Table B-VIII-4 indicates, non-cash benefits to users total approximately 81 million dollars for the first decade and 115 million dollars for the fifth decade. For the timber program, the variation in receipts is due to the differences in the volume, species mix, and size of timber harvested. The variation in costs is due to differences in the volume, location, and silvicultural system of timber harvested. In the first decade, all alternatives except B and J produced positive net receipts. By the fifth decade, the timber program was producing positive net receipts for all alternatives. The alternatives with the largest net cash receipts in the fifth decade were Alternatives B and J as a result of the large investments in the timber program in the first decade.

Total receipts are higher for the fifth decade than for the first decade. The general trend is for the alternatives to harvest more valuable timber in the future due to the assumption that timber will increase in real value by one percent a year for the next 50 years. Costs tend to be stable to somewhat lower in the future, primarily due to lower capital investments for roads. Non-cash benefits also increase due to increased recreational use, grazing, and wildlife and anadromous fish production.

Receipts plus non-cash benefits exceed costs in all alternatives for all decades.

TABLE B-VIII-4

**AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS IN THE
FIRST AND FIFTH DECADES 1/
(Million Dollars)**

ALT.	Decade 1				Decade 5			
	Net Receipts	Total Costs	Total Receipts	Non-Cash Benefits to Users	Net Receipts	Total Costs	Total Receipts	Non-Cash Benefits to Users
A	-10.5	23.0	12.5	81.3	-6.2	20.6	14.4	115.4
B	-12.6	26.9	14.3	81.2	-7.9	23.7	15.8	114.1
F	-13.8	22.2	8.4	80.3	-9.1	19.4	10.3	114.9
C	-15.0	29.0	14.0	81.3	-8.5	22.8	14.3	115.3
G	-15.3	25.7	10.4	81.4	-9.7	22.1	12.4	115.8
H	-16.0	28.9	12.9	81.3	-9.8	25.1	15.3	115.4
I	-16.3	31.6	15.3	81.2	-14.2	27.0	12.8	115.0
E	-16.8	24.8	8.0	81.3	-13.4	23.2	9.8	115.9
J	-25.1	33.8	8.7	81.2	-1.6	27.3	25.7	114.9
B	-26.1	34.2	8.1	81.2	-1.4	27.5	26.1	114.2
NC	-2.4	17.6	15.2	2.7	<u>2/</u>	<u>2/</u>	<u>2/</u>	<u>2/</u>

1/Costs include only those of the Forest Service; receipts do not include payments to counties.

2/Resource outputs cannot be reasonably estimated because the TM plans were based on different yield tables and resource relationships.

For a display of quantifiable changes in outputs and effects for each alternative, refer to Table II-3a in Chapter II of the FEIS. See Table II-3b in Chapter II of the FEIS for a display of changes in outputs and effects which are more difficult to quantify.

D. Allowable Sale Quantity by Proclaimed National Forest

Section 13(a) of the National Forest Management Act of 1976 requires the calculation of sustained yield on individual proclaimed National Forests. The Naches Ranger District is administered by the Wenatchee National Forest, but is within the proclaimed boundary of the Snoqualmie National Forest. Proclaimed Wenatchee National Forest land administered by the Mt. Baker-Snoqualmie Forest includes 3,751 acres near Snoqualmie Pass. The Okanogan National Forest administers 9,032 acres of the Wenatchee proclaimed area.

The administering Forest is the primary planning area in FORPLAN. However, the model was rerun to find the proportion of predicted outputs for each Ranger District. Table B-VIII-5 shows the results of the calculations of the harvest levels and suitable lands for the Naches Ranger District. The minor administrative changes on other lands were ignored in this calculation.

TABLE B-VIII-5

Proclaimed and Administering National Forest
Allowable Sale Quantity for Alternative C (First Decade)

Proclaimed Forest	Administering Forest	Long-Term Suitable Acres	Allowable Sale Sustained Yield MMCF/YEAR	Quantity MMCF/YEAR
Wenatchee	Wenatchee	453,956	17.4	15.5
Snoqualmie	Wenatchee	<u>176,538</u>	<u>9.8</u>	<u>8.8</u>
<u>TOTALS</u>		630,494	27.2	24.3

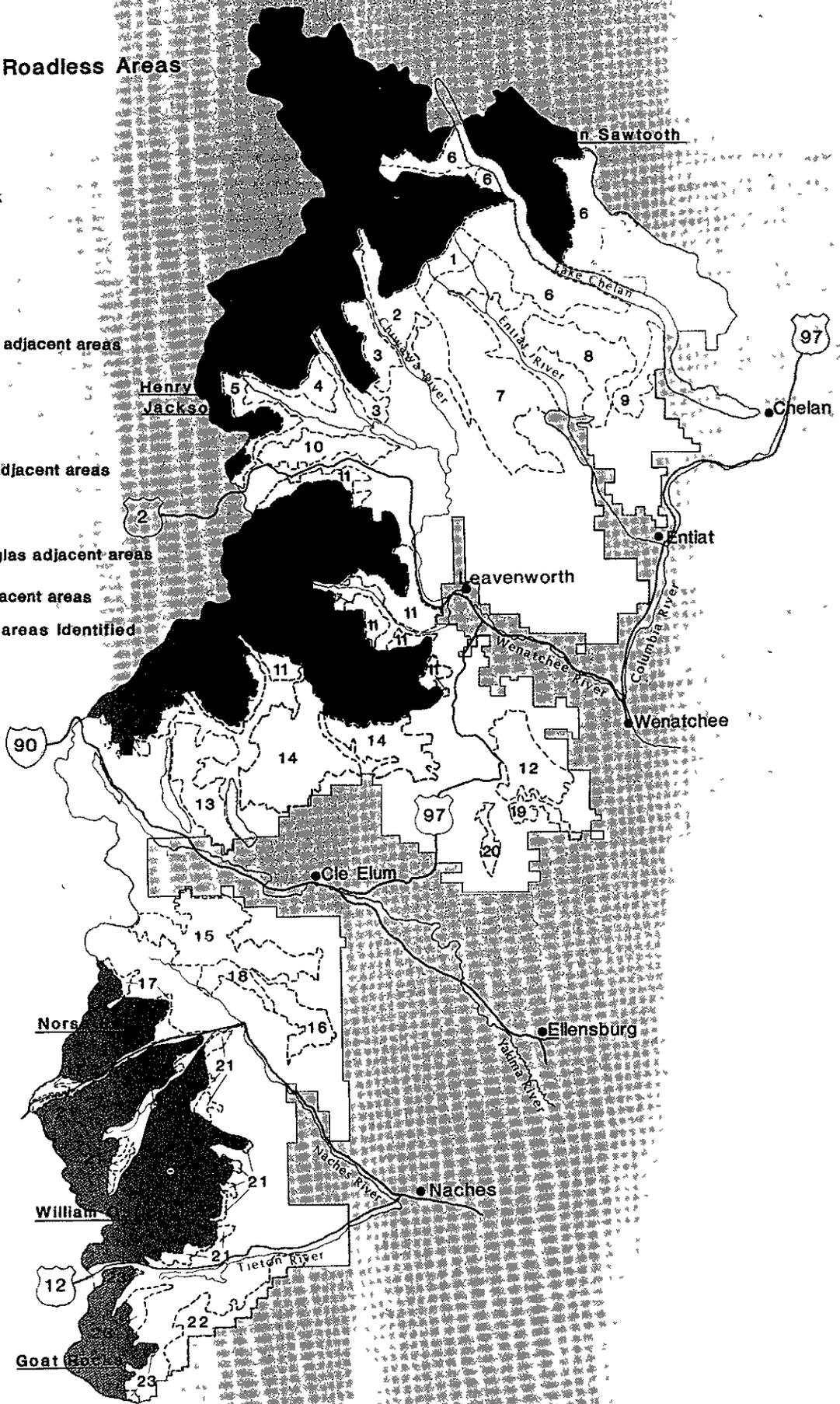
Appendix C
ROADLESS AREAS



Inventoried Roadless Areas

- 1 Myrtle Lake
- 2 Rock Creek
- 3 Twin Lakes
- 4 Canyon Creek
- 5 Heather Lake
- 6 Chelan
- 7 Entiat
- 8 Stormy Mtn.
- 9 Slide Ridge
- 10 Nason Ridge
- 11 Alpine Lakes adjacent areas
- 12 Devils Gulch
- 13 Thorp Mtn.
- 14 Teanaway
- 15 Taneum
- 16 Manastash
- 17 Norse Peak adjacent areas
- 18 Quartz
- 19 Naneum
- 20 Lion Rock
- 21 William O. Douglas adjacent areas
- 22 Blue Slide
- 23 Goat Rocks adjacent areas

note: Wilderness areas identified



APPENDIX C

ROADLESS AREAS

INTRODUCTION

The purpose of this Appendix is to present a detailed and site-specific analysis of the areas of the Wenatchee National Forest that are in an Unroaded and essentially undeveloped condition. It includes a description of the resources, physiographic and biologic features, and the present management situation for each area. In addition, it specifically indicates how each area would be affected by the alternatives proposed in this FEIS.

With the passage of the Washington State Wilderness Act of 1984, Congress found that the Forest Service was *not required to review the wilderness option for the remaining Roadless Area Review and Evaluation (RARE II) areas, areas less than 5,000 acres in size, certain areas evaluated for wilderness in unit plans, and Further Planning Areas in Washington when developing this Forest Plan.* This law does provide that the areas that are still in an unroaded condition when this plan is revised shall be reviewed with wilderness as an option. The full text of this portion of the Act is: Sec. 5 (a) (1 & 2), (b) (1 & 2), and (d).

Since Congress has not designated these areas as wilderness, this appendix does not make a recommendation on wilderness option for the unroaded areas. Congress has done that job.

This appendix does present information about the unroaded areas to disclose the environmental effects of allocation each area to continued unroaded status or to some level of development (of all or a portion) of each area.

To do this, this appendix presents a description of the environment, presents the proposed management allocation for each of the alternatives, and discloses the environmental consequences of those alternatives for each area.

If roads, timber harvest, or other development occurs in these areas, they will no longer be eligible for consideration for wilderness. This itself may be a significant environmental consequence. For this reason we are considering each area's attributes as a wilderness, such as its capability, availability, and need, so that any decision to designate the area for particular uses will be made with full knowledge of its environmental consequences.

General

The areas being addressed in this Appendix were included in an updated inventory of roadless areas made by the Wenatchee National Forest in the fall of 1983. The inventory considered roadless areas involved in RARE I and II, Unit Planning and other areas not included in any of those assessments.

All of the areas discussed in detail in this Appendix are those remaining after passage of the Washington State Wilderness Act of 1984.

In April of 1985 the areas were re-examined by the Wenatchee National Forest and boundary adjustments were made to account for any development activities which occurred after the Act. In November of 1988 the areas were again re-examined and small boundary adjustments were made. Changes in land allocations have been made between the DEIS and this FEIS as a result of public comment and to reflect updates in old-growth and mature allocations for spotted owl and other dependent species.

The four inventoried roadless areas within the Alpine Lakes Management Area are included under this plan with no change in present management. These are: Nason Ridge, Alpine Lakes Adjacent, Thorp Mountain, and Teanaway. They are being included here as a matter of information.

All of the roadless areas are within two to four hours travel time from major population centers such as Seattle-Tacoma, Tri-Cities, Yakima, and Wenatchee. Many are immediately adjacent to existing wildernesses or are within only a few miles of them.

One original RARE II area was previously sub-divided into smaller areas in order to address alternative ways of management as wilderness or non-wilderness prior to the passage of the Act. This was the Glacier Peak A, B, C, D, E, and F 6031 composite area. Most of the A, D, and F 6031 areas became wilderness under the Act as well as portions of C and E 6031.

All, or portions, of the following inventoried RARE II areas in the Glacier Peak area were not included in wilderness: Myrtle Lake, Rock Creek, Twin Lakes, Canyon Creek, and Heather Lake.

The public responses to the original RARE II composite area that now involves those five remaining areas, totaled 6,811. Of this total, 68 percent favored non-wilderness, 1 percent favored further planning, 13 percent favored wilderness with boundary adjustment and 18 percent favored wilderness as inventoried.

The timber figures shown for each area are based upon applying the Forest-wide average volume for each stand size class and ecotype to the acres involved in each of those categories.

The use season for all of these areas generally runs from late May-mid June to late October. Some winter use may occur at times.

Table C-1 on the next page indicates the history of the various areas beginning with their RARE II or Unit Planning Size Status and traces changes in them.

Table C-2 which follows shows identified roadless areas that are no longer being addressed for roadless status and the reasons why.

TABLE C-1
ROADLESS AREA SUMMARY-ORIGINAL AREA AND CURRENT AREA
AND REASON FOR THE CHANGE

Area Name	Forest Plan Inventory Name	1979 FEIS Acres	Computer Map Acres	FEIS/ Computer Difference	Reason for Difference	1985 Acres	Difference Acres	Reason for Difference
RARE II Glacier Peak A6031	Cady Creek	11,356	12,084	+ 728	More	21	- 12,063	Became Wilderness 7/84
RARE II Glacier Peak B6031	Heather Lake	21,505	22,218	+ 713	advanced	11,067	- 11,151	Became Wilderness 7/84
RARE II Glacier Peak C6031	Rock Creek Twin Lakes Canyon Creek	— 69,828 —	39,411 27,709 7,568	+ 4,860	electronic area calculation	32,924 22,048 9,158	- 6,487 - 5,661 + 1,590	Became Wilderness 7/84 Became Wilderness 7/84 These acres were added in re-inventory
RARE II Glacier Peak D6031	Chipmunk Indian Creek	— 6,274	4,049 2,396	+ 171	methods	678 106	- 3,371 - 2,290	Became Wilderness 7/84 Became Wilderness 7/84
RARE II Glacier Peak E6031	Myrtle	22,848	23,045	+ 197	were	10,918	- 12,127	Became Wilderness 7/84
RARE II Glacier Peak F6031	Mirror	9,464	9,710	+ 246	used.	148	- 9,562	Became Wilderness 7/84
RARE II Lion Rock 6038	Lion Rock	9,960	9,943	- 17		4,834	- 5,109	Timber Sale Activity
RARE II Naneum 6039	Naneum	7,200	7,435	+ 235		6,911	- 524	Timber Sale Activity
RARE II Quartz 6033	Quartz	17,400	17,172	- 228	The	8,756	- 8,416	Timber Sale Activity
RARE II Norse Peak 6034	Norse Peak Adj	51,140	49,696	- 1,444	RARE II	11,300	- 38,396	35,892 acres went to wilderness, 7/84-2,504 reduced for timber sale activity
RARE II Cougar Lakes C,D,E 6032	W.O. Douglas Adj	175,820	169,389	- 6,431	DEIS	22,938	-146,451	Became Wilderness 7/84
RARE II Blue Slide 6035	Blue Slide	16,740	16,367	- 373		18,571	+ 2,204	Re-inventory increase
RARE II Goat Rocks 6036	Goat Rocks Adj	19,200	18,530	- 670	acres	7,357	- 11,173	Became Wilderness 7/84
RARE II Bethel 6037	Bethel	6,100	6,445	+ 345	were	4,770	- 1,675	Timber Sale Activity
Unit Plan Roadless Areas			11/83		by	71,063	- 62,386	Became Wilderness 7/84
Chelan	Chelan	—	133,449			32,500	- 1,696	Timber Sale Activity
Stormy	Stormy	—	34,196			10,091	- 340	Timber Sale Activity
Slide Ridge	Slide Ridge	—	10,431		Dot Grid	71,254	- 657	Timber Sale Activity
Entiat	Entiat	—	71,911			25,186	0	
Devil's Gulch	Devil's Gulch	—	25,186		methods	19,123	0	
2/ Nason Ridge	Nason Ridge	—	19,123			44,393	0	
2/ Alpine Lakes Adj	Alpine Lks Adj	—	44,393			15,667	0	
2/ Thorp Mountain	Thorp Mtn	—	15,667			66,293	0	
2/ Teanaway	Teanaway	—	66,293			25,122	-10,367	Timber sale activity much of which is on pvt intermingled lands
Taneum	Taneum	—	35,489					Timber sale activity on pvt lands
Manastash	Manastash	—	9,180			8,798	- 382	

1/ All acres are net National Forest

2/ Within Alpine Lakes Management Plan Area

TABLE C-2
PREVIOUSLY IDENTIFIED ROADLESS AREAS THAT NO LONGER MEET
REQUIREMENTS FOR WILDERNESS CONSIDERATION AND REASON FOR CHANGE

Area Name	Reason No Longer Considered
Mirror Lake (Former 6031)	All but 148 acres were added to the Glacier Peak Wilderness in 1984.
Chipmunk (Former D6031)	All but 678 acres were added to the Glacier Peak Wilderness in 1984.
Indian Creek (Former D6031)	All but 106 acres were added to the Glacier Peak Wilderness in 1984.
Cady Creek (Former A6031)	All but 21 acres became part of the new Henry M. Jackson Wilderness in 1984.
Bethel	The area is less than 5,000 acres and no additional public interest has been expressed in recent meetings.

Table C-3 indicates the percentage of the inventoried roadless areas which have roadless management allocated to them by alternative. Table C-4 shows a summary of the total number of roadless areas having roadless management by alternative in addition to the total acres allocated to roadless management.

The tables following Table C-4 indicate the acres allocated to the various management prescriptions for each roadless area for each alternative.

**TABLE C-3
PERCENTAGE OF INVENTORIED ROADLESS AREAS REMAINING UNROADED**

ROADLESS AREA	ACRES 1/	ALTERNATIVE										
		NC	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Myrtle Lake	10,918	82	100	82	100	82	100	100	100	100	100	82
Rock Creek	32,924	0	54	52	60	52	100	96	92	54	60	32
Twin Lakes	22,048	0	62	61	65	61	100	97	66	62	65	61
Canyon Creek	9,158	0	0	46	46	46	100	97	49	0	46	46
Heather Lake	11,067	0	14	13	25	13	100	81	23	14	25	13
Chelan	71,063	0	84	59	90	59	100	85	82	84	90	52
Entiat	71,254	38	27	36	50	36	100	91	94	27	50	36
Stormy	32,500	0	0	17	30	16	95 2/	89	89	0	30	16
Slide Ridge	10,091	0	0	11	25	11	100	92	0	0	25	10
Devil's Gulch	25,186	0	37	0	34	0	100	87	78	37	34	0
Taneum	25,122	0	25	10	28	10	100	95	34	25	28	0
Manastash	8,798	0	46	40	69	40	100	70	54	46	69	0
Norse Peak Adj.	11,300	0	23	0	12	0	100	12	35	23	12	0
Quartz	8,756	0	1	1	13	1	100	71	96	1	13	0
Naneum	6,911	0	100	0	19	0	100	86	0	100	19	0
Lion Rock	4,834	0	0	80	74	80	100	94	94	0	74	80
Wm O. Douglas Adj.	22,938	0	3	0	1	0	100	11	6	3	1	0
Blue Slide	18,571	0	0	13	16	13	100	80	80	0	16	3
Goat Rocks Adj.	7,357	0	76	0	18	0	100	50	31	76	18	0
Nason Ridge 3/	19,123	0	63	63	63	63	63	63	63	63	63	63
Alpine Lakes Adj. 3/	44,393	0	64	64	64	64	64	64	64	64	64	64
Thorp Mountain 3/	15,667	0	28	28	28	28	28	28	28	28	28	28
Teanaway 3/	66,293	0	79	79	79	79	79	79	79	79	79	79

1/ Net National Forest Acres

2/ Experimental Forest within the boundaries of the inventoried roadless area.

3/ Within Alpine Lakes Management Plan Area

TABLE C-4

**SUMMARY OF ALLOCATION OF INVENTORIED ROADLESS AREAS
TO ROADLESS MANAGEMENT**

ALTERNATIVE	Inventoried Roadless Areas				Inventoried Roadless Acreage			
	W/Alpine Lakes		Excluding Alpine Lakes		W/Alpine Lakes		Excluding Alpine Lakes	
	Number	% of Total Number	Number	% of Total Number	Acres	% of Total Acres	Acres	% of Total Acres
NC	2	9	2	11	36,397	7	36,397	9
A/NFMA	18	78	14	74	251,686	45	154,082	38
B	19	83	15	79	229,238	41	131,634	32
C/PREFERRED	21	91	17	89	267,570	48	169,966	41
D	19	83	15	79	229,238	41	131,634	32
E	23	100	19	100	506,768	91	409,164	99.6
F	23	100	19	100	435,711	78	338,107	82
G	22	96	18	95	384,089	69	286,485	70
H	18	78	14	74	251,686	45	154,082	38
I	19	83	15	79	267,315	48	169,711	41
J	14	61	10	53	209,160	38	111,556	27

Roadless Area **MYRTLE LAKE** Acres 10,918
 Designation by Management Prescription
 Acres By Alternative

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone			297		297						276
Key Big Game Habitat, Unroaded											
General Forest	1,951		1,485		1,485						1,505
Old-Growth Management			169		169						169
Mature Habitat											
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized	8,967	10,918	5,172	1,569	5,172			9,180	10,918	1,569	5,173
Dispersed Rec , Unroaded, Non-Motorized			3,795	8,522	3,795	10,091	10,155	1,738		8,522	3,795
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention							21				
Scenic Travel, Partial Retention											
Scenic River, Proposed				827						827	
Recreational River, Proposed						827					
Wild River, Proposed							742				

Roadless Area **ROCK CREEK** Acres 32,924
 Designation by Management Prescription
 Acres By Alternative

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		552	721	508	721		21	191	551	508	635
Key Big Game Habitat, Unroaded											
General Forest	32,924	6,106	11,342	4,176	11,342				6,106	4,176	16,918
Old-Growth Management		1,356	360	615	360			21	1,356	615	1,357
Mature Habitat		1,293	3,413	1,336	3,413		255	191	1,293	1,336	3,498
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized		6,382	8,862	8,756	8,862	12,975	12,975	20,946	6,381	8,756	2,290
Dispersed Rec , Unroaded, Non-Motorized		11,554	8,226	14,056	8,226	19,949	18,677	9,455	11,554	14,056	8,226
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention		21		64			763	1,166	21	64	
Scenic Travel, Partial Retention		5,427		3,095			21	615	5,427	3,095	
Scenic River, Proposed		233					212	339	233		
Recreational River, Proposed				318							318
Wild River, Proposed											

Roadless Area TWIN LAKES
Designation by Management Prescription
Acres By Alternative

Acres 22,048

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		445	996	657	996			614	445	657	975
Key Big Game Habitat, Unroaded											
General Forest	22,048	3,392	6,318	1,505	6,318			1,505	3,392	1,505	6,339
Old-Growth Management		424	764	742	764			764	424	742	764
Mature Habitat							148				
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized											
Dispersed Rec , Unroaded, Non-Motorized		13,717	13,420	14,331	13,420	21,921	21,179	14,480	13,717	14,331	13,420
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other						127	127				
Scenic Travel, Retention		954		678			382	3,350	954	678	
Scenic Travel, Partial Retention		1,738	550	2,777	550				1,738	2,777	550
Scenic River, Proposed		1,378		192			212	1,335	1,378	192	
Recreational River, Proposed				1,166							
Wild River, Proposed											

Roadless Area CANYON CREEK
Designation by Management Prescription
Acres By Alternative

Acres 9,158

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		763	488	466	488		21	466	763	466	488
Key Big Game Habitat, Unroaded											
General Forest	9,158	4,070	4,282	1,760	4,282			912	4,070	1,760	4,303
Old-Growth Management		297	42	297	42			42	297	297	42
Mature Habitat		106		233				212	106	233	
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized											
Dispersed Recreation, Unroaded, Non-Motorized			4,240	1,611	4,240	9,158	8,904	4,495		1,611	4,240
Dispersed Recreation, Unroaded, Tmbr Harvest				2,587						2,587	
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention		382	21	21	21		191	191	382	21	
Scenic Travel, Partial Retention		3,498	85	2,141	85			2,798	3,498	2,141	85
Scenic River, Proposed		42		42			42	42	42	42	
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area HEATHER LAKE
Designation by Management Prescription
Acres By Alternative

Acres 11,067

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
<i>Experimental Forest</i>											
Big Game Habitat											
Riparian Protection Zone		636	636	403	636		42	466	636	403	594
Key Big Game Habitat, Unroaded											
General Forest	11,067	3,689	8,480	6,636	8,480		1,293	1,569	3,689	6,636	8,692
Old-Growth Management		63	63	63	63	127	127	63	63	63	63
Mature Habitat				806			254	424		806	
<i>Developed Recreation</i>											
Dispersed Recreation, Unroaded, Motorized											
Dispersed Recreation, Unroaded, Non-Motorized		1,528	1,442	2,714	1,442	10,940	8,990	2,502	1,528	2,714	1,442
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention		424	233	148	233		85	509	424	148	64
Scenic Travel, Partial Retention		4,727	213	297	213		212	5,534	4,727	297	212
Scenic River, Proposed							64				
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area CHELAN
Designation by Management Prescription
Acres By Alternative

Acres 71,063

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
<i>Experimental Forest</i>											
Big Game Habitat			14,671	318	14,671	6,551	6,551	6,720		318	7,335
Riparian Protection Zone		721	1,972	488	1,972	445	594	848	721	488	1,844
Key Big Game Habitat, Unroaded				6,805						6,805	
General Forest	70,724	488	5,342	2,714	5,342				488	2,714	17,702
Old-Growth Management		191	869	170	869		21	42	191	170	869
Mature Habitat		2,332	1,993		1,993		42		2,332	1,993	
Developed Recreation		64	148	148	148		148	145	64	148	148
Dispersed Recreation, Unroaded, Motorized		212	13,229	15,964	13,229	1,145		18,847	212	15,964	
Dispersed Recreation, Unroaded, Non-Motorized			28,472	36,867	28,472	62,583	60,548	39,713		36,867	13,229
Dispersed Recreation, Unroaded, Timber Harvest				4,007						4,007	23,532
Intensive Range Management		1,039	1,060	890	1,060		1,060	1,060	1,039	890	1,060
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation		59,592		21					59,592	21	
Classified Special Interest Area, Other											
Scenic Travel, Retention		2,841		1,208			191	233	2,841	1,208	
Scenic Travel, Partial Retention		3,244	2,968	1,124	2,968		569	3,116	3,244	1,124	3,012
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											
Water	339	339	339	339	339	339	339	339	339	339	339

Roadless Area ENTIAT **Acres 71,254**
Designation by Management Prescription
Acres By Alternative

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		2,014	2,205	1,166	2,205		21	85	2,014	1,166	2,056
Key Big Game Habitat, Unroaded											
General Forest	43,824	16,176	33,687	11,279	33,687		2,523	2,353	16,176	11,279	34,069
Old-Growth Management		3,774	3,689	2,607	3,689		720	297	3,774	2,607	3,689
Mature Habitat		3,986	4,685	3,837	4,685	1,166	1,823	191	3,986	3,837	4,685
Developed Recreation		42	42	42	42		21	42	42	42	42
Dispersed Recreation, Unroaded, Motorized	27,430	19,059	24,147	25,801	24,147	9,964	8,756	65,169	19,059	25,801	24,083
Dispersed Rec , Unroaded, Non-Motorized		85	1,272	10,176	1,272	58,216	54,421	1,929	85	10,176	1,272
Dispersed Recreation, Unroaded, Timber Harvest				21						21	
Intensive Range Management		276	21		21				276		21
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation			382		382						
Classified Special Interest Area, Other						1,187	1,018				
Scenic Travel, Retention		3,774	212	2,353	212		509	298	3,774	2,353	
Scenic Travel, Partial Retention		22,068	912	13,038	912		827	890	22,068	13,038	1,337
Scenic River, Proposed				934			615			934	
Recreational River, Proposed											
Wild River, Proposed						721					

Roadless Area STORMY **Acres 32,500**
Designation by Management Prescription
Acres By Alternative

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest	1,632	1,632	1,632	1,632	1,632	1,632	1,632	1,632	1,632	1,632	1,632
Big Game Habitat								21			
Riparian Protection Zone		1,590	1,505	1,187	1,505		64	106	1,590	1,187	1,314
Key Big Game Habitat, Unroaded											
General Forest	30,868	13,165	21,370	11,363	21,370		212	170	13,165	11,363	21,561
Old-Growth Management		2,120	1,844	1,654	1,844		63	42	2,120	1,654	1,844
Mature Habitat		615	594	594	594		488	488	615	594	594
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized			5,130	9,498	5,130	20,331	20,331	28,726		9,498	5,130
Dispersed Recreation, Unroaded, Non-Motorized						9,625	7,844				
Intensive Range Management		213	21	21	21				213	21	21
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation			276	212	276	212	212	212		212	233
Classified Special Interest Area, Other						700	700				
Scenic Travel, Retention		318		127			127	191	318	127	
Scenic Travel, Partial Retention		12,847	128	6,148	128		763	912	12,847	6,148	171
Scenic River, Proposed				64			64				
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area SLIDE RIDGE **Acres 10,091**
Designation by Management Prescription
Acres By Alternative

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat			403	382	403					382	382
Riparian Protection Zone		212	212	148	212		21	212	212	148	212
Key Big Game Habitat, Unroaded											
General Forest	10,091	1,336	5,724	64	5,724		42	42	1,336	64	5,745
Old-Growth Management		953	954	954	954			954	953	954	954
Mature Habitat											
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized						6,678	6,678				
Dispersed Recreation, Unroaded, Non-Motorized			1,060	2,502	1,060	3,413	2,565			2,502	1,060
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention		2,650	1,738	339	1,738		382	8,523	2,650	339	
Scenic Travel, Partial Retention		4,940		5,702			403	360	4,940	5,702	1,738
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area DEVIL'S GULCH **Acres 25,186**
Designation by Management Prescription
Acres By Alternative

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat			21	869	21	42	42	42		21	763
Riparian Protection Zone		212	594	212	594		85	148	212	212	551
Key Big Game Habitat, Unroaded				7,992						7,992	
General Forest	25,186	8,035	18,360	6,635	18,360		1,865	1,717	8,035	6,635	17,660
Old-Growth Management		2,141	2,374	2,077	2,374			827	2,141	2,077	2,374
Mature Habitat		636	2,120	2,608	2,120		106		636	2,608	2,120
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized		9,226				5,321	5,321	19,739	9,226		
Dispersed Recreation, Unroaded, Non-Motorized						19,823	16,474				
Intensive Range Management			954		954						954
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other				594						594	
Scenic Travel, Retention		654	360	784	360		1,251	1,505	654	784	318
Scenic Travel, Partial Retention		4,282	403	3,415	403		42	1,208	4,282	3,415	446
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area TANEUM
Designation by Management Prescription
Acres By Alternative

Acres 25,122

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat		1,950		1,336		445	445	1,781	1,950	1,336	1,696
Riparian Protection Zone		827	1,060	700	1,060	64	127	636	827	700	784
Key Big Game Habitat, Unroaded											
General Forest	25,122	4,622	12,975	5,342	12,975		21	3,159	4,622	5,342	13,526
Old-Growth Management		699	1,102	594	1,102			594	699	594	1,569
Mature Habitat		6,402	6,550	6,742	6,550	127	170	6,805	6,402	6,742	6,551
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized		6,296	2,438	7,037	2,438	22,451	22,451	8,649	6,296	7,037	
Dispersed Recreation, Unroaded, Non-Motorized						2,035	1,357				
Intensive Range Management			827		827						827
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention		403		170			42	509	403	170	
Scenic Travel, Partial Retention		3,923	170	3,201	170		509	2,989	3,923	3,201	169
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area MANASTASH
Designation by Management Prescription
Acres By Alternative

Acres 8,798

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat		1,102						1,124	1,102		
Riparian Protection Zone		212	212	127	212		85	212	212	127	170
Key Big Game Habitat, Unroaded											
General Forest	8,777	1,929	2,629	1,505	2,629		1,399	1,420	1,929	1,505	5,491
Old-Growth Management		466	466	212	466		275	381	466	212	1,102
Mature Habitat											
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized		4,072	3,498	6,106	3,498	6,063	6,064	4,750	4,072	6,106	
Dispersed Recreation, Unroaded, Non-Motorized						2,714					
Intensive Range Management			1,972						1,972		2,014
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention											
Scenic Travel, Partial Retention		996		827			954	890		827	
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											
Water	21	21	21	21	21	21	21	21	21	21	21

Roadless Area NORSE PEAK ADJACENT
Designation by Management Prescription
Acres By Alternative

Acres 11,300

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Mather Memorial Parkway				3,115			2,841			3,115	
Big Game Habitat				191						191	191
Riparian Protection Zone		509	488	297	488		254	382	509	297	466
Key Big Game Habitat, Unroaded											
General Forest	11,300	1,950	5,385	2,502	5,385		509	933	1,950	2,502	5,215
Old-Growth Management		699	699	636	699		594	445	699	636	699
Mature Habitat											
Developed Recreation		21	1,972	42	1,972		1,738	1,844	21	42	1,972
Dispersed Recreation, Unroaded, Motorized								3,922			
Dispersed Recreation, Unroaded, Non-Motorized		2,650		1,357		11,236	1,272		2,650	1,357	
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other				64		64	64	64		64	
Scenic Travel, Retention		3,775	2,671	1,654	2,671		2,438	2,141	3,775	1,654	127
Scenic Travel, Partial Retention		1,696	85	1,442	85		1,590	1,569	1,696	1,442	2,630
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area QUARTZ
Designation by Management Prescription
Acres By Alternative

Acres 8,756

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		551	551	360	551		127	42	551	360	466
Key Big Game Habitat, Unroaded											
General Forest	8,756	6,296	7,951	4,135	7,951		890	85	6,296	4,135	8,142
Old-Growth Management		148	148	148	148				148	148	148
Mature Habitat				1,781			85	64		1,781	
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized		64	106	1,145	106	6,254	6,255	8,437	64	1,145	
Dispersed Recreation, Unroaded, Non-Motorized						2,502					
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention		213					191	64	213		
Scenic Travel, Partial Retention		1,484		1,187			1,208	64	1,484	1,187	
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area NANEUM
Designation by Management Prescription
Acres By Alternative

Acres 6,911

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat		2,205		1,887				3,138	2,205	1,887	3,116
Riparian Protection Zone		509	445	106	445		85	445	509	106	254
Key Big Game Habitat, Unroaded				3,307						3,307	
General Forest	6,911	890							890		
Old-Growth Management		933	636		636		42	636	933		636
Mature Habitat											
Developed Recreation		21	21	42	21		21	21	21	42	21
Dispersed Recreation, Unroaded, Motorized		21		1,294		5,957	5,958		21	1,294	
Dispersed Recreation, Unroaded, Non-Motorized				42		424				42	
Intensive Range Management			5,279		5,279						2,354
Research Natural Area			530		530	530	530	530			530
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention				191			148	1,293		191	
Scenic Travel, Partial Retention		2,332		42			127	848	2,332	42	
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area LION ROCK
Designation by Management Prescription
Acres By Alternative

Acres 4,834

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat		509							509		
Riparian Protection Zone		254					21	21	254		
Key Big Game Habitat, Unroaded											
General Forest	4,834	106	869		869				106		869
Old-Growth Management		254	21	42	21				254	42	21
Mature Habitat		106	64	64	64			21	106	64	64
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized			3,859	3,582	3,859	4,558	4,558	4,558	3,859	3,859	3,859
Dispersed Recreation, Unroaded, Non-Motorized						276					
Intensive Range Management			21		21						21
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention		382		148			85	85	382	148	
Scenic Travel, Partial Retention		3,223		998			170	149	3,223	998	
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area WILLIAM O. DOUGLAS ADJACENT **Acres 22,938**
Designation by Management Prescription
Acres By Alternative

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Mather Memorial Parkway				2,014			1,802			2,014	
Big Game Habitat			572	1,569	572	64	64	445		1,569	1,526
Riparian Protection Zone		1,420	1,420	1,102	1,420		1,080	1,378	1,420	1,102	1,357
Key Big Game Habitat, Unroaded											
General Forest	22,874	4,452	15,455	5,194	15,455		1,569	1,187	4,452	5,194	14,565
Old-Growth Management		657	657	509	657		106	466	657	509	657
Mature Habitat		763	763	890	763		1,802	827	763	890	763
Developed Recreation		148	572	572	572		551	572	148	572	572
Dispersed Recreation, Unroaded, Motorized				191		190	191	191		191	
Dispersed Recreation, Unroaded, Non-Motorized		784				21,412	1,187	1,187	784		
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation						1,208	1,208				
Classified Special Interest Area, Other											
Scenic Travel, Retention		9,032	2,375	3,350	2,375		9,667	12,635	9,032	3,350	276
Scenic Travel, Partial Retention		5,618	1,060	7,441	1,060		3,583	3,986	5,618	7,441	3,158
Scenic River, Proposed				42			64			42	
Recreational River, Proposed											
Wild River, Proposed											
Water	64	64	64	64	64	64	64	64	64	64	64

Roadless Area BLUE SLIDE **Acres 18,571**
Designation by Management Prescription
Acres By Alternative

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat				148		170	170	170		148	148
Riparian Protection Zone		912	890	869	890		339	339	912	869	742
Key Big Game Habitat, Unroaded											
General Forest	18,571	2,523	11,279	4,643	11,279			170	2,523	4,643	12,932
Old-Growth Management		742	742	340	742		212	254	742	340	742
Mature Habitat		2,820	2,692	3,286	2,692		636	657	2,820	3,286	2,820
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized			1,823	2,947	1,823	14,861	14,861	14,883		2,947	21
Dispersed Recreation, Unroaded, Non-Motorized						3,540					
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other			551	85	551					85	551
Scenic Travel, Retention		4,366		805			1,611	1,589	4,366	805	
Scenic Travel, Partial Retention		7,208	594	5,448	594		742	509	7,208	5,448	615
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area GOAT ROCKS ADJACENT
Designation by Management Prescription
Acres By Alternative

Acres 7,357

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		106	445	445	445		339	445	106	445	424
Key Big Game Habitat, Unroaded											
General Forest	7,357	466	6,509	2,588	6,509		1,399	2,268	466	2,588	6,530
Old-Growth Management											
Mature Habitat							509				
Developed Recreation		42	212	212	212		212	212	42	212	212
Dispersed Recreation, Unroaded, Motorized				1,293						1,293	
Dispersed Recreation, Unroaded, Non-Motorized		5,598				7,357	3,689	2,248	5,598		
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention		615		996			912	6,654	615	996	
Scenic Travel, Partial Retention		530	191	1,823	594		297	530	530	1,823	191
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											

Roadless Area NASON RIDGE
Designation by Management Prescription
Acres By Alternative

Acres 19,123

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		445	445	382	445	445	445	382	445	382	360
Key Big Game Habitat, Unroaded											
General Forest	19,102	1,845	1,845	1,845	1,845	1,335	1,399	1,845	1,845	1,845	1,845
Old-Growth Management		1,357	1,357	212	1,357	636	636	212	1,357	212	1,357
Mature Habitat		1,357	1,357	3,180	1,357	2,544	2,544	3,180	1,357	3,180	1,357
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized											
Dispersed Recreation, Unroaded, Non-Motorized											
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation		11,363	11,273	11,087	11,363	10,814	10,814	11,087	11,273	11,087	11,363
Classified Special Interest Area, Other											
Scenic Travel, Retention		1,717	1,717	1,569	1,717	2,099	2,035	1,569	1,717	1,569	1,781
Scenic Travel, Partial Retention		1,018	1,018	827	1,018	1,187	1,187	827	1,018	827	1,039
Scenic River, Proposed						42	42				
Recreational River, Proposed											
Wild River, Proposed											
Water	21	21	21	21	21	21	21	21	21	21	21

Roadless Area ALPINE LAKES ADJACENT
Designation by Management Prescription
Acres By Alternative

Acres 44,393

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		1,060	1,060	784	1,060	933	933	1,018	1,060	784	933
Key Big Game Habitat, Unroaded											
General Forest	44,393	5,978	5,978	5,745	5,978	5,915	6,339	5,724	5,978	5,745	5,978
Old-Growth Management		1,123	1,123	1,123	1,123	254	254	1,123	1,123	1,123	1,123
Mature Habitat		2,523	2,523	2,989	2,523	3,116	3,116	2,989	2,523	2,989	2,523
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized		445	445	445		445	445	445	445	445	445
Dispersed Recreation, Unroaded, Non-Motorized		20,035	20,035	20,036	20,035	20,013	20,034	20,035	20,035	20,036	20,034
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation		6,932	7,208	6,932	7,208	6,572	6,572	6,932	6,932	6,932	6,932
Classified Special Interest Area, Other		276	276	276	276	276	276	276	276	276	276
Scenic Travel, Retention		4,325	4,049	3,328	4,049	3,774	3,371	4,367	4,325	3,328	4,176
Scenic Travel, Partial Retention		1,696	1,696	1,463	1,696	1,802	1,781	1,484	1,696	1,463	1,973
Scenic River, Proposed				657		1,251	1,251			657	
Recreational River, Proposed				615		21	21			615	
Wild River, Proposed						21					

Roadless Area THORP MOUNTAIN
Designation by Management Prescription
Acres By Alternative

Acres 15,667

Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		530	508	466	508	445	445	466	530	466	466
Key Big Game Habitat, Unroaded											
General Forest	15,455	3,965	3,965	3,817	3,965	3,625	3,731	3,817	3,965	3,817	4,007
Old-Growth Management		508	509	509	509	360	360	509	508	509	509
Mature Habitat		3,456	3,456	3,646	3,456	3,774	3,774	3,646	3,456	3,646	3,456
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized		4,389	4,410	4,410	4,410	4,410	4,410	4,410	4,389	4,410	4,410
Dispersed Recreation, Unroaded, Non-Motorized											
Intensive Range Management											
Research Natural Area											
Classified Special Interest Area-Scenic/Recreation											
Classified Special Interest Area, Other											
Scenic Travel, Retention		1,399	1,399	1,399	1,399	1,548	1,442	1,399	1,399	1,399	1,399
Scenic Travel, Partial Retention		1,208	1,208	1,208	1,208	1,293	1,293	1,208	1,208	1,208	1,208
Scenic River, Proposed											
Recreational River, Proposed											
Wild River, Proposed											
Water	212	212	212	212	212	212	212	212	212	212	212

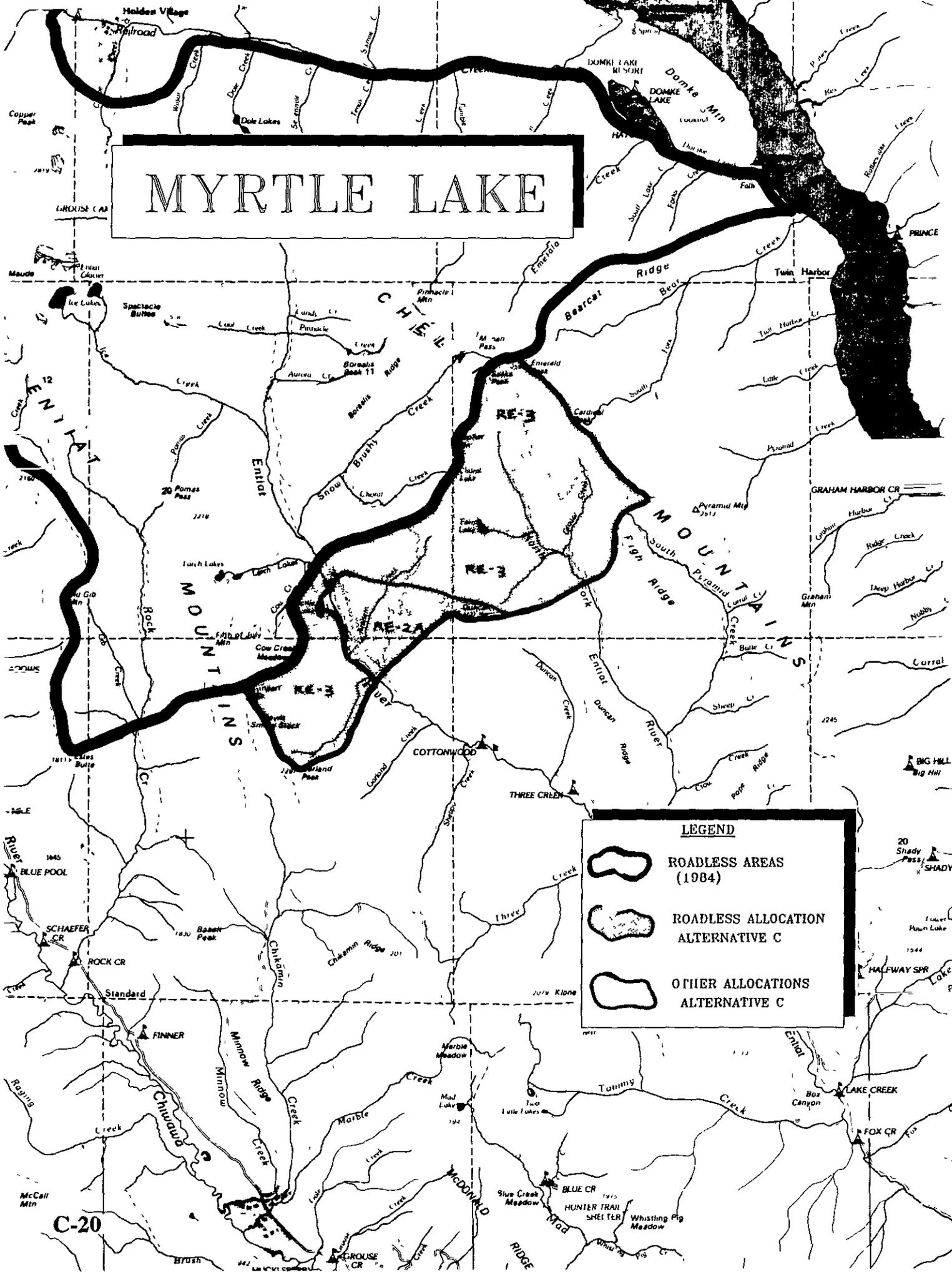
Roadless Area TEANAWAY
Designation by Management Prescription
Acres By Alternative

Acres 66,293

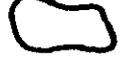
Management Prescription	NC	A	B	C	D	E	F	G	H	I	J
Experimental Forest											
Big Game Habitat											
Riparian Protection Zone		424	403	403	403	445	445	403	424	403	360
Key Big Game Habitat, Unroaded											
General Forest	66,293	6,869	6,912	6,890	6,912	6,932	7,272	6,868	6,869	6,890	6,912
Old-Growth Management		2,100	2,056	2,099	2,056	1,145	1,145	2,099	2,100	2,099	2,099
Mature Habitat		5,024	5,024	5,109	5,024	3,625	3,625	5,109	5,024	5,109	5,024
Developed Recreation											
Dispersed Recreation, Unroaded, Motorized		1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696
Dispersed Recreation, Unroaded, Non-Motorized											
Intensive Range Management											
Research Natural Area		1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060
Classified Special Interest Area-Scenic/Recreation		47,170	47,170	47,086	47,170	48,782	48,782	47,086	47,170	47,086	47,170
Classified Special Interest Area, Other											
Scenic Travel, Retention		424	424	424	424	806	466	424	424	424	424
Scenic Travel, Partial Retention		1,526	1,548	1,526	1,526	1,760	1,760	1,548	1,526	1,526	1,548
Scenic River, Proposed											
Recreational River, Proposed						42	42				
Wild River, Proposed											



MYRTLE LAKE



LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

C-20

MYRTLE LAKE ROADLESS AREA

Size: Gross Acres: 10,918

Net Acres: 10,918

I. GENERAL INFORMATION

A. History

Originally allocated to unroaded dispersed recreation under the Forest multiple use plan and Chelan Unit Plan. Studied for wilderness under Rare II as part of Glacier Peak Area No. E6031 and not recommended for wilderness. Reexamined for wilderness in 1984 and is currently that portion of E6031 not made wilderness under the Washington State Wilderness Act of 1984. Over 12,000 acres of the inventoried roadless area was added to wilderness in 1984.

B. Location and Access

The area lies adjacent to the Glacier Peak Wilderness in Chelan County on the Entiat Ranger District. Main access is gained by the Entiat River Road, from the town of Entiat, Washington, and the Entiat River trail from the road's end.

C. Physiography and Soils

This area is characterized by very wide and deep "U" shaped glacial valleys, with rough broken angular rocky ridges surrounding them. The valley bottoms are covered with conifer stands that have been dissected in many places by avalanche chutes. There are also many wet meadows that occur in the riparian zones.

Elevations range from about 3,300 to 7,800 feet. Most of the soils (59 percent) have developed in granitic residuum and the balance in deposits of volcanic ash and pumice. The granitic soils have a high bearing strength and remain in place better than the ash soils. The ash soils are easily displaced, because they are light and fluffy. Neither of these soils is slippery or sticky when wet, so are excellent for absorbing early and late season use. The ash soils are quite dusty when dry.

D. Climate

Precipitation ranges from 40 to 70 inches with an average of 50 inches. About 70 percent falls as snow which can range from 6 to 15 feet in depth.

E. Vegetation

Thirty-one percent of this area is tentatively suitable timberland. Most of this lies in the valley bottoms up to midslope and extending up side drainages. All of the area is classified as wet ecotype with the principal species being small diameter Douglas-fir, lodgepole pine, subalpine fir, and Englemann spruce. On the most productive sites, Pacific silver-fir is a common understory species.

Ridge tops in this area are open grass-forb communities with some wet areas and lakes. Avalanche paths create open corridors through the timbered valleys, increasing vegetative diversity and grass-forb-brush species similar to those that regenerate after fire or logging.

F. Current Uses

The current use is for recreation purposes. Major recreation activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitors Days</u>
ORV Trail Riding	835
Hiking	1,000
Horseback Riding	200
Mountain Climbing	100
Fishing	1,200
Hunting	300
Total	3,635

The area contains the following kinds and amounts of recreation opportunity spectrum (ROS) classes:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Non Motorized (SPNM)	1,485
Semi-Primitive Motorized (SPM)	9,433

There are 20.5 miles of trail in the area of which 18.0 miles are currently open to motorized use.

G. Appearance and Surroundings

The area has high visual variety of landform, vegetation, waterforms (lakes and streams), and rockforms.

The northeast half is within a basin surrounded by ridgetops and peaks. The basin has four tributary creeks and a variety of vegetation including fall color. Myrtle and Fern Lakes add to the diversity of waterforms in the area.

The area is primarily viewed as foreground and middleground from trails of the area.

The Myrtle Lake area is bounded by the Glacier Peak Wilderness to the north and the Entiat roadless area on the south.

The southwest half of the area is within the glaciated valley with steep side slopes and a variety of vegetative patterns. The ridgetops are open and rugged.

H. Attractions

Some major attractive features are the North Fork of the Entiat River, Myrtle and Fern Lakes, Pyramid Mountain, Devil's Smokestack, and the headwall of the North Fork of the Entiat River.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The Myrtle Lake roadless area of the Wenatchee National Forest is that area of the Entiat District that is bounded on the northwest by the Glacier Peak Wilderness and on the southeast by the northern boundary of the Entiat roadless area. The southwest boundary is the summit of the Entiat Mountain range, and the northeast line is the summit of the Chelan Mountain range.

For the most part, the boundaries are located on identifiable features on-the-ground.

B. Natural Integrity

The impact of past human activity in this area is evident in the form of a steel girder bridge across the Entiat River and an adjacent helispot cut out of the Forest. There are approximately 18.0 miles of trails in this area that are now open to, and have a long history of, trail bike use. Also, there is an old fire lookout foundation on top of Duncan Hill. Although there are some evidences of man, the basic ecological processes have not been greatly altered.

C. Natural Appearance

The Myrtle Lake area in and of itself is a somewhat small area taking in segments of two major drainages, the main Entiat and the North Fork of the Entiat River. The deep, incised drainages, with heavy forest vegetation, conceal the evidence of human activity except when one is right at the site. From the ridges and high points it is possible to see distant roads and timber harvest activities several miles down valley.

D. Opportunities for Solitude

Although the area is small, as compared with adjacent areas, there are opportunities for solitude in several cirque basins that drain into the main Entiat and the North Fork.

E. Opportunities for Primitive Recreation

Although there are several tables and steel fire rings at different locations within this unit, there are several opportunities for primitive recreation experiences such as hunting, fishing, hiking, horseback riding, rock climbing, and viewing outstanding scenery.

F. Challenging Experiences

There are peaks and rock bluffs that offer challenge to rock and mountain climbers.

G. Special Wildlife Features

There are no known threatened or endangered wildlife species within the area. The extent of use in the area by sensitive species is unknown.

H. Historical and Scientific Study

There are no special unique opportunities for outdoor education and scientific or historic study in the area which cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities. It contains one of the very few lakes accessible to bike riders. Estimated carrying capacity by ROS class is as follows:

ROS Class	Capacity in Potential Recreation	
	Visitors	Days Per Year
SPNM	1,500	
SPM	28,000	
	Total	29,500

B. Wildlife

The area provides summer range for a portion of the Entiat deer herd. There are scattered populations of mountain goat in the Chelan Mountain area between Pyramid Peak Big Hill and Emerald Peak. Grouse can be found throughout the area. The area is occasionally used by elk in the summer and a small black bear population.

C. Fish

In this area there are two lakes: Fern Lake and Myrtle Lake. Primarily eastern brook trout utilize Myrtle Lake. The lake is heavily fished because of easy access. Fern Lake has relatively good cutthroat trout fishing and there may also be Kamloops rainbow trout in the Lake. Fern Lake has very difficult access and, therefore, is not heavily fished.

This roadless area also contains portions of the Entiat River and the North Fork of the Entiat River. Both systems are inhabited by native cutthroat and rainbow trout. The Entiat River is heavily fished and probably has fairly good fisheries production. The North Fork of the Entiat is a shorter, more sterile, higher gradient stream and probably has low productivity and a fairly small trout population. The North Fork of the Entiat is not fished to any great extent.

D. Water

The area includes two storage precipitation gauges (annual) and three snow survey aerial markers.

The water quality (Nephelometric Turbidity Unit) flowing from this area is excellent. Turbidity levels annually average less than 5 NTU's. This roadless area provides a proportionally large percentage of the Entiat Basin runoff.

E.Livestock

The portion of this area within the main Entiat River drainage has no potential for domestic or recreation stock allotments due to topography or an almost complete lack of forage vegetation types. The portion in the North Fork Entiat River is currently part of the Pyramid Recreation Stock Allotment and receives use annually from both commercial outfitters and hunters stock. There is some potential for domestic livestock (sheep) if it were combined with Pyramid Creek and other areas farther to the south.

F.Timber

The area contains 3,434 acres of tentatively suitable timberland. Species are Douglas-fir, Pacific silver, and subalpine firs, Englemann spruce, and lodgepole pine. Other data is as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	1,484	42.1	7.7
Wet	Immature	1,929	34.7	6.4
Wet	Seedling-Sapling	21	---	
	Total	3,434	76.8	14.1

The estimated maximum biological potential contribution to the long-term sustained yield is 1.1 MMBF (0.2 MMCF) per year.

G.Minerals

This area is underlaid by pre-Cretaceous metamorphic rock and granitic rock of Mesozoic age. Surface deposits of pumicite derived from the eruption of Glacier Peak occur sporadically throughout the area, but they have not been adequately investigated for commercial value. The area around Milham Pass is underlaid by a rhyodacite plug, which contains disseminated sulfides (Church and Stotelmeyer, 1984). Based upon this, the U.S.G.S. and U.S.B.M. have identified the area around Milham Pass as having a "low" potential for the occurrence of base and precious metal resources in hydrothermal veins. According to Bureau of Land Management records (1/23/85), however, the area has had no mining claims located within it. The area is not classified "prospectively valuable" for any of the leasable commodities, and there are no existing leases, nor are there any pending lease applications.

H.Cultural-Historical

Historical information about the Myrtle Lake Unit is scanty. Duncan Hill, along the south margin of the Unit, was the site of a Forest Service fire lookout between 1923 and 1967. The surrounding country between the North Fork of the Entiat and the summit of the Chelan Mountains was part of the fur trapping territory of Gordon Stuart, whose permanent residence was at Domke Lake, near Lake Chelan. It is likely that some of his traplines may still be seen within the unit. American Indian uses of this area are completely unknown.

I.Land Use

There are no special land uses within the area.

J.Fire

Annual fire occurrence is low with half of the fires started by lightning and half being human-caused. Fuel loadings range from heavy accumulations of down fuels at lower elevations to scattered timber and meadows at higher elevations. Periodic large fires have occurred.

K.Insects and Disease

No serious insect or disease problems have been noted in this area since 1978. Spruce budworm damage was heavy during the period 1973-1976 in the lower elevation areas but was treated aerially in 1977 with Seven and budworms have not been a problem since.

L.Private Lands

There are no private lands within the area.

IV.NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located immediately adjacent to the boundary of the existing 576,865 acre Glacier Peak Wilderness area and the Rock Creek and Entiat roadless areas.

B. Distance from Population Centers

The area is reachable within two to four hours' driving time from population centers such as Seattle-Tacoma, Yakima and the Tri-Cities.

C. Need for Ecosystem Representation

There are no special unique ecosystems within the area in need of representation through wilderness classification.

D. Interest by Proponents, Including Congressional

Since passage of the Washington State Wilderness Act of 1984, Congress has not expressed interest in making further additions to the State wilderness system. Environmental organizations have expressed interest in adding portions of the area to the National Wilderness Preservation System in the future.

Both environmental and ORV organizations have advocated maintaining roadless status for the area.

E. Public Input

Public input during the RARE II and other planning efforts was obtained and supported unroaded allocations. Response results are covered under the "General" portion at the beginning of this appendix.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area. There is a difference of opinion as to the allocation for motorized versus nonmotorized use.

V. Environmental Consequences

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Myrtle Lake Roadless area consists of 10,918 acres that is located adjacent to the Glacier Peak Wilderness area on the Entiat Ranger District.

This area has been and is managed for dispersed recreation, ROS class semi-primitive motorized. There is a trail that is closed to motorized travel, the Fern Lake trail, 1.5 miles long, which has been closed to horses and bikes for over 10 years. There is long established trail bike use in the Myrtle Lake roadless area.

Management of this area under the land allocations in Alternative NC, A/NFMA and H would be very similar. However, in Alternative NC 1,951 acres would be entered for timber harvest.

Alternatives B and D would make access easier to focal points such as Myrtle Lake and Fern Lake. The close proximity of these focal points along with the fragile meadows in the North Fork drainage would invite increased pressure from day use.

Under these alternatives 16 percent of the Myrtle Lake Roadless Area would be entered for harvest and 1,951 acres would be taken out of the semi-primitive classification and converted to roaded natural.

Under Alternative C and I the portion of the trail system that is in this roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Entiat River	1400	--	--	4.2
Cow Creek Meadows	1404	1.0	--	--
Myrtle Lake Camp	1404.2	--	0.4	--
Duncan Hill VP	1434.2	--	--	0.5
Anthem Creek	1435	--	--	3.3
Fern Lake	1436	1.5	--	--
NF Entiat	1437	3.3	--	--
Pyramid Mtn.	1433	6.3	--	--
Totals		12.1	0.4	8.0

Under Alternative E, the roadless allocation would be the same as Alternatives C and I, except there is no motorized use permitted.

Under Alternative F, the allocation for the whole area would be semi-primitive non-motorized.

Alternative G would be similar to A/NFMA, the current management situation, with no reduction in miles of trails available for motorized use.

Alternative J would be very similar to Alternatives B and D.

b. Summary

The following Tables indicate, by Alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is 1/ motorized and non-motorized.

PERCENT OF THE AREA HAVING UNROADED ALLOCATION

ALTERNATIVE	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	100	82	100	82	100	100	100	100	100	82

PERCENT OF THE UNROADED ALLOCATION AREA
IN TERMS OF 1/ MOTORIZED/NON-MOTORIZED RECREATION

ALTERNATIVE	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	100/0	58/42	56/44	58/42	0/100	0/100	84/16	100/0	56/44	58/42

1/ These represent the semi-primitive motorized and semi-primitive non-motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS depending on the intensity of development.

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading will provide a less semi-primitive recreation experience with more area taking on a roaded natural or roaded modified appearance.

2 Wild, Scenic, and Recreational Rivers

A portion of the following river corridors (one-quarter mile each side of the river) is located within this roadless area and is recommended for designation in Alternatives C and I:

<u>River</u>	<u>Recommended Classification</u>
Entiat	Segment 2 Scenic

More information concerning this recommendation can be found in Chapter III and Chapter IV.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations, and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4.Scenery

Alternatives A/NFMA, C, E, F, G, H, and I will allocate the area to preservation and retention visual quality objectives. Alternatives B and D will have maximum modification of the lower North Fork and the Grouse Creek area. The valley bottom drainage of the Entiat will also be heavily altered under these alternatives. The location of the existing trail will be moved and existing trails will be lost.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	C PREFERRED	Alternative		F	G	H	I	J
				D	E					
Preservation	--	--	--	--	827	742	--	--	--	--
Retention	10,918	9,264	10,918	9,264	10,091	10,176	10,918	10,918	10,918	9,244
Partial Retention	--	169	--	169	--	--	--	--	--	169
Modification	--	--	--	--	--	--	--	--	--	--
Maximum Modification	--	1,485	--	1,485	--	--	--	--	--	1,505
Total Acres	10,918	10,918	10,918	10,918	10,918	10,918	10,918	10,918	10,918	10,918

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5.Wildlife

Alternatives A/NFMA, G, and H would have the potential for impact on wildlife due to the large area of land available for motorized use. Alternatives B and D would have the most impact on wildlife due to roading of 18 percent of the area which would increase access to the area. Alternatives B and D would also impact habitat with timber harvest activities. Alternatives C and I would have less impact than any of the above mentioned alternatives due to a decrease in area open to motorized use. Alternatives E and F would not have any impact on the natural setting or the wildlife in this area.

6.Fisheries

a.Significant Effects on Fish

The vicinity of Fern and Myrtle Lakes and South Pyramid Creek would remain unroaded with implementation of any alternative. Therefore, the existing fishery conditions in these areas should remain unchanged.

In Alternatives A/NFMA, C, E, F, G, H, and I, the portions of the North Fork of the Entiat River and the main Entiat River included in this roadless area would remain unroaded. In Alternatives B, D and J the area surrounding the lower one-and-one-half miles of the rivers would be roaded and an intensive timber harvest regime would be implemented. The upper reaches of both rivers would remain unroaded.

Roading these areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that recreational fishing would increase. This would help to meet a portion of the fishing demand (see Chapter III on fish), but also could result in overfishing and reduction in both numbers and size of fish using the habitat. However, since the wild fisheries production is thought to be very low in these headwater systems, fishermen are unlikely to fish intensively here and overfishing effects should not occur.

It is also possible that roading the unroaded areas could result in environmental degradation to streams due to timber harvest and road construction in the basins (see Chapter IV Environmental Consequences). Some of these possible effects are also addressed in the soil and water environmental effects.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas along the main and North Forks of the Entiat, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September, 1980 and revised October, 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Most of this area will remain unroaded in all alternatives.

Vegetation changes will be only those occurring naturally and those minor changes along trails and campsites caused by recreation use.

Natural vegetative process will result in these unmanaged areas. These processes will result in increased mortality due to insect and disease and replacing the subclimax lodgepole pine and Douglas-fir species with climax species such as subalpine fir. Douglas-fir and lodgepole pine will remain a significant stand component as a result of fire killing the thin barked subalpine fir or as a result of some other catastrophic tree-killing event. Douglas-fir and lodgepole pine are the species that would be planted and managed for following harvest on 18 percent of the area under Alternatives B, D and J. No harvest would be permitted on any of these roadless areas under Alternatives E and F. All other alternatives would not schedule harvest, but would permit salvage if compatible with the roadless motorized recreation objective.

7b. Vegetation: Forage

This roadless area will remain roadless in most alternatives. Natural succession is expected to move toward tall brush and trees, which will reduce the forage base for both livestock and big game. Due to the relatively small size of this area and the limited potential for use by livestock, the loss of forage base will not be significant. This loss of forage for big game could be mitigated through the use of prescribed burning.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Myrtle Lake area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternatives A/NFMA, C, E, F, G, H, and I because soil and water disturbing activities occurring would be minimal. Up to 18 percent of the area could be allocated to timber harvest and road building in Alternatives B, D and J. The environmental effects of timber harvest and road building are discussed in Chapter IV-Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building Alternatives B and D pose more risk of degrading the soil and water resource than the other alternatives due to more intensive management. However, since Wenatchee National Forest Best Management Practices and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of Forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV-Soil and Water sections.

9. Air

There will be little additional prescribed burning generated in the Myrtle Lake roadless area as a result of the alternatives which would not have significant effects on air quality beyond those effects discussed in Chapter IV.

10. Minerals

Since this area appears to have a low potential for the occurrence of mineral resources, the consequences on mineral resources do not appear to be significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative do restrict mineral activities to varying degrees (special stipulations in leases and in approved operating plans). For example, a withdrawal precludes all mineral related activities except those authorized by prior existing rights; and a designation as a roadless non-motorized area or as a developed recreation site, special area, or as a wild and scenic river calls for the area to be managed under highly restrictive management strategies. The cumulative effect of such restrictive management cannot be quantified, but the negative influence it would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. The relative variation between alternatives is depicted on the following table.

CONSEQUENCES ON MINERAL RESOURCES

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	D Alternative	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	10,918	9,136	10,918	9,136	10,918	10,897	10,918	10,918	10,918	9,137
Moderately Restrictive	0	297	0	297	0	21	0	0	0	276
Relatively Few Restrictions	0	1,485	0	1,485	0	0	0	0	0	1,505

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past 10 years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case-by-case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

ALTERNATIVES

	A/NFMA B		C	D	E	F	G	H	I	J
			PREFERRED							
ROAD MILES	0	6	0	6	0	0	0	0	0	6

12. Fire

The fire management workload generated in the Myrtle Lake roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur from increased motorized use in Alternatives A/NFMA, G, and H, while Alternatives E and F would present the least amount of risk.

The cost efficiency of fire suppression activities will not vary significantly between alternatives since access patterns will not vary significantly.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the percentages of unroaded management

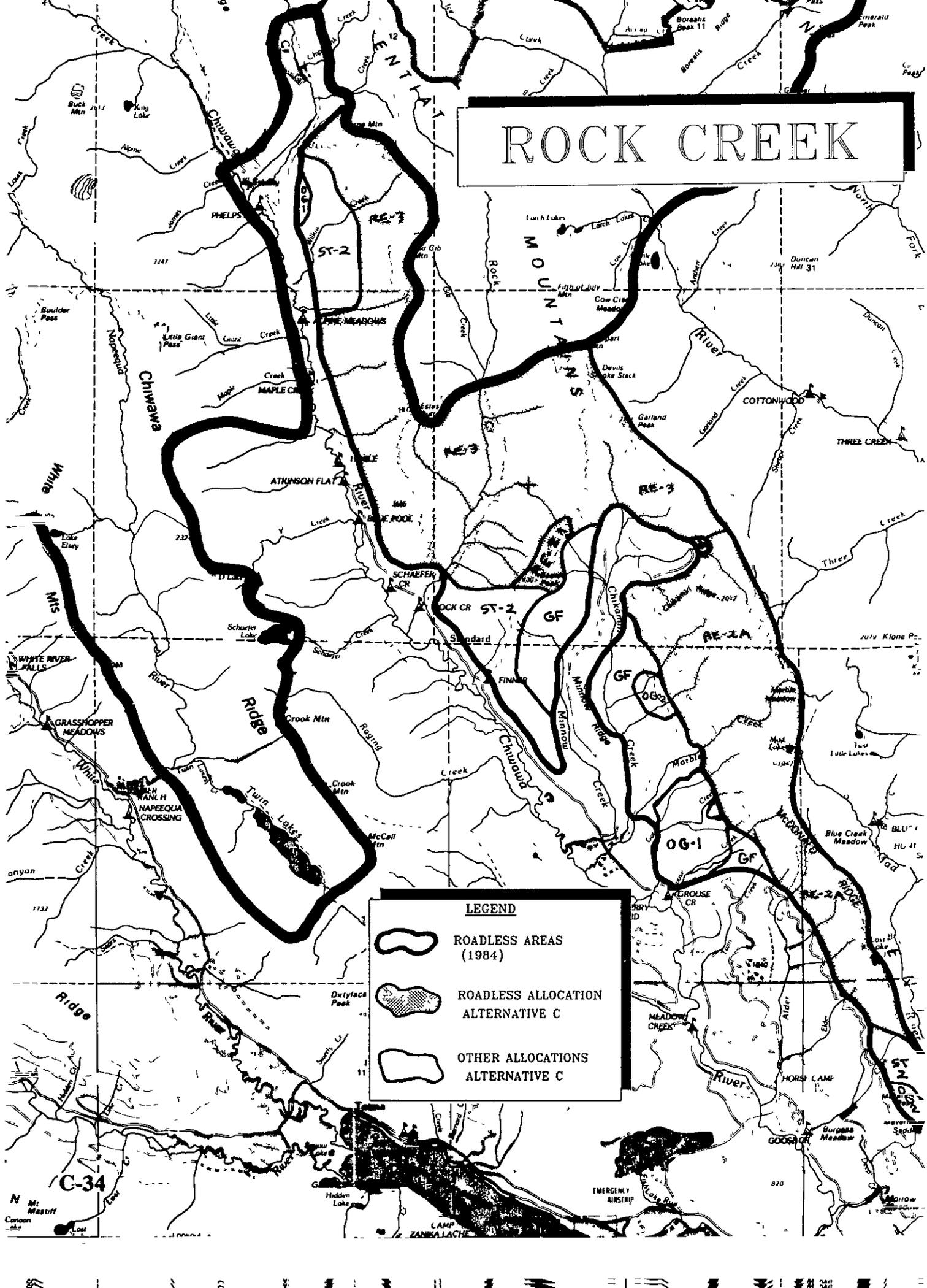
Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber-oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber-oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 13.4 jobs.

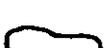
14. Wilderness Potential

The roadless area has potential as wilderness; however, not as a unit by itself but as an addition to the Glacier Peak Wilderness. In all alternatives except B, D, and J, 100 percent of the roadless area will remain unroaded and in natural condition. In Alternatives B, D, and J, 18 percent of the area or 1,951 acres, would be allocated to roaded prescriptions. A total of 1,485 acres would be allocated to General Forest. In this allocation, roads would be constructed, timber harvested, vegetation would be managed, and the natural appearance of the area would be modified. Wilderness character would be foregone in these prescriptions.

ROCK CREEK



LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

C-34

N Mt. Westfall
Cannon

CAMP ZANKALACHE

EMERGENCY AIRSTRIP

GOOSE CR.

Morrow

ROCK CREEK ROADLESS AREA

Size: Gross Acres: 32,945

Net Acres: 32,924

I. GENERAL INFORMATION

A. History

The northeastern quarter was originally directed to unroaded, dispersed recreation as part of the Chelan unit plan. The western portion was allocated to dispersed, unroaded recreation as part of the Siwash Unit under the Forest multiple use plan.

A total of 6,487 acres of the area became part of the Glacier Peak Wilderness in 1984. The entire area was studied under RARE II as Area No. C6031 and was not recommended for wilderness.

B. Location and Access

The area lies between the Entiat Mountains to the east and the Chiwawa River on the west in Chelan County on the Lake Wenatchee Ranger District.

Major access is via the Chikamin and Chiwawa Roads and the Rock Creek, Carne Mountain, Basalt Ridge, Old Gibb, and Chikamin Trails.

C. Physiography and Soils

This area lies along the northeastern edge of the Chiwawa River. The Chiwawa River basin is a very wide and deep, glacially carved valley. The upper slopes of the Rock Creek roadless area is characterized by very long and steep west facing slopes that head up along McDonald Ridge. The lower slopes show evidence of glaciation, because they have been rounded and smoothed and in some places there is evidence of terrace remnants.

Elevations range from 2,500 to 7,500 feet. Most of the soils (59 percent) have developed in deposits of volcanic ash and pumice, and the majority of the rest have formed in granitic residuum. About four percent of the soils have developed in basaltic residuum, which tends to become slippery and sticky when wet, whereas, neither the ash nor the granitic soils do. The ash and pumice soils tend to be very light and fluffy and so can be easily displaced. Both soils are easily eroded by wind and water when the protective vegetation is removed. The granitic soils are more stable, and are able to withstand repeated traffic better than the ash soils. The ash soils are dusty when dry.

D. Climate

Annual precipitation averages between 45 and 90 inches with approximately 70 percent of the moisture falling as snow. An estimated 50 percent of the runoff emanates from the Glacier Peak Wilderness.

E. Vegetation

Fifty-two percent of this area is tentatively suitable for timber harvest. All but 361 acres are classified as moist ecotype, typified by Douglas-fir, Pacific silver fir, grand fir, and western hemlock. Western white pine and western red cedar are the most valuable commercial species present.

Understory species most common are vine maple, huckleberry species, false azalea, and mertensia. Avalanche paths encourage pioneer species such as Sitka alder, elderberry, mountain ash, and trailing blackberry.

Very few open areas, except avalanche paths and rock outcrops, occur in this area. Therefore, vegetative diversity could be enhanced by fire or timber harvest.

F. Current Uses

Major recreation activities and their estimated annual use are as follows:

Activity	Annual Recreation Visitor Days
Hunting	300
Hiking	600
ORV Trail Riding	700
Fishing	300
Horseback Riding	100
	Total 2,000

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes.

ROS Class	Acres
Primitive	9,900
Semi-Primitive Non Motorized	7,676
Semi-Primitive Motorized	15,328

There are 39.2 miles of trail in the area of which 20.9 are currently open to motorized use.

G. Appearance and Surroundings

The area has moderate to high visual variety of landform, vegetation, waterforms (lakes and streams), and rockforms.

The area is a south facing slope in a glaciated valley with steep side slopes, rugged ridges, avalanche paths, and a variety of vegetative patterns. A strong ridgetop (Entiat Mountains) has a variety of rockform and vegetation. Two lakes include Mad Lakes and Lost Lake.

The area is primarily viewed as middleground from the Chiwawa River road, and both foreground and middleground when viewed from the Entiat Mountain ridge top trail.

The Rock Creek area is surrounded by the Glacier Peak Wilderness, the Entiat roadless area, and Chiwawa River.

H. Attractions

Some of the major attractions within the area are Mad and Lost Lakes and panoramic scenic views from along McDonald Ridge in the southern tip of the unit.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

As roadless areas go, the boundary is probably more easily identified than most. The east side follows the ridge dividing Lake Wenatchee and Entiat Ranger Districts. The Glacier Peak Wilderness boundary on the north can be identified in most cases as well. The south and west boundaries are arbitrary and open to discussion. The identification of these is not possible on the ground with any degree of accuracy. The best feature for the south boundary would be Grouse Creek and for the west would be the Chiwawa River Road. The southern portion of the east boundary would be more identifiable if moved to McDonald Ridge. This would move both Mad and Lost Lakes into the Entiat Roadless area.

B. Natural Integrity

The area is bounded only by roads along the south, and roads and timber units on the west side. The Chikamin road creates a roaded neck partway across the center of the unit. There is a system of fairly extensive multipurpose trails within the area. Even with the extensive trail system, there are large blocks of land remaining undeveloped. The major scenic attractions are accessible. Some trail development is occurring to tie various trail systems together.

C. Natural Appearance

The area is large enough and the topography and vegetation such that visitors could get a feeling that they are away from human development. Roads and timber harvest areas can be seen from a number of vantage points but they do not dominate the viewshed.

D. Opportunities for Solitude

Opportunities for solitude are restricted. Some off-trail opportunities exist but they offer no scenic attractions to draw visitors.

E. Opportunities for Primitive Recreation

The trail system provides the best opportunity on the Lake Wenatchee Ranger District. It is the only area, besides Nason Ridge, that any real backcountry experience can be had. Nason Ridge is confined to a single ridge, however, with the experiences in Rock Creek being much more varied. It is the only area on the District that offers any real experience for non-traditional users (such as motorcycles and bicycles). It is currently available for use by larger groups than are permitted in the wilderness. However, compared to the potential of wilderness area, this area has very limited opportunities.

F. Challenging Experiences

A well developed trail system open to motorcycles offers a variety of experiences for motorcycle riders. Challenges to hikers and backpackers are not great but a trip of two to three days would be possible.

G. Special Wildlife Features

There are no known threatened or endangered wildlife species within the area. The extent of use in this area by sensitive species is unknown. Spotted owls have been located within the area.

H. Historical and Scientific Study

There are no special unique opportunities for outdoor education and scientific or historic study in the area which cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

This area has potential value for unroaded types of recreation activities. It also contains some of the few lakes presently available to bikeriders. Estimated potential carrying capacity by ROS Class is as follows:

<u>ROS Class</u>	<u>Potential Capacity in Recreation Visitor Days Per Year</u>
Primitive(P)	7,900
Semi-Primitive Non-Motorized(SPNM)	7,700
Semi-Primitive Motorized(SPM)	<u>46,000</u>
Total	61,600

This is one of only two of the inventoried roadless areas having primitive recreation opportunities outside of Wilderness.

B. Wildlife

There are elk, deer, and black bear found on the area as well as grouse and their associated habitat. The area is summer range for a portion of the Entiat deer herd and for a small elk herd.

C. Fish

In this roadless area there are two lakes, Mad and Lost Lakes. Both have good resident fishing.

There are also two major stream systems included in the area, Rock and Chikamin Creeks. In Chikamin Creek there is anadromous fish use to at least Marble Creek and possibly steelhead trout use beyond. Both stream systems also have resident fish, probably including both cutthroat and rainbow trout.

D. Water

The Blue Creek Guard Station aerial snow marker was established in 1973 and has provided approximately 10 years of snow data. This site is no longer active.

The area is located mid-drainage, namely in the Chiwawa River headwaters originating in the Glacier Peak Wilderness and east of Chiwawa Ridge. The lower elevation is approximately 2,300 feet with upper elevations over 7,000 feet along Entiat Ridge.

There are currently no climatic or stream discharge facilities within the areas.

Water quality is generally high except during spring runoff or Chinook-generated peak flows. The meandering nature of the Chiwawa River in this area is highly prone to channel erosion and bank undercutting with subsequent stream loading with timber falling into the stream course as a result of bank failure.

The Chiwawa River has extremely high levels of woody debris resulting from bank failure or undercutting.

E. Livestock

Although this area lies within the boundaries of three existing allotments, two recreation and one domestic stock, range resource inventory maps show only three small meadows of usable forage in the upper portion of Chikamin and Marble Creeks. All three meadows are in the Lower Chiwawa Recreation Stock Allotment and are approximately ten acres each. They receive some hunter stock use in the fall but no commercial use. The rest of this roadless area is covered by varying age classes of dense timber, or has steep topography which limits potential for any class of livestock without vegetative manipulation.

F. Timber

The area contains 17,236 acres considered as tentatively suitable timberland:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	5,724	162.2	29.8
Wet	Immature	11,003	197.9	36.3
Wet	Seedling-Sapling	148	---	
Dry	Mature	191	2.4	0.4
	Immature	170	1.7	0.3
	Total	17,236	364.2	66.8

The estimated maximum biological potential contribution to the long-term sustained yield is 5.6 MMBF (1.0 MMCF) per year.

G. Minerals

The geology of this area is very complex. It is not only highly faulted, but is underlaid by a complex association of Cretaceous nonmarine sedimentary rocks, pre-Upper Jurassic metamorphic rocks, Mesozoic granitic rocks, Tertiary volcanic rocks and glacial drift. Structurally, it lies within what is called the Chiwaukum graben, which, according to D'Arcy and others (1984), is a "structural zone where Tertiary - Cretaceous age sedimentary and Tertiary age intrusives interrupt a major Mesozoic age pluton by major faults."

This area lies within the Chiwawa Mining District, which is best known for the Royal Development, or Red Mountain Mine. The mine lies at the north end of the subject area and was active from 1929 to 1940 when it produced copper, silver, and gold. The mineralization at this property is associated with a breccia pipe at or near the contact of granitic and metamorphic rocks. According to the U.S.G.S. and U.S. Bureau of Mines (Map MF-1652-A), the northern part of the area near the Royal Development Mine has a "high" potential for occurrence of base metal resources in breccia pipes or disseminated porphyry deposits. These deposits would also contain gold and silver. The majority of the area lying south of Willow Creek has not been studied in detail by the U.S.G.S. and U.S.B.M., but it is reported to have occurrences of arsenic, talc, gold, tungsten, pumice and limestone, most of which have not been investigated adequately to determine if commercial deposits exist.

Of most interest is probably the gold occurrences in the metasedimentary rocks around Maverick Peak near the southeast end of the area. Traces of placer gold in drainages below the peak tend to confirm at least marginal potential. Discontinuous veins of copper and gold in the lower Rock Creek area and occurrences of gold in the metamorphics on the southeast side of Phelps Creek are also of interest. None of these occurrences have a record of past production, nor have they been explored in other than a superficial way.

The pumice is found throughout the area, but deposits of minable thickness (4+ feet) generally are limited to the north half. There has been interest in and some production of pumice from the Chikamin Creek area.

According to Bureau of Land Management records (January 23, 1985) 392 lode claims and five placer claims have been located within or immediately adjacent to the subject area. The majority of these were located in 1984, and except for nine lode claims, the assessment work has been maintained on those located earlier. A small part of the area between Rock Creek and Alder Creek has been classified "prospectively valuable" for coal resources, and the portion of the area lying north of Rock Creek has been classified "prospectively valuable" for geothermal resources. There are, however, no existing leases or pending lease applications within the area.

H. Cultural-Historical

It is likely that portions of the Rock Creek Unit were once utilized by the Wenatchi Indians in their travel and seasonal food collecting. The area includes a former reported Indian trail (south of Grouse Creek) to Mad Lake, and borders an ethnographically reported Wenatchee summer village site at Rock Creek, as well as an important rendezvous point on Chikamin Flats. Historic-era sites are the reported remains of a trappers cabin along Rock Creek, and the former emergency Basalt Peak fire lookout, dating from the 1920's. The area also experienced use by sheep grazing and mineral prospecting, and may include remnants of these uses.

I. Land Use

The area contains no special land uses.

J. Fire

Annual fire occurrence is low to moderate with most started by lightning. Fuel loadings are moderate to heavy accumulations at lower elevations to scattered alpine meadows at higher elevations. Periodic larger fires have occurred.

K. Insects and Disease

The Rock Creek area was heavily defoliated by spruce budworm in the mid-1970's and aerially sprayed in 1977. Since then spruce budworm populations have remained low. However, mountain pine beetles have killed a large portion of the valuable western white pine in this area and are presently killing lodgepole pine near Minnow Creek.

Robert Dolph, Regional Office entomologist, visited the Chikamin Creek area in 1981 to review the potential for a major mountain pine beetle development in the pole size pines in this area and found it to be high. Portions of this area are very high priority for harvest due to low access costs, high timber values, and high insect loss potential.

L. Private Lands

There is approximately 21 acres of other ownership near the southern tip of the area where it joins the Entiat roadless area.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located immediately adjacent to the eastern boundary of the 576,865 acre Glacier Peak Wilderness area and the Entiat and Myrtle Lake roadless areas.

B. Distance From Population Centers

The area is reachable within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

ccThere are no special or unique ecosystems within the area which need representation through wilderness classification.

D. Interest by Proponents, Including Congressional

Since passage of the Washington State Wilderness Act of 1984, Congress has not expressed interest in making further additions to the State wilderness system. Environmental organizations have expressed interest in adding portions of the area to the National Wilderness Preservation System in the future.

Both environmental and ORV organizations and users have advocated maintaining roadless status for the area.

E. Public Input

Public input during the RARE II and other planning efforts was obtained and supported unroaded allocations. Response is covered under the General portion of this Appendix.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area. There are differing opinions as to the allocation for motorized or nonmotorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

This area contains a number of trails, many of which are open to ORV use. Some were reconstructed or built with State IAC funds set aside for ORV use. Alternative B and D are the only alternatives that do not provide scenic corridors or unroaded recreation status for these trails. These alternatives would have a significant effect on the character of much of the trail system within this area. Alternatives A/NFMA, C, H and I would restrict motorcycle use on some of the present open trails by allocating some of the trail system to Dispersed Recreation Non-Motorized. Alternatives E, F and G emphasize the unroaded allocation, with Alternative G as the alternative with the greatest allocation of semi-primitive motorized acreage. Under Alternative J emphasis is on roaded management with the least area allocated to unroaded recreation.

Under Alternatives C and I the Trail System for the area is as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Mad Lake	1406	--	0.4	--
Garland Peak	1408	4.0	2.0	--
Mad River (upper)	1409.1	--	2.0	--
Pond Camp	1409.2	--	3.7	--
Carne Mtn.	1508	1.5	--	2.0
Rock Creek	1509	3.5	1.0	--
Basalt Ridge	1515	5.7	--	2.8
Alder Ridge Tie	1523	--	1.0	--
Old Gib	1528	2.0	--	--
Rock Creek Tie	1538	1.6	--	--
Totals		18.3	10.1	10.8

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These percentages represent the Semi-primitive Motorized and Semi-primitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	54	52	69	52	100	96	92	54	69	32

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	36/64	52/48	36/64	52/48	39/61	41/59	69/31	36/64	36/64	22/78

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading will provide a less semi-primitive recreation experience with more area taking on a roaded natural or roaded modified setting.

2. Wild, Scenic, and Recreational Rivers

A portion of the following river corridor (one-quarter mile each side of the river) is located within this roadless area and is recommended for designation in Alternatives C and I.

<u>River</u>	<u>Recommended Classification</u>
Chiwawa	Segment 2 Recreational

More information concerning this recommendation can be found in Chapter III and Chapter IV.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate the upper end of the ridgetop of the Chiwawa and Entiat Mountains, and the Rock Creek Basin, to Retention visual quality objectives. The McDonald Ridge and the trails in the area will be allocated to Partial Retention visual quality objectives. The view from the Chiwawa viewshed will be natural appearing. The middleground from the trails will be General Forest, or Maximum Modification visual quality objective (VQO).

Alternatives B and D will allocate the Devil's Smoke Stack area and the ridgetops of McDonald Ridge and Willow Creek Basin, to Retention VQO. The Willow Creek Basin, Rock Creek drainage bottom, and the midslope to the wilderness boundary, the lower one-half of Chikamin, Marble, Gale, and Grouse Creeks, and the Maverick Saddle area, will be allocated to General Forest, or Maximum Modification VQO. Parts of the area will be altered as viewed from the Chiwawa viewshed.

Alternatives C and I allocate three-quarters of the area to Retention VQO. Most trails will be allocated to Partial Retention VQO. The Chikamin Creek drainage lower valley bottom will be allocated to General Forest prescription, or Maximum Modification VQO. Glimpses of parts of the middleground from the Chiwawa River viewshed will be heavily altered.

Alternative E allocates all of the area to Retention VQO. The entire area will have a natural appearing landscape.

Alternative F will allocate virtually all areas to Retention VQO. A small area of the Mad River will be allocated to the Wild River prescription or Retention VQO.

Alternative G will allocate all areas to Retention and Partial Retention VQO. The Alpine Meadows area to the trailhead will be allocated to Scenic Travel Retention VQO.

Alternative J allocates the most area to Maximum Modification VQO and would have the most altered appearance.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative		F	G	H	I	J	
			C PREFERRED	D						E
Preservation	-	--	-	-	-	-	-	-	-	
Retention	20,035	21,222	24,720	21,222	32,924	32,903	32,288	20,035	24,720	14,650
Partial Retention	6,783	360	4,028	360	-	21	636	6,783	4,028	1,357
Modification	-	-	-	-	-	-	-	-	-	-
Maximum Modification	6,106	11,342	4,176	11,342	-	-	-	6,106	4,176	16,917
Total Acres	32,924	32,924	32,924	32,924	32,924	32,924	32,924	<u>32,924</u>	<u>32,924</u>	<u>32,924</u>

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would have one-half the impact on wildlife habitat of Alternatives B and D. Alternatives B and D would road 48 percent of the area, and would harvest timber on 39 percent of the area while Alternative J would road 68 percent. Alternatives C and I would have almost one-fourth the impact of B and D. This relationship is due to the amount of land allocated to General Forest. Alternative E would have no significant impact on wildlife. Alternatives F and G would have more impact than E due to the roading, but considerably less impact than the other alternatives.

6. Fisheries

a. Significant Effects

The vicinity of Mad and Lost Lakes would remain unroaded with implementation of any alternative, therefore, the existing fishery conditions of these lakes should remain unchanged.

In Alternatives E, F, and G, the Rock and Chikamin Creek areas would remain unroaded. In Alternatives B, D and J the land area surrounding these creeks could be roaded and a General Forest timber harvest regime would be implemented. Alternatives A/NFMA, C, H, and I could road and intensively harvest the Chikamin drainage but not the Rock Creek drainage. In Alternatives C and I, the lower Rock Creek area would be managed using primarily extended shelterwood timber harvest methods.

Roading these areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase. This would help to meet a portion of the fishing demand (see Chapter III on Fish), but also could result in overfishing and reduction in both numbers and size of fish using the habitat.

It is also possible that roading the unroaded areas could result in environmental degradation to streams due to timber harvest and road construction in the basins (see Chapter IV; Environmental Consequences). Some of these possible effects are also addressed in the soil and water environmental effects.

b. Mitigation measures

In the alternatives that could road presently unroaded areas along Rock and Chikamin Creeks, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Under all alternatives except Alternative J, it is expected that more area will remain unroaded than is roaded. The range of tree management activities is from 16,918 acres (51 percent) scheduled for timber emphasis in Alternative J to no scheduled harvest in Alternative E.

Alternatives A/NFMA and H has 6,106 acres (19 percent) timber emphasis and an additional 7,526 acres of vegetation manipulation with other resource emphasis planned.

Alternatives C and I have identical acre allocations. Both have 4,176 acres of timber emphasis, or 13 percent of the area. An additional 9,350 acres would be managed for other resource values that permit vegetative manipulation through timber sales. The primary difference between Alternatives C and I is the rate of harvest. Under Alternative I, more harvest activity would be scheduled in the first five decades.

Alternatives F and G do not allocate any acres to timber emphasis. However, they do anticipate vegetative manipulation through timber sales on 1,654 to 2,522 acre or five to eight percent of the area.

7b. Vegetation: Forage

Alternatives C, H, and I, with the proposed vegetative manipulation and improved access, will contribute adequate forage to the base needed for big game and livestock. Alternatives A/NFMA, B, D and J will provide forage in excess of projected needs. Alternatives E, F, and G which have little or no vegetative manipulation proposed, will not provide adequate forage to meet the projected needs for livestock, particularly in the fourth and fifth decades. Prescribed fire in the remaining unroaded portion of this area could offset the loss of forage for big game due to ecological succession.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Rock Creek Area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Alternatives A/NFMA, B, C, D, F, G, H, I and J allocate up to 51 percent of the area to timber harvest and road building. The environmental effects of timber harvest and road building are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building. Alternatives A/NFMA, B, C, D, H, and I pose more risk of degrading the soil and water resource than Alternatives F and G due to more intensified management. However, since Wenatchee National Forest Best Management Practices and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

The additional prescribed burning generated in the Rock Creek roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed Chapter IV.

The close proximity to the Glacier Peak Wilderness Area would increase the risk of a smoke intrusion into the Class I area from Alternatives B and D.

10. Minerals

As the previous discussion indicates, the area is encumbered by 392 lode claims and 5 placer claims, and the area is considered to have a “high” potential for the occurrence of base metal deposits, often in association with precious metals. It also is reported to have occurrences of arsenic, talc, gold, silver, tungsten, pumice, and limestone, none of which have been investigated adequately to determine if commercial deposits exist. Portions of the area have also been classified prospectively valuable for coal and geothermal resources. Since none of the alternatives call for withdrawing any part of the area from mineral entry, the consequences on mineral resources do not appear to be extremely significant nor do they vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative do restrict mineral related activities to varying degrees (i.e., special stipulations in leases and approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

CONSEQUENCES ON MINERAL RESOURCES

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	D	Alternative		G	H	I	J
					E	F				
Withdrawn from Mineral Entry	0	0	0	0	0	0	0	0	0	0
(valid existing rights will be determined and recognized)										
Highly Restrictive	20,818	20,861	25,081	20,861	32,924	32,118	30,952	20,818	25,081	15,370
Moderately Restrictive	6,000	721	3,667	721	0	806	1,972	6,000	3,667	636
Relatively Few Restrictions	6,106	11,342	4,176	11,342	0	0	0	6,106	4,176	16,918

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C	D	E	F	G	H	I	J
			Preferred							
Miles	40	50	41	50	0	4	10	40	41	50

12. Fire

The fire management workload generated in the Rock Creek roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur from increased recreation use in Alternatives E, F, and G, while a slight increase of industrial fires would occur in Alternatives B, D and J. Risk of fire would change little in Alternatives A/NFMA, C, H, and I.

The cost efficiency of fire suppression activities would be slightly increased in Alternatives B, D and J as road access would allow for more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives E, F, and G would be less due to slower initial attack by ground forces or requiring the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary table under item 1, Recreation, at the beginning of this section (Section V), which indicates the percentages of unroaded management.

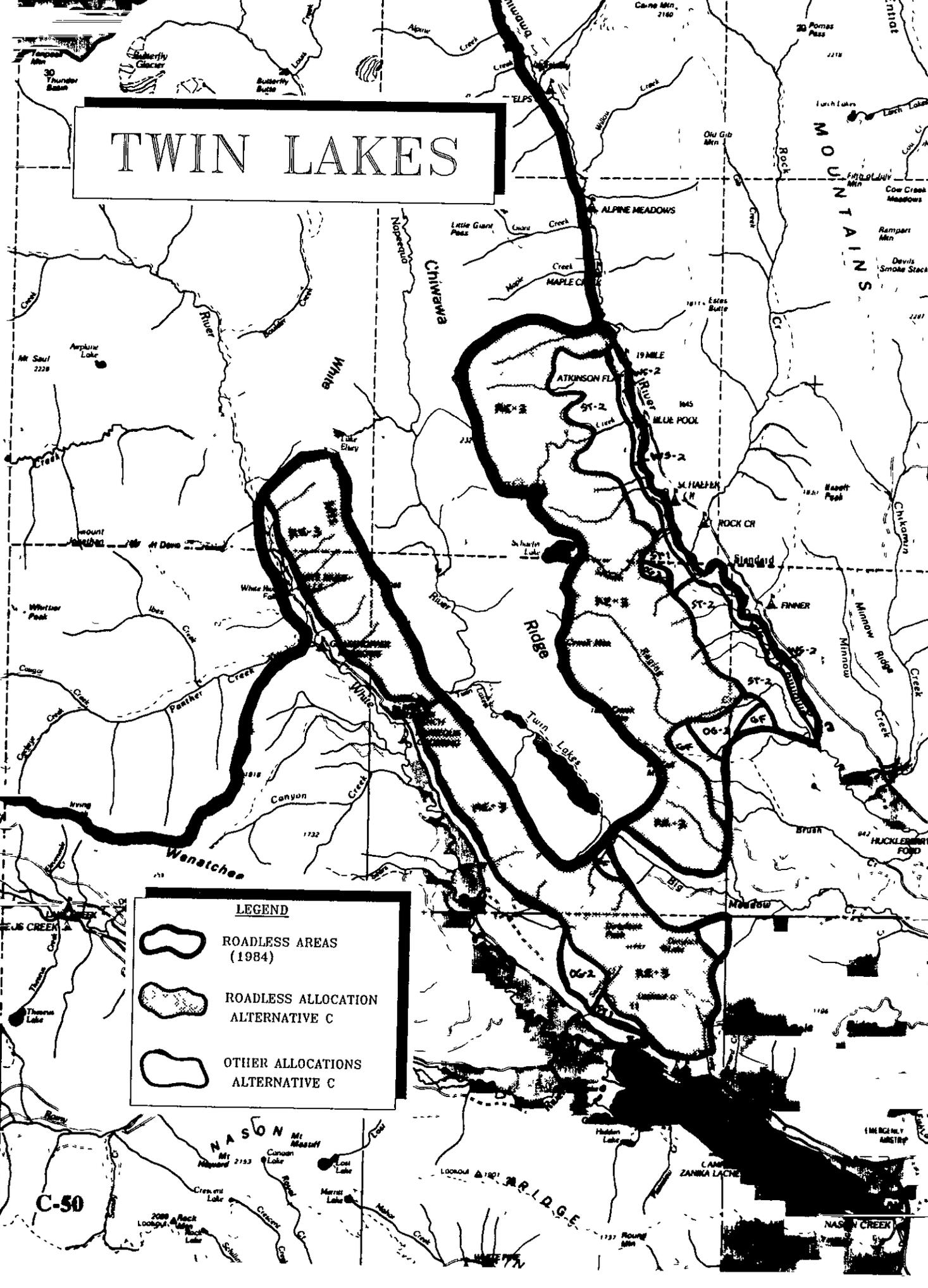
Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber-oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber-oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 87.3 jobs.

14. Wilderness Potential

The roadless area is suitable as wilderness. The area is large enough to be a separate entity but more logically has potential to be an addition to the Glacier Peak Wilderness. Alternatives A/NFMA, B, C, D, H, I, and J all propose similar acreage allocated to development prescriptions, 52 percent to 70 percent would remain unroaded. Alternatives B, D, and J would result in the greatest change with 34 percent, or 11,342 acres, allocated to General Forest. Alternatives, E, F, and G would keep the total area in an unroaded condition. Alternatives A/NFMA and H allocate more acres to General Forest than C and I and would result in more loss of wilderness character. Roads, evidence of timber harvest, and modification of natural appearances would occur in General Forest and other allocations which have some level of timber harvest and commodity development.

TWIN LAKES



LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

TWIN LAKES ROADLESS AREA

Size: Gross Acres: 22,133

Net Acres: 22,048

I. GENERAL INFORMATION

A. History

The area has a history of unroaded, recreation management through the original multiple use plan and as part of the Siwash area under unit planning. It was studied under RARE II as part of Unit C 6031 and was not recommended for Wilderness. Further consideration was given during preparation of the Washington State Wilderness Act of 1984 under which 5,661 acres of the November 1983 inventoried roadless area, including Twin Lakes, were made a part of the Glacier Peak Wilderness.

B. Location and Access

This area is located adjacent to the Glacier Peak Wilderness in Chelan County on the Lake Wenatchee Ranger District. It exists in two parts, the northeastern and southwestern portions which are separated by the Twin Lakes additions to Glacier Peak.

Major access routes are as follows: for the northeastern portion, the Chiwawa, Brushy Creek and Meadow Creek roads, and the Schaefer Lake and Raging Creek trails; for the southwestern portion, the Big Meadow Creek and Upper White River roads and the Dirty Face Peak Trail.

C. Physiography and Soils

This area occurs within the very wide and deep Chiwawa and White River basins. Both drainageways are characterized by the distinctive "U" shaped glacial features. The glacial features are most evident in the lower slope positions, while the upper positions, like those found along Chiwawa Ridge, are made up of rough broken rocky features.

Elevations range from 2,500 to 6,900 feet. Most of the soils (52 percent) have developed in granitic residuum, and the majority of the rest have developed in volcanic ash and pumice deposits. There are minor amounts of soils that have developed in basaltic residuum, glacial till, alluvium, and Swauk sandstone. The basaltic materials and the Swauk sandstone derived soils can be very slippery and greasy when wet and both are subject to water erosion and are easily compacted. The granitic soils withstand traffic very well and usually hold up well even when wet. Ash soils are very dusty when dry and are easily eroded if the surface is bare and subject to overland flow.

D. Climate

Precipitation ranges from 50 to 80 inches annually, falling mostly as snow.

E. Vegetation

One-third of this area is tentatively suitable for sustained timber production. As most of the suitable area is on north slopes except along the Chiwawa River, the ecotype is primarily wet conifer forest. Douglas-fir is the major species. Western white pine, Englemann spruce, western red cedar, western hemlock, and Pacific silver fir are also present especially along the Chiwawa River.

The only low elevation non-forested areas are the open, rocky, south aspect along Big Meadow Creek and the smaller, steep, open, sandstone south facing area north of Raging Creek.

Lodgepole pine has gradually encroached upon the open huckleberry fields near McCall Mountain, once important berry gathering areas for Indians.

F. Current Uses

The use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Hiking	700
Hunting	100
Total	800

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Class</u>	<u>Acres</u>
Primitive (P)	13,377
Semi-primitive Non-Motorized (SPM)	8,671

There are 11.9 miles of trail within the area, of which 8.2 miles are open to motorized use.

G. Appearance and Surroundings

The area has high visual variety of landforms and rockforms, moderate to high variety of vegetation. It contains numerous small creeks, and is low in waterforms (lakes and streams).

Approximately one-half of the area is on a north facing slope of the glaciated Chiwawa River Valley. The area has highly textured vegetation on steep slopes intermingled with rockforms. Approximately 15 small drainages bisect the area.

The other half of the area is the south facing slope of the glaciated White River Valley. The upper slopes have steep sides, avalanche paths, a variety of vegetative patterns and ridgetops that are open and rugged.

Landforms include Dirty Face Peak, McCall Mountain, Crook Mountain and ridgetops of the White Mountain and Chiwawa.

The Twin Lakes area is surrounded by the Glacier Peak Wilderness, Chiwawa River drainage, White River drainage, and multiple-use land.

H. Attraction

Some major attractive features are McCall Mountain, Chiwawa Ridge, Dirty Face Mountain, Crook Mountain, and Raging and Schaefer Creeks.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The area is divided into two parts which are split by a road corridor and a finger of the Glacier Peak Wilderness. The northeastern half is about twice the size of the southwestern half. Both halves are bounded on two sides by the Glacier Peak Wilderness. They are surrounded by roads on all other sides. The only easily identifiable boundary is the east boundary of the northeastern half which is the Chiwawa River.

B. Natural Integrity

Impact of human activity has been minor. Some trail development is evident. About one mile of the Twin Lakes Trail and one and a half mile of Dirty Face Trail are in the southwestern half, and about four miles of Shaeffer Lake Trail and two miles of Raging Creek Trail are in the northeastern half. Twin Lakes Trail and Shaeffer Lake Trail access the Glacier Peak Wilderness. There is an old lookout site on Dirty Face Mountain. This was removed but signs of its remains are still evident

C. Natural Appearance

The southwestern half is very narrow and there are some areas where a visitor could be free from the sights and sounds of human activity. The northeastern half is large enough and has several small drainage basins where a visitor could feel separated from human developments. The area from outside looking in, has a very natural appearance. This is particularly true of the rugged area north of the White River Road and of the area south of the Chiwawa River.

D. Opportunities for Solitude

With the exception of the Raging Creek Trail, the developed trails are used to such an extent that there is little opportunity for solitude. The Dirty Face Trail is presently often used by large groups on day hikes. With the additional wilderness established in 1984, it is one of the few areas where use by large groups can occur. Much of the area of the developed trail is either heavy brush and old-growth timber or steep, rocky cliffs.

E. Opportunities for Primitive Recreation

These opportunities are limited to the few miles of trail systems. The old lookout site on Dirty Face Mountain offers spectacular views of the surrounding valleys and ridges. There are no other destination areas within the roadless area of any note. The Raging Creek drainage is used by hunters on an annual basis.

F. Challenging Experience

Except for the number of switchbacks or the grade of the trails, there is little to draw visitors in terms of a challenge. Some interesting opportunities for such experience could be had by trying to find routes to the Glacier Peak Wilderness through the rocky cliffs above the White River.

G. Special Wildlife Features

There are no known threatened or endangered wildlife species within the area. The extent of use in this area by sensitive species is unknown.

H. Historical and Scientific Study

There are some opportunities for outdoor education and scientific or historic study in the area relating to past use and events.

III.RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS Class is as follows:

Capacity in Potential Recreation Visitor Days Per Year

<u>ROS Class</u>	
Primitive	10,700
SPNM	<u>8,700</u>
Total	19,400

This is one of only two of the inventoried roadless areas having primitive recreation opportunities outside of wilderness.

B. Wildlife

In addition to deer, black bear, and other game and non-game species, the area has mountain goats along Chiwawa Ridge, on McCall Mountain, and Dirty Face Peak. This area is summer range for a portion of the Oklahoma Gulch deer herd.

C. Fish

This area includes many small streams which are tributary to both the Chiwawa and White Rivers. However, only two are known to have any significant number of fish: Schaefer and Raging Creeks. Schaefer Creek drains Schaefer Lake which is stocked by the Washington State Department of Game. There are probably both Eastern brook trout and cutthroat trout using the system. The creek itself is steep a gradient, and does not have very high production. Raging Creek has a population of cutthroat trout and possibly rainbow trout. It too is not a major fishery.

In this area there is also a very short reach of the Napeequa River which is an anadromous fish stream. Sockeye, and possibly chinook salmon spawn in this area of stream.

D. Water

There is currently a power withdrawal site filed under FERC #2151 (Wenatchee River Project). A portion of the withdrawal site lies within Section 36, T28N, R16E. This project was surrendered or "given up" by the Chelan County PUD #1 several years ago. If constructed, water would have been impounded on portions of Section 1, T28N, R16E WM.

An additional encumbrance also exists within this area. Under Executive Order of 5/8/12, the U.S. Geological Survey designated all lands lying within one mile either side of the Chiwawa River as withdrawn sites. Lands lying within portions of Sections 18, 19, 20, and 29 and T28N, R16E WM. have been encumbered by the obsolete Executive Order.

E. Livestock

A portion of this area in Chiwawa Creek drainage is within the Lower and Upper Chiwawa Recreation Stock Allotments. The range resource inventory maps do not show any forage vegetative types in this roadless area. The dense timber vegetation, in addition to very steep topography, severely limits the potential for either recreation or domestic stock use even with vegetative manipulation.

F. Timber

The area contains 7,250 acres of tentatively suitable forest land categorized as shown below:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	3,668	104.0	19.1
Wet	Immature	3,286	59.1	10.8
Wet	Seedling-Sapling	127		
Dry	Mature	127	1.603	
Dry	Immature	42	0.401	
	Total	7,250	165.1	30.3

The estimated maximum biological potential contribution to the long-term sustained yield is 3.1 MMBF, or 0.6 MMCF, per year.

G. Minerals

This area is primarily overlaid by granitic rock of Mesozoic age, but is also overlain in part along the westside by pre-Tertiary metamorphic rock. The Napeequa River area, which lies adjacent to the subject area, has been investigated by the U.S.G.S. and U.S. Bureau of Mines. As a result of their investigations, they have not identified the area as having any known mineral potential. The area has no reported occurrences of mineral commodities of interest; however, an area around Raging Creek has been classified "prospectively valuable" for coal resources and those portions of the area lying north of Schaefer Creek and north of White River Falls have been classified prospectively valuable for geothermal resources. According to Bureau of Land Management Records (1/23/85), 32 lode claims and 4 placer claims have been located within or immediately adjacent to that portion of the area lying along the Chiwawa River, and assessment work has been maintained on these claims through 1984. Even though portions of the area are classified "prospectively valuable" for leasable commodities other than oil and gas, only a small portion of the area is leased and it is leased for oil and gas under OR 29079 and OR 29080. There are no pending lease applications within the area.

H. Cultural-Historical

The area has a high potential for the occurrence of significant archaeological resources. The backcountry between McCall and Crook Mountains was traditional huckleberry picking country. Indian families camped here for two to three weeks each year to collect and dry huckleberries and undertake small hunting expeditions. Access was by way of a trail up Raging Creek (a portion of the original tread still exists). The upper Raging Creek country was also the scene of a reported encounter (and possible massacre) in 1858 between the Wenatchi Indians and the United States militia. The Twin Lakes unit also borders an area along the White River that was used both as a fishery and as a spirit quest site. Because of this history, it is possible there is a special spiritual link between the lands within the Twin Lakes unit and present day Wenatchee people on the Colville and Yakima Indian Reservations.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is moderate with most started by lightning. Fuel loadings are moderate with heavy accumulations at lower elevations, to scattered accumulations in alpine meadows at higher elevations. Periodic large fires have occurred.

K. Insects and Disease

As more than 3,600 acres of mature timber occurs in this area, bark beetles are a high risk. Timber having heavy losses to Douglas-fir bark beetle, and root rot was mapped and sold in the Upper Huck timber sale immediately adjacent to the south of this area. Because the Twin Lakes area was in the Siwash study area at the time, no timber was sold north of Raging Creek.

Heavy salvaging of western white pine killed by mountain pine beetle has occurred along the Chiwawa River, but salvage did not extend south of the river. The 1984 aerial survey of insect damage mapped several small, beetle-killed stands along the Chiwawa in the unroaded area.

L. Private Lands

There are 85 acres of non-federal lands within the southwestern portion. A portion of these lands are part of the Tall Timber Ranch, a private organization camp. Access to these lands is gained from outside of the area.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located immediately adjacent to the eastern boundary line of the Glacier Peak Wilderness area which contains 576,865 acres.

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area which need representation through wilderness classification.

D. Interest by Proponents, Including Congressional

Since the passage of the Washington State Wilderness Act of 1984, Congress has not expressed interest in making further additions to the State wilderness system. Environmental organizations have expressed interest in adding portions of the area to the National Wilderness Preservation System in the future.

Both environmental and ORV organizations have advocated maintaining roadless status for the area.

E. Public Input

Public input during the RARE II and other planning efforts has supported unroaded allocations. Response is noted under the General portion of this Appendix.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area. Opinion differs as to the allocation for motorized versus non-motorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

All alternatives class much of the area as Dispersed Recreation Non-Motorized. No alternative allocates any land to Dispersed Recreation Motorized. There are presently about 10 miles of trail within the area.

There is not a large variation in land allocations between alternatives. Alternatives B, D and J allocate the most area to General Forest, with less emphasis on retaining visual qualities and the recreation setting. Alternatives E and F provide the greatest retention of present resource conditions with nearly total allocation of the area to unroaded non-motorized recreation. Alternative A/NFMA, C, G, H and I provide a balanced allocation with more than 60% of the retained in unroaded condition.

Under Alternatives C and I the portion of the trail system that is in this roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Dirty Face	1500	2.5	--	2.0
Twin Lakes	1503	0.8	--	--
Phelps Creek	1511	--	2.6	--
Schaefer Lake	1519	--	--	4.0
Totals		3.3	2.6	6.0

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. (These represent the Semi-primitive Motorized and Semi-primitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.)

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C Preferred	D	E	F	G	H	I	J
	62	61	65	61	100	97	66	62	65	61

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C Preferred	D	E	F	G	H	I	J
	0/100	0/100	0/100	0/100	1/99	1/99	0/100	0/100	0/100	0/100

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading will provide a less semi-primitive recreation experience, with more area taking on Roaded natural appearing or Roaded Modified recreation setting.

2. Wild, Scenic, and Recreational Rivers

A portion of the following river corridors (one-quarter mile each side of the river) are located within this roadless area and are recommended for designation in Alternatives C and I:

<u>River</u>	<u>Recommended Classification</u>	
Chiwawa	Segment 2	Recreational
White River	Segment 2	Scenic
	Segment 3	Recreational

More information concerning this recommendation can be found in Chapter III and Chapter IV.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will

be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate the Chiwawa drainage side, and the upper end of the White River drainage, to Retention VQO. The middleground view as seen from the White River and Lake Wenatchee will be allocated to Partial Retention VQO. The Dirtyface Peak, lake, and surrounding area including the Meadow Creek Basin will be allocated to General Forest or Maximum Modification VQO.

Alternatives B, D and J will allocate the upper one-half of the drainage to Retention VQO. The lower one-half of the area will be allocated to Maximum Modification VQO. The area will be highly visible from the Chiwawa viewshed. The timbered portion of the landscape will be heavily altered.

Alternatives C and I will allocate the White River viewshed to a Retention VQO. Most of the area will be natural appearing. A small portion along the upper end of the Meadow Creek drainage will be allocated to General Forest or Maximum Modification VQO.

Alternatives E and F allocate all of the area to a Retention VQO. The natural appearing landscape will dominate the entire area. A cultural resource trail, Scenic River allocation, Scenic Travel prescription, Special Interest Area, and some old-growth management will all be Retention VQO.

Alternative G allocates many areas to Retention VQO. The Dirty Face Lake area and adjacent area will be allocated to Maximum Modification VQO.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	16,494	14,416	17,024	14,416	22,048	22,048	19,779	16,494	17,024	14,395
Partial Retention	2,162	1,314	3,519	1,314	--	--	764	2,162	3,519	1,315
Modification	--	--	--	--	--	--	--	--	--	--
Maximum Modification	3,392	6,318	1,505	6,318	--	--	1,505	3,392	1,505	6,338
Total Acres	22,048	22,048	22,048	22,048	22,048	22,048	22,048	22,048	22,048	22,408

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would have almost one-half the impact on wildlife than Alternatives B, D and J due to the amount of land allocated to General Forest. Alternative B, D and J would road 39 percent of the area and allow for timber harvest on 29 percent of the area. Alternatives C, F, and I would have an insignificant effect on wildlife. Alternative E would have no effect on wildlife, and Alternative G would have about one-fourth the impact as Alternatives B and D.

6. Fisheries

a. Significant Effects

In all alternatives, the small land area surrounding the Napeequa River would remain unroaded.

In all alternatives except E and F, at least portions of the area surrounding Raging and Schaefer Creeks could be roaded and timber harvested. Even with roading and timber harvest, impacts on the fisheries should be very minor since the creeks are high gradient and have very little fisheries value.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas along Schaefer and Raging Creeks, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices, and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Under all alternatives it is expected that more area will remain unroaded than is roaded. The range of tree management activities is from 6,339 acres (29 percent) scheduled for timber emphasis in Alternative J to no scheduled harvest in Alternative E.

Alternatives A/NFMA and H has 3,392 acres (15 percent) timber emphasis and an additional 4,515 acres of vegetation manipulation with other resource emphasis planned.

Alternatives C and I have identical acre allocations. Both have 1,505 acres of timber emphasis, or 7 percent of the area. An additional 5,470 acres would be managed for other resource values that permit vegetative manipulation through timber sales. The primary difference between Alternatives C and I is the rate of harvest. Under Alternative I, more harvest activity would be scheduled in the first five decades.

Alternative F does not allocate any acres to timber emphasis. However, it does anticipate vegetative manipulation through timber sales on 742 acres or 3 percent of the area.

Alternative G has 1,505 acres allocated to timber emphasis and an additional 5,299 acres allocated to vegetation manipulation with other resource emphasis planned.

7b. Vegetation: Forage

Alternatives C, H, and I, with the proposed vegetative manipulation and improved access, will contribute adequate forage to the base needed for big game and livestock. Alternatives A/NFMA, B, D and J will provide forage in excess of projected needs. Alternatives E, F, and G which have little or no vegetative manipulation proposed, will not provide adequate forage to meet the projected needs for livestock, particularly in the fourth and fifth decade. Prescribed fire in the remaining unroaded portion of this area could offset the loss of forage for big game due to ecological succession.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Twin Lakes area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Up to three percent of the area could be allocated to timber harvest and road building in Alternative F, therefore, minimal soil and water consequences would occur. Alternatives A/NFMA, B, C, D, G, H, I and J allocate up to 39 percent of the area to timber harvest and road building. The environmental effects of timber harvest and road building are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building. Alternatives A/NFMA, B, D, G, and H pose more risk of degrading the soil and water resource than Alternatives C and I due to more intensive management. However, since Wenatchee National Forest Best Management Practices and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

Any additional prescribed burning generated in the Twin Lakes roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

The close proximity to the Glacier Peak Wilderness Area would increase the risk of a smoke intrusion into the Class I area from timber harvest activities in Alternatives A/NFMA, B, C, D, G, H, I and J.

10. Minerals

Even though an area along the Chiwawa River is encumbered by 32 lode claims and 4 placer claims, the Twin Lakes area has no reported occurrences of locatable mineral commodities of a significant nature. Portions of the area are classified prospectively valuable for coal and geothermal resources, but only a small area has been leased and that was for oil and gas. Considering available information, the area does appear to have a relatively low potential for the occurrence of mineral resources. Therefore, the consequences on mineral resources do not appear to be extremely significant nor do they vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans).

The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions										
	A/NFMA	B	Alternative								
			C PREFERRED	D	E	F	G	H	I	J	
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	15,519	14,184	16,431	14,184	22,048	21,666	16,579	15,519	16,431	14,183	
Moderately Restrictive	3,137	1,546	4,112	1,546	0	382	3,964	3,137	4,112	1,526	
Relatively Few Restrictions	3,392	6,318	1,505	6,318	0	0	1,505	3,392	1,505	6,339	

miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis.

That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C	D	E	F	G	H	I	J
Miles	14	24	21	24	0	2	21	14	21	24

12. Fire

The fire management workload generated in the Twin Lakes roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight decrease in risk of industrial related fires would occur in the area as a result of little timber harvest in Alternatives E and F. Overall risk of fire will not significantly vary between Alternatives A/NFMA, B, C, D, G, H, I, or J. The cost efficiency of fire suppression activities would be slightly decreased in Alternatives E and F due to limited access by ground based suppression resources. All other alternatives will vary little in cost efficiency.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

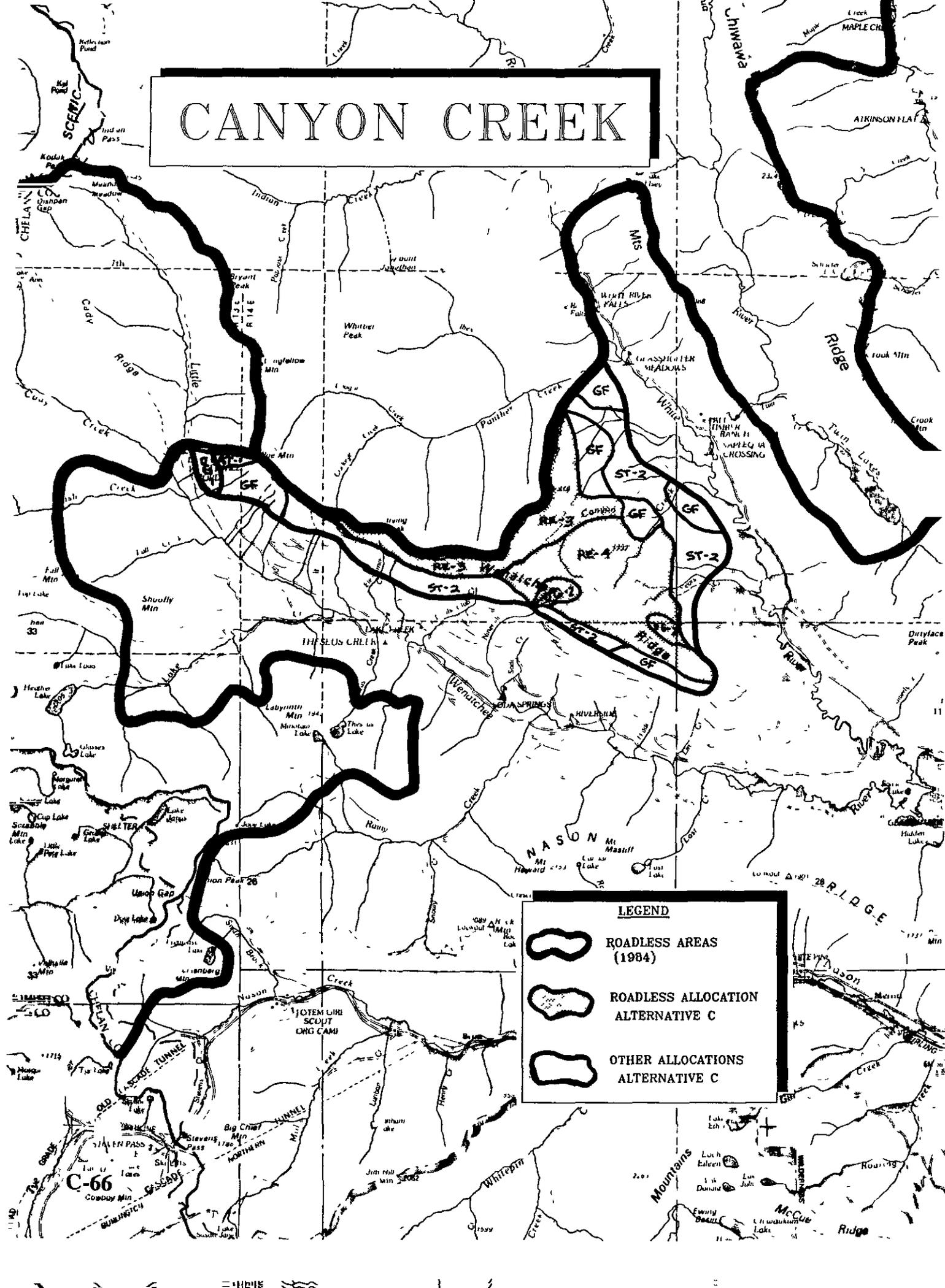
Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber-oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber-oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 38.3 jobs.

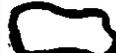
14. Wilderness Potential

The roadless area does have potential as wilderness. It is large enough to be a separate unit; however, it would make a more logical addition to the Glacier Peak Wilderness. Under Alternatives A/NFMA, B, C, D, G, H, I, and J, a similar percentage of the area is allocated to roaded allocations. Alternatives B, D, and J prescribe the greatest acreage allocated to General Forest with 29 percent of the area. Alternatives E and F provide the greatest retention of wilderness attributes with all, or nearly all, of the area prescribed unroaded. Alternatives A/NFMA, C, H, and I provide a more even allocation with slightly more General Forest allocated in A/NFMA and H. General Forest allocation results in highest degree of road construction, timber management, and alteration of wilderness characteristics.

CANYON CREEK



LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

CANYON CREEK ROADLESS AREA

Size: Gross Acres: 9,158

Net Acres: 9,158

I. GENERAL INFORMATION

A. History

The area was inventoried and studied under RARE II and was recommended as non-wilderness. None of the area became wilderness under the Washington State Wilderness Act of 1984.

B. Location and Access

The area is located adjacent to the Glacier Peak Wilderness in Chelan County on the Lake Wenatchee Ranger District. It lies between the Little Wenatchee and White Rivers. Major access is via the White River, Sears Creek, Little Wenatchee, and Devil's Club roads, and a trail which ends on Irving Peak.

C. Physiography and Soils

This area occurs in both the White River and the Little Wenatchee River basins. Both valleys are wide and deep and were glacially carved so have many glacial features, particularly along the lower slopes. The ridgetops have not been glaciated so are characterized by rough and broken topography. In some places, snow chutes (avalanche paths) are very distinct and common.

Elevations range from 2,500 to 5,000 feet. About 50 percent of the soils have formed in granitic residuum, another 40 percent in volcanic ash and pumice, and the remainder have formed in glacial till or basaltic materials. The granitic soils have a high bearing strength (load capacity); they usually are not slippery or sticky when wet. The ash soils are very dusty when dry, and they tend to erode very easily if water is allowed to concentrate and run downhill over a bare surface.

There are a few deposits of glacial till and also some soils that have formed in basaltic residuum. The basaltic soils tend to become slippery and sticky when wet and are easily compacted. The glacial till soils tend not to be sticky or slippery when wet and they are more resistant to soil compaction.

D. Climate

Annual precipitation ranges from 70 to 100 inches per year, mostly as snow.

E. Vegetation

This area is 41 percent tentatively suitable timberland. It is all classed as wet ecotype. Douglas-fir, western hemlock, western red cedar and Pacific silver fir are the dominant species. Plantations of Douglas-fir in both Sears Creek and Rainy Creek show excellent growth and some stands will be ready for commercial thinning in the near future. Growth rates of an inch of diameter in six years is not uncommon in managed plantations adjacent to this area.

Wet areas originally occupied by western red cedar, and avalanche debris areas that have been logged, are difficult to reforest. Vine maple, sedges, fireweed, huckleberries, and creeping blackberries invade cutover areas. Beach cottonwood also grows vigorously in wet areas following logging.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Hunting	200
Rock Hounding	Minor use

The area contains the following kinds and amounts of recreation opportunity spectrum (ROS) classes:

<u>ROS Class</u>	<u>Acres</u>
Semi-primitive Non-Motorized (SPNM)	9,158

There is only one mile of trail within the area and it is currently not open to motorized use.

G. Appearance and Surroundings

The area has high variety in landforms, and rockforms, moderate vegetative variety and low variety of waterforms (lakes and streams).

The area is highly textured mostly on the north slope and more broken and open on the south. The vegetation is on steep sided drainage bottoms and there is a broad but rugged ridgetop that is open, and broken.

The area is primarily viewed as middleground from the Little Wenatchee and White River valleys and Lake Wenatchee.

H. Attractions

Main attractions are Wenatchee Ridge, Sears, and Canyon Creek. Occasional use by rock hounds is attracted to the area by soapstone and actinolite crystals found in the area.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The area is surrounded by the Glacier Peak Wilderness and by timber harvest and roads in the Little Wenatchee drainage. On the east it is surrounded by timber harvest and roads on the Wenatchee Ridge, as well as clearcuts and roads in the White River drainage.

The current boundaries do not follow any identifiable geographical features and therefore would be difficult to manage.

B. Natural Integrity

The impacts of human activity within the area are few and minor. What does exist is very minor. There is only one developed trail of about one mile. Two other old trails have not been maintained for many years and are almost entirely indistinguishable. A hunter's route exists for a couple of miles on top of Little Wenatchee Ridge.

C. Natural Appearance

The area has a natural, undisturbed appearance.

D. Opportunities for Solitude

A semblance of solitude could be obtained in the center of the area. Along the edges a person would probably be alone but the sight and sounds of human activity would preclude a real feeling of solitude. The lack of developed trails and the presence of heavy brush precludes much recreational use. There are very few visitor days use within the area. Few other people are or will be encountered except perhaps by hunters who venture more than a few hundred feet off the roads.

E. Opportunities for Primitive Recreation

With only one mile of developed trail there is not much opportunity. The area contains little attraction to draw much use. The old Sears Creek and Canyon Creek trails have not been maintained for years and thus are not used. Even when they were maintained they received virtually no use by general public. *There is one area, a ridge, which contains good representation of actinolite crystals but because of no road access, crystal hunters rarely go there.*

F. Challenging Experiences

Challenge would be afforded off the existing trail for cross country travel or orienteering.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. No other threatened or endangered species have been located in the area. The extent of sensitive species use in the area is unknown.

H. Historical and Scientific Study

There are no special or unique opportunities for outdoor education and scientific or historic study in the area which cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in Potential Recreation Visitor Days Per Year</u>
Semi-Primitive Non-Motorized (SPNM)	9,200

B. Wildlife

There is mountain goat habitat located in the Wenatchee Ridge vicinity. The area is summer habitat for a small mule deer herd.

C. Fish

Canyon Creek and Sears Creek are the only fish containing streams in this roadless area. Neither produce more than a few small fish. Ninemile and Elevenmile Creeks are also in this area, but are too steep to afford fish habitat.

D. Water

There are no water related encumbrances or planned activities within the area.

E. Livestock

There are no inventoried allotments within this roadless area. Wildfire has created some transitory forage in upper Canyon Creek, but due to topography, sensitive soils, and lack of access to adjacent forage areas, the potential for either recreation or domestic stock use is limited.

F. Timber

The area contains 3,795 acres of tentatively suitable Forest land. Stand, volume, and other data are as follows:

<u>Ecotype</u>	<u>Stand Size</u>	<u>Acres</u>	<u>Estimated Standing Volume (MMBF)</u>	<u>(MMCF)</u>
Wet	Mature	1,484	42.1	7.7
Wet	Immature	2,247	40.4	7.4
Dry	Mature	64	.8	1
		Total 3,795	83.3	15.2

The estimated maximum biological potential contribution to the long-term sustained yield is 1.5 MMBF (0.28 MMCF) per year.

G. Minerals

This area is underlain by pre-Tertiary and pre-Jurassic metamorphics. The area lying adjacent and to the north was investigated by the U.S.G.S. and U.S. Bureau of Mines. As part of that investigation they took some samples within the subject area. As a result of their investigation, they have not identified the area as having any known mineral potential of significance. The only minerals of economic interest in the area are possibly feldspar and limestone, however, most interest appears to be concentrated to the south and east of the subject area. According to Bureau of Land Management records (1/23/85), 30 lode claims have been located along the Wenatchee Ridge in the southeast part of the area where the feldspar deposits appear to be located. Ten of these claims were located in 1984 while the other 20 have been maintained by annual assessment work. Except for a small area around the Little Wenatchee Ford which is classified prospectively valuable for geothermal resources, the area is not classified "prospectively valuable" for leasable commodities. There are no existing leases or pending lease applications.

H. Cultural-Historical

The only recorded historic use of the Canyon Creek unit was the Poe Mountain fire lookout, in existence between 1933 and approximately 1970. Although the Little Wenatchee served as a cross-Cascade route to early Indians and later exploring expeditions (in 1860, the E.F. Cady party for whom Cady Pass and Creek were named; D.C. Linsley, with the Northern Pacific Railroad surveys in 1870; and A.B. Rogers, with Great Northern Railroad in 1887), travel was directed to the main river corridor rather than across the rugged slopes to the north. There may have been some use by fur trappers--cabin remnants are reported in the upper reaches of the Little Wenatchee. However, because of the transitory pattern of use within and adjacent to the Canyon Creek Unit, there is not a high potential for the occurrence of significant cultural sites.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is low to moderate with most started by lightning. Fuel loadings are moderate to heavy at lower elevations, with scattered accumulations in alpine meadows at higher elevations. Periodic large fires have occurred.

K. Insects and Disease

Heavy mortality to western white pine has left a grey snag area on the ridge between Rainy Creek and Sears Creek. Investigations for timber sales to salvage this area in 1977 found the trees too blue stained and weather checked to be of commercial sawlog value. As these trees begin to fall over, fire potential will be extreme in this area.

Future sales in or immediately adjacent to this area are planned to remove decadent old-growth timber and stands with high risk of future insect losses.

L. Private Lands

There are no private lands within the area.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located immediately adjacent to the boundary of the 576,865 acre Glacier Peak Wilderness Area and less than one mile south of the Twin Lakes roadless area.

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area which need of representation through wilderness classification.

D. Interest by Proponents, Including Congressional

Since the passage of the Washington State Wilderness Act of 1984, Congress has not expressed interest in making further additions to the State wilderness system. Environmental organizations have expressed interest in adding portions of the area to the National Wilderness Preservation System in the future.

Both environmental and ORV organizations have advocated maintaining roadless status for the area.

E. Public Input

Public input during the RARE II and other planning efforts was obtained and this input supported unroaded allocations. The response is covered under the General portion of this appendix.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area. There are differing opinions as to whether the allocation should be for motorized or nonmotorized use.

The owners of the Tall Timbers Ranch expressed concern over timber sales in the area.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

Only portions of two trails lie within this roadless area: Poe Mountain, three miles; and Irving Pass, one mile. The Poe Mountain Trail goes in and out of wilderness as it switchbacks up the ridge. Alternatives A/NFMA, C, and G would allocate areas along this trail to scenic travel and protect the trail corridor.

Alternatives B, D and J would allocate them to General Forest and could alter the trailside environment. Alternatives E and F would allocate these trails to Dispersed Recreation, Non-motorized. The trails are currently open to hikers and horses. Under Alternatives C and I, Poe Mountain would travel through unroaded non-motorized allocation and Irving Pass through roaded motorized.

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. (These represent the Semi-primitive Motorized and Semi-primitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.)

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0	45	46	46	100	97	49	0	46	46

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0	0/100	62/38	0/100	0/100	0/100	0/100	0	62/38	0/100

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading will provide a less semi-primitive recreation experience with more area taking on a Roaded Natural or Roaded Modified recreation setting.

2. Wild, Scenic, and Recreational Rivers

A portion of the following river corridors (one-quarter mile each side of the river) is being located within this roadless area and is recommended for designation in Alternatives C and I:

<u>River</u>	<u>Recommended Classification</u>
White River	Segment 3 Recreational

More information concerning this recommendation can be found in Chapter III and Chapter IV.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate the middleground of both the Little Wenatchee viewshed and most of the White River viewsheds in Partial Retention VQO. Approximately one-third of the Canyon Creek area will be allocated to Maximum Modification VQO. These areas are from the bottom to the upper end of the drainage. From the White River viewshed, recreationists will see areas of heavily altered landscape.

Alternatives B, D and J will allocate about one-half of the areas to Maximum Modification VQO. The lower one-half of the drainage to the wilderness boundary will be heavily modified. The upper ridgetop of the Wenatchee Ridge will be allocated to Retention VQO. The Little Wenatchee and the White River viewsheds will be heavily altered as viewed from the recreation travel routes.

Alternatives C and I will allocate mostly to Retention and Partial Retention VQO. Glimpses of the middleground area from the Little Wenatchee and White River viewsheds will be General Forest or Maximum Modification VQO.

Alternatives E and F will allocate all areas to Retention VQO. All of the area will be in a natural appearing condition.

Alternative G allocates most areas to Retention and Partial Retention VQO. Some General Forest allocation will heavily alter the middleground of Canyon Creek Area and the lower end of the midslopes. Most middleground views from the White River and the Little Wenatchee viewsheds will be allocated to Partial Retention VQO.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	1,293	4,749	2,373	4,749	9,158	9,158	5,406	1,293	2,373	4,728
Partial Retention	3,795	127	2,438	127	--	--	2,840	3,795	2,438	127
Modification	--	--	2,587	--	--	--	--	--	2,587	--
Maximum Modification	4,070	4,282	1,760	4,282	--	--	912	4,070	1,760	4,303
Total Acres	9,158	9,158	9,158	9,158	9,158	9,158	9,158	9,158	9,158	9,158

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would have the most impact on wildlife and habitat due to the roading of the entire area. Alternatives A/NFMA and H would road the entire area and allow harvest on 44 percent of the area. Alternatives B, D and J would only road 54 percent of the area; therefore, Alternatives B, D and J would have less of an overall impact than A/NFMA and H. Alternatives C and I would have about one-third the impact on wildlife as Alternatives A/NFMA and H. Alternative E would have no effect on wildlife in this area, and Alternative F would have an insignificant effect. Alternative G would have less than one-fifth the impact of Alternatives A/NFMA and H.

6. Fisheries

a. Significant Effects

In Alternatives E and F, the vicinity of Canyon and Sears Creeks would remain unroaded. In the other alternatives, the area of Sears Creek and the lower two miles of Canyon Creek could be roaded. In all the alternatives, except possibly Alternatives A/NFMA and H, the upper Canyon Creek area would remain unroaded. In those areas with potential timber harvest, in all alternatives, the vicinity of Canyon Creek would be managed with an intensive timber harvest regime. In all alternatives except Alternatives B, D and J, the vicinity of Sears Creek would be managed with an extended shelterwood prescription to maintain the visual objectives of the area. In Alternatives B, D and J the Sears Creek area could be managed with the intensive timber harvest regime.

Roading these areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase. This would help to meet a portion of the fishing demand (see Chapter III on fish), but also could result in overfishing and reduction in both numbers and size of fish using the habitat. However, since the wild fisheries production is very low in these headwater systems, fishermen are unlikely to fish intensively here and overfishing effects should not occur.

It is also possible that roading the unroaded areas could result in environmental degradation to streams due to timber harvest and road construction in the basins (see Chapter IV, Environmental Consequences). Some of these possible effects are also addressed in the soil and water environmental effects.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas along Canyon and Sears Creeks, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Management direction under Alternatives A/NFMA and H does not preclude roading or vegetative manipulations through timber sales on any of this area. Timber emphasis is allocated on 4,070 acres or 44 percent of the area under this alternative. An additional 4,515 acres are zoned special resource management area where timber sales will be used to manipulate the existing vegetation.

All other alternatives allocate at least the ridgetop portion of this area to nonroaded recreation. Alternative E allocates the entire roadless area to unroaded non-motorized recreation where no timber sales are permitted. Alternative F is similar with 97 percent or 8,904 acres allocated to roadless recreation with no timber harvest.

Under Alternatives C and I the unroaded motorized recreation zone would be 4,876 acres or 46 percent of the area. The remaining 54 percent of the area would permit manipulation through timber sales. However, only 3,000 acres or 33 percent of the area, is suitable for timber harvest under these alternatives. Alternatives B, D and J would have timber sales proposed for 4,876 acres. However, most of the acres under Alternatives B, D and J would be timber emphasis acres. Under Alternative G, the largest block of vegetative manipulation acres would emphasize the scenic travel prescriptions.

7b. Vegetation: Forage

Alternatives C, H, and I, with the proposed vegetative manipulation and improved access, will contribute adequate forage to the base needed for big game and livestock. Alternatives A/NFMA, B, D and J will provide forage in excess of projected needs. Alternatives E, F, and G which have little or no vegetative manipulation proposed, will not provide adequate forage to meet the projected needs for livestock, particularly in the fourth and fifth decade. Prescribed fire in the remaining unroaded portion of this area could offset the loss of forage for big game due to ecological succession.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Canyon Creek area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Up to three percent of the area could be allocated to timber harvest and road building in Alternative F. Alternatives A/NFMA and H allocate all of the area to timber harvest and road building, while Alternatives B, C, D, G, I and J allocate up to 53 percent of the area to timber harvest and road building. The environmental effects of timber harvest and road building are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building. Alternatives A/NFMA and H pose more risk of degrading the soil and water resource than Alternatives B, C, D, G, I and J due to more intensive management. However, since Wenatchee National Forest Best Management Practices and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

Any additional prescribed burning generated in the Canyon Creek roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

The close proximity to the Glacier Peak Wilderness Area would increase the risk of a smoke intrusion into the Class I area from timber harvest activities in Alternatives A/NFMA, B, C, D, G, H, I and J.

10. Mineral

Since this area appears to have a low potential for the occurrence of mineral resources, the consequences on mineral resources do not appear to be extremely significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	D Alternative	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	445	4,282	6,770	4,282	9,158	8,946	4,791	445	6,770	4,282
Moderately Restrictive	4,643	594	628	594	0	212	3,455	4,643	628	573
Relatively Few Restrictions	4,070	4,282	1,760	4,282	0	0	912	4,070	1,760	4,303

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C	D	E	F	G	H	I	J
			PREFERRED							
Miles	15	11	11	11	0	1	11	15	11	11

12. Fire

The fire management workload generated in the Canyon Creek roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight decrease in risk of industrial related fires would occur in the area as a result of little timber harvest in Alternatives E and F. Overall risk of fire will not significantly vary between Alternatives A/NFMA, B, C, D, G, H, I or J. The cost efficiency of fire suppression activities would be slightly decreased in Alternatives E and F due to limited access by ground based suppression resources. All other alternatives will vary little in cost efficiency. The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

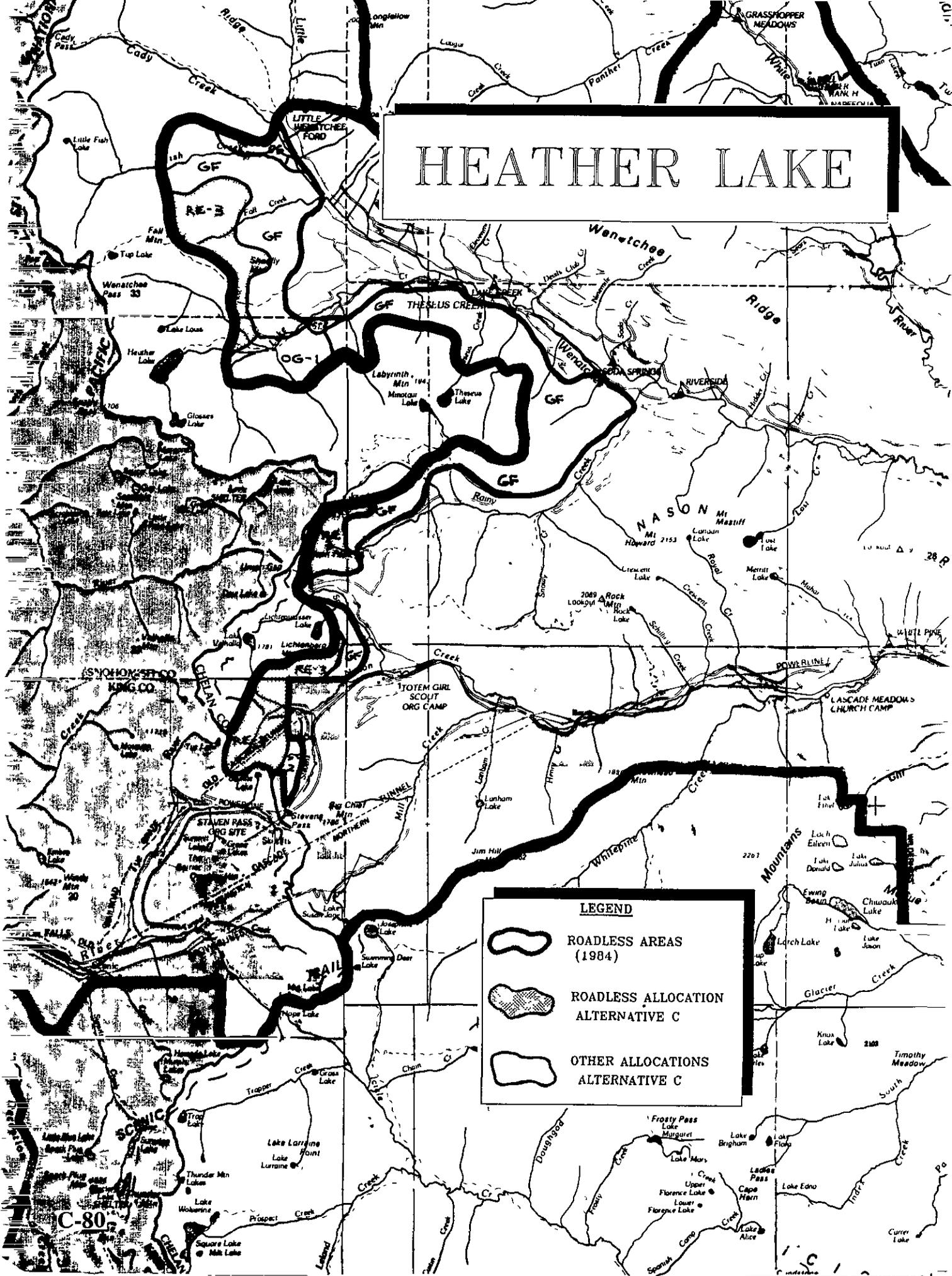
A general measure of timber-oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber-oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 18.8 jobs.

14. Wilderness Potential

The roadless area has potential as wilderness. It is too small of an area to be a separate unit of wilderness and is a more logical addition to the Glacier Peak Wilderness.

Alternatives A/NFMA and H provide for the least retention of wilderness values, with 44 percent prescribed as General Forest and none of the area retained as unroaded. Alternatives B, D, J, C, and I all allocate about 45 percent of the area as unroaded. Alternatives B, D, and J prescribe the largest area of General Forest at 48 percent. Alternatives E and F provide the least change with all or nearly all of the area retained in unroaded and natural condition.

HEATHER LAKE



LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

HEATHER LAKE ROADLESS AREA

Size: Gross Acres: 11,258

Net Acres: 11,067

I. GENERAL INFORMATION

A. History

This area was designated for unroaded recreation use under the multiple use plan. It was inventoried and evaluated in RARE II as part of area #B 6031 and recommended as nonwilderness. When reassessed as part of the Washington State Wilderness Act of 1984 proposal, 11,151 acres became part of the newly established Henry M. Jackson Wilderness.

B. Location and Access

The area is adjacent to the 102,700 acre Henry M. Jackson Wilderness in Chelan County on the Lake Wenatchee Ranger District.

Main access is via the Lake Creek and Rainy Creek - Smith Brook Roads and the Lake Creek and Top Lake Trails.

C. Physiography and Soils

The topography is rolling and smooth and very typical for a glaciated valley. The main part of the river basin (Little Wenatchee) is a wide, deep glaciated valley. The overstory vegetation in this unit consists mainly of large conifers. There are not very many open areas in this unit.

The soils are pretty evenly split between those that have developed in granitic residuum and those that have formed in volcanic ash and pumice materials. About three percent of the soils have formed in basaltic residuum. The granitic soils have good bearing strength and they do not become slippery or sticky when wet. Also, they are not easily displaced. The ash soils on the other hand are easily displaced, and they become very dusty when dry. Ash soils are easily eroded by running water if the surface is left bare. The basaltic soils tend to be slippery and sticky when wet, and they are easily compacted.

D. Climate

This roadless area experiences significant annual precipitation ranging from 90 to 150 inches annually. The mean elevation of this area would indicate that an estimated 75 percent of the annual precipitation falls as snow with depths over 200 inches not uncommon.

E. Vegetation

This area is 60 percent tentatively suitable commercial timberland. It is all classed as wet ecotype with overmature 400-500 year old cedar, hemlock, white pine, and Douglas-fir along the Lake Creek trails. This area is the approximate northern limit of natural noble fir in the Washington Cascades. Huckleberries, heather, false azalea, and devil's club characterize the shrub vegetation. Mountain hemlock, western hemlock, Pacific silver fir, and large Douglas-fir with volumes exceeding 80 M board feet per acre occur in areas proposed for harvest in the Fish and Fall Creek areas. Adjacent harvest units are well stocked with planted Douglas-fir as well as naturally seeded-in true firs and hemlock. Huckleberries and fireweed thrive in the cutover areas.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Hunting	100
Hiking	500
Fishing	<u>100</u>
Total	700

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes.

<u>ROS Class</u>	<u>Acres</u>
Semi-primitive Nonmotorized	10,066

There is 1.0 mile of trail within the area and it is currently open to motorized use.

G. Appearance and Surroundings

The area is primarily viewed as middleground from the main Little Wenatchee road, and foreground from two short trails.

The area is steep and even textured with vegetation, with some rockforms and a few mountain tops such as Shoofly and Jove Mountain. Large old-growth vegetation along the foreground of Top and Heather Lakes provides high visual variety.

The Heather Lake area is surrounded by Glacier Peak Wilderness and the Little Wenatchee River and Rainy Creek valleys.

H. Attractions

The area has no major attraction features. The recreation activities stated above occur basically in Fish Creek, Lake Creek, and Theseus Creek respectively.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

a. Manageability and Boundaries

The west boundary is adjacent to the Henry M. Jackson Wilderness area. The south boundary touches the Henry M. Jackson Wilderness and adjoins the Nason Ridge unit which is included in Alpine Lake Management Plan. The northern boundary traverses hillsides above the Little Wenatchee River.

Most of the boundaries do not follow clearly defined physical features.

B. Natural Integrity

The impact of human activity in the past is minor. Two developed trails (Heather Lake and Top Lake) cross the area as they access the Henry M. Jackson Wilderness. A fisherman route goes up Theseus Creek into the Henry M. Jackson Wilderness. There are no other signs of human activity in the area at present. There is a well developed road system on both the north and south sides and immediately adjacent to it. Extensive timber harvest has occurred along these road system.

C. Natural Appearance

The area is long and narrow and sandwiched between the Henry M. Jackson Wilderness and a well developed roaded area. There are few places within the area that a person would not be at least within sight or sound of human activity. Nearby roads and timber harvest activities can be seen from many locations.

D. Opportunities for Solitude

The size and shape of the area preclude a sense of real solitude. However, there are very few miles of trail and people will be confined to them. If a person had the objective of not seeing people, they could enter the area off the trails, and although being within sight and sound of developments they would not likely confront other individuals.

E. Opportunities for Primitive Recreation

With less than three miles of developed trail within the area, primitive recreation opportunities are not abundant.

F. Challenging Experiences

Trails that exist are well developed and of no particular challenge. Off the trails, steep slopes and heavy brush offer a challenge to only the most dedicated cross country hiker.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. No other threatened or endangered species have been located in the area. The extent of use by sensitive species in the area is unknown. Some spotted owls have been located within the area.

H. Historical and Scientific Study

There are no special or unique opportunities for outdoor education, and scientific or historic study in the area, which cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS Class is as follows:

ROS Class Capacity in Potential Recreation Visitor Days Per Year

Semi-Primitive Non-Motorized 11,000

B. Wildlife

The area is summer habitat for a small mule deer herd. Black bear also inhabit the area.

C. Fish

In this area, Lake Creek, an outlet for Heather Lake, supports some resident trout. However, only one mile of this stream is within the roadless area.

Theseus and Fish Creeks fish populations are not known, but are thought to be insignificant. Fish are planted at the bridge crossing on the lower end of Theseus Creek. Fall Creek is too steep to be significant fish habitat.

D. Water

There are no water related encumbrances or planned activities within the area.

E. Livestock

This area is within portions of the Stevens Pass and Little Wenatchee Recreation Stock Allotments. Range resource inventory maps do not show any usable forage types inside this roadless area. Due to vegetative cover, topography and limited access, there is no stock allotment potential, neither recreation nor domestic.

F. Timber

The area contains 6,678 acres of tentatively suitable timberland. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Dry	Mature	42	.5	.1
Wet	Mature	4,261	120.8	22.2
Wet	Immature	2,311	41.6	7.6
Wet	Seedling-Sapling	64	---	---
	Total	6,678	162.9	29.9

The estimated maximum biological potential contribution to the long-term sustained yield is 2.2 MMBF (0.4 MMCF) per year.

G. Minerals

This area is underlain by pre-Tertiary metamorphics. It has not been investigated by the U.S.G.S. or the U.S. Bureau of Mines, but reported mineral occurrences are limited to beryl. According to Bureau of Land Management records (1/23/84), there are no mining claims located within the subject area. The west half of the area is classified "prospectively valuable" for geothermal resources, but there are no existing mineral leases within the area, nor are there any pending lease applications. Low grade garnets can be found along parts of the Heather Lake trail.

H. Cultural-Historical

There are no recorded or reported historic uses of this area. The cultural resource sensitivity of this area is similar to the Canyon Creek unit in that the land base is fairly rugged. The area is also marginal to the main Little Wenatchee River corridor where much of the prehistoric and historic uses were centered.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is low to moderate with most started by lightning. Fuel loadings are moderate to heavy at lower elevations, with scattered accumulations in alpine meadows at higher elevations. Periodic large fires have occurred.

K. Insects and Disease

The primary losses in this area are old-age tree diseases including butt rot (*Polyporus schweinitzii*) and heart rot (*Fomes pini*). Large valuable white pine are lost to mountain pine beetle, but this species is a minor component of most of the stands in this area.

L. Private Lands

There are 191 acres of private land within the area with access being afforded from lands lying outside the area.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

The area is located immediately adjacent to the boundaries of the 103,591 acre Henry M. Jackson Wilderness area and the Nason Ridge roadless area which is located within the Alpine Lakes Management Area.

B. Distance From Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area which need representation through wilderness classification.

D. Interest by Proponents, Including Congressional

Since the passage of the Washington State Wilderness Act of 1984, Congress has not expressed interest in making further additions to the State wilderness system. Environmental organizations have expressed interest in adding portions of the area to the National Wilderness Preservation System in the future.

Both environmental and ORV organizations have advocated maintaining roadless status for the area.

E. Public Input

Public input during the RARE II and other planning efforts was obtained and supported unroaded allocations. Response is covered under the General portion of this Appendix.

F. Other Public Involvement

Public input solicited during the formulation of alternative for this plan indicated much support for dispersed, unroaded recreation use for the area.

There is a difference of opinion as to whether the allocation should be for motorized or non-motorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

In alternatives A/NFMA and H the area is allocate predominantly to development with 1,528 acres retained in unroaded recreation. Although 4,727 acres are to be managed in partial retention to scenic values.

Alternatives B, D and J allocate nearly all of the area to General Forest with 1,442 acres allocated to unroaded recreation, non-motorized.

Alternatives C and I call for little more even allocation between development and unroaded non-motorized Recreation.

Under Alternatives C and I the portion of the trail system in this roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Top Lake	1506	--	--	0.8
Lake Minotaur	1517	--	--	0.2
Totals		--	--	1.0

Alternatives E and F allocate nearly all of the roadless area for unroaded, non-motorized Recreation.

Alternative G put high emphasis on partial retention and General Forest with 2,502 acres allocated to unroaded non-motorized recreations. This alternative is similar to A/NFMA and H

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semi-primitive Motorized and Semi-primitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	14	13	25	13	100	81	23	14	25	13

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may be reduced as road construction occurs. The roadless character of these portions would also be lost.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate the Heather Lake trailhead to a Retention VQO. The mid-ground viewshed of the Little Wenatchee will generally be Partial Retention. The Fall Creek and Fish Creek basins will be allocated to General Forest or Maximum Modification VQO. Glimpses of heavily altered areas will be visible from the Little Wenatchee viewshed.

Alternatives B, D and J will allocate over three-fourths of the area to General Forest or Maximum Modification VQO. The area will appear heavily altered clear to the wilderness boundary. Only the Union Gap area will be allocated to Preservation VQO. Views from trails will be Maximum Modification.

Alternatives C and I will allocate most middleground views from the Little Wenatchee viewshed to Partial Retention VQO. The Fish Creek Basin will be allocated to Maximum Modification. The Heather Lake trail foreground will be allocated to Retention VQO.

Alternative E will allocate all areas to Dispersed Recreation, Unroaded, Non-motorized, and these areas are Retention VQO.

Alternative F will allocate all areas to Retention and Partial Retention VQO. A small area will be in General Forest.

Alternative G will allocate most areas to Retention and Partial Retention VQO. Scenic travel allocation increases the Partial Retention VQO. A small area will be allocated to Maximum Modification VQO. These areas are in the middleground areas from existing trails and roads.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C Preferred	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	2,013	1,738	2,925	1,738	11,067	9,266	3,074	2,013	2,925	806
Partial Retention	5,363	849	1,506	849	--	508	6,424	5,363	1,506	1,569
Modification	--	--	--	--	--	--	--	--	--	--
Maximum Modification	3,689	8,480	6,636	8,480	--	1,293	1,569	3,689	6,636	8,692
<u>Total Acres</u>	<u>11,067</u>									

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would have one-third the impact on wildlife of Alternatives B, D and J due to the amount of land allocated to General Forest. Alternatives B, D and J would road 87 percent of the area and harvest timber on over 75 percent of the area.

Alternatives C and I would have less impact than Alternatives A/NFMA and H. Alternative E would have no impact on wildlife. Alternatives F and G would have a slight impact on wildlife.

6. Fisheries

a. Significant Effects

In Alternatives F and G, the area surrounding Fish, Lake and Theseus Creeks would remain unroaded. In Alternatives B, D and J the three areas could be roaded and intensively managed for timber production. Also, in all other alternatives the Fish Creek area could be managed under an intensive timber harvest prescription. In Alternative E, the vicinity of Theseus Creek could be intensively managed for timber production, while in the other roaded alternatives the area would be managed primarily with the extended shelterwood harvest prescription. Management of the Lake Creek area differs by alternatives: in Alternatives C, E and I, the lower one mile would be managed with extended shelterwoods with the upper one mile within the roadless area being unroaded. In Alternatives A/NFMA and H, the entire Lake Creek area would be managed with the extended shelterwood harvest prescription.

Roading these areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase. This would help to meet a portion of the fishing demand (see Chapter III on Fish), but also could result in overfishing and reduction in both numbers and size of fish using the habitat. However, since the wild fisheries production is thought to be very low in these systems, except possibly Lake Creek, fishermen are unlikely to fish intensively here and overfishing effects should not occur. Also, only one mile of Lake Creek is included within this roadless area.

It is also possible that roading the unroaded areas could result in environmental degradation to streams due to timber harvest and road construction in the basins (see Chapter IV, Environmental Consequences). Some of these possible effects are also addressed in the soil and water environmental effects.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas along Lake, Theseus, and Fish Creeks, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Tree management would be planned on 9,476 acres or 86 percent of the area under Alternatives A/NFMA and H. Total vegetation manipulation area would be similar under Alternatives B, D and J. However, under these alternatives the emphasis would be on timber production rather than other resource enhancement and protection.

Alternatives C and I would manage 6,636 acres with emphasis on timber production (60 percent). In addition 1,654 acres will be managed for other resource values, especially scenic travel, that permit scheduled timber harvest. Total suitable forest that would be manipulated through timber sales is 5,872 or 58 percent of the area.

No timber management would be permitted under Alternative E, and only 1,950 acres or 18 percent under Alternative F.

Alternative G emphasizes management to provide scenic travel on 55 percent or 6,043 acres. Timber management would be emphasized on 1,569 acres.

7b. Vegetation: Forage

This roadless area has little potential for producing forage for livestock and moderate potential for big game. Due to the relatively small size, the importance of forage is not significant. Where forage is lost through natural succession, prescribed fire could mitigate this loss in all alternatives, but particularly Alternatives E, F, and G where little vegetative manipulation is proposed.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Heather Lake area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Up to 19 percent of the area could be allocated to timber harvest and road building in Alternative F, therefore, minor soil and water consequences would occur. Alternatives A/NFMA, B, C, D, G, H, I and J could allocate up to 87 percent of the area to timber harvest and road building. The environmental effects of timber harvest and road building are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building. Alternatives A/NFMA, B, C, D, G, H, I and J pose more risk of degrading the soil and water resource than Alternative E due to more intensive management. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

Any additional prescribed burning generated in the Heather Lake roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

The close proximity to the Glacier Peak Wilderness Area would increase the risk of a smoke intrusion into the Class I area from timber harvest activities in Alternatives A/NFMA, B, C, D, G, H, I and J.

10. Minerals

Since this area appears to have a low potential for the occurrence of mineral resources, the consequences on mineral resources do not appear to be extremely significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	<u>Alternative</u> D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	1,593	1,505	3,883	1,505	11,607	9,435	2,989	1,593	3,883	1,505
Moderately Restrictive	5,787	1,082	848	1,082	0	339	6,509	5,787	848	870
Relatively Few Restrictions	3,689	8,480	6,636	8,480	0	1,293	1,569	3,689	6,636	8,692

11 Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-Wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C	D	E	F	G	H	I	J
			PREFERRED							
Miles	27	25	22	25	0	4	23	27	22	25

12. Fire

The fire management workload generated in the Heather Lake roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight decrease in risk of industrial related fires would occur in the area as a result of little timber harvest in Alternatives E and F. Overall risk of fire will not significantly vary between Alternatives A/NFMA, B, C, D, G, H, I or J. The cost efficiency of fire suppression activities would be slightly decreased in Alternatives E and F due to limited access by ground based suppression resources. All other alternatives will vary little in cost efficiency. The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber-oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber-oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 26.9 jobs.

14. Wilderness Potential

The roadless area has limited potential due to its size and shape. It has potential to be an addition to the Henry M. Jackson Wilderness. Alternatives A/NFMA, B, D, H, and J allocate a small percentage to unroaded condition and would have the greatest affect on wilderness attributes. Alternatives B, D, and J have the largest allocation to General Forest, at 4,287 acres or 47 percent of the area. Alternatives E and F provide the greatest retention of wilderness attributes. Alternatives C and I are more balanced than B, D, and J with 1,760 acres in General Forest. The General Forest allocation, as well as other alternatives with some level of timber harvest, will result in road construction, vegetation and timber stand management, and loss of wilderness characteristics.

CHELAN ROADLESS AREA

Size: Gross Acres: 71,571

Net Acres: 71,063

I. GENERAL INFORMATION

A. History

Originally suggested for scenic area consideration in 1915 as the Chelan-Sawtooth area. That proposed status remained intact through all planning efforts from that time. A portion was evaluated for addition to the Glacier Peak Wilderness as area F6031 under RARE II and was recommended as non-wilderness. As a result of the Washington State Wilderness evaluation and subsequent Act in 1984, area F6031 and adjacent lands extending to Lake Chelan became part of the Glacier Peak Wilderness. An additional area became part of the newly created Lake Chelan-Sawtooth Wilderness. In all, 62,386 acres of the original area became wilderness.

The original area consisted of a portion lying both north and south of Lake Chelan. The wilderness created has further separated the roadless areas with one being north of Lake Chelan and other being divided north and south of Holden Village in the Railroad Creek drainage.

The area is being treated as one unit but will be described by the three portions just mentioned, where it is felt necessary to do so.

B. Location and Access

The area is adjacent to both the Lake Chelan-Sawtooth (north of lake) and Glacier Peak Wildernesses (north and south of Holden) in Chelan County on the Chelan Ranger District.

Access to the north of Lake Chelan portion is via the South Navarre Road and Summit, Safety Harbor, Fish Creek and Prince Creek Trails. The north Holden portion is reached via Lake Chelan and the Railroad Creek Road and Ten Mile Trail. The south Holden portion is accessed by boat on Lake Chelan in addition to the Domke Lake, Pyramid Mountain Trails, and the Shady Pass Road.

C. Physiography and Soils

This area is dominated by glacially carved Lake Chelan. Conifers are common on both sides of the lake. The area ranges from Dutch Harbor to Point-No-Point on the north shore up to Sawtooth Ridge, and from Twenty Five Mile Creek to the Glacier Peak Wilderness boundary on the south shore, and then up to the Chelan mountains. The topography on the lower slopes is characterized by glacial deposit, glacially rounded bedrock, and some hanging valleys. The non-glaciated upper segments are dominated by very rough broken and craggy rock features.

(North of Lake Chelan) - Elevations range from about 1,100 to 8,400 feet. About 75 percent of the soils have formed in granitic residuum; however, most of them have some volcanic ash mixed into the surface layer. Most of the other soils have formed in deposits of volcanic ash and pumice (depths vary from 6 inches to as much as 30 feet). The granitic soils tend to be mostly on the very steep and rugged lands, whereas the ash and pumice soils will tend to occur more on the flatter landscapes. The ash soils are easily displaced once the protective vegetation has been removed. Ash soils tend to be very dusty when dry. Granitic soils are usually good for all weather use because they rarely become slippery when wet or dusty when dry.

(South Shore, North of Holden) - Elevations range from about 1,100 to 7,200 feet. About 80 percent of the soils have developed in granitic residuum; however, most of them have some volcanic ash mixed into the surface layer. Most of the other soils have formed in glacial till. All soils have at least some influence of volcanic ash in the surface layers. The glacial till soils tend to occur mostly along the slopes that face Lake Chelan, and in Railroad Creek. Both soil types have enough coarse materials in them so that they do not become slippery or sticky when wet, and both have good bearing strength.

(South Shore, South of Holden) - Elevations range from about 1,100 to 8,400 feet. About half of the soils have formed in deposits of volcanic ash and pumice (depths vary from as little as 6 inches to more than 30 feet), and the rest have formed in granitic residuum. There is also a small amount of soils that have developed in glacial till. Ash soils are easily displaced once the protective surface vegetation has been removed. Ash soils are very dusty during dry weather. The granitic soils are less dusty and have better bearing strength when unconfined.

D. Climate

The entire area is within the 25 to 60 inch precipitation zone with much of the moisture being in the form of snow which can reach depths of 18 feet.

E. Vegetation

North of lake portion: Seventeen percent of this area is tentatively suitable timberland. Of this, 1,506 acres are seedlings and saplings, most of which are on acres burned in the Safety Harbor fire of 1970. Nearly one-third of the area is nonvegetated rock.

Mature timber areas are dominated by Douglas-fir with ponderosa pine and lodgepole pine being important associated species. Acres burned in 1970 have dense ceanothus velutinous and lodgepole pine on the north slopes. Some nonstocked areas occur on more harsh aspects originally stocked by ponderosa pine and Douglas-fir. Planting has not been done due to access problems. Timber inventory plots show some of this area to be very productive with a site index of 100. (Site index average for the forest is 70 for dry and 83 for wet.) North of Holden portion: Twenty-nine percent of this area is tentatively suitable timberland. Forty-six percent of the area is classed as rocky nonvegetated, although some vegetation suitable for mountain goat habitat is present.

The principal species present is Douglas-fir. Previous logging removed much of the existing old-growth ponderosa pine leaving pole sized Douglas-fir.

Understory vegetation includes pinegrass, Oregon grape, ocean spray, and willow.

South of Holden portion: Thirty percent of this area is tentatively suitable timberland. However, much of the upper slopes are occupied by dense, small diameter lodgepole pine-subalpine fir stands. These stands are the result of past wildfires.

There are some highly productive small areas such as near Domke Lake where water loving species such as western red cedar and Englemann spruce mix with Douglas-fir to form high volume old-growth forests.

Understory vegetation varies from the pinegrass, ocean spray type at low elevation to dwarf huckleberry and false azalea at higher elevations.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
<u>North of Lake</u>	
Motorized Trail Riding	1,800
Hunting	1,000
Backpacking	<u>1,800</u>
Sub Total	4,600
<u>N. Holden</u>	
Hiking	100
Hunting	<u>200</u>
Sub Total	300
<u>S. Holden</u>	
Hiking	400
Hunting	250
Fishing	<u>500</u>
Sub Total	<u>1,150</u>
Total	6,050
<u>Total Area</u>	
Motorized Trail Riding	1,800
Hunting	1,450
Hiking	500
Backpacking	1,800
Fishing	<u>500</u>
Total	6,050

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) classes:

<u>ROS Class</u>	<u>Acres</u>
<u>N of Lake</u>	
Semi-primitive Motorized (SPM)	23,780
<u>N Holden Portion</u>	
Primitive (P)	6,410
Semi-primitive Motorized (SPM)	2,860
<u>S. Holden Portion</u>	
Primitive (P)	14,013
Semi-primitive Non-Motorized (SPNM)	8,565
Semi-primitive Motorized (SPM)	15,435
<u>Total Area</u>	
Primitive (P)	20,423
Semi-primitive Non-Motorized (SPNM)	8,565
Semi-primitive Motorized (SPM)	42,075

There are 43.7 miles of trail within the entire area of which 43.3 are currently open to motorized use.

G. Appearance and Surroundings

South of Holden:

This area has a high visual variety of landform, vegetation, and rockform, and moderate to high waterforms (lakes and streams).

The area is a glaciated valley with a variety of texture patterns. Steep slopes climb up out of the valley to a ridgeline dominated by snowy peaks. Numerous streams dissect the landform. A portion of the area is secluded in the Domke Lake and mountain basin. This area has high visual variety.

The area is primarily viewed as foreground and middleground from scenic Lake Chelan and the ridge top trail of the Chelan mountains and the Domke Lakes Trail.

Boundaries are Lake Chelan to the north and northeast, Entiat mountain ridgetop to the south southwest, Glacial Peak Wilderness to the northwest.

North of Holden:

This area has a high visual variety of landform, moderate to high visual variety of vegetation and rockform, and low waterforms (lakes and streams).

There is a highly textured quality with vegetation on the north and northeast slopes, and a broken and open appearance on the south slopes. The ridgetop is rugged and open with sparse vegetation. The slopes are steep with avalanche paths along the glaciated valleys of Lake Chelan and Railroad Creek.

The area is primarily viewed as foreground and middleground from Railroad Creek, Lake Chelan, and Glacier Peak Wilderness.

Boundaries are the Glacier Peak Wilderness to the north and west, Lake Chelan to the northeast and east, and the side slope above Railroad Creek to the south.

North of Lake:

This area has a moderate to high visual variety of landform including knife ridges, moderate vegetation, rockform, and a few scenic lakes.

The area lies on the north side of Lake Chelan facing south, southwest and west. It includes the upper drainages of the Middle and East Fork of Prince Creek, and Safety Harbor. Vegetation is broken on steep open slopes with broad ridgetops and numerous densely vegetated creek drainages. Evidence of old burns in the Safety Harbor drainage create a sparse, blackened scene. Lakes include Cub and Boiling.

The area is primarily viewed as foreground and middleground from scenic Lake Chelan, the Sawtooth trail, and other trails along the drainage bottoms.

Boundaries are the Lake Chelan-Sawtooth Wilderness to the west, the Sawtooth ridge of the Okanogan National Forest to the north and northeast, Lake Chelan to the south and southwest, and roaded multiple use land to the east.

H. Attractions

Major attractive features are:

North of Lake:

High mountain meadows; Prince Creek and Safety Harbor Creek drainages; and Boiling and Cub Lakes, which are among the few lakes accessible by motorized transportation.

North of Holden Portion:

High-country deer hunting and historical mines and trails.

South of Holden Portion:

Scenic views from both the upper and lower elevations.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

North of Lake:

The north of the Lake area lies adjacent to and east of the new Lake Chelan-Sawtooth Wilderness. It is bounded on the south by Lake Chelan, on the north by Okanogan National Forest along the Sawtooth Ridge, and by a heavily roaded area to the east. The area consists of the Safety Harbor Creek drainage, the upper portions of the East Fork and Middle Fork of Prince Creeks, and a small area along Lake Chelan between Safety Harbor Creek and Grade Creek. All boundaries are easy to define and locate on the ground, with the exception of the line between Safety Harbor and Grade Creek. This line does not follow any prominent geographic feature, but instead follows a township line a few miles, then rambles around, finally ending at Lake Chelan below Grade Creek.

The area does include about three miles of an old road in Safety Harbor Creek drainage that will revert to a trail-like appearance after many years. This route is presently closed to four-wheeled vehicles.

Off site intrusions include the motorized use along the Lake Chelan corridor and the sights and sounds of the existing road system to the east of the area.

North of Holden:

This area lies north of the existing Railroad Creek Road #3100. The area abuts Glacier Peak Wilderness on the north and west and Lake Chelan to the east. Proposed boundaries would be easy to define and to locate on the ground. The area is located primarily within the Railroad Creek drainage with views of the Railroad Creek Road, Holden Village, and the mine tailing piles near Holden. The remainder overlooks the upper portion of the Lake Chelan basin. Even though the area has some off-site visual intrusions, the surrounding areas have such outstanding scenic qualities that the intrusions are minimized.

South of Holden:

This area consists of two units. One surrounds Domke Lake and the other lies on the south side of Lake Chelan from Bear Creek to Box Canyon. The large unit is bounded by the Chelan mountains, Lake Chelan, and the Glacier Peak Wilderness. The Domke Lake unit borders Lake Chelan and the Glacier Peak Wilderness. All boundaries are easy to define and locate. The Domke Lake unit is affected by visual and noise intrusions from motorized use on Domke Lake, Lake Chelan, and the Domke Lake National Recreation Trail #1280. The larger Lake Chelan unit is influenced by the motorized use along Lake Chelan, and the roaded area across Lake Chelan, visible from the southern portion of the area. All boundaries would be easily managed to maintain the primitive character except the shoreline along Lake Chelan. The shoreline is susceptible to random landings of motorized watercraft which would be difficult to administer.

B. Natural Integrity

North of Lake:

Mans' influence within the area has been considerable with a moderate impact on resources. Existing structures and activities include the following: remnants of an old electrical transmission line along Lake Chelan; developed campsites at Deer Point and Safety Harbor, docks, private land including year around homes and roads; water transmission lines; 3 miles of old road leading to a small concrete dam; a hunting cabin; old mine diggings and equipment; approximately 2 miles of old cat road for mining access; abandoned wood and metal water flume; cattle and sheep grazing allotments; trails open to motorbikes; firebreaks; and backcountry facilities such as log tables, wallowa toilets, hitchrack, steel fire-rings, and bulletin boards.

The offsite intrusions may include the sounds and sight of motorboats and aircraft along Lake Chelan, and the occasional glimpses of Grade Creek Rd. #3001. The area is a "buffer" zone between the developed area to the east and Lake Chelan-Sawtooth Wilderness to the west. This zone has had a long history of mans' influence and activities.

North of Holden:

The majority of the land within the area is so rugged and remote that man has had very little influence on natural conditions. The Railroad Creek Road along the south boundary of the unit has a very light volume of traffic, primarily serving Holden Village needs. The road is well screened with heavy vegetation. Holden Village, a small year-round community with numerous structures, is visible from some vantage points within the area.

A user built trail of approximately two miles in length is located up Ten Mile Creek. An old trail located on Lightning Ridge and Lucerne Mountain was abandoned many years ago. A small, two unit developed campsite for boaters is located at Elephant Rock on Lake Chelan. Facilities include a small dock, pit toilet, tables, and fire-rings. A small tract of private land exists at the mouth of Lightning Creek, with a cabin and dock.

South of Holden:

The Domke Lake portion has a considerable number of existing human influences including a resort with four cabins, rental motorboats, horse grazing, trails, abandoned powerline corridor, developed campsites with docks, tables, firerings, pit toilets, an old abandoned lookout site, special use summer home, fences, and float plane use. The Domke Lake area is accessed by a National Recreation Trail which permits motorized use. Aircraft, both private and commercial, regularly use Domke Lake as a destination area for fishermen and resort users.

The large southern portion of the area has no human influence throughout the majority of the area except along the shoreline of Lake Chelan. Some of the developments found along the shoreline includes summer homes, docks, campgrounds, and navigation markers. Lake Chelan has a fairly heavy amount of power boat and float plane use that influences the user by sight and sound. This influence is confined primarily to the lakeshore area.

C. Natural Appearance

North of Lake:

The impacts on the natural aspects of the area are moderate. The past disturbances which have had the greatest impact on the area's natural character are the old Reclamation Road into Safety Harbor Creek, mining activities in the head of Safety Harbor Creek, the hunters cabin near Uno Peak, and the developed recreation sites on Lake Chelan. Firebreaks on Goat Mountain Ridge were constructed to stop the devastating fires of 1970. Watershed damage, as a result of these fires, contributed to the heavy channel erosion evident in Safety Harbor Creek.

North of Holden:

A minor amount of human activity has taken place and the area appears natural and free from disturbance. The offsite intrusions are subservient to the overwhelming beauty of the surrounding landscape.

South of Holden:

The Domke Lake area has a long established history of motorized use. Numerous structures and developments within the area detract from the wilderness capability. Alterations, such as old powerline corridors, reduce the natural appearance of the area. Domke Lake as a destination area for float planes does detract from the natural aspects of the area even though there is little effect on resources. It is difficult to escape the motorized uses and developments which surrounds the area.

The larger southern portion of area contains a highly natural appearance. Once the user leaves the shoreline of Lake Chelan, only the occasional sight and sound of planes and boats mar an otherwise totally natural setting.

D. Opportunities for Solitude

North of Lake:

The two heaviest used trail corridors leading into the Chelan-Sawtooth Wilderness are through this unit. The area is extensively trailed having approximately 25 miles open to motorbike use. Cub and Boiling Lakes provide popular camping and fishing destination points. Solitude can be increased by traveling cross-country, which is possible due to the relatively openness of the terrain. Also, avoiding the popular destination lakes can provide a higher level of solitude. The Lake Chelan waterway has a relatively high amount of use by motorboats and aircraft which influences the solitude along the southern boundary of the area.

North of Holden:

The area offers high opportunities for solitude. The area is not large but the remoteness, rough topography, and vegetative cover offers ample opportunity for the user to disperse. Considering that the unit is contiguous with Glacier Peak Wilderness, a user would develop a strong feeling of the spirit of wilderness.

South of Holden:

The Domke Lake area offers only a moderate level of solitude. The outside influences “squeeze in” on the area reducing an opportunity for seclusion. However, the majority of the area between Bear Creek and Box Canyon can offer a relatively high level of solitude. The large amount of area, the ruggedness and the lack of access trails, all combine to offer considerable solitude once a visitor leaves the shoreline of Lake Chelan.

E. Opportunities for Primitive Recreation

North of Lake:

Due to the high, open, less rugged topography, good opportunities exist for primitive recreation off the developed trail system. Cross-country backpacking, hiking, fishing, horseback riding, and hunting are popular activities. High elevation cross-country skiing holds good potential, however, winter access to the area is difficult.

North of Holden:

The area offers a moderately high opportunity for primitive recreation experience such as backpacking, canoeing, camping, fishing, hunting, and mountain climbing. Despite the fact the area lies adjacent to the motorized use on Lake Chelan, Holden Village, and Railroad Creek Road, most users would experience the primitiveness of the area once they went beyond its boundaries.

South of Holden:

Primitive recreation opportunities include mountain climbing, cross-country backpacking, fishing, big game hunting, camping, and photography. Once away from the influence of Domke Lake and Lake Chelan, the opportunity for a primitive experience is good.

F. Challenging Experiences

North of Lake:

The area has a variety of terrain features that provide a moderate amount of challenge for both summer and winter recreation access.

North of Holden:

There are ample opportunities for challenging experiences, self-reliance and adventure within the area. Mountain climbing and off-trail high mountain hiking offers the most challenge.

South of Holden:

The area can offer a high level of challenging experiences due to the rough topography, difficult access and extreme elevation gain over a short distance. A transverse across the area from any direction will test a person’s self-reliance, judgment, and ability.

G. Special Wildlife Features

Peregrine falcons have been seen in the area during the summer months but no nest sites have been located during the winter and spring months. No other threatened or endangered species have been located in this area. The extent of use of the area by sensitive species is unknown.

H. Historical and Scientific Study

North of Lake:

The area has an unusually large floral display in early summer due to past wildfires and sheep grazing. The hunting cabin under special use permit near Uno Peak is eligible for the National Register of Historical Places.

North of Holden:

The Edil Mine offers evidence of the tenacity of miners seeking gold at the turn of the century. The only other historical attribute is the abandoned trail located on Lightning Ridge.

South of Holden:

The Domke Lake area is rich in the tradition of the old mountain men and trappers, such as Cool and Stuart. The history of these men have made them a legend to the local people. Their developments in the Domke Lake area are an integral part of the natural environment of the area.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities. Estimated carrying capacity by ROS class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
North of Lake	
Semi-primitive Motorized (SPM)	71,000
North of Holden	
Primitive (P)	5,100
Semi-primitive Motorized (SPM)	8,600
	13,700
South of Holden	
Primitive (P)	11,200
Semi-primitive Non-motorized (SPNM)	8,600
Semi-primitive Motorized (SPM)	46,000
	65,800
Area Total	
Primitive (P)	16,300
Semi-primitive Non-motorized (SPNM)	8,600
Semi-primitive Motorized (SPM)	125,600
	TOTAL 150,500

B. Wildlife

The area provides summer and winter range for a large deer herd^d and several small mountain goat herds. The mountain goat populations declined from the early 1970's to the early 1980's. In 1983 and 1984, a total of 44 mountain goats were transplanted to the Lake Chelan drainage in an effort to build the goat populations up. The area is also used by black bear, cougar, and a variety of small mammals and birds.

C. Fisheries

North Lake:

Although this roadless area includes a long section of the Lake Chelan shoreline, there is very little of significance relating to fish. Safety Harbor Creek is used for spawning by kokanee salmon coming from Lake Chelan. The use is limited to about one-quarter of a mile above its mouth. No other small streams along the Lake are used by a significant number of spawning kokanee.

There is also use by other species of fish in some of the streams in the area. Safety Harbor Creek and the Middle Fork of Prince Creek have populations of trout which are fairly heavily fished. The East Fork of Prince Creek has a practically insignificant amount of fish production.

Cub Lake, along the Middle Fork of Prince Creek, is a popular fishing lake because of easy trail access. There are large numbers of fish in the lake that may be of reduced size because of overpopulation and low productivity. Boiling Lake, the only other lake in the roadless area, has a small trout population. Although very scenic, it is more important as a camping site than a fishery attraction.

North Holden:

There is nothing significant about fish in this area.

South Holden:

A very large lake, Domke Lake, is located in this roadless area. It has a population of rainbow trout that is fairly heavily fished. It has been occasionally stocked. Fish migrate out of Domke Lake to Lake Chelan. Since there are falls on the Creek, there is no reverse migration possible from Lake Chelan to Domke.

There are no other streams with significant fish populations in this area.

D. Water

North Lake:

Portions of this area include withdrawn lands for purposes of power withdrawals and impoundments. There are numerous locations along Lake Chelan where the withdrawal extends into this inventoried designated roadless area.

Water yield information is available for the Chelan River (Lake Chelan). Only a small percentage of runoff in Lake Chelan emanates from National Forest lands in this drainage basin (approximately 12 percent). The majority of water originates in wilderness or from National Park lands. The Chelan Public Utility District #1 has water yield information for this basin.

North Holden:

There is a water transmission and dam pipeline at Holden Village, Sections 7 and 8; T31N, R17E, WM. The original FPC #2023 license was for an intake. The conduit was replaced with a Special Use Permit in 1951.

South Holden:

FPC #1465 withdraws portions of a section for the transmission line to Holden. This line has been removed but the withdrawal remains along a 50 foot right-of-way each side of center line leading from Lake Chelan up to Domke Lake via Domke Creek. The right-of-way traverses Railroad Creek to Holden.

The Chelan Copper Mining Co. made application for a power project at Domke Lake. The Project (FPC #1200) was requested by application in March 1932. The proposal was never implemented but remains as a withdrawn site.

E. Livestock

North Lake:

The north one-half of this area contains all of the Horsethief (a portion of Buttermilk) domestic stock allotments. These allotments are currently being used in alternating years by sheep (Buttermilk Allotment) and by cattle (Horsethief Allotment). Topography and key wildlife range limits the development potential for domestic stock on the south one-half of the area along Lake Chelan.

North Holden:

The Railroad Creek domestic stock allotment is within a portion of this area near Lucerne. It is currently being used for commercial recreation stock (horses) under paid permit. Topography and access limits the development of the remainder of the area.

South Holden:

The Railroad Creek allotment is within a portion of this area near Domke Lake. It is currently being used for commercial recreation stock (horses) under paid permit. Development potential for the remainder of the area is limited due to topography and access

F. Timber

The entire area contains 17,933 acres of tentatively suitable timberland. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
N. of Lake				
Wet	Mature	890	25.2	4.6
Wet	Immature	233	4.2	0.8
Wet	Seedling-Sapling	700	---	---
Dry	Mature	1,018	12.6	2.3
Dry	Immature	296	2.9	0.5
Dry	Seedling-Sapling	806	---	---
	Subtotal	3,943	44.9	8.2
N. Holden				
Wet	Mature	148	8.2	1.5
Wet	Immature	424	12.9	2.4
Wet	Seedling-Sapling	106	---	---
Dry	Mature	657	4.2	0.8
Dry	Immature	1,314	7.6	1.4
	Subtotal	2,649	32.9	6.1
S Holden				
Wet	Mature	2,459	69.7	12.8
Wet	Immature	2,480	44.6	8.2
Wet	Seedling-Sapling	42	---	---
Dry	Mature	3,074	38.5	7.1
Dry	Immature	3,138	30.8	5.6
Dry	Seedling-Sapling	148	---	---
	Subtotal	11,341	183.6	33.7
Grand Total		17,933	261.4	48.0

For the entire area, the estimated maximum biological potential contribution to the long-term sustained yield is 5.4 MMBF (1.0 MMCF) per year.

G. Minerals

North Lake:

This area is dominantly overlaid by granitic rocks of Mesozoic age, but is also overlaid in part by Upper Jurassic - Lower Cretaceous sedimentary and volcanic rocks. The area has not been studied by the USGS or the U.S. Bureau of Mines, but it does have reported occurrences of limestone and pumice. Neither has been adequately investigated to determine whether the deposits have commercial value, if any. Bureau of Land Management Records (1/23/85) indicate that nine lode claims have been located within the area, one of which is considered abandoned for failure to record assessment work. None of the area is classified "prospectively valuable" for leasable minerals, and there are no existing leases nor are there any pending lease applications.

North Holden:

This area is underlain by pre-Cretaceous metamorphic rock and granitic rock of Mesozoic age. Of importance for mineral resources are the contact or shear zones between these two types of rocks, as well as the body of the Riddle Peak pluton itself. The subject area lies within the Railroad Creek mining district which is best known for the Holden mine where substantial amounts of copper, gold, silver, and zinc, were produced from 1938 to 1957. The Holden Mine deposit itself lies south of the subject land and significant deposits of similar nature are not known to occur within the C-2 area. Based upon the U.S. Geological Survey and U.S. Bureau of Mines study of the Glacier Peak Wilderness and adjacent areas, however, the western portion of the subject area is considered to have a "moderate" potential for the occurrence of copper, zinc, gold, and silver resources in volcanogenic massive-sulfide deposits, and a "low" potential for the occurrence of nickel, cobalt, chromium, and platinum group metal resources in mafic layered complexes. According to Bureau of Land Management records (1/23/85), nine lode claims and three placer claims have been located within or immediately adjacent to the area, for which assessment work has been recorded through 1985. Except for the western 10 percent of the area, which is classified "prospectively valuable" for geothermal resources, the area is not considered to have potential for any of the leasable commodities. It has no existing mineral leases, nor are there any lease applications pending.

South Holden:

This area is dominantly underlain by pre-Cretaceous metamorphic rocks, but is also underlain in part by Mesozoic intrusive rocks. The area around Milham Pass, which is underlain by a rhyodacite plug containing disseminated sulfides (Church and Strotelmeyer, 1984), is of most interest as far as mineral potential is concerned. That area has been identified by the U.S. Geological Survey and U.S. Bureau of Mines as having a "low" potential for the occurrence of base-end precious metal resources in hydrothermal veins. The area also has deposits of pumicite, which have not been adequately investigated to determine their commercial value, if any. According to Bureau of Land Management records (1/23/85), no mining claims have been located within the area. The area has not been classified "prospectively valuable" for any of the leasable commodities, and it has no existing mineral leases nor any pending lease applications.

H. Cultural-Historical

North Lake:

Centuries before the first Euro-American contact, ancestors of the Chelan Indians made their homes along the lower margins of Lake Chelan. From these villages, individual Indians and families regularly traveled uplake, camping along the shores and making hunting and food plant gathering expeditions into the appropriate backcountry areas. To date, however, archaeological indications of these uses north of the lakeshore have not been located.

Historically, the Chelan-Sawtooth North Lake unit was used primarily for sheep grazing, hunting, and small scale mining. There is one National Register-eligible site, the Crow Cabin, within the unit, at least two reported sheep camps; and the remnants of former mining operations in Miners and Horsethief Basins. The Coyote Creek incline, a unique historic feature associated with early logging and with later construction of the Lake Chelan Reclamation District irrigation flume, is located just west of Coyote Creek, in the southern portion of the unit.

North Holden:

Indian use of this unit would be similar to that described in Unit C1. No archaeological sites are known within the area, but a single, unverified pictograph site has been reported. Historic uses would most likely relate to the succession of mining activities that took place at Holden, on Railroad Creek.

South Holden:

Indian use of this unit would be similar to that described in Unit C1. One pictograph site and reports of lithics occurrences exist along the south and west shore of the lake, between Lucerne and Twenty-five Mile Creek. However, there are no archeological sites known in the backcountry south of the lake.

The predominant historic use of this unit was in fire protection. Lookouts were in existence on Junior Point (1931-68), Big Hill (1933-1950's), Pyramid Mountain (1917-1954), and Domke Mountain (1920-1970). Sheep grazing was generally confined to the area south and west of the Chelan Mountain divide, but allotment boundaries did spill over into the upper Corral and Big Creek drainages. The northern part of the unit was within the trapping territory of A.L. Cool, who preceded Gordon Stuart at Domke Lake. Some remnants of this use may yet exist.

I. Land Use

The South Holden unit contains the Domke Lake resort which is under Special Use Permit.

J. Fire

Annual fire occurrence is moderate and primarily caused by lightning. Fuel accumulations are moderate at lower elevations to exposed rock and alpine meadows at higher elevations. Periodic large fires have occurred.

K. Insects and Disease

North Lake:

Both western spruce budworm and tussock moth defoliations have occurred in this area in the past. Dwarf mistletoe is also heavy in the Douglas-fir. Mature lodgepole pine is subject to mountain pine beetle attacks.

All of these pests can contribute to increased fuel loading and eventual large fires such as occurred in 1970.

North Holden:

Mistletoe in Douglas-fir is the primary damaging agent in this area. Western spruce budworm, although not as damaging here as in Fish Creek, is a potential problem due to the high proportion of Douglas-fir host trees.

South Holden:

The most threatening insect in the area is the mountain pine beetle. Lodgepole pine stands created by past fires in areas such as Big Creek are becoming increasingly susceptible to mountain pine beetle.

A timber sale is planned in Big Creek to harvest high risk lodgepole pine. Adjacent stands in Twenty-five Mile Creek have large areas infected with root rot and dwarf mistletoe and it is expected that Douglas-fir dominated stands to the west would also be affected.

L. Private Lands

There are 508 acres of private lands within the North Lake area. These are all accessed by facilities lying outside of the area and are subdivided into multi-ownerships. Acquisition possibilities are considered to be very difficult and costly.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

The North of Lake area is located immediately adjacent to the eastern boundary of the Lake Chelan-Sawtooth Wilderness Area. Both the North and South of Holden portions are bounded in part by the Glacier Peak Wilderness and Lake Chelan. The South Holden portion also adjoins the Entiat roadless area to the south and is near the Stormy Mountain roadless area to the east.

B. Distance from Population Centers

The entire area is reachable within two to four hours driving time from population centers such as Seattle, Tacoma, Yakima, Tri-Cities and Wenatchee.

C. Need for Ecosystem Representation

North Lake:

The ecosystem is adequately represented in the adjacent Lake Chelan Sawtooth Wilderness.

North Holden:

No unique ecosystems are known to exist within the area that aren't already adequately represented in the adjacent Glacier Peak Wilderness.

South Holden:

There are no unique ecosystems represented that are not already contained within the adjacent Glacier Peak Wilderness and the Lake Chelan-Sawtooth Wilderness across Lake Chelan.

D. Interest by Proponents, Including Congressional

North Lake:

Recent wilderness legislation created the Lake Chelan-Sawtooth Wilderness adjacent to the Chelan-Sawtooth North Lake unit. Congress considered but deleted this area from wilderness due to the large trail system that had been reconstructed with State IAC funds and the large amount of interest from motorbike users. Portion of this area is presently under permit for helicopter skiing and holds potential for both cross-country and alpine helicopter assisted skiing.

The area has had a long history of considerable public support for the management of the area as roadless, scenic or wilderness.

North Holden:

The area was previously considered as a part of the entire Lake Chelan roadless area. The majority of the Lake Chelan area was designated wilderness in 1984. Although there was little public interest specific to this area, it can be assumed that the public is still interested in this area for its roadless and wilderness attributes. Its proximity to Glacier Peak Wilderness will continue to make the area a candidate for wilderness inclusion by the public.

South Holden:

The Domke Lake area was specifically excluded by Congress as part of the Washington State Wilderness Act of 1984 Glacier Peak Addition. Local residents have always favored roadless status without wilderness designation due to the long history of the Domke Lake Resort and the float plane use of Domke Lake.

The remainder of the Chelan-South Holden area has had a long public interest in the area as a roadless, scenic, or wilderness area. It is contiguous with Glacier Peak Wilderness and only a mile across the lake from the Lake Chelan-Sawtooth Wilderness. Due to its outstanding scenic beauty, public support for management as a roadless area is expected to continue.

E. Public Input

North Lake:

This area was not considered during the RARE II Planning because it had previously been addressed by the Chelan Unit Plan in 1976. The Chelan Unit Plan allocated the area for Scenic-Roadless management. Two special interest groups proposed wilderness status for the area during the development of the Unit Plan.

North Holden:

This area was not considered during the RARE II planning process because it was addressed in the Chelan Unit Plan of 1976. The Chelan Unit Plan land allocation was to designate the area for Scenic-Roadless management. Special interest groups have proposed wilderness status of this area (Lake Chelan) for many years.

South Holden:

The area was not considered during the RARE II planning because it had previously been addressed in 1976 by the Chelan Planning Unit. This plan allocated the Chelan-South Holden Unit to proposed Scenic Area status. Past public input by some special interest groups have proposed wilderness classification for this area.

F. Other Public Involvement

None

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Chelan Roadless Area is located on both sides of Lake Chelan and is 71,063 acres in size. The unit on the north side of the lake is adjacent to the Lake Chelan-Sawtooth Wilderness and the unit on the south side of the Lake is adjacent to Glacier Peak Wilderness.

The area offers excellent opportunities for horse packing and backpacking as well as ORV use. Boiling Lake is a focal point for backcountry campers and hunters. Surprise Lake is a heavily used destination lake for fishing and camping. The Summit Trail serves as the transportation corridor to the Lake Chelan-Sawtooth Wilderness and the Upper Lake Chelan Area.

The roadless unit on the south side of Lake Chelan has been inventoried as semi-primitive, non-motorized with the exception being the area adjacent to Domke Lake. Other than the area near Domke Lake, the area is trailless and basically pristine in character.

Recreational activities are mostly big game hunting and cross country back packing. Semi-primitive, non-motorized use is relatively light, estimated at 100 RVD's with the exception of the Domke Lake Area. Domke Lake is accessed by a National Recreation Trail open to bikes, and a special use resort with rental boats and motors operates on the Lake. The semi-primitive motorized use adjacent to Domke Lake is estimated at 200 RVD's.

Alternatives A/NFMA and H would allocate close to 90 percent of the area to a scenic designation. The objective would be to manage for recreation use substantially in a natural condition. The purpose would be to protect the natural beauty and to foster public use and enjoyment. Some timber harvest may take place if compatible with the recreation use or if necessary to enhance other resources such as wildlife. Under these alternatives the areas would be administratively classified Scenic under 36 CFR 294.

Alternatives B and D result in 59 percent of the area being in a roadless category, the majority in semi-primitive, non-motorized status. The north unit and small area around Domke Lake is in a semi-primitive, motorized setting. The biggest change from the existing situation is the conversion of approximately 35 percent of the area to a Roaded Natural ROS class. Within this area wildlife recreation values would be emphasized, possibly including some vegetative management or road construction. This prescription falls within the Big Creek, Corral Creek, Little-Big Creek drainages. The wildlife prescription may appeal to some wildlife recreation users, but may conflict with the roadless/non-motorized advocates of the area.

Another seven percent of the area in the Safety Harbor drainage will change to a roaded modified setting with the primary emphasis on timber removal.

Alternatives B, D and J result in a more complete range of recreational opportunities; however, considering the location and pristine character of this roadless unit, the overall recreational input could be considered negative by the roadless advocates.

Alternatives C and I would allocate about 81 percent of the area to roadless management. These alternatives would retain about the same ROS settings as the existing inventoried use. In addition, about 11 percent of the area will be designated under the wildlife management prescription on the north shore of Lake Chelan. This strategy is within ROS Class Roded Natural; however, due to the lack of timber over most of the area, no timber cutting or road building is anticipated.

Under Alternatives C and I the portion of the trail system that is in this roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roded Motorized
Prince Creek	1255	--	6.9	--
E. Fk. Prince Creek	1257	--	3.0	--
Summer Blossom	1258	--	6.0	--
Summit	1259	--	11.0	--
Hoodoo Pass	1259.3	--	1.3	--
Uno Peak	1260	--	6.1	--
Safety Harbor	1261	--	3.8	--
Graham Harbor Creek	1269	0.4	--	--
Domke Lake	1280	--	3.2	--
Domke Mt. Lookout	1280.1	--	2.0	--
Totals		0.4	43.3	--

Alternatives E and F emphasize the amenity values and the roadless management prescriptions. Both these alternatives allocate about 90 percent of area to non-motorized dispersed recreation. The existing inventoried dispersed recreation motorized use will be eliminated and converted to non-motorized use.

A wildlife management prescription totaling 10 percent of the area exists on the north shore of Lake Chelan. This area would be designated Roded Natural; however, no roads are anticipated to be constructed.

Alternative G emphasizes the amenity values in a semi-primitive, motorized setting. Eighty-two percent of the area is in roadless status with 68 percent allocated to non-motorized use and 32 percent of the area allocated to motorized use. The additional area in the motorized setting is in a corridor along the south shore of Lake Chelan. This alternative would allow for construction of a trail from Twenty-Five Mile Creek to Lucerne with ORVs permitted from Twenty-Five Mile to Bear Creek (wilderness boundary).

The remainder of the area would be designated Roded Natural under the scenic travel and wildlife prescriptions. Some timber may be cut in the background areas of the scenic travel strategy but no timber is available for removal within the wildlife management area on the north shore of Lake Chelan.

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semi-primitive Motorized and Semi-primitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	84	59	90	59	100	85	82	84	90	52

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	100/0	32/68	48/52	32/68	2/98	0/100	32/68	100/0	48/52	64/36

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with more roaded natural or roaded modified setting.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate the majority of the area to Retention and Partial Retention VQO. The Navarre Peak south along the ridges will be allocated to Intensive Range allocation or Modification VQO. Most viewsheds will have high visual quality.

Alternatives B and D will allocate lands with a variety of prescriptions within the viewshed to provide contrasting visual quality. The Chelan viewshed between Lucerne north to Wolverine Creek will be slightly altered. Deep Harbor, Corral Creek, and Big and Little Creek Basins to Chelan Mountain ridge top will be allocated to Partial Retention VQO. The area south of Holden Village will be allocated to Roaded Natural Partial Retention VQO. Three-quarters of the Safety Harbor drainage will be allocated to Maximum Modification.

The upper end of Railroad Creek drainage, Domke Lake, and the upper end of Sawtooth Ridge will be allocated to Retention VQO. Navarre Peak area will be Maximum Modification.

Alternative J allocates most areas to Modification and Maximum Modification.

Alternatives C and I allocate many areas to Preservation, Retention, and Partial Retention VQO. The visual resource will have high visual quality except along the upper end of South and North Navarre area, the upper end of Junior Point, and Big Hill areas. These areas are allocated to Maximum Modification. Domke Lake Basin is dispersed recreation, unroaded-motorized or Retention VQO.

Alternative E allocates most areas to Retention VQO. The Upper Navarre Area will have high visual quality without intensive range management.

Alternative F will allocate most areas except the Navarre Area to Retention VQO. There is no General Forest or dispersed recreation unroaded, motorized allocations in this alternative.

Alternative G will allocate most areas to Retention and Partial Retention VQO. There is no General Forest allocation in this alternative. Partial Retention VQO is the allocation along the foreground and parts of the middleground of Lake Chelan from Point to No Point.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	63,239	44,901	61,522	44,901	64,512	63,307		63,239	61,522	14,585
Partial Retention	6,299	5,089	1,612	5,089	--	1,205	3,964	6,297	1,612	6,849
Modification	1,039	15,721	5,215	15,731	6,551	6,551	7,780	1,039	5,215	31,927
Maximum Modification	488	5,342	2,714	5,342	--	--	--	488	2,714	17,702
Total Acres	71,063	71,063	71,063	71,063	71,063	71,063	71,063	71,063	71,063	71,063

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would have an insignificant effect on wildlife use in the area. Alternatives B and D would allow for harvest on eight percent of the area which, even though minor, would be seven times the impact of A/NFMA and H. Alternative J would have the most area allocated to timber emphasis with 26 percent of the area. Alternatives C and I would have less effect than B, D and J, but more than A/NFMA and H due to the development of motorized use on 23 percent of the area. Alternatives E and F would have less effect than A and H. Alternative G would have less impact than A/NFMA and H, but more impact than E due to the amount of motorized recreational development.

6. Fisheries

a. Significant Effects

In all alternatives the areas of Cub, Domke, and Boiling Lakes and the Middle Fork of Prince Creek would remain roadless. In Alternatives A/NFMA, E, and H, all of Safety Harbor Creek in the roadless would also remain unroaded. In Alternatives B, C, D, F, G, I, and J the lower areas of Safety Harbor Creek would be managed principally to benefit domestic livestock (range management), while the upper reaches would be unroaded.

In the alternatives in which range management would dominate the management, it is possible that roads could be built in the vicinity of Safety Harbor Creek. Rooding these areas could change the recreational fishing opportunities, although the total mileage of streams in this roadless is quite small. Since about two-thirds of the Forest's fishing occurs in rooded areas, it is expected that fishing would increase slightly. However, there is already a fair amount of recreational fishing use of Safety Harbor Creek and the net use would not change.

Rooding the unroaded areas could also result in environmental degradation to streams due to timber harvest and road construction in the basins. Since the area would also be managed for livestock use, there could be some stream degradation or enhancement due to grazing. Some of these possible effects are also addressed in the soil and water environmental effects section.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas or manage areas for livestock production, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are rooded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations. Also, allotment plans would be written which should consider streamside use by cattle and necessary mitigating measures.

7a. Vegetation: Trees

Under all alternatives it is expected that more area will remain unroaded than is rooded. The range of tree management emphasis activities is from 17,702 acres (25 percent) scheduled for timber emphasis in Alternative J to no scheduled harvest in Alternative E.

Alternative A/NFMA has 488 acres (one percent) timber emphasis and an additional 8,036 acres of vegetation manipulation with other resource emphasis planned.

Alternative H is similar to A except that old growth management is planned on 848 acres.

Alternative C, the preferred alternative, and Alternative I have identical acre allocations. Both have 1,739 acres of timber emphasis, or two percent of the area. An additional 11,193 acres would be managed for other resource values that permit vegetative manipulation including timber sales. The primary difference between Alternatives C and I is the rate of harvest. Under Alternative I, more harvest activity would be scheduled in the first decade.

Alternatives F and G do not allocate any acres to timber emphasis. However, they do anticipate vegetative manipulation through timber sales on 8,967 to 12,021 acres or 13 to 17 percent of the area.

7. Vegetation: Forage

This large roadless area contains portions of three livestock allotments which will remain roadless in all alternatives. Natural succession will reduce the forage base in these allotments and, without prescribed fire, adequate forage may not be produced in the future for big game or livestock. Livestock can be moved to new forage areas where vegetative manipulation through silvicultural practices occur. With the ability to relocate livestock to new forage areas, Alternatives C, H, and I will contribute adequate forage for both big game and livestock. Alternatives A/NFMA, B, and D will provide forage in excess of projected needs. Alternatives E, F, and G will not meet the forage needs for livestock in the fourth and fifth decade.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Chelan roadless area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Up to 20 percent of the area could be allocated to timber harvest and road building in Alternatives A/NFMA, C, F, G, H, and I. Alternatives B and D could allocate up to 41 percent of the area to timber harvest and road building. All alternatives except Alternative E could allocate up to 19 percent of the area to domestic livestock grazing. The environmental effects of timber harvest, road building, and domestic livestock grazing on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building. Alternatives A/NFMA, B, C, D, F, G, H, and I pose more risk of degrading the soil and water resource than Alternative E due to more intensive management. However, since Wenatchee National Forest Best Management Practices and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

There will be little additional prescribed burning generated in the Chelan roadless area as a result of the alternatives. There would not be significant effects on air quality beyond those effects discussed in Chapter IV.

10. Minerals

As the previous discussion indicates, the area is encumbered by nine lode claims and three placer claims, and the western portion of the area is considered to have a moderate potential for the occurrence of copper, zinc, gold, and silver and a low potential for the occurrence of nickel, cobalt, chromium, and platinum group metals. A small portion of the area is classified prospectively valuable for geothermal resources as well. However, since none of the alternatives call for withdrawing any part of the area from mineral entry, the consequences on mineral resources do not appear to be extremely significant nor do they vary appreciably by alternative. The management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any known mineral resources of the area. The relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions Alternative									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	62,730	45,050	60,314	45,050	64,067	62,098	59,086	62,730	60,314	16,577
Moderately Restrictive	6,806	19,611	7,145	19,611	6,996	7,905	10,917	6,806	7,145	35,723
Relatively Few Restrictions	1,527	6,402	3,604	6,402	0	1,060	1,060	1,527	3,604	18,763

11. ROADS

miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness.

The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Miles	15	49	18	49	0	8	15	15	18	49

12. Fire

The fire management workload generated in the Chelan roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of non-motorized recreation related fires would occur from increased use in Alternatives E and F. There would also be an increase in risk of motorized recreation related fires in Alternatives B, C, D, G, I and J.

The cost efficiency of fire suppression activities would be slightly decreased due to slight increase in overall risk of fire in Alternatives B, C, D, E, F, G, I and J. Accessibility is not expected to change under any alternative requiring continued expensive aerial or boat use for initial attack on fires. The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

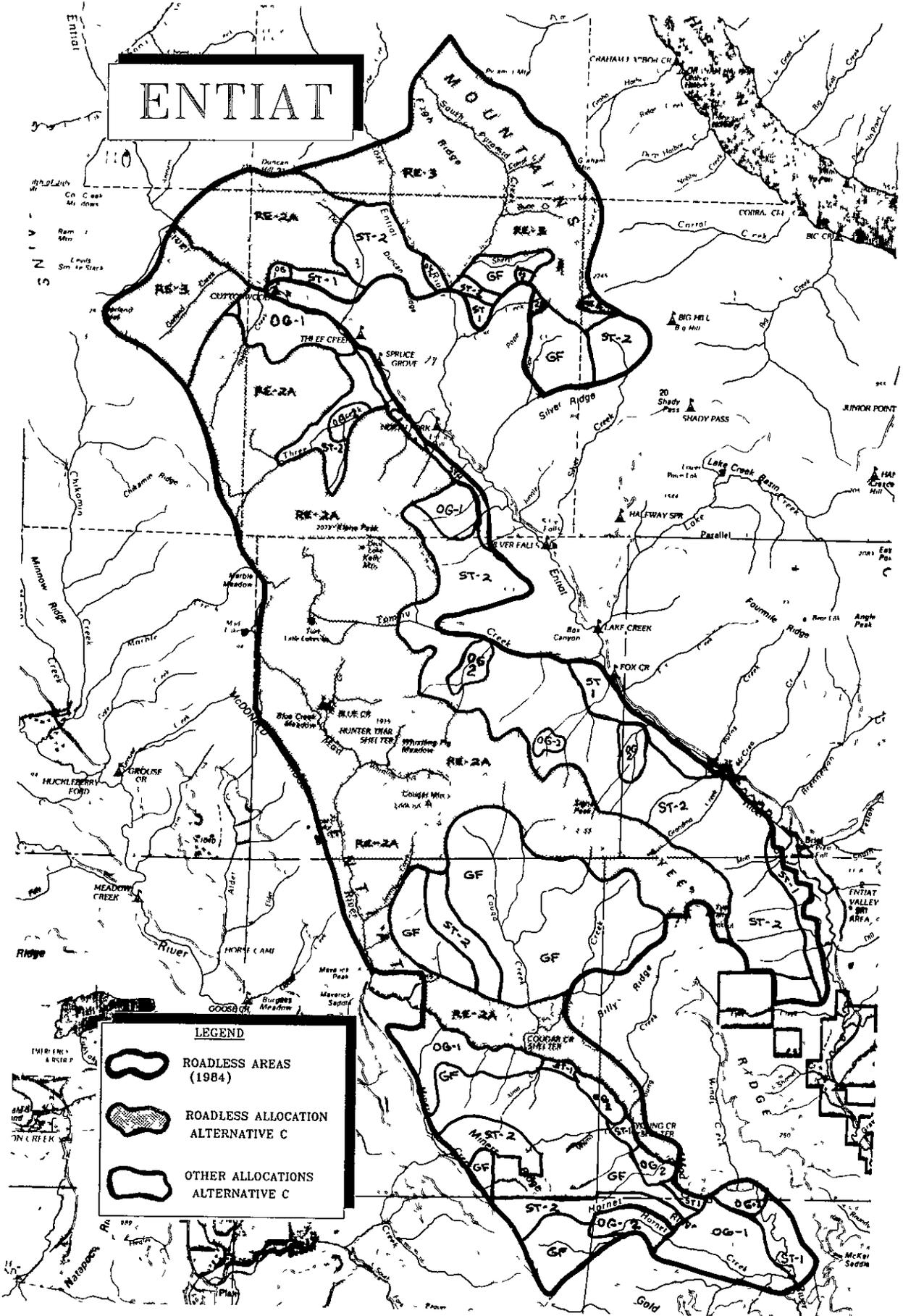
This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 90.7 jobs.

14. Wilderness Potential

The roadless area has high potential for wilderness classification, either as an individual wilderness or as additions to existing wilderness. Alternatives B, D, and J allocate the least (59 percent of the area) to unroaded allocations and would result in the greatest change in the roadless area. Alternative J would be the most impacting with 17,707 acres in the General Forest allocation. Alternatives E, F, G, A/NFMA, and H provide the least impacting allocation on the wilderness character with 87 to 100 percent of the area in unroaded condition. Alternatives C and I provide a balanced resource allocation with 2,714 acres or 4 percent of the area allocated to General Forest.



ENTIAT ROADLESS AREA

Size: Gross Acres: 72,526

Net Acres: 71,254

I. GENERAL INFORMATION

A. History

Portions of this area have been allocated to dispersed roadless recreation through the Multiple Use Plan and Unit Plans. These were the Borealis area, Upper Entiat and Mad Lake Roadless Areas. Additional roadless area was inventoried by the Forest in the fall of 1983.

None of the area as currently mapped was involved in the RARE II study as it was addressed under the Chelan Unit Plan or was evaluated or selected as wilderness during the Washington State Wilderness Act of 1984 development.

B. Location and Access

The area lies adjacent to three of the other inventoried roadless areas in Chelan County on the Entiat Ranger District.

It is accessed by the Entiat Valley, North Fork Entiat, Tye Ridge, and Summit Ridge Roads, and the Entiat, North Fork Entiat, Pyramid Mountain, and Mad River Trails.

C. Physiography and Soils

This is a very large area, most of which is a plateau that has rolling gentle slopes. The part of this area that lies along the southwestern side of the Entiat River is distinct because it has cliffs of large angular granitic rock, below which are extensive talus slopes. There are some large meadows on the top of the plateau.

Elevations range from 4,400 to 8,200 feet. About 66 percent of the soils have formed in deposits (depths vary from as little as 6 inches to more than 30 feet) of volcanic ash and pumice, and the rest have formed in granitic materials. Ash soils are easily displaced once the protective surface vegetation has been removed. These soils are also very dusty when dry. The granitic soils on the other hand have excellent traffic bearing characteristics, they are not as dusty as the ash soils. Neither soil is sticky or slippery when wet.

D. Climate

Annual precipitation ranges from approximately 35 inches easterly within the area to over 50 inches to the west. An estimated 60-65 percent of the annual moisture falls as snow. Snow depths vary from a mean of 93 inches at the Pugh Ridge Aerial Marker site to a mean of 83 inches at the Tommy Creek Aerial Marker site. Valley sites experience an estimated mean snow depth of 60 inches annually.

E. Vegetation

Fifty-seven percent of this area is tentatively suitable timberland. Some 4,452 acres of this is in trees originating after the Hornet Creek fire of 1966 and the Gold Ridge and Tommy Creek fires in 1970. The Hornet Creek burn is well stocked with aerial seeded, planted, and natural origin trees.

Stocking in the Tommy Creek fire area is very dense lodgepole and Douglas-fir, much of which is in need of precommercial thinning. The Gold Ridge area is more sporadically stocked and still has some reforestation needs.

There are 9,455 acres classified as dry ecotype and most of this has been burned over, leaving only 16 percent in mature forest. The wet ecotype acres include 15,031 or almost 50 percent mature timber. Much of this is small diameter alpine fir-lodgepole pine type. Wet meadows and small lakes, including Mad Lake and Two Little Lakes, are included in this area.

Mad Lake area was included as unregulated area in the 1963 Timber Management Plan.

F. Current Uses

The Entiat roadless area is being managed as open to trail bike use. The Mad Lakes Management Unit, which comprises about one-third of this roadless area, is a very popular ORV area and receives heavy trail bike use.

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

Activity	Estimated Annual Recreation Visitor Days
Motorized Trail Bike	1,600
Hunting	1,500
Hiking	1,200
Horseback Riding	400
Fishing	700
Total	5,400

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) classes:

ROS Class	Acres
Semi-Primitive Non-Motorized (SPNM)	20,734
Semi-Primitive Motorized (SPM)	50,520

There are 159.3 miles of trail within the area and there are 121.8 miles currently open to motorized use.

G. Appearance and Surroundings

The area has high visual variety of landform and moderate to high variety in vegetation, rockforms, and waterforms (streams). There are few lakes within the area.

The area is essentially a steep and dissected glaciated valley with evenly textured north and northeast sideslopes. It has dense vegetation along stream bottoms and open, steep, rugged ridgetops. Some of the area has south facing basins with creeks in the bottom and a variety of evenly textured vegetation.

The area is primarily viewed as foreground from internal trails; as foreground and middleground from the Entiat Valley Road; and both foreground and middleground from the Chelan and Entiat Mountain ridgetop trails.

The Entiat area is surrounded by the Entiat Mountains, the Entiat River valley, and the Chelan Mountains.

H. Attractions

Attracting features are numerous meadows such as Cougar, Blue, and Marble, as well as the Mad Lake area including Mad, Ann, and Louise Lakes. Other attractions are the upper Entiat River, which is a main portal route into the Glacier Peak Wilderness, and the scenic Mad River corridor.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The Entiat roadless area of the Wenatchee National Forest is that area of the Entiat District from the summit of the Entiat Mountain Range on its west to the west side of the Entiat River with exclusions for the Tommy Creek Road and private land in the valley bottom. The northern boundary is the southern edge of the Myrtle roadless area. A portion of the Entiat roadless area on the northeast side extends across the Entiat and North Fork Entiat River valleys to an eastern boundary along the summit of the Chelan Mountains. The southern line of this segment extends from one half-mile west of Big Hill, southwesterly along Silver Ridge to the Pope Ridge Road, then contouring in a northwesterly direction to the confluence of the North Fork Entiat River and Pyramid Creek. From that point the boundary goes in a westerly direction to the west side of the Entiat Valley, just above the road end near Cottonwood Campground. The southern boundary extends from the west side of the Entiat Valley, just north of Tyee Creek to Tyee Mountain, down Billy Creek and Billy Ridge to Young Creek. From Young Creek the line contours the northeast side of Mad River down to a point just south of the confluence of Hornet Creek and Mad River. From there the boundary runs to the summit of the Entiat Mountains on the south side of Hornet Creek.

The west boundary, from Marble Meadow south to McDonald Ridge should include Mad Lake, which is east of the summit of the Entiat Mountain range, and not follow the ridge line as it does now. The west boundary should also include Lost Lake since the trail access is from the Mad River side.

B. Natural Integrity

The impact of past human activity in this area is quite evident in the form of an extensive, existing trail system throughout the area and 2 cabins, 3 shelters, and 4 old lookout sites with foundations remaining. *Almost all of the trails are now open to, and have a long history of, trail bike use. One of the cabins is a Forest Service Guard Station. It is a log structure on concrete footings with a 30 foot radio antenna outside the cabin.*

C. Natural Appearance

The Entiat roadless area is large enough, and the topography and vegetation are such, that persons visiting the area have the opportunity to seek out drainages and areas that appear natural, away from ordinary human activity and development. It is, however, possible to observe distant roads, timber harvest activities, fire lookouts, farms and houses from the main ridges of the Entiat and Chelan Mountains as well as Tyee and Duncan Ridges.

D. Opportunities for Solitude

The area offers many opportunities for solitude. The area is in a long irregular shape that is approximately 19 miles long and 7 to 8 miles wide at its widest with some 1 1/2 - 2 mile wide fingers. There are three principal drainages with the longest being the Mad River. The other two are small segments of the main Entiat and the North Fork of the Entiat Rivers. There are also several deeply dissected side drainages that are untrailed and offer opportunity for solitude.

E. Opportunities for Primitive Recreation

There are ample opportunities for primitive recreation experiences. Horseback riding, hiking, backpacking, and viewing outstanding scenery are all opportunities that are available to the visitor. There are also good fishing opportunities in the many lakes and streams. Big game hunting throughout the area is quite good.

F. Challenging Experiences

There are several peaks and rock bluffs or cliffs that offer challenge to rock climbers. There are trailless areas that offer challenges to the cross-country enthusiast. Winter survival and other wilderness challenges are also available in this area.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. No other threatened or endangered species have been located within the area. The extent of sensitive species use in the area is unknown. Spotted owls have been located in the Hornet Ridge area.

H. Historical and Scientific Study

There are no special or unique opportunities for outdoor education and scientific or historic study in the area which cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities. Estimated carrying capacity by ROS class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
Semi-primitive Non-motorized (SPNM)	20,700
Semi-primitive Motorized (SPM)	151,500
Total	172,200

B. Wildlife

The area serves as summer habitat for a large mule deer herd and provides habitat for a variety of game and non-game species of birds and animals including black bear, martin, and grouse. Some small elk herds also use the area in the summer. There are several mountain goat herds that use the ridge area between Big Hill and Pyramid Peak.

C. Fish

This roadless area contains portions of many streams, and in some cases, entire streams. The stream systems will be listed in a counter-clockwise direction beginning in the northern portion of the area.

South Pyramid Creek is a relatively small, infertile stream known to have a small population of rainbow trout. In addition there are probably cutthroat trout in some reaches and there have been reports of Eastern brook trout and bull trout.

The North Fork of the Entiat also is a relatively infertile, high gradient stream, although the production would be expected to be slightly higher than South Pyramid Creek. The same species mix as for South Pyramid Creek should be expected. There is some fishing pressure on the stream due to a trail paralleling the stream along its entire length.

Duncan Creek has no known fish population.

The Entiat River is heavily fished along its entire length within this roadless area. It is stocked just below the roadless area and there is essentially a "put and take" fishery. The Entiat has populations of both native rainbow and cutthroat trout.

Tommy Creek is the next fish stream. From the Entiat River to Two Little Lakes there are populations of mostly cutthroat trout. Production is thought to be good, although the stream is not heavily fished. There may also be Eastern brook trout and bull trout in the stream.

Along the south side of the Entiat, there are numerous small streams that enter between Tommy Creek and the Mad River. None of these are known to have any fish production.

The Mad River has reaches that appear to have fairly high fisheries production, as compared to other eastern Cascade systems. This may be due to the river originating below the Cascade's crest. Generally, rainbow trout are found below Young Creek and cutthroat trout above Young Creek. The upper reaches of the Mad River appear to have the highest production of fish. There is also use of the Mad River by anadromous fish. Steelhead probably use the river upstream to at least Almà Creek. There is also the potential for spring chinook salmon use in the same reach. Of the tributaries to the Mad River, Young, Cougar, and Billy Creeks have some resident fish use (cutthroat) in their lower reaches. Hornet Creek is a small creek, and the presence of fish is not known. Whistling Pig and Blue Creek are also very small tributaries that have some resident fish use.

D. Water

There are currently two snow survey aerial marker sites in the area. There is a powersite withdrawal Power Site Classification (PSC) #40 located in portions of Sections 33 and 34, T28N, R19E, and Sections 3 and 10, T27N, R19E WM. There is also a proposed reservoir or impoundment authorized under Power Site Reservoir (PSR) 755. The location of the site would inundate portions of Sections 3 and 10 of the township and range stated above.

Water yield information relevant to potential runoff snow survey sites and a stream discharge measurement station (immediately outside the roadless area), also exist. The only active stream gaging station in the Entiat drainage is maintained by the U.S. Geological Survey at the mouth of Stormy Creek on the main Entiat River.

E. Livestock

This is a large roadless area with varying degrees of potential for livestock grazing. The area currently contains existing, or portions of existing, recreation stock allotments.

The North Fork Entiat River and Pyramid Creeks are part of the Pyramid Creek Recreation Stock Allotment. There is some potential for domestic stock particularly if adjacent roaded areas in Pope and Crow Creeks were combined with the portion in this roadless area. The potential would be further enhanced with access and transitory range in Butte and Sleep Creeks.

The upper Mad River portion of the area, in the vicinity of Blue Creek, is currently inventoried as the Mad Lake Recreation Stock Allotment. This portion is used through the summer and fall by recreation stock, but no commercial use has occurred here in the past 10 years. There may be some potential for a domestic stock allotment.

An area between Billy Ridge and Cougar Creek has moderate topography, and may have some potential for domestic stock with improved access and creation of transitory range.

The remainder of the area including the main Entiat River and lower Mad River drainages have little if any potential for stock allotments due to a combination of topography, vegetative types, and access.

F. Timber

The area contains 40,450 acres of tentatively suitable timberland. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	15,031	426.0	78.2
Wet	Immature	15,455	260.0	47.7
Wet	Seedling-Sapling	509	---	---
Dry	Mature	1,526	19.1	3.5
Dry	Immature	4,219	41.4	7.6
Dry	Seedling-Sapling	3,710	---	---
	Total	40,450	746.5	137.0

The estimated maximum biological potential contribution to the long-term sustained yield is 13.0 MMBF (2.4 MMCF) per year.

G. Minerals

Available references indicate that the northeast and southern parts of the area are overlaid by pre-upper Jurassic metamorphic rocks, while the remainder is primarily overlaid by Mesozoic granitic rocks. The area's mineral resources have not been studied in detail by either the U.S.G.S. or U.S. Bureau of Mines, but it is reported that the area has occurrences of gold (both placer and lode), platinum, kyanite, graphite, limestone, mica, pumice, and slate. None of these have been adequately investigated to determine whether the deposits are of commercial value. According to the Bureau of Land Management records (1/23/85), the area has had no mining claims located within it. The area is not classified "prospectively valuable" for any of the leasable commodities, and it has no existing leases nor any pending lease applications.

H. Cultural-Historical

A portion of the Entiat unit (Tyee Mountain and Mad River country) was reportedly used by the Entiat Indians for travel, hunting, and food gathering. No prehistoric sites are known within this unit, but cultural resource survey of the area has been minimal.

Historically, the unit received intensive use by sheep grazing, and sites related to this use are likely. Administration of the area by the Forest Service for fire protection and recreational use is evident in the unit with the old lookout sites on Tyee Mountain (1931-1950's), Klone Peak (1931-1960's), and Cougar Mountain (1921-1969), and the shelter at Blue Creek. Evidence of former traplines might also be expected in this area.

I. Land Uses

There are no special land uses within the area.

J. Fire

Annual fire occurrence is moderate with most fires started by lightning. Fuel loadings range from heavy accumulations of down fuels at lower elevations to scattered alpine timber and meadows at higher elevation. Periodic large fires have occurred.

K. Insects and Disease

Severe defoliation by the spruce budworm occurred in the Mad River area in the 1970's. Since aerial spray treatment in 1977, no outbreaks have been detected.

Mature lodgepole stands subject to mountain pine beetle are the major insect potential problem in this area. Access to these lodgepole stands in Billy Basin is planned to prevent major insect damage.

Scattered, heavily mistletoed trees are being treated to prevent the new stands developing after the 1970 fires from becoming infected. Special insect and disease funds have been requested to complete this work. Both regional and national insect and disease specialists visited this area in 1984 to review needs and completed projects. This area is top priority in the region for mistletoe control due to the high benefit to cost ratio for work here.

L. Private Lands

There are 1,272 acres of private land within the area. Section 16 of T27N, R18E, is State of Washington land and Section 36 and portions of 35, T27N, R18E, are owned by the City of Seattle. Both are accessed by foot only.

Possibilities for acquisition are considered excellent for the state lands and good for the Seattle property.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located within 10 miles of the 576,865 Glacier Peak Wilderness Area and is adjacent to the Myrtle Lake, Rock Creek, and Chelan-Sawtooth roadless areas.

B. Distance From Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities and Wenatchee.

C. Need For Ecosystem Representation

There are no special or unique ecosystems within the area which need representation through wilderness classification.

D. Interest By Proponents, Including Congressional

Since the passage of the Washington State Wilderness Act of 1984, Congress has not expressed interest in making further additions to the State wilderness system. Environmental organizations have expressed interest in adding portions of the area to the National Wilderness Preservation System in the future.

Both environmental and ORV organizations and users have advocated maintaining roadless status for the area.

E. Public Input

Public input during the unit planning efforts was obtained and supported unroaded allocations.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area.

Opinions differ as to the allocation being for motorized or non-motorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Entiat roadless area consists of 71,254 acres. Alternatives A/NFMA and H allocations depict the current land management direction. If either of these alternatives were selected, there would be no significant change from the present situation. Trails and recreation sites that exist in General Forest and timber management allocations would be protected or replaced during harvest activities. Approximately 25 percent of the area is in General Forest allocation in Alternative A/NFMA. Allocation of unroaded areas emphasize non-motorized recreation.

Alternatives B, D and J would allocate 49 percent of this roadless area for General Forest. While existing trails and recreation sites would be protected, there would be a significant loss of roadless characteristics and roadless recreation opportunities.

Alternatives C and I would have 18 percent of the area allocated to General Forest. Recreation improvements and trails would be protected during harvest activities.

Under Alternative C and I the portion of the trail system in this roadless area is allocated as follows:

<u>Trail Name</u>	<u>Trail Number</u>	<u>Unroaded Non-Motorized</u>	<u>Unroaded Motorized</u>	<u>Roaded Motorized</u>
Entiat River	1400	--	--	4.2
Cow Creek Meadows	1404	1.0	--	--
Myrtle Lake Campground	1404.2	--	0.4	--
Mad River (Lower)	1409	--	5.0	9.9
Hornet Ridge	1410	--	--	6.0
Miners Ridge	1411	--	--	4.5
Tyee Ridge	1415	--	8.7	--
Billy Creek	1416	--	0.5	4.7
Hunter	1417	--	1.2	--
Cougar Ridge	1418	--	2.0	4.5
Jimmy Creek	1419	--	2.4	0.5
Cougar Mtn. VP	1419.1	--	0.4	--
Cougar Mtn.	1420	--	2.3	--
Lost Lake	1421	--	3.9	--
Mott Creek	1422	--	0.3	1.0
S. Tommy	1423	--	1.0	4.7
Middle Tommy	1424	--	2.0	6.8
N. Tommy	1425	--	4.5	4.5
Blue Creek	1426	--	4.8	--
Klone Peak	1427.1	--	0.5	--
Shetipo	1429	--	2.7	2.0
Pyramid Mtn.	1433	6.3	--	--
Pyramid Mtn	1433.1	1.2	--	--
Pyramid Mtn.	1433.2	7.1	--	--
Duncan Hill	1434	--	--	10.4
Duncan Hill VP	1434.2	--	--	0.5
Anthem Creek	1435	--	--	3.3
Fern Lake	1436	1.5	--	--
N.Fk Entiat River	1437	6.6	--	1.5
Pugh Ridge	1438	4.9	--	--
Pyramid Creek	1439	4.0	--	--
Butte Creek	1440	2.0	--	--
Pyramid View Point	1441	2.9	--	--
Mad River (Upper)	1409.1	--	10.2	--
Totals		37.5	52.8	69.0

Alternative E would allocate the whole roadless area to Unroaded Dispersed Recreation with some trails open for motor bike use.

Alternative F would allocate almost all of the area to Dispersed Recreation, Non-motorized, thus removing all of the trails in this area from motorized use. This would mean a loss of 133 miles of motorized trail opportunities. Only four percent of this roadless area would be allocated to General Forest and would have no significant effect on the recreation.

Alternative G would allocate almost the same areas as Alternative F, but to Dispersed Recreation, Motorized with 133 miles of trails open to motorbikes. Four percent of the area would be allocated to General Forest.

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semi-primitive Motorized and Semi-primitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	27	36	51	36	100	90	94	27	51	36

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	91/90	95/5	72/28	95/5	17/83	15/85	97/3	99/1	72/28	95/5

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with a more roaded natural or roaded modified setting.

2. Wild, Scenic, and Recreational Rivers

A portion of the following river corridors (one-quarter mile each side of the river) is being located within this roadless area and is recommended for designation in Alternatives C and I:

<u>River</u>	<u>Recommended Classification</u>	
Entiat	Segment 2	Scenic
	Segment 3	Recreational

More information concerning this recommendation can be found in Chapter III and Chapter IV.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate the upper end of the valley, North Fork Basin trail foreground, and the Mad River trail foreground to Retention VQO. The middleground of the North Fork Basin and the Entiat Valley viewsheds will be allocated to Partial Retention VQO. The Cougar Creek Basin and the Clone Peak trail and its surrounding areas will be allocated to General Forest, or Maximum Modification VQO.

Alternatives B, D and J will allocate almost one-half of the area to Maximum Modification VQO. These areas include the lower three-quarters of the drainage in the North Fork Entiat River, South Pyramid Creek, to Corral Creek; the lower mid-slopes of the creek bottoms of the Entiat viewshed, and the entire Cougar Creek basin. The upper ridges of Tyee and Entiat Mountains will be allocated to Retention VQO. Most ORV trails will have heavily altered recreational settings.

Alternatives C and I will allocate many areas to protect the scenic values of the area. Many viewsheds will have high visual quality except the Cougar Creek basin and the Hornet Creek area. The upper ridgetops of the planning area will be allocated to Retention VQO.

Alternative E will allocate all areas to Retention VQO. There is no General Forest allocation in this alternative.

Alternative F will allocate most areas to Retention VQO. The Upper Entiat, North Fork of the Entiat, and the Mad River will be allocated to Wild River or Retention VQO. Some areas will be Maximum Modification VQO.

Alternative G will allocate most areas to Dispersed Recreation Unroaded-Motorized or Retention VQO. Some areas will be Partial Retention and Maximum Modification VQO.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	C	Alternative		F	G	H	I	J
				D	E					
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	28,960	32,945	44,309	32,945	71,254	67,184	67,714	28,960	44,309	32,138
Partial Retention	25,842	4,601	15,641	4,601	--	1,547	1,187	25,842	15,645	5,026
Modification	276	21	21	21	--	--	--	276	21	21
Maximum Modification	16,176	33,687	11,279	33,687	--	2,523	2,353	16,176	11,279	34,069
Total Acres	71,254	71,254	71,254	71,254	71,254	71,254	71,254	71,254	71,254	71,254

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road 73 percent of the area and allow timber emphasis harvest on 23 percent of the area, compared to B, D and J which would road 64 percent and timber emphasis on 49 percent. Therefore, Alternatives A/NFMA and H would have one-half the impact of B and D on wildlife habitat. Alternatives C and I would road 56 percent of the area and allow timber emphasis on 18 percent of the area. Alternatives C and I would have less impact than A/NFMA and H, but more than E, F, and G. Alternative E would have insignificant effect on wildlife habitat in this area. Alternatives F and G would have more impact than E, but considerably less than C; G would have somewhat more impact than F due to the development of more ORV use.

6. Fisheries

a. Significant Effects

In Alternative E, all areas would remain roadless; in Alternative F all areas would be either roadless or in the Wild, Scenic, or Recreational river category; and in Alternative G all areas affecting fish would be roadless except the upper three miles of the Billy Creek drainage which could be managed under an intensive timber harvest prescription. In all these alternatives, the existing fishery conditions are expected to remain essentially unchanged.

In the other alternatives the stream areas would be managed in a variety of different ways. The table on the next page depicts these management prescriptions for the stream areas shown.

Roading these areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase. This would help to meet a portion of the fishing demand (see Chapter III on Fish), but also could result in overfishing and

reduction in both numbers and size of fish using the habitat. However, since the wild fisheries production is thought to be very low in many of these headwater-type stream systems, fishermen are unlikely to fish intensively in most areas and overfishing effects generally should not occur.

It is also possible that roading the unroaded areas could result in environmental degradation to streams due to timber harvest and road construction in the basins (see Chapter IV Environmental Consequences). Some of these possible effects are addressed in the soil and water environmental effects section. Overall, even if all areas would be roaded it is not expected that there would be any significant individual or cumulative effects on the resident and anadromous fish populations in the Entiat Drainage (see Mitigation Measures below).

b. Mitigation Measures

In the alternatives that could road presently unroaded areas, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices, and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

Table - Allocation of Management Prescriptions in the Entiat Roadless Area In Stream and River Areas for Alternatives A/NFMA, B, C, D, H, and I

Where "Int." is shown, this indicates that an intensive timber management prescription could dominate in that area. Where "Ext." is shown, this indicates that an extended shelterwood timber management prescription would dominate in that area and would be executed primarily to meet visual objectives. Where "Rdls." is shown, this indicates that the management prescription would be to maintain the area as roadless.

Stream/River	A/NFMA /H	Alternative B/D	C/I
South Pyramid	Lower 2 Miles: Ext. Upper: Rdls.	Lower 3 Miles: Int. Upper: Rdls.	Lower 3 Miles: Ext. Upper: Rdls.
North Fk. Entiat	Lower 2 Miles: Ext. Upper 2 Miles: Rdls	All Int.	Lower 2 Miles. Ext. Upper 2 Miles: Rdls
Entiat River	All Rdls.	All Int.	All Rdls
Tommy Creek	Lower 1/2: Int. Next 1: Ext. Upper: Rdls.	Lower 1 Mile: Int. Upper: Rdls.	Lower 1 Mile. Ext. Upper: Rdls.
Mad River	All those listed below are tributaries to the Mad River.		
Upper Mad	To Lost Lake: Ext. Upper: Rdls.	All Int.	All Rdls.
Lower Mad	All Ext.	All Int.	To Jimmy Ck: Ext.
Young Creek	All Ext.	All Int.	All Ext
Cougar Creek	All Int.	All Int.	All Int
Billy Creek	All Int.	All Int.	Lower 1 Mile: Ext Upper: Int.
Hornet Creek	All Int.	All Int.	All Int.
Whistling Pig	All Rdls.	All Int.	All Rdls
Blue Creek	All Rdls.	All Int.	All Rdls.

7a. Vegetation: Trees

Under all alternatives it is expected that more area will remain unroaded than is roaded. The range of tree management activities is from 34,069 acres (48 percent) scheduled for timber emphasis in Alternative J to no scheduled harvest in Alternative E.

Alternatives A/NFMA and H have 16,176 acres (23 percent) timber emphasis and an additional 32,118 acres of vegetation manipulation with other resource emphasis planned.

Alternatives C and I have identical acre allocations. Both have 11,279 acres of timber emphasis, or 16 percent of the area. An additional 21,349 acres would be managed for other resource values that permit vegetative manipulation through timber sales. The primary difference between Alternatives C and I is the rate of harvest. Under Alternative I, more harvest activity would be scheduled in the first decade.

Alternatives F and G allocate 2,353 to 2,523 acres to timber emphasis. They also anticipate vegetative manipulation through timber sales on 1,506 to 3,816 acres, or two to five percent of the area, for other resource objectives.

7b. Vegetation: Forage

There are existing allotments within this roadless area. However, the existing and potential forage base will make a significant contribution to the forage needed by big game and livestock from the fourth decade on. Due to the low incidence of natural fire and lack of livestock use over the past 10 to 50 years, many forage areas are stocked with trees or high brush and do not provide wildlife forage. With the proposed vegetative manipulation and access, Alternatives C, H, and I will contribute adequate forage for big game and livestock. Alternatives A/NFMA, B, D, and J will provide forage in excess of needs, while Alternatives E, F, and G will not meet forage needs for livestock in the fourth or fifth decades.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Entiat roadless area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Up to six percent of the area in Alternatives F and G could be allocated to timber harvest and road building so the soil and water consequences would be minimal. Alternatives A/NFMA, B, C, D, H, I and J could allocate up to 59 percent of the area to timber harvest and road building. The environmental effects of timber harvest and road building on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building. Alternatives A/NFMA, B, C, D, H, I, and J pose more risk than Alternatives E, F, and G due to more intensive management. However, since Wenatchee National Forest Best Management Practices and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

The additional prescribed burning generated in the Entiat roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

Since this area appears to have a low potential for the occurrence of mineral resources of significant nature, the consequences on mineral resources do not appear to be extremely significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). For an example, a withdrawal precludes all mineral related activities except those authorized by prior existing rights; and a designation as a roadless non-motorized area, a developed recreation site, special area or as a Wild and Scenic river calls for the area to be managed under highly restrictive management prescriptions. The effects of these restrictions cannot be quantified. The negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. The relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	26,946	34,217	43,397	34,217	71,254	67,374	67,628	26,946	43,397	33,771
Moderately Restrictive	27,856	3,329	16,578	3,329	0	1,357	1,273	27,856	16,578	3,393
Relatively Few Restrictions	16,452	33,708	11,279	33,708	0	2,523	2,353	16,452	11,279	34,090

11. ROADS

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Miles	148	126	114	126	0	10	15	148	114	126

12. Fire

The fire management workload generated in the Entiat roadless area, as a result of the alternatives, will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives E, F, and G. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives A/NFMA, B, D, H and J.

The cost efficiency of fire suppression activities would be slightly increased in Alternatives A/NFMA, B, D, H and J as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives E, F, and G would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber-oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber-oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 161.3 jobs.

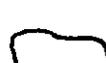
14. Wilderness Potential

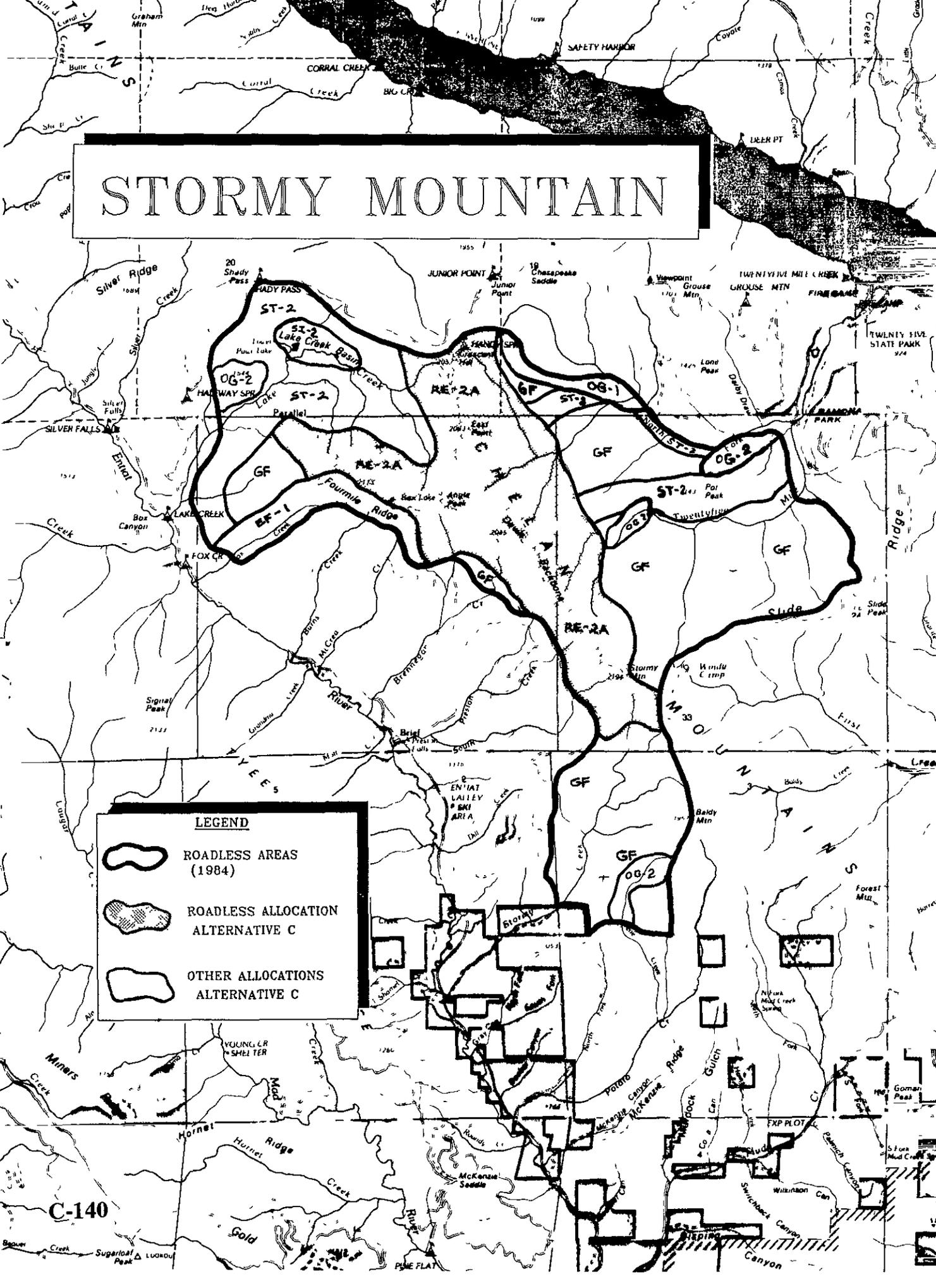
The roadless area has high potential for wilderness as an individual area or as addition to existing wilderness. Alternatives A/NFMA, H, B, D, and J provide the least retention of unroaded conditions. Alternatives B, D, and J propose the greatest allocation of General Forest at 33,687 acres or 47 percent of the area. Under these alternatives, the great modification or change from natural conditions would occur.

Alternatives E, F, and G would result in the least change with no, or very few, acres in General Forest. Alternatives C and I propose a blend of allocations with moderate change as General Forest is proposed on 11,363 acres.

STORMY MOUNTAIN

LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C



STORMY ROADLESS AREA

Size: Gross Acres: 32,521

Net Acres: 32,500

I. GENERAL INFORMATION

A. History

The area was inventoried under RARE I but was not selected. In 1974 the area was allocated to sustained resource production under the Chelan Unit Plan. It was re-inventoried in 1983 and none of the area was allocated for wilderness under the Washington State Wilderness Act of 1984.

In 1970, under his authority, the Chief of the Forest Service established the Entiat Experimental Forest. Of this area, 1,632 acres lie within the boundaries of the Stormy roadless area. The experimental forest is dedicated to a variety of forest resource management activity-oriented research projects.

B. Location and Access

It is located near the south end of the South Holden portion of the Chelan-Sawtooth roadless area and east of the Entiat roadless area in Chelan County on both the Chelan and Entiat Ranger Districts. It is accessed by the Shady Pass and Stormy Mountain Roads and the Pot Peak, Devil's Backbone, Entiat, Lake Creek, and Four Mile Ridge Trails.

C. Physiography and Soils

This area is characterized by the rugged Devils Backbone ridge separating the Entiat River drainage from the Chelan drainage. The drainage basins on both sides of the ridge are well timbered and the topography suggests that they were formerly cirque basins that were formed by small alpine glaciers. Lake Creek basin is characterized by extensive wet marshy areas along the bottom of the upper basin.

Elevations range from 2,500 to 7,200 feet. About 8 percent of the soils have formed in deposits (depths vary from as little as 6 inches to more than 30 feet) of volcanic ash and pumice, and the rest have formed in granitic materials. Trails through ash soil areas are dusty, and the material is easily displaced. Once the protective vegetation has been removed, ash soils tend to be very erosive in trails and in campgrounds. The granitic materials have good bearing strength, are not very dusty, and tend to stay in place.

D. Climate

Annual precipitation ranges from 25 to 60 inches, mainly as snow.

E. Vegetation

This area is 65 percent tentatively suitable timberland.

Vegetation types vary from open pine/bitterbrush in lower Stormy Creek to Englemann spruce and Pacific silver fir in the head of Lake Creek. Large acreages of pole size lodgepole pine occupy the lower Lake Creek basin. Douglas-fir pole size timber is the predominate type in Twenty-Five Mile Creek. However, very old fire scar pockets of Douglas-fir occur throughout this area.

Pinegrass and gopher activity have caused poor regeneration in the Baldy Mountain, Forest Mountain areas, but in the wet areas like Lake Creek, overstocking of trees is the more common situation.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Motorized Trail Riding	1,800
Hunting	3,100
Total	4,900

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Class</u>	<u>Acres</u>
Semiprimitive Nonmotorized (SPNM)	11,788
Semiprimitive Motorized (SPM)	20,712
Total	32,500

There are 58.6 miles of trail within the area and are all currently open to motorized use.

G. Appearance and Surroundings

The area has moderate to high visual variety in landforms, waterforms (lakes and streams), and moderate variety in rockforms and vegetation. Parts of Lake Creek basin, Pot Peak, Stormy Mountain, and Devil's Backbone ridgetop have high visual variety. The Twenty-Five Mile and Stormy Creek drainages are evenly textured and have less visual variety.

The area is steep and has pronounced ridgetops such as the Devil's Backbone. The drainages have evenly textured vegetation. Large blocks of lodgepole pine create a smooth even appearance with limited variety. Dense vegetative patterns occur in the creek bottoms.

The area is primarily viewed as foreground and middleground from the Devil's Backbone Trail, Shady Pass Road, Pot Peak Trail area, and as background from portions of the Lake Chelan high country.

The Stormy Mountain area is surrounded by the Shady Pass Road, the upper end of the Entiat drainage, the Slide Ridge Road, and the North Fork of Twenty-Five Mile Creek.

H. Attractions

Major attractions are Stormy Mountain, Devil's Backbone, Pond Lakes and Twenty-Mile, Lake, and Stormy Creeks.

II. CAPABILITY - WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

Entiat:

The Stormy Mountain roadless area of the Wenatchee overlaps onto two Ranger Districts, the Entiat and the Chelan. The Entiat's portion included the summit of the Chelan Mountain range to the west, taking in the Lake Creek basin, Four Mile Ridge and the head of the Stormy Creek drainage, which is approximately three-fifths of the Stormy Mountain roadless area.

Chelan:

The Chelan Ranger District portion of the area straddles the crest of the Chelan Mountains occupying a portion of the east slope of the Twenty-Five Mile Creek basin. It is located between two heavily used recreational developed areas, the lower Entiat River and lower Lake Chelan. The area is almost entirely surrounded by a roaded high ridge system which can easily be viewed from the higher vantage point. The boundaries primarily follow existing roads which are easy to locate on the ground. The adjacent land in Twenty-Five Mile Creek is heavily roaded, and has had a large amount of timber cutting activity. These works of man, including seed orchards, rock quarry, and recreational developments around the mouth of Twenty-Five Mile Creek, are easily viewed from the high points of the roadless area. The City of Chelan is visible from Stormy Mountain.

B. Natural Integrity

Entiat:

The impact of past human activity in this area is relatively minor in the form of a trail system. Most of the trail system in this area has been constructed or reconstructed with State Off-Road Vehicle funds and is heavily used by motorbikes. There are approximately 20 of the total of 58.6 miles of trail located on the Entiat portion of this area. The whole area is completely encircled by roads.

Chelan

The impacts of past human activity within the Chelan Ranger District portion of the area are relatively light due to a rugged topography and marginally merchantable timber. The area is a mosaic of burned and unburned land as a result of the 1970 fires. Evidence of severe fire activity over the past 100 years is evident in the existing vegetation.

Past fire suppression efforts have left their mark on the land, including many miles of 75 foot-wide breaks constructed along the ridges to stop the ravages of the 1970 fires. The area has one old jeep road that penetrates the area about two miles along Devil's Backbone ridge south of Handy Spring. This wheel track is legally closed to four-wheeled traffic but persistent four-wheelers occasionally bypass the gate and drive the road. The area has an extensive trail system including approximately 30 miles of trails reconstructed with State IAC funds, called the Devil's Backbone ORV area. This trail system was completed in 1985, and though motorized use is presently light, it is expected to increase greatly as the area becomes better known. All of the trail system within this area has been open to motorbike use for many years. The remains of one old lookout structure is located on Stormy Mountain. There also has been some expressed interest for a winter sports area development on Stormy Mountain.

C. Natural Appearance

Entiat:

The core areas, Lake Creek basin and the head of Stormy Creek, except for the trails, are natural appearing. Some adjacent roads are visible from most areas of this unit. From Four Mile Ridge and the summit of the Chelan Mountains, evidence of timber harvest activities and roads are very evident.

The Preston Creek drainage, west of the Chelan Mountain range, has many miles of roads that were constructed during the jammer logging era of the 1960's. The whole Preston Creek drainage was burned heavily during the 1970 fires and the road system is very obvious.

Chelan:

The Stormy Mountain area is a fairly large unit, but due to its location between the highly developed lower Lake Chelan area and the lower Entiat Valley, many adjacent roads and past timber management activities are visible. From the higher points, distant roads and structures give a feeling of never being able to escape human presence. Within the unit, firebreaks on ridges and helispots are a constant reminder of man's fire suppression efforts. Area stream channels have been highly eroded due to fires and resultant watershed damage. Evidence of man's ability to stabilize stream channels, such as with introduced grasses, are present.

D. Opportunities for Solitude

Entiat:

There are some areas and cirques away from the trails that afford opportunities for solitude, but most of the area does not lend itself to solitude that one can find in larger areas.

Chelan:

The Chelan portion offers a low opportunity for solitude. Off-site visual intrusions and the evidence of human presence would be common. Since the land in the unit slopes downward toward the developed areas, topographic screening is almost non-existent except in stream bottoms.

E. Opportunities for Primitive Recreation

Entiat:

There are opportunities for primitive recreation experiences in the form of camping, hiking, and horseback riding. This area has been designated by the Washington Department of Game as a quality hunting area. There is a small lake with no trail access called Bear Lake.

Chelan:

Opportunities for primitive recreation on this portion are below average for the same reasons it is low in solitude. Opportunities do exist for backpack camping, big game hunting, horseback riding, and hiking. Also, a limited fishery exists in Twenty-Five Mile Creek. However, the recreational activities that exist would be accomplished in the presence of many off-site intrusions.

F. Challenging Experiences

Entiat:

There are no unique challenges in this area other than the normal challenges one would expect to find in a roadless area.

Chelan:

This area does possess some challenging hiking opportunities due to the extensive trail system and steep terrain. It offers some good opportunities for dispersed recreation without a real primitive experience. The area is in a quality hunting management unit and does provide good roadless mule deer hunting opportunities.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. The extent of use by sensitive species in this area is not known.

H. Historical and Scientific Study

There are no special or unique opportunities for outdoor education and scientific or historic study in the area which cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIAL

A. Recreation

The area has potential value for unroaded types of recreation activities. Estimated carrying capacity by ROS Class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
Semi-primitive Non-motorized (SPNM)	12,000
Semi-primitive Motorized (SPM)	62,000
Total	74,000

B. Wildlife

The area serves as summer range for a large mule deer herd and provides habitat for a variety of animals and birds including black bear and grouse.

C. Fish

In the Entiat portion of this roadless area, only Lake Creek has any fisheries significance. In its upper reaches there are cutthroat and possibly rainbow trout. The exact extent of the population is not known.

Stormy Creek does not have any known fish population.

Twenty-Five Mile Creek is the only stream with fish in the Chelan portion. The North Fork of Twenty-Five Mile Creek is permanently flowing in the lower one or two miles in the roadless area and has a very small population of fish. Above that point, the stream normally is intermittent. The main fork of Twenty-Five Mile Creek has small trout along much of its length.

There is a spawning channel at the lower end of Twenty-Five Mile Creek used by the Washington Department of Game for kokanee salmon from Lake Chelan. Maintenance of high quality water is important to this structure.

D. Water

The Stormy Mountain roadless area has one aerial snow marker site located on Four Mile Ridge. The site was measured and maintained from 1972 - 1981. It had a mean snow depth of 86 inches and snow water equivalent of 35 inches annually. This site is no longer active nor maintained.

Stream discharge measurements were formerly taken on Twenty-Five Mile Creek near the northerly boundary of the roadless area. This station is no longer active.

E. Livestock

A combination of steep topography and lack of natural forage vegetative types severely limits the potential of this area for domestic stock. Access and the creation of transitory range could enhance the potential along the edge of the area near Baldy Mountain and Slide Ridge.

There is some limited recreation stock use during the hunting season, particularly in the Lake Creek basin and in the Twenty-Five Mile Creek drainage.

F. Timber

The area contains 21,136 acres of tentatively suitable timberland. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	5,258	149.0	27.3
Wet	Immature	1,293	23.3	4.3
Wet	Seedling-Sapling	530	---	---
Dry	Mature	2,523	31.6	5.8
Dry	Immature	7,907	77.6	14.2
Dry	Seedling-Sapling	3,625	---	---
	Total	21,136	281.5	51.6

The estimated maximum biological potential contribution to the long-term sustained yield is 6.3 MMBF (1.2 MMCF) per year.

G. Mineral

This area is reported to be primarily underlain by granitic rocks of Mesozoic age. The area has not been studied in detail by the U.S.G.S. or U.S. Bureau of Mines, but it is reported to have occurrences of pumice and kyanite. Neither has been investigated adequately to determine if the deposits are of commercial value. According to Bureau of Land Management records (1/23/85), the area has had no mining claims located in it. It is not classified "prospectively valuable" for any of the leasable commodities and it has no existing leases or pending lease applications.

H. Cultural-Historical

This area encompasses a number of historic sheep allotments dating back to the turn of the century, as well as the former site of the Stormy Mountain Lookout (1919-circa 1955). There are no known or reported archaeological sites or prehistoric use areas. Based on terrain and known patterns of use, the potential for such occurrences is moderate.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is low to moderate and primarily started by lightning. Fuel loadings range from heavy accumulations at lower elevations to clumps of trees and scattered meadows at higher elevations. There is a frequent history of large fires in this area.

K. Insects and Disease

Past fires have created large areas of even aged lodgepole that will soon be very susceptible to mountain pine beetle damage.

Fire scarred remnant stands of Douglas-fir old-growth were heavily hit by the Douglas-fir bark beetle in the late 1970's. The North Fork of Twenty-Five Mile Sale was sold to help salvage timber killed by bark beetles.

Mistletoe infection is heavy in partially burned-over stands in Lake Creek and South Fork Twenty-Five Mile Creek. Access is needed before treatment would be cost effective.

L. Private Lands

There are 21 acres of State land in Section 16 of T27N, R20E. Access is gained from outside of the roadless area. Possibilities for acquisition are considered to be excellent.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located between the Chelan, Entiat, and the Slide Ridge roadless areas.

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle, Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There is a unique riparian zone in the area of the Pawn Lakes Meadows within the Entiat Ranger District portion. These meadows are ancient lakes that have silted in but are still marshy. There are plant communities and fauna that are unique to this type of setting.

D. Interest by Proponents, Including Congressional

Since the passage of the 1984 Washington State Wilderness Act of 1984, there has been no strong interest for additional wilderness classification for this area by environmental proponents.

E. Public Input

Public input during the RARE I and other planning efforts was obtained and supported unroaded allocations.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area. Opinions differ as to whether the area should be for motorized or nonmotorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The area around Stormy Mountain has limited potential as a winter sports site. Local proponents have attempted to develop an interest in the area since 1969. Difficult access and the lack of an adequate base area have been the biggest factors for lack of development.

Alternatives A/NFMA and H would not allocate any of the area to unroaded management. Under these alternatives most of the area would be entered for timber harvest and all the inventoried semi-primitive, motorized and non-motorized recreation opportunities would be lost within the planning period.

Sixty percent of the area will be converted to ROS Class Rooded Natural through timber harvesting under the Scenic Travel prescription and to enhance wildlife. The remaining 40 percent of the area would present a Rooded Modified ROS setting to the recreation user, after the timber harvesting was completed.

If this area is rooded and harvested, some portions of the existing trails may be affected. It would lose its unrooded characteristics, and the quality hunting that this area has been designated for by the Washington State Game Department would diminish. Road construction could possibly enhance access for development of the Stormy Mountain Ski Area.

Alternatives B, D and J result in over 60 percent of the area to be emphasized for timber management. The ROS setting for this area will change from Semi-primitive to Rooded Modified as timber production is maximized. The roadless character of the area will be irretrievably lost, semi-primitive recreation would decrease significantly.

Large segments of the area, the Lake Creek basin and the upper half of the Stormy Creek drainage, would be allocated as General Forest, available for rooding and timber harvest. The area along the summit of the Chelan Mountains, where the Devil's Backbone Trail is located, would be allocated Dispersed Recreation, Unrooded Motorized. Over 80 percent of this unrooded area would be designated General Forest.

If timber is harvested under the General Forest allocation, the area, with the exception of a special interest area designation around the Pawn Lakes Meadows, will lose its unrooded characteristics and the quality hunting would diminish.

Alternatives C and I would allocate about 29 percent of the area to semi-primitive, motorized use with the rest of the area allocated to timber harvesting. About 35 percent of the area will have a rooded modified setting due to maximizing timber harvest. The remaining area would have timber harvesting in the background and to enhance the wildlife potential.

Under Alternatives C and I, the portion of the trail system in this roadless area is allocated as follows:

Trail Name	Trail Number	Unrooded Non-Motorized	Unrooded Motorized	Rooded Motorized
Windy Saddle	1232	--	1.0	0.5
Loan Peak	1264	--	--	2.0
NF 25 Mile Creek	1265	--	2.0	7.0
Pot Peak	1266	--	1.0	9.0
Devils Backbone	1448	--	13.0	--
Lake Creek	1443	--	2.0	5.6
Angle Peak	1444	--	1.0	3.0
4 Mile Ridge	1445	--	5.3	1.0
Stormy Creek	1451	--	1.0	4.2
Totals			26.3	32.3

These alternatives would allocate the Lake Creek basin as scenic travel, partial retention with special interest area designation around Pawn Lakes Meadow. The area along the ridge of the Chelan Mountains would be classified as Dispersed Recreation, Unrooded Motorized. The upper portion of Stormy Creek and a small area between Fox Creek and Lake Creek known as Little Fox would be General Forest. The significant effects would be similar to Alternatives A/NFMA and H.

Although roading would not be as severe as Alternatives B and D, the semi-primitive, non-motorized use of the area would be totally eliminated. The loss of the dispersed recreation, non-motorized use will be a concern for the roadless recreation users as approximately half the area that is presently inventoried for that use will be lost. Some loss of trails can be expected from roading and the semi-primitive hunting opportunity will decrease. Access to Stormy Mountain may be enhanced through timber sales and road development.

Alternatives E and F allocate almost the entire area to unroaded management objectives. The existing inventoried area of two-third semi-primitive, motorized and one-third semi-primitive, non-motorized would remain essentially the same under these alternatives. Use could increase significantly in the Dispersed Recreation, Motorized category due to the publicity of the Devil's Backbone ORV area.

Alternative F would allocate the Lake Creek Basin, with the exception of the Pond Lakes special interest area, to Dispersed Recreation, Unroaded, Non-motorized, and the remainder of the area would be Dispersed Recreation, Unroaded, Motorized with trails open to motorbikes. In the non-motorized area it would mean the reduction of 19 miles of trail available for motorized use, which have been reconstructed with State off-road vehicle funds.

Alternative G would convert the existing one-third use in the Roadless Non-motorized category to Motorized. The majority of the area would be managed roadless and would promote motorized use. Additional ORV trails could be constructed to expand the motorized use. Very little timber harvesting would be accomplished and the non-motorized setting would be eliminated.

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semi-primitive, Motorized and Semi-primitive, Non-motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0	17	30	17	95 1/2	87	89	0	30	17

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0/0	100/0	100/0	100/0	69/31	72/28	100/0	0/0	100/0	100/0

1/This reflects the existence of the Entiat Experimental Forest which is dedicated to research of the various resource management activities.

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with a more roaded natural or roaded modified setting.

2. Wild, Scenic, and Recreational Rivers

A portion of the following river corridors (one-quarter mile either side of the river) is located within this roadless area and is recommended for designation in Alternatives C and I:

<u>River</u>	<u>Recommended Classification</u>
Entiat River	Segment 3 Recreational

More information concerning this recommendation can be found in Chapter III and Chapter IV.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate about a third of the area to Maximum Modification VQO. These areas are the Devil's Backbone trail and its adjacent areas, and the upper end of Twenty-Five Mile Creek basin. The upper hillside of the Twenty-Five Mile Creek basin areas as viewed from the Lake Chelan viewshed will be heavily altered. Trails in the area will be altered. Much of the area will be allocated to a Partial Retention middleground view from Lake Chelan.

Alternatives B, D and J will allocate most areas to Maximum Modification VQO. These areas are the Twenty-Five Mile basin, Pot Peak Trail Area, Lake Creek basin except the immediate Lake Creek Meadows, and the Shady Pass area. The Twenty-Five Mile Basin is highly visible from Lake Chelan and its surrounding community. Some areas will have higher visual quality. These areas are the Devil's Backbone Trail and the ridge tops of Stormy Mountain, Devil's Backbone, and Angle Peak to Crescent Hill.

Alternatives C and I will allocate many areas to Retention and Partial Retention VQO. Some areas will be allocated to Maximum Modification. The Upper Twenty-Five Mile Creek basin will be heavily altered as viewed from the Lake Chelan community. Other altered areas are parts of the Lake Creek and Shady Pass viewshed.

Alternative E will allocate all areas to Retention VQO except the Experimental Forest allocation. Most of the area will be natural appearing. The view from Lake Chelan will be preserved.

Alternative F allocates most areas to Retention VQO. The view from Lake Chelan will be natural appearing.

Alternative G will allocate most of the area to Retention or Dispersed Recreation, Unroaded, Motorized. The view from Lake Chelan will be natural appearing.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	C	Alternative		F	G	H	I	J
				D	E					
Preservation	-	-	-	-	-	-	-	-	-	-
Retention	605	7,505	11,682	7,505	30,868	29,830	30,063	605	11,682	7,271
Partial Retention	14,967	1,972	7,802	1,972	-	826	954	14,967	7,802	2,015
Modification	3,763	1,653	1,653	1,653	1,632	1,632	1,653	3,763	1,653	1,653
Maximum Modification	13,165	21,370	11,363	21,370	-	212	170	13,165	11,363	21,561
Total Acres	32,500	32,500	32,500	32,500	32,500	32,500	32,500	32,500	32,500	32,500

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road all of the area and allow for timber harvest emphasis on 41 percent of the area, which would be approximately one-half of the impact on wildlife of Alternatives B, D and J. Alternatives B, D and J would road 83 percent and emphasize harvest on 66 percent of the area. Alternatives C and I would road 70 percent of the area and have harvest emphasis on 35 percent; this would be less impact than B, D and J but more than A/NFMA and H. Alternative E would have an insignificant impact on wildlife habitat while F and G would have slightly more impact than E.

6. Fisheries

a. Significant Effects

In Alternatives E, F, and G, the areas surrounding Lake and Twenty-Five Mile Creeks, the only significant systems with fish in this roadless area, would remain unroaded. In Alternatives B, D and J both areas would be available for intensive timber management. In Alternatives A/NFMA, C, H, and I, the Twenty-Five Mile Creek area could also be managed for intensive timber harvest, while the Lake Creek area could be managed using primarily extended shelterwood timber harvest methods. In all alternatives except A/NFMA and H, a small portion of Lake Creek would be designated a "special interest" botanical area.

Roading the Lake and Twenty-Five Mile Creek areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase. This would help to meet a portion of the fishing demand (see Chapter III on Fish), but also could result in overfishing with a reduction in both numbers and size of fish using the habitat. Twenty-Five Mile Creek, with a very low population of fish in the roadless area, probably would be unaffected by roading. Lake Creek, in its lower gradient reaches in the upper watershed, could be heavily fished, depending on developed access.

It is also possible that roading the unroaded areas could result in environmental degradation to streams due to timber harvest and road construction in the basins (see Chapter IV Environmental Consequences). Some of these possible effects are addressed in the Soil and Water Environmental Effects section. Overall, even if both areas would be roaded, it is not expected that there would be any significant effects on the resident fish populations.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices, and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Management direction under Alternatives A/NFMA and H does not preclude roading or vegetative manipulations through timber sales on any of this area. Timber emphasis is allocated on 13,165 acres or 41 percent of the area under these alternatives. An additional 17,501 acres are zoned special resource management area where timber sales will be used to manipulate the existing vegetation.

All other alternatives allocate at least the ridge top portion of this area to unroaded recreation. Alternative E allocates the entire roadless area except the Entiat Experimental Forest, to unroaded non-motorized recreation. Alternative F is similar with 87 percent, or 28,175 acres, allocated to roadless recreation with no timber harvest scheduled.

In Alternatives C and I, the unroaded motorized recreation zone would be 9,498 acres or, 29 percent of the area. The remaining area would permit manipulation through timber sales.

Alternatives B, D and J would have timber sales proposed for 23,618 acres, similar to Alternatives C and I. However, most of the acres under B, D and J would be timber emphasis acres. Under Alternative G, the largest block (1,103 acres) of vegetative manipulation acres would emphasize the scenic travel prescriptions. However, 28,726 acres or 88 percent, would not schedule any timber management, but would be allocated to unroaded motorized recreation.

7b. Vegetation: Forage

Alternatives C, H and I, with the proposed vegetative manipulation and improved access, will contribute adequate forage to the base needed for big game and livestock. Alternatives A/NFMA, B, D and J will provide forage in excess of projected needs. Alternatives E, F, and G which have little or no vegetative manipulation proposed, will not provide adequate forage to meet the projected needs for livestock, particularly in the fourth and fifth decade. Prescribed fire in the remaining unroaded portion of this area could offset the loss of forage for big game due to ecological succession.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Stormy area to General Forest or Roadless Management are discussed by alternative below. Alternative E could allocate up to five percent of the area to timber harvest or road building which would be relatively insignificant. Alternatives F and G could allocate up to five percent, and Alternatives B, C, D, I and J could allocate up to 73 percent of the area to timber harvest and road building. Alternatives A/NFMA and H would allocate the entire area to timber harvest and road building. The environmental effects of timber harvest and road building on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building. Alternatives A/NFMA and H pose more risk of degrading the soil and water resource than Alternatives B, C, D, I and J and Alternatives F, G, and E, respectively. However, since Wenatchee National Forest Best Management Practices and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

The additional prescribed burning generated in the Stormy roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

Since this area appears to have a low potential for the occurrence of mineral resources, the consequences on mineral resources do not appear to be extremely significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions Alternative									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	2,449	9,477	13,654	9,477	32,500	31,344	31,046	2,449	13,654	9,433
Moderately Restrictive	14,755	1,633	7,462	1,633	0	954	1,284	14,755	7,462	1,485
Relatively Few Restrictions	15,296	21,390	11,384	21,390	0	212	170	15,296	11,384	21,582

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case-by-case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

Alternative

	A/NFMA	B	C	D	E	F	G	H	I	J
		PREFERRED								
Miles	88	72	72	72	0	4	5	88	72	72

12. Fire

The fire management workload generated in the Stormy roadless area, as a result of the alternatives, will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives E, F, and G. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives A/NFMA, B, D, H and J.

The cost efficiency of fire suppression activities would be slightly increased in Alternatives A/NFMA, B, D, H and J as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives E, F, and G would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

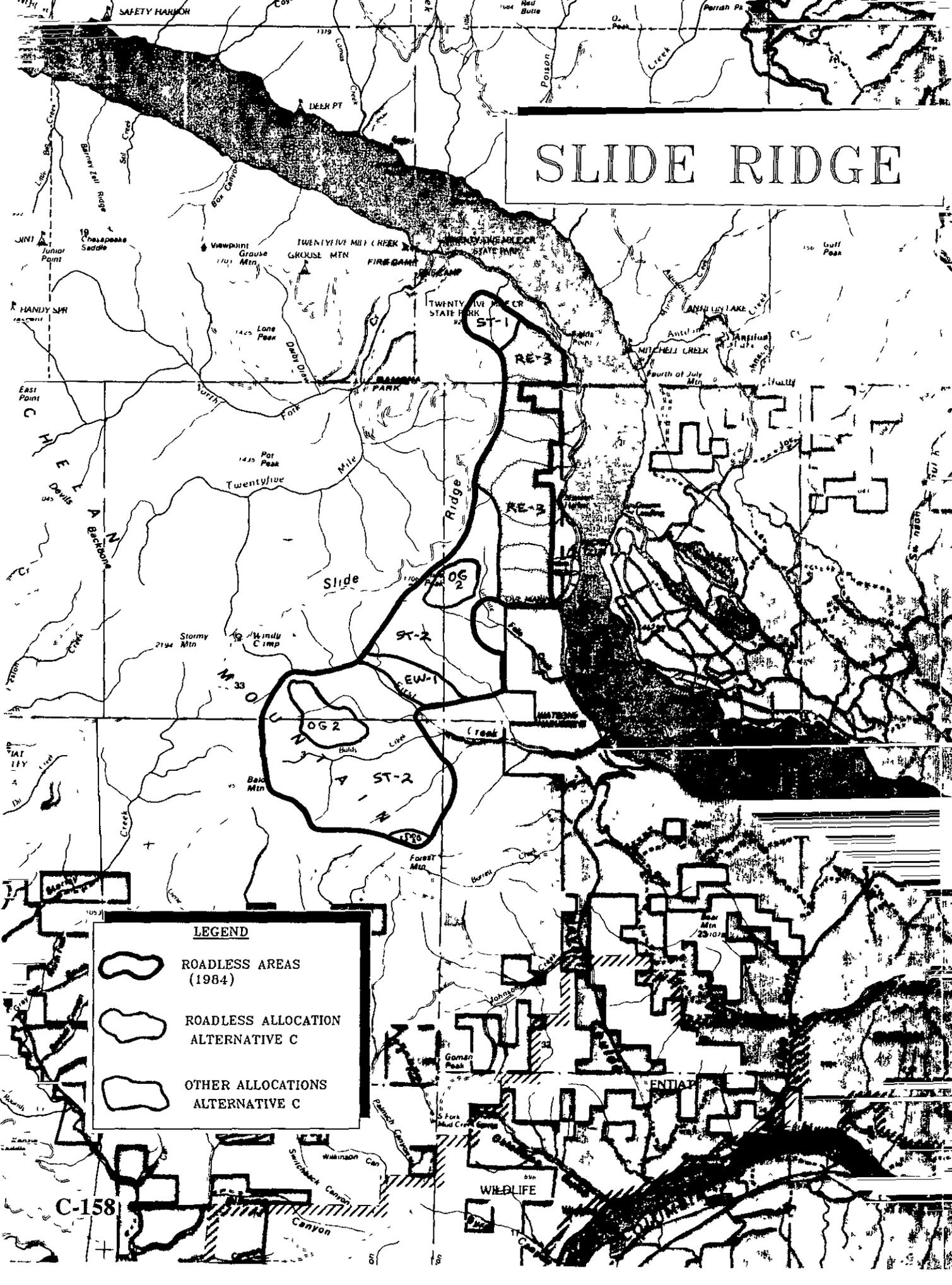
Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber-oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 80.6 jobs.

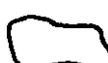
14. Wilderness Potential

This roadless area has limited potential for wilderness as an individual wilderness, or as part of an addition to existing wilderness. All alternatives, with the exception of E, F, and G, result in large portions of the area allocated to roaded prescriptions. Alternatives A/NFMA and H would retain no acres in unroaded condition. Alternatives B, C, D, H, I, and J would retain only 16 percent of the area in unroaded condition. Alternatives B, D, and J would allocate the largest acreage, 21,370 acres to General Forest with road construction, timber harvest, and high levels of modification of natural conditions. Alternatives E, F, and G retain the most wilderness character.

SLIDE RIDGE



LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

C-158

SLIDE RIDGE ROADLESS AREA

Size: Gross Acres: 10,409

Net Acres: 10,091

I. GENERAL INFORMATION

A. History

This area was studied under RARE I but not selected. The 1974 Chelan Unit Plan directed the area to sustained resource production. It was re-inventoried in the fall of 1983. None of the area was included as wilderness under the Washington State Wilderness Act of 1984 proceedings.

B. Location and Access

It is located near the southern end of Lake Chelan and extends inland on the south side of the lake. It is just east of the Stormy Mountain roadless area. Access is via the Stormy Mountain Road and there are no maintained trails within the area.

C. Physiography and Soils

Part of this area is very steep and barren and is highly visible from both Manson and the city of Chelan. The slide itself has been responsible for closure of the south shore road on numerous occasions and for damage to private property. Much of the area is overstocked with dense stands of lodgepole pine that has grown up since the 1970 fires.

Elevations range from 1,650 to 5,700 feet. Approximately 68 percent of the soils have developed in deposits of volcanic ash and pumice (depths vary from as little as 6 inches to more than 30 feet) and the rest have formed in granitic materials. Ash soils tend to be very dusty when dry. They are also easily displaced and are very erosive if the protective surface vegetation is removed. Soils formed in granitic materials have good bearing strength and tend to stay in place.

D. Climate

Precipitation ranges from 25 to 45 inches annually and falls mostly as snow.

E. Vegetation

This area is 60 percent tentatively suitable forest land, most of which (90 percent) is dry forest ecotype. Only 12 percent of the suitable land is mature timber.

Most of this area is dense overstocked Douglas-fir, ponderosa pine type. Small diameter lodgepole pine and subalpine fir stands occur at higher elevations. Pinegrass, bitterbrush, ceanothus, and poison oak are common understory plants in this predominantly dry ecotype.

F. Current Uses

The current use is for dispersed recreation. The major activity and its estimated annual use is:

Activity	Estimated Annual Recreation Visitor Days
Hunting	1,000

The area contains the following Recreation Opportunity Spectrum (ROS) class:

ROS Class	Acres
Semiprimitive Nonmotorized	10,091

There are no trails within the area.

G. Appearance and Surroundings

The area has a moderate visual variety in landforms, vegetation, and rockforms, and a low variety in waterforms (lakes and streams).

The area has a steep, broken vegetative pattern with dense vegetation along streams. Some rockforms occur along the ridgetops and as the contrasting slides of Slide Ridge. The Baldy and First Creek basins have a variety of vegetative patterns of dense to sparse vegetation.

The area is primarily viewed as middleground from the Lake Chelan area, and Baldy and Forest Mountains.

The Slide Ridge area is surrounded by Lake Chelan, Slide Ridge, Baldy and Forest Mountains, and First Creek.

H. Attractions

There are no major attractions within the area.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The Slide Ridge roadless area occupies the rugged east slope of Slide Ridge and the upper portion of the First Creek drainage. Due to the steep terrain and difficult access, the area acts as a physical barrier to existing or potential public use. However, the area lies immediately adjacent to the highly developed west shore of lower Lake Chelan and is heavily influenced by the sights and sounds of private land in the lower Lake Chelan basin. These sights and sounds include developed recreation, orchards, residential areas, roads and power boats.

B. Natural Integrity

The rough topography of the area has almost excluded any past human activities, the exceptions being a 1.5 mile-long power line that crosses the area and two special use waterlines extending a short distance into the east side. A system of existing roads nearly encircles the boundary of the area. The one human influence that has had an impact on the natural conditions is fire. Portions of the area were burned by 1970 and 1979 fires and some firelines were constructed.

C. Natural Appearance

The area gives a feeling of being free from disturbance; however, the location adjacent to and above the highly visible, lower Lake Chelan basin gives the feeling of being "downtown." The proximity and sight of lower Lake Chelan gives the viewer an overwhelming feeling of human presence.

D. Opportunities for Solitude

The proximity to the occupancy zone along lower Lake Chelan offers little opportunity for solitude. The sight and sounds of man and the highly altered environment are ever present.

E. Opportunities for Primitive Recreation

The area offers no real primitive recreation opportunities. Although access to the area is not difficult, the steep terrain limits recreation use primarily to big game hunting.

F. Challenging Experiences

This area offers a real challenge to those intrepid souls that wish to hike from the bottom to the top of the area; however, the challenge is a physical endeavor and has little to do with wilderness adventure.

G. Special Wildlife Features

During the winter and spring months, bald eagles make use of the lower elevations near Lake Chelan foraging for food. No other threatened or endangered species have been found in this area. The extent of use of this area by sensitive species is unknown.

H. Historical and Scientific Study

The area possess a geologic phenomenon (earthquake fault) called "The Slide" which is a natural, raw, steep slope of inherent instability. Its presence on Slide Ridge is a local landmark.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities. Estimated carrying capacity by ROS class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
SPNM	10,000

B. Wildlife

The lower elevations of this area provide winter range for a large mule deer herd. A few deer, as well as black bear, spend the summers in this area.

C. Fish

There is nothing significant about fish in this area.

D. Water

There are no water related encumbrances or planned projects within the area.

E. Livestock

There is no current potential for stock use within this area. Very steep topography limits the potential of grazing, except near Forest Mountain and possibly in a few locations near the top of Slide Ridge.

F. Timber

The area contains 6,105 acres of tentatively suitable forest land. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	21	.6	.1
Wet	Immature	593	10.7	2.0
Dry	Mature	742	9.3	1.7
Dry	Immature	3,943	38.7	7.1
Dry	Seedling-Sapling	806	---	---
	Total	6,105	59.3	10.9

The estimated maximum biological potential contribution to the long-term sustained yield is 1.8 MM Bd. Ft. (0.3 MM Cu. Ft.) per year.

G. Minerals

The subject land is primarily underlain by granitic rock of Mesozoic ages; however, the northern portion is also underlain by pre-upper Jurassic metamorphic rocks. The area has not been studied in detail by the U.S.G.S. or U.S. Bureau of Mines, but there are reported occurrences of fluorite and pumice. Neither commodity has been objectively investigated to determine if the deposits have commercial value. According to Bureau of Land Management records (1/23/85), there are no mining claims located within the area. The area is not classified prospectively valuable for any of the leasable commodities, and there are no existing leases or pending lease applications.

H. Cultural-Historical

No cultural sites are known or recorded in this unit. The area is marginal to most historic uses of Lake Chelan, and there are few resources or topographic features present that would attract prehistoric use at a level sufficient to leave identifiable remains.

I. Land Use

There is a special use electric transmission line across portions of Sections 7 and 8 T28N., R21E., W.M.

J. Fire

Annual fire occurrence is high and primarily started by lightning. Fuel loadings range from heavy accumulations of down fuels at lower elevations to scattered alpine timber and meadows at higher elevations. There is a frequent history of large fires in this area.

K. Insects and Disease

Mistletoe on both Douglas-fir and lodgepole pine is very damaging in this area. This, in conjunction with overstocking, often makes stand destruction a more viable option than thinning in immature stands.

L. Private Lands

There are 318 acres of private lands within the area along the northeast portion. Access is gained by means outside of the area. Possibility for acquisition is considered to be fair.

Current access is by other than roads.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located within 25 miles of both the 145,667 acre Lake Chelan-Sawtooth and the 576,865 acre Glacier Peak Wilderness Areas and just east of the Stormy Mountain roadless area.

B. Distance From Population Centers

The area is reachable within two to four hours driving time from population centers such as Seattle, Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through wilderness classification.

D. Interest by Proponents, Including Congressional

Since the passage of the Washington State Wilderness Act of 1984, there has been no apparent interest for additional wilderness classification by proponents or Congressional factions.

However, there have been proposals by both environmental and off-road vehicle users to maintain roadless status for the area.

Local citizens have expressed an interest in potential development on Slide Ridge adjacent to "The Slide" area. The concern has been that any road building or vegetative manipulation above or adjacent to "The Slide" may intensify the natural erosion process with resultant downstream damage.

E. Public Input

Public input during the RARE I and other planning efforts was obtained and it supported unroaded allocations.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated support for dispersed unroaded recreation use for the area. Opinion differs as to the area being for motorized or nonmotorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Slide Ridge roadless area consists of 10,091 acres located on the rugged east slope of Slide Ridge and a large portion of the First Creek drainage.

The area does not contain any trails and has been inventoried according to the ROS as primarily Semi-primitive, Non-motorized.

However, because of the steep terrain, poor access and lack of attractive destination points, the area's current use is almost entirely by deer hunters during the months of October and November. The total use of the area is light, estimated at approximately 1000 RVDs.

Alternatives A/NFMA and H would not allocate any of the area to unroaded management. The entire area would be managed for timber harvest. Approximately 79 to 83 percent of the area would be managed under the Scenic Travel-Retention or Partial Retention prescription, which maintains a natural appearing environment in the foreground and middleground. Thirteen percent of the area is managed under the timber management prescriptions.

The inventoried semi-primitive, non-motorized recreation opportunities would be converted to ROS classes Roaded Natural and Roaded Modified during the planning period.

Total recreation use for the area would probably increase due to increasing roaded access. The activities of hunting and scenic driving would account for the majority of the use. Any new roads, as viewed by the recreation users on Lake Chelan and in the Manson area, would probably be looked upon negatively.

Alternatives B, D and J would allocate 62 percent of the area for maximum timber harvest and heavy roading, with approximately 11 percent of the area remaining as unroaded. These alternatives would maximize vegetative management and change the ROS setting to Roaded Modified.

Recreation use in the form of visitor travel and sightseeing would increase but the developed areas as viewed from Lake Chelan will detract from the natural setting. Timber production will be maximized at the expense of the natural landscape, which is the scenic backdrop to the heavily used lower Lake Chelan area.

Alternatives C and I allocate 25 percent of the area to roadless management. Recreation use in the semi-primitive, non-motorized setting would remain at present levels. The remainder of the area would be managed primarily in the Scenic Travel-Partial Retention ROS class. Some road building would occur but foreground and middleground views of the established vegetation would be preserved. The majority of the use would occur within the Roaded Natural ROS setting. There are no system trails in this roadless area.

Alternatives E and F maximize the area to be managed with no roading or timber harvesting activities. Almost the entire area would be managed to enhance Dispersed Recreation, Non-motorized, and Motorized ROS classes. The greatest change in the recreation use will be the increase in motorized dispersed recreation activities which could occur through additional trail development within the area. The increase in motorized trail use at the expense of the non-motorized use could be an issue with the roadless, non-motorized proponents.

Alternative G will be managed as Scenic Travel Retention which changes the ROS setting from Semi-primitive, Non-motorized to Roaded Natural. Timber cutting will occur within the background areas.

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semiprimitive Motorized and Semiprimitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0	10	25	10	100	92	0	0	25	10

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0/0	0/100	0/100	0/100	66/34	72/28	0/0	0/0	0/100	0/100

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may be reduced as road construction occurs. The roadless character of these portions would also be lost.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate much of the area to Retention and Partial Retention VQO. The foreground and middleground views from Lake Chelan will have high visual quality. The Maximum Modification allocation remains on the backside of the Lake Chelan viewshed and is not visible from that travel route.

Alternatives B, D and J allocate much of the area to Maximum Modification VQO. The middleground view from the Lake Chelan area will be heavily altered from the Baldy Creek basin and Slide Peak area. The foreground view of Lake Chelan is allocated to Retention VQO.

Alternatives C and I will allocate the foreground view from Lake Chelan to Retention and most middle-ground views to Scenic Travel Partial Retention.

Alternative E will allocate all foreground and middleground view of Lake Chelan to Retention. All areas will have natural appearing landscapes. The view from the Lake Chelan viewshed will be preserved.

Alternative F will allocate most landscape to Retention VQO. Some land will be allocated to Partial Retention and Maximum Modification VQO. All views from Lake Chelan will be natural appearing.

Alternative G allocates most land to Retention Scenic Travel VQO. Views from the Lake Chelan viewshed will be protected by Retention and Partial Retention VQO.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	2,862	3,010	2,989	3,010	10,091	9,646	8,735	2,862	2,989	1,272
Partial Retention	5,893	954	6,656	954	--	403	1,314	5,893	6,656	2,692
Modification	--	403	382	403	--	--	--	--	382	382
Maximum Modification	1,336	5,724	64	5,724	--	42	42	1,336	64	5,745
Total Acres	10,091	10,091	10,091	10,091	10,091	10,091	10,091	10,091	10,091	10,091

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road all of the area and allow for timber harvest emphasis on about 13 percent of the area. Alternatives A and H would have one-fifth the impact of Alternatives B, D and J which would road 89 percent of the area and allow for timber harvest emphasis on 62 percent of the area. Alternatives C, F, G, and I would have a minimal effect on wildlife while Alternative E would have no impact on wildlife habitat.

6. Fisheries

There are no significant consequences relating to fish in this roadless area.

7a. Vegetation: Trees

Current management direction under Alternatives A/NFMA and H does not preclude roading or vegetative manipulations through timber sales on any of this area. Timber emphasis is allocated on 1,463 acres or 14 percent of the area under this alternative. An additional 8,628 acres are zoned special resource management area where timber sales will be used to manipulate the existing vegetation.

All other alternatives except G allocate at least a portion of this area to nonroaded recreation. Alternative E allocates the entire roadless area to unroaded recreation where no timber sales are scheduled. Alternative F is similar with 92 percent, or 9,243 acres, allocated to roadless recreation with no scheduled timber harvest.

Under Alternatives C and I the unroaded non-motorized recreation zone would be 2,502 acres or 25 percent of the area. The remaining 75 percent of the area would permit manipulation through timber sales. However, only 5,131 acres, or 51 percent of the area, is suitable for timber harvest under these alternatives. Alternatives B, D and J would have timber sales proposed for 8,077 acres, similar to Alternatives C and I. However most of the acres under B, D and J would be timber emphasis acres. Under Alternative G, the largest block of vegetative manipulation acres (8,883, or 88 percent) would emphasize the scenic travel prescriptions.

7b. Vegetation: Forage

Alternatives C, H, and I, with the proposed vegetative manipulation and improved access, will contribute adequate forage to the base needed for big game and livestock. Alternatives A/NFMA, B, D and J will provide forage in excess of projected needs. Alternatives E, F, and G, which have little or no vegetative manipulation proposed, will not provide adequate forage to meet the projected needs for livestock, particularly in the fourth and fifth decade. Prescribed fire in the remaining unroaded portion of this area could offset the loss of forage for big game due to ecological succession.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Slide Ridge area to General Forest or roadless management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities would be minimal. Up to eight percent of the area could be allocated to timber harvest and road building in Alternative F. Alternatives B, C, D, I and J could allocate up to 89 percent, and Alternatives A/NFMA, G, and H could allocate up to 100 percent of the area to timber harvest and road building. The environmental effects of timber harvest and road building on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building activities, particularly if these alternatives enter the zone of instability of the landslide. Alternatives A/NFMA, G, and H pose more risk of degrading the soil and water resource than Alternatives B, C, D, I and J, and Alternative F, respectively. Intensive timber harvest and road building in the zone of instability could result in significant loss of long term site productivity if the slide was triggered to erode more area. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

The additional prescribed burning generated in the Slide Ridge roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

Since this area appears to have a low potential for the occurrence of mineral resources, the consequences on mineral resources do not appear to be extremely significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	953	2,014	3,456	2,014	10,091	9,243	954	953	3,456	2,020
Moderately Restrictive	7,802	2,353	6,571	2,353	0	806	9,095	7,802	6,571	2,332
Relatively Few Restrictions	1,336	5,724	64	5,724	0	43	42	1,336	64	5,745

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case-by-case basis, according to the Forest Road Closure Policy found in the Forest-Wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C	D	E	F	G	H	I	J
			PREFERRED							
Miles	25	23	20	23	0	2	24	25	20	23

12. Fire

The fire management workload generated in the Slide Ridge roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives E, F, and G. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives A/NFMA, B, D, H and J.

The cost efficiency of fire suppression activities would be slightly increased in Alternatives A/NFMA, B, D, and H as road access would allow more area to be covered by ground-based suppression resources. Cost efficiency levels in Alternatives E, F, and G would be less due to slower initial attack by ground forces or the use of more expensive aerially-delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, because of the expressed interest in keeping as much as possible of the inventoried roadless areas unroaded, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table, as referenced above, reflecting this condition for each alternative. It indicates the amount of motorized versus non-motorized use within the unroaded allocation.

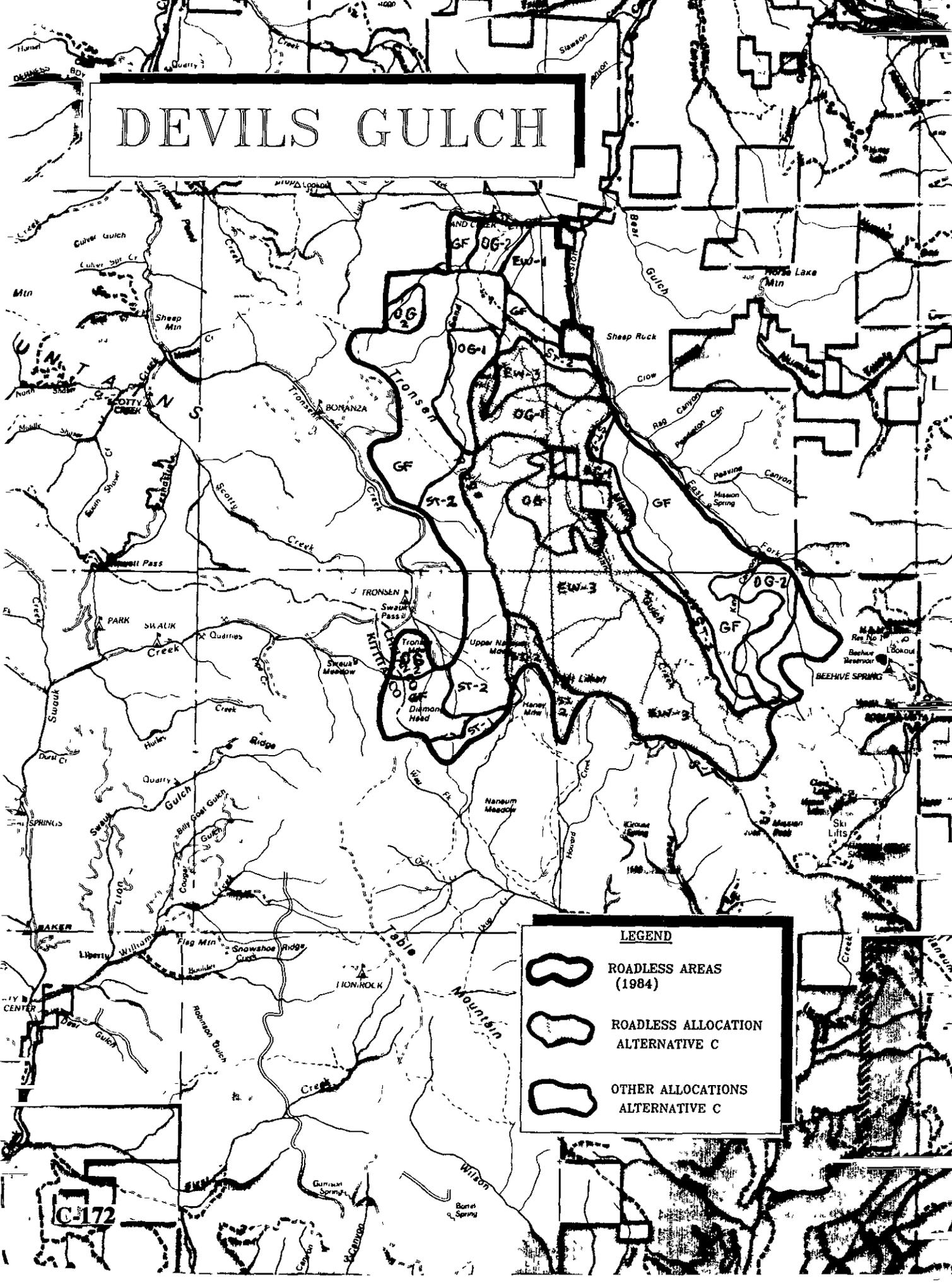
A general measure of timber oriented economic impacts can be made using the same table, which shows the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 20.2 jobs.

14. Wilderness Potential

This roadless area has the physical and biological attributes of Wilderness but, due to the location of the area and its proximity to lower Lake Chelan, the opportunities for solitude from human sights and sounds is low.

Alternatives A/NFMA, H, and G retain no unroaded acres but have very low allocations of General Forest. Alternatives E and F provide the greatest retention of natural conditions. Alternatives C and I provide for a balanced allocation of resource values, with emphasis on retention of visual quality. Alternatives B, D, and J allocate a large portion (57 percent) of the area to General Forest. General Forest allocation would prescribe road construction, timber harvesting, vegetative change, and reduction of visual qualities.

DEVILS GULCH



LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

C-172

DEVIL'S GULCH ROADLESS AREA

Size: Gross Acres: 25,186

Net Acres: 25,186

I. GENERAL INFORMATION

A. History

The area was allocated to dispersed, unroaded recreation prior to RARE II through the Chelan Unit Plan. It was not included for wilderness status as part of the Washington State Wilderness Act of 1984 process.

B. Location and Access

The Devil's Gulch roadless area is located approximately 10 miles south of the town of Cashmere, Washington, and is approximately 10 miles west-southwest of Wenatchee, Washington. It lies entirely within Chelan County on the Leavenworth Ranger District of the Wenatchee National Forest. Primary access includes U.S. 97 (Blewett Pass), Mission Creek Road south of Cashmere, and the Squilchuck road and Liberty-Beehive Road south of Wenatchee. The Liberty-Beehive road lies along the southern boundary. A network of trails (Devil's Gulch, Mission Ridge, Red Hill, and Tronsen Meadow) provide access. A small portion along the western edge lies within the Alpine Lakes Management Unit.

C. Physiography and Soils

This area is characterized by steep, rough, angular topography created by large blocks of sandstone bedrock that have been broken and twisted by uplift. The bedded material has no cardinal direction. The dip and strike of the bedding planes vary widely depending upon what part of the area they are in. Vegetative patterns are very distinct, because on most south and southwest facing slopes the plant community is dominated by open stands of ponderosa pine surrounded by a dense carpet of pinegrass, whereas on the north and easterly slopes there are dense stands of Douglas-fir and ponderosa pine. All of the individual drainages are steep and deeply incised.

Elevations range from 1,600 to 6,500 feet. Approximately 90 percent of the soils have formed in Swauk sandstone material and the rest have formed in basaltic residuum. Both materials tend to be slippery and greasy when wet. Puddling and compaction are two of the major problems associated with managing these soils. When these materials are dry, they have excellent bearing strength.

D. Climate

Precipitation averages about 15 to 25 inches per year and occurs mainly as snow.

E. Vegetation

This area has 65 percent tentatively suitable commercial forest area. The primary species are Douglas-fir, ponderosa pine, lodgepole pine, grand fir, and western larch. Early day logging in Mission Creek up to Stump Camps and in King Canyon removed much of the mature timber. Primitive logging roads up stream courses are still evident.

Open south slope areas support bitterbrush shrub areas. Some prescribed burning of bitterbrush and ceanothus stands to improve wildlife browse has been recently completed.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Motorized Trail Riding	4,000
Hunting	9,800
Hiking	2,000
Total	15,800

The area contains the following Recreation Opportunity Spectrum (ROS) Class:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Motorized (SPM)	25,186

There are 36.7 miles of trail within the area of which all are open to motorized use. The area serves as the major motorbike use site on the Ranger District.

G. Appearance and Surroundings

The area has moderate to high visual variety in landforms, vegetation and rockforms but very little variety in waterforms (lakes and streams). Large rock slides of the Swauk sandstone formation provide contrast within the area.

There is a variety of mixed conifers and larch on the upper slopes near Mount Lilhan, Upper Naneum Meadows, and Diamond Head. The ridgetops are open and have sparse vegetation on their south slopes. Dense vegetation is located in the drainage bottoms.

The area is primarily viewed as both foreground and middleground from the Blewett Pass Highway (Highway 97), the Liberty-Beehive Road, the Mission Creek drainage, and Tronsen Ridge, Mission Ridge, and Devil's Gulch Trails.

The Mission Creek area is surrounded by the Liberty-Beehive Road, Mission Creek, Highway 97, and Little Camas Creek.

H. Attractions

One major drainage, Mission Creek, commonly known as Devil's Gulch, is included in the unit. A well known landmark attraction called Devil's Slide occupies the steep, bare, sandstone bedrock headwall in this drainage.

The portion within the Alpine Lakes Management Area contains features such as Diamond Head and Upper Naneum Meadows.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

Most of the boundary does not lie on specific identifiable ground features, thus lending to difficulty of management.

B. Natural Integrity

Impacts of past human activity in this area have been relatively minor. A short logging road penetrated up Mission Creek into the area in the '40s. It basically followed the stream bed and is evident only in a few locations with trees up to 8 inches in diameter growing on it. Portions of the trail system are relatively new (early '50s) and were built for motorized two-wheel vehicles. All of the trails in the unit have considerable motor bike use.

C. Natural Appearance

The main Devil's Gulch is relatively remote from population centers and gives a feeling of being away from human activity or development. Views from the unit are relatively free from man's impact such as timber harvest, etc. The large sandstone cliff slide area in the head of the gulch reinforces a feeling of naturalness.

D. Opportunities for Solitude

The area offers good opportunities for solitude due to terrain, vegetative cover, and geologic character.

E. Opportunities for Primitive Recreation

Opportunities for primitive recreation experiences are midrange. The area is not exceptionally large but the absence of facilities contribute to its primitive character. Access is good by roads to the perimeter of the unit and good trail systems occur on the boundaries and in the interior of the unit. There are ample opportunities for big game hunting, horseback riding, hiking, backpacking, and nature study or scenic viewing.

F. Challenging Experiences

The area has marginal opportunities for challenging experiences due to the amount of easy access in the unit. Some opportunity exists for climbing of the sandstone formation.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. Spotted owls have been located in this area. Use of the area by any other threatened, endangered, or sensitive species is unknown.

H. Historical and Scientific Study

Some opportunity exists for scientific study in relationship to the geology of the area.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS Class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
SPM	50,300

B. Wildlife

Lower elevation south slopes in the area provide winter range for a large number of mule deer and some elk. The area is used in the summer by migrating elk from the Colockum unit south of Wenatchee. A variety of other wildlife common to central Washington also inhabit the area. Other species of interest are black bear, goshawk, marten, bobcat, and cougar.

C. Fish

Mission Creek is used by both anadromous and resident fish. It is thought that at one time Mission Creek had one of the largest runs of steelhead trout in the Wenatchee system. Resident cutthroat and rainbow trout also utilize the stream.

D. Water

Water yield records are available for the period between December, 1958 and September, 1971. The stream discharge measurement site is located at the extreme northeast corner of the roadless area, just above its confluence with Sand Creek.

The mean discharge over the 12 years of record was 13 cubic feet/second (cfs). The maximum discharge recorded was 299 cfs--occurring in January 1971. Minimum flow was 0.90 cfs occurring on September 9, 1966. There are no diversions above the stream discharge measurement site.

Sand Creek was also monitored for discharge but records were not continuous. The stream gauging site was located on Sand Creek immediately above the confluence with Mission Creek. The drainage area of 18.6 miles experienced a peak flow of 425 cfs on August 15, 1956. Minimum discharge occurred on September 10, 1955 with 0.4 cfs. There are diversions above this site. The site is no longer maintained by the Geological Survey. There are no precipitation records for the area. The Mission Creek drainage has been subjected to occasional high intensity rainfall and flashy runoff.

E. Livestock

The portion of this area west of Tronsen Ridge is currently within the Tronsen Recreation Stock Allotment, and because the allotment inventory map shows only one relatively small suitable range area, the potential for domestic livestock is limited.

The portion of this roadless area within the Mission Creek drainage is outside of any existing allotments. Vegetative types in the northern part of the drainage have potential for domestic stock use. Lack of

access into forage areas and cost of developing unroaded allotments when other areas are available have resulted in little interest or use by livestock owners. The potential for use by sheep or cattle would be enhanced through timber harvest and roading.

F. Timber

The area contains 16,495 acres of tentatively suitable forest land. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Bare Ground	64	---	---
Wet	Mature	2,311	65.5	12.0
Wet	Immature	4,834	86.9	15.9
Wet	Seedling-Sapling	64	---	---
Dry	Mature	2,078	26.0	4.8
Dry	Immature	7,102	69.7	12.9
Dry	Seedling-Sapling	42	---	---
	Total	16,495	248.1	45.6

The estimated maximum biological potential contribution to the long-term sustained yield is 5.0 MM Bd. Ft. (0.92 MM Cu. Ft.) per year.

G. Minerals

This area is underlain by Tertiary and Cretaceous aged sedimentary rocks. A fairly large Tertiary intrusive body lies immediately to the northeast of the subject land, however, which is of interest for its related gold potential. The area has not been investigated by the U.S.G.S. or U.S. Bureau of Mines, but available references indicate that the only known mineral resource occurrences of interest are limited to sandstone deposits. The entire area has been classified "prospectively valuable" for both oil and gas, and coal resources by the U.S.G.S. , and the south half of the area has been nominated as an "area of critical mineral potential" through a Bureau of Land Management nomination process (Bee, 1983).

Even though the area has no proven mineral resources of significant nature, there is interest in the area. According to B.L.M. mining claim recordation data (1/23/85), these have been 966 lode claims and 11 placer claims located within or immediately adjacent to the area. Assessment work appears to have been maintained on most of these claims; however, it is not known whether the claims were located for known deposits or in speculative response to the activities on-going nearer Wenatchee. The area has also been leased for its oil and gas resources, but it has not yet experienced any exploration drilling so its actual oil and gas potential is not known. Presently it does not appear that there is any interest in the potential coal resources of the area.

H. Cultural-Historical

The Tronsen Ridge and Upper Naneum Meadows area of this unit were reportedly used in prehistoric times for travel, food, and the collection of household materials. There are no known archaeological sites, although field survey has been limited. Historic uses include small-scale mining, trapping, and sheep grazing.

I. Land Use

J. Fire

Annual fire occurrence is high with fires primarily started by lightning. Fuel loadings are moderate with intermittent small openings and areas of heavier fuels. Periodic large fires have occurred.

K. Insects and Disease

Due to past removal of the old-growth timber, the stands in this area are less susceptible to bark beetles than most areas.

Budworm feeding occurred in the 1970's but, following aerial spraying in 1977, no budworm feeding has been evident. Mistletoe is present, but less common than in completely unlogged areas.

L. Private Lands

There are no private lands within the area. There are, however, two small parcels of alienated lands within the area which are currently accessed only by foot trail.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located within 10 miles from the southeastern portion of the 393,360 acre Alpine Lakes Wilderness Area and just north of the Naneum and Lion Rock roadless areas.

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

The ecosystem is somewhat unique due to the Swauk sandstone formations in the unit that are fairly widespread in North Central Washington but not represented in other wilderness or wild areas.

D. Interest by Proponents, Including Congressional

Since the passage of the Washington State Wilderness Act of 1984, Congress has not expressed interest in making further additions to the State wilderness system. Environmental organizations have expressed interest in adding portions of the area to the National Wilderness Preservation System in the future.

Both environmental and ORV organizations and users have advocated maintaining roadless status for the area.

E. Public Input

Public input during the unit planning efforts was obtained and supported unroaded allocations.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area. There is a difference of opinion as to whether it should be motorized or nonmotorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

Alternatives B, D and J would not allocate any of the area to roadless management. Under these alternatives, the area would be entered for harvest and all motorized recreation opportunities would be changed from semi-primitive to Roaded Natural or Roaded Modified.

Alternative E represents the current roadless situation. It represents the maximum area (100 percent) available for roadless opportunities, such as motorized trail use, with opportunity for dispersed recreation, non-motorized use.

Alternative F would provide for mostly dispersed recreation unroaded non-motorized opportunities (approximately 90 percent) and allocate approximately 10 percent to unroaded recreation, motorized. This alternative would eliminate approximately 3,600 RVDs of motorized trail use. Opportunities for solitude would increase as motorized use would be restricted.

Alternative G has similar allocations as Alternative E, with the exception being that there is no dispersed recreation, unroaded, non-motorized setting. That allocation would go to roaded eventually with timber harvest and increased roaded motorized recreation opportunities.

Under Alternative C and I, the portion of the trail system in this roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Mission Ridge	1201.1	--	2.0	--
Tronsen Ridge	1204	--	6.0	2.7
Tronson Meadow	1205	--	--	2.0
Devils Gulch	1220	--	12.3	--
Red Hill	1223	--	--	8.0
Red Hill Spur	1223.1	--	2.2	1.5
Totals		--	22.5	14.2

In these alternatives 32% of the area is allocated to unroaded Big Game habitat. Motorized recreation can occur in this allocation as long as the objectives of Big Game Management are being met.

Alternatives C and I represent a balanced allocation emphasis for all resource values of the Devil's Gulch area.

Alternatives A/NFMA and H would reduce the dispersed recreation, motorized, trails for motorbikes slightly. Some of the trails would run on the boundary of the unit which could potentially conflict with roaded use in the future. Much of the current roadless acreage would be allocated to General Forest

with roads and timber harvest. This would increase opportunities for roaded modified recreation opportunities.

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semiprimitive Motorized and Semiprimitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	37	0	39	0	100	87	78	37	39	0

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	100/0	0/0	100/0	0/0	21/79	24/76	0/100	100/0	100/0	0/0

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roaded may provide a less semi-primitive recreation experience with a more Roaded Natural or Roaded Modified setting.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate many areas to Maximum Modification VQO. These areas are the Diamond Head area (Highway 97), Mission Creek, King Canyon, Sand Creek area, and the upper end of the Mission Creek drainage. The middleground view from the Beehive to Liberty travel route will be heavily altered.

Most middleground views from the Blewett Pass area (Highway 97) will be Partial Retention VQO.

Alternatives B, D and J will allocate the majority of the area to Maximum Modification VQO. These areas are the middleground view from the Blewett Pass area (Highway 97), the Mission Creek drainages, Tronsen Ridge, the Beehive to Liberty travel route viewshed, Mount Lilian area, and many trails within the area. Most areas will be heavily altered as viewed from the recreational travel routes.

Alternatives C and I will allocate many areas to Maximum Modification VQO. Areas of heavily altered land will be the Tronsen Ridge and Mission Creek ridge, the middleground view from the Liberty Beehive road, the Mission Creek midslope areas, and a small portion of the Tronsen Ridge middleground viewed from Blewett Pass Area (Highway 97). Only the Devil's Gulch Creek and most of the middle-ground view from the Swauk Pass viewshed will be Partial Retention VQO. The foreground of the Liberty-Beehive Road will have high visual quality.

Alternative E will allocate all areas to Retention VQO. All areas will have natural appearing landscapes. All viewsheds will have very high scenic qualities.

Alternative F allocates most areas to a high visual quality. All major viewsheds will have a very high visual quality. Only a small area will be General Forest or Maximum Modification VQO.

Alternative G will allocate most land to Retention VQO. All major viewsheds will have high visual quality.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative C		D	Alternative E	F	G	H	I	J
			PREFERRED								
Preservation	--	--	--	--	--	--	--	--	--	--	--
Retention	11,406	3,753	12,868	3,753	25,144	23,918	22,070	11,406	12,868	3,667	
Partial Retention	7,250	3,604	6,319	7,604	--	1,017	2,862	7,250	6,319	3,647	
Modification	--	975	869	975	42	42	42	--	869	1,717	
Maximum Modification	6,530	16,854	5,130	16,854	--	212	212	6,530	5,130	16,155	
Total Acres	25,186	25,186	25,186	25,186	25,186	25,186	25,186	25,186	25,186	25,186	

Preservation indicates that only natural ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road 63 percent and allow for timber harvest emphasis on 32 percent of the area. Alternatives B, D and J would road all of the area and allow for timber harvest emphasis in 77 percent of the area. Alternatives A/NFMA and H would have less than one-half the impact on

wildlife habitat of B, D and J. Alternatives C and I would road 61 percent and allow for timber harvest emphasis on 26 percent of the area. These alternatives also have the EW-3 roadless wildlife prescription with no scheduled timber harvest allowed. This would result in less impact than B, D and J. Alternative E would have minimal effect on wildlife habitat. Alternatives F and G would have more effect than E, but considerably less than A/NFMA and H on wildlife habitat.

6. Fisheries

a. Significant Effects

Mission Creek, the only stream with fish populations in this roadless area, would remain roadless in Alternatives A/NFMA, C, E, F, G, H, and I. In Alternatives B, D and J the area around Mission Creek in the roadless area could be managed with an intensive timber harvest regime.

Roading Mission Creek could change its recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that recreational fishing would increase. This would help to meet a portion of the fishing demand, but also could result in overfishing and reduction in both numbers and size of fish using the habitat. This may be more likely to happen in Mission Creek than other areas because of the population concentration nearby in Wenatchee.

It is also possible that roading the unroaded areas could result in environmental degradation to streams due to timber harvest and road construction in the basins. This is of particular concern in this roadless area since increases in road and timber harvest-produced sediment could have an effect on steelhead production downstream. Some of these possible effects are also addressed in the soil and water environmental effects.

b. Mitigation Measures

In the alternatives that could road the presently unroaded Mission Creek area, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September 1980 and revised October 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Tree management would be planned on 11,367 acres, or 45 percent, of the area under Alternatives A and H. Vegetation manipulation would be permitted on 94 percent of the area under Alternatives B, D and H.

No timber management would be scheduled under Alternative E, and only 3,390 acres or 13 percent under Alternative F.

Alternatives C and I would manage 6,635 acres for emphasis on timber production (26 percent). In addition, 7,888 acres could be managed for other resource values that permit scheduled timber harvest. Total suitable forest that would be manipulated through timber sales is 13,759, or 55 percent of the area.

Alternative G emphasizes management to provide scenic travel on 11 percent or 2,713 acres. Timber management would be emphasized on 1,717 acres. Motorized unroaded recreation would be the largest allocation with 19,739 acres or 78 percent of the area.

7b. Vegetation: Forage

There are no existing allotments within this roadless area. The existing and potential forage base, however, will make a significant contribution to the forage needed by big game and livestock from the fourth decade on. Due to the non-occurrence of natural fire and lack of livestock use over the past 10 to 50 years, many forage areas are stocked with trees or high brush and do not provide wildlife forage. With the proposed vegetative manipulation and access, Alternatives C, H, and I will contribute adequate forage for big game and Livestock. Alternatives A/NFMA, B, D, and J will provide forage in excess of needs while Alternatives E, F, and G will not meet forage needs for livestock in the fourth or fifth decades.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Devil's Gulch (Mission Creek) area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Up to 22 percent of the area could be allocated to timber harvest and road building in Alternatives F and G. Alternatives C and I allocate 61 percent. Alternatives A/NFMA, C and H could allocate up to 80 percent of the area, and Alternative B, D and J could allocate the entire area to timber harvest and road building. The environmental effects of timber harvest and road building on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building activities, particularly if those activities enter the zone of instability of the landslide at the upper end of Mission Creek. Alternatives B, D and I pose more risk of degrading the soil and water resource than Alternatives A, C, H, and J, and Alternatives F and G, respectively. Intensive timber harvest and road building in the zone of instability could result in significant loss of long-term productivity if the slide were triggered to erode more area. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

c. Potential Conflicts with Plans and Policies of Other Jurisdiction

There are 6,996 acres of Burlington Northern Railroad lands adjacent to the area. More timber harvest has occurred on private land in the headwaters of South Fork Manastash Creek, Gold Creek, Mill Creek, and North Fork Wenas Creek drainages than is occurring on National Forest Lands. The Forest Service needs to examine land management practices on adjacent land to consider the possibility of cumulative effects. The analysis of cumulative effects in this area is the same as that discussed in Chapter IV-Soil and Water sections.

9. Air

The additional prescribed burning generated in the Devil's Gulch/Mission Creek roadless area as a result of the alternative would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

The area has no proven mineral resources, but it is encumbered by 966 lode claims, 11 placer claims, and by oil and gas leases. It has also been classified prospectively valuable for both oil and gas, and coal, and was identified as an area of critical mineral potential. Since none of the alternatives call for withdrawing any part of the area from mineral entry, the consequences on mineral resources do not appear to be extremely significant nor do they vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. The relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	D Alternative	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	12,003	4,494	13,271	4,494	25,186	21,901	20,566	12,300	13,271	4,494
Moderately Restrictive	5,148	1,378	5,280	1,378	0	1,420	2,903	5,148	5,280	2,078
Relatively Few Restrictions	8,035	19,314	6,635	19,314	0	1,865	1,717	8,035	6,635	18,614

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case-by-case basis, according to the Forest Road Closure Policy found in the Forest-Wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C	D	E	F	G	H	I	J
			PREFERRED							
Miles	37	47	37	47	0	6	11	37	37	47

12. Fire

The fire management workload generated in the Devil's Gulch/Mission Creek roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives C, E, F, G and I. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives A/NFMA, B, D, H and J.

The cost efficiency of fire suppression activities would be slightly increased in Alternatives A/NFMA, B, D, H and J as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives C, E, F, G and I would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber-oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber-oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 61.8 jobs.

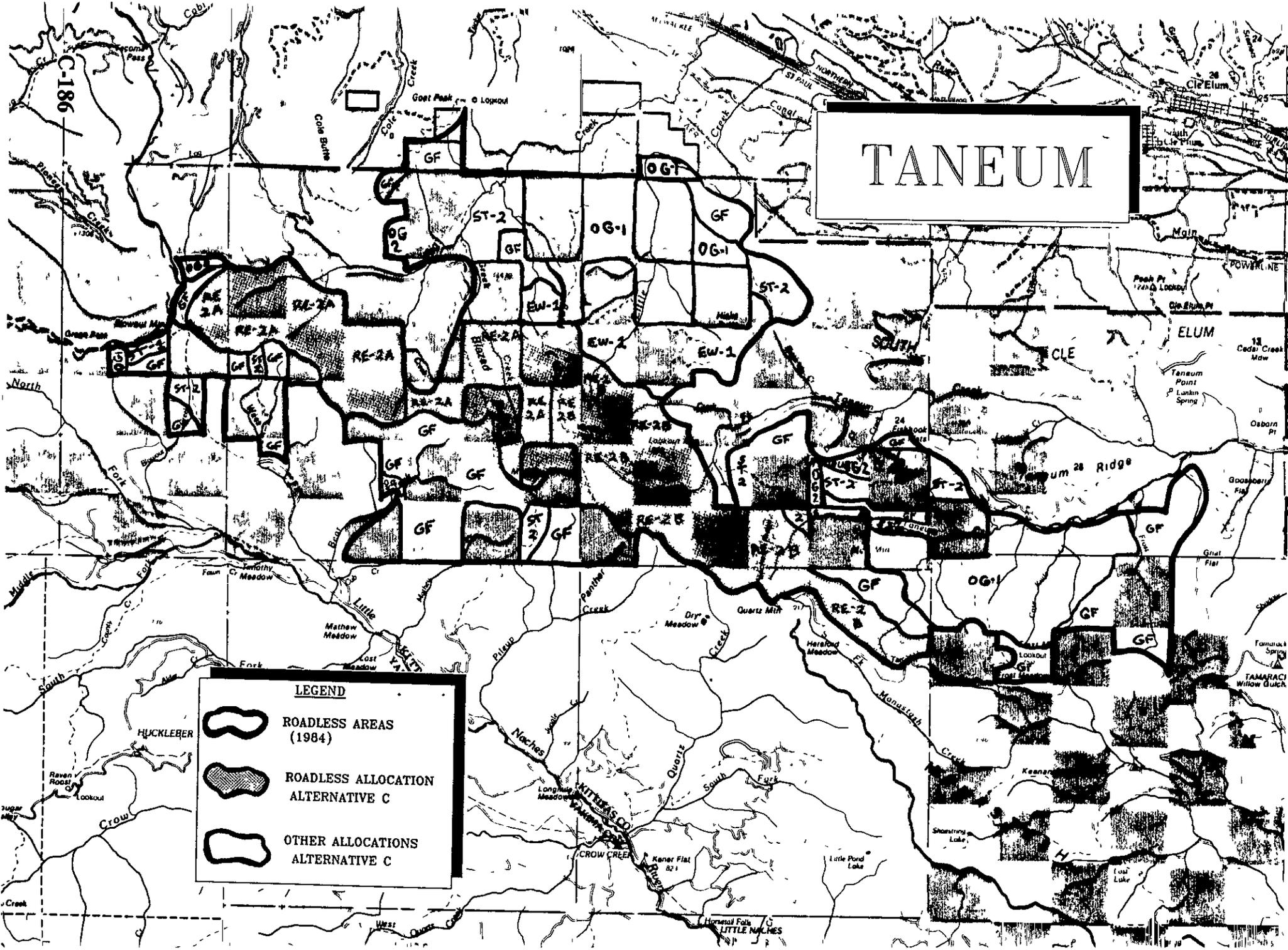
14. Wilderness Potential

The roadless area has limited potential for Wilderness. It is not adjacent to any existing Wilderness and is of relative small size although many Wilderness attributes are characteristic of the area. Alternatives B, D, and J prescribe the greatest change in natural attributes with no roadless area retained. About 18,360 acres would be managed as General Forest, which is 73 percent of the area. Alternatives E, F, and G prescribe the greatest retention of unroaded characteristics. Alternatives C and I prescribe a balance of prescriptions with 6,635 acres in General Forest. Alternatives A/NFMA and H prescribe a greater area retained in unroaded, but 8,035 acres allocated to General Forest. Under General Forest, the area would be highly modified, roads constructed, and timber management activities present.

TANEUM

LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C



TANEUM ROADLESS AREA

Size: Gross Acres: 43,257

Net Acres: 25,122

I. GENERAL INFORMATION

A. History

The area was not considered as roadless until the Forest's inventory in the fall of 1983. It did not meet the RARE II definition due to large amounts of mixed ownership, which is still the case. It is being addressed due to expressed public interest in it remaining unroaded.

B. Location and Access

The area is within Kittitas County and lies on both the Cle Elum and Naches Ranger Districts and is adjacent to the Quartz Mountain and Manastash roadless areas. Access is mainly via the Quartz Mountain and Taneum Roads.

C. Physiography and Soils

The upper elevations can be considered as a narrow, gently rolling plateau. Then on either side of the plateau the slopes are steep, but smooth and fairly uniform. The entire unit is well stocked with conifers.

Elevations range from 3,000 to 6,000 feet . There are several different soil types in this area, so the management may be complicated by the pattern and arrangement of the different soils. Twenty-seven percent of the soils have developed in granitic residuum, 21 percent from sandstone, 19 percent from schist, and the remainder from alluvium and serpentine materials. The granitic materials and the alluvium generally are not sticky or slippery when wet and have good bearing strength. The sandstone, basalt, and pyroclastic materials all are fine when dry; however, all are sticky and slippery when wet. Soils formed in schist materials can have characteristics that resemble the other two main groups depending upon the specific kind of schist.

D. Climate

Annual precipitation in this roadless area is estimated to be 45 inches with approximately 50 percent falling as snow. Snow depths are estimated to average 80 inches.

E. Vegetation

Seventy-four percent of this area is tentatively suitable timberlands. Because this area is presently alternate sections of National Forest and Plum Creek Timber land, it is currently being roaded and the mature timber on the private lands removed. The species most common to the area is Douglas-fir. However, as this area extends from the crest of the Cascades to 22 miles to the east along Manastash Ridge, most of the species common to the Wenatchee are found in this area. Old burn areas are mostly reforested to pole size stands with only about three percent of the area in regeneration with seedlings or sapling size trees.

Only eight percent of the area is in open rock or meadows, making this the heaviest timbered roadless area. A low productivity, open grown alpine forest occupies another 14 percent of the area.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Trailbike and 4X4 Use	5,000
Hunting	10,000
Total	15,000

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Non-Motorized (SPNM)	7,527
Semi-Primitive Motorized (SPM)	17,595
	25,122

There are 124.0 miles of trail within the area of which all are open to motorized use. The area is also popular for 4X4 vehicle activities. Trail management on the area is made difficult due to the large amount of checkerboard ownership.

G. Appearance and Surroundings

The area has moderate visual variety in landforms, vegetation, rockforms, and waterforms (lakes and streams). The ridgetops have moderate to high visual variety.

The area has steep, highly textured north and northeast slopes with open ridgetops (mostly along the south exposed ridges). The ridgetops from Quartz to Clifty and Blowout Mountains are open with sparse vegetation and rock outcrops throughout. The north and northeast slopes are dissected with streams. Fall colors are prevalent along the upper ridges. Dendritic stream patterns are present in the upper North Fork Taneum creek drainage.

The area is primarily viewed as foreground and middleground from the Quartz Mountain Road, ridgetop trails, the Pacific Crest National Scenic Trail, and other trails. A portion of the area is viewed as middle-ground and background from the I-90 highway. The background viewing is from the Raven's Roost area.

The Taneum Area is surrounded by portions of Big Creek, Taneum Creek and Taneum Ridge, the Gnat Flat and the Quartz Mountain road, the upper drainages of Little Naches, and the Pacific Crest National Scenic Trail.

H. Attractions

Major attractions within the area are Mount Clifty, Taneum Lake, and the Big and Little Creek drainages.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

Since the area lies on both the Cle Elum and Naches Ranger District, this section discusses these characteristics by District.

A. Manageability and Boundaries

Cle Elum:

This area is bordered on the south by a major ridge system and highlighted by three prominent peaks. Blowout Mountain, Mount Clifty and Quartz Mountain. The boundary then meanders toward the east in the vicinity of Manastash Road, then northerly in the vicinity of Gnat Flat Road, to Taneum Creek, then westerly along the South Fork of Taneum Creek and the Fishhook Flats Road to an area near Lookout Mountain. The boundary then meanders in a northerly direction toward Hicks Butte and on to the powerline corridor, then westerly along section lines and the Forest boundary to Coal Creek. The boundary then meanders southerly in the vicinity of Big Creek to Blazed Ridge and westerly to the Forest boundary. The boundary is not easily identified on the ground except when it follows ridge lines or streams. The entire area is in mixed ownership. Future management of public lands will be influenced by the management activities of the private land owner.

Naches:

The Taneum roadless area south of Manastash Ridge is bordered by Forest roads and timber harvest units. These features would be difficult to locate on the ground or map. These roads bring the sights and sounds of human intrusion into the fingers and periphery of the roadless area.

B. Natural Integrity

Cle Elum:

Due to the checkerboard ownership pattern of this area, long term natural processes are expected to be heavily influenced by actions of the private landowner. Trails 1388, 1318, 1333, 1321, 1326, 1377, 1367, and 1363 dissect this area. The area is heavily used by motorcycle riders. Continued encroachment by roads is expected in the management of private sections.

Naches:

This roadless area was not considered for Wilderness in RARE II because of the large amount of checkerboard ownership. The area is bordered by both private and government roads and timber harvest units which reflect man's activities. Within the area, past human activity has been relatively minor even though some of those activities have been extensive. The trail system provides access to Manastash Ridge at many points. This trail system has a long history of motorized vehicle use.

C. Natural Appearance

Cle Elum:

The area retains its natural appearance except for the direct impact of the network of trails. Management activities on adjacent lands are strongly evident from the numerous vantage points throughout this area. Over the long- term, it is expected that management on private lands will alter this situation.

Naches:

The Taneum roadless area is large enough and the topography and vegetation are such that persons visiting the area feel that they are in a natural area away from ordinary human activity and development. Forest roads, timber harvest activities, fire lookouts and the Raven Roost Microwave site may be seen from higher points within the area. Most of the area has a closed evergreen canopy which reinforces a feeling of naturalness even though it is somewhat monotonous.

D. Opportunities for Solitude

Cle Elum:

There is a moderate opportunity for solitude in this area if a person is willing to leave the roads and trails. Most of the trails are heavily used by motorcyclists. The best opportunity for solitude is during the winter when access is difficult and the area is little used by snowmobiles.

Naches:

The area offers some opportunities for solitude. The area has an irregular shape approximately 13 miles long and 4 miles wide at its widest point. This includes the portion of the Taneum roadless area south of Manastash Ridge. Blowout Creek and Bear Creek drainages are the principal drainages. The area contains moderately dissected topography and a fairly even cover of vegetation which easily screens people from each other at short distances.

E. Opportunities for Primitive Recreation

Cle Elum:

Primitive recreation opportunities are moderate to low, except during the winter. Portions of the area are a mile or less from any road or trail. During the snow season the area is inaccessible except for over-the-snow vehicles and on foot. The majority of the area is inaccessible to snowmobiles due to the steepness of the terrain.

Naches:

Opportunities for primitive recreation experiences are moderately high. The size of the area and the absence of facilities contribute to the primitive character of the area. In spite of the good access afforded by Forest roads and the trail system within the area, there are good opportunities for big game hunting (elk, deer, black bear and some mountain lion), horseback riding, hiking, berry picking, and scenic viewing from high points.

F. Challenging Experiences

Cle Elum:

The geography of this area lends itself to a few challenging opportunities during the summer season. There are a few moderate peaks and some cliffs and canyons. Some of the trails offer a challenge to motorcyclists. The winter season offers ample opportunity to the ski tourer, snowshoer, and snowmobiler. Snow depth on the area varies from three feet to ten feet and the nearest plowed access is two miles on the north.

Naches:

This area offers few challenging experiences. The dense evergreen forest might be challenging to travel through for the more inexperienced visitor. A proposed 50 mile Boy Scout hike goes through this area. Present Wilderness regulations limit group size and discourage the continuation of the traditional 50 mile scout hike. Fifty mile hike opportunities for large groups are almost impossible to provide on the Forest with the 1984 expanded Wilderness.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. No other threatened or endangered species have been located in the area. The extent of use in this area by sensitive species is unknown. Spotted owls have been located within the area.

H. Attractions

There are good opportunities for outdoor education and scientific and historic study in the area for archeological purposes.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in Potential Recreation Visitor Days Per Year</u>
SPNM	7,500
SPM	52,800
Total	60,300

B. Wildlife

The area is summer habitat for a large elk herd and also support some mule deer and other forest animals and birds.

C. Fish

Taneum is the only lake in this roadless area. The lake has been regularly planted with cutthroat and other trout species. Fishing is very popular because of its proximity to roads.

There are a number of streams in this area, of which only a few support fishable populations.

The South Fork of the Taneum is utilized by rainbow and cutthroat trout, although it is not very productive. The Taneum is occasionally dewatered by irrigation users below the Forest boundary.

First and Case Knife Creeks, tributaries to the South Fork of the Taneum, are steep and have very low seasonal flows. Small numbers of native cutthroat trout are probably present in both streams.

Below the Forest boundary, Little and Big Creeks have potential for anadromous fish off-channel (Yakima River) rearing. On the Forest, there are only minor populations of resident trout.

This area also includes the headwaters of the Little Naches, Bear Creek, and Blowout Creek. Blowout and Bear Creeks produce native wild populations of cutthroat trout. These are in essentially pristine condition.

D. Water

There is currently a withdrawal for a 68 acre proposed impoundment in the SW 1/4 of Section 32, T19N, R15E WM. The application was forwarded by a F.S. Ward on June 13, 1908, and is subject to reservation by the U.S. Department of Interior.

This impoundment was never constructed but remains an encumbrance on the land. Precipitation averages 45 inches annually with an estimated 50 percent falling as snow. Runoff records are available but incomplete. A gauging station existed "near Thorp, Wa." in 1909-1910. Since then, there has been only miscellaneous discharge measurements. There are no official precipitation gauges or snow survey sites in this roadless area.

E. Livestock

The majority of this roadless area lays within three existing allotments. The eastern one-fourth of the area is in the Manastash Cattle Allotment, however, allotment maps do not show much usable existing forage in the roadless portion. Timber harvest would greatly enhance the potential for domestic livestock.

The remaining three-fourths of this area is within the Taneum, the Little Naches, and the Crest Trail Recreation Stock Allotments. Allotment inventory maps show only very scattered small usable forage areas except near Lookout and Blowout Mountains. All forage areas are currently used by recreation stock in the summer and fall. The potential for domestic stock use in this roadless area is very low without timber harvest and improved access.

F. Timber

The area contains 18,613 acres of tentatively suitable forest land. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Bare Ground	64	---	---
Wet	Mature	6,869	194.7	35.7
Wet	Immature	10,621	191 0	35 0
Wet	Seedling-Sapling	127	---	---
Dry	Mature	466	5.8	1.1
Dry	Immature	445	4.4	8
Dry	Seedling-Sapling	21	---	---
	Total	18,613	395.9	72 6

The estimated maximum biological potential contribution to the long term sustained yield is 6.1 MM Bd. Ft. (1.1 MM Cu. Ft.) per year, in addition to Plum Creek Timber Company sales.

G. Minerals

The geology of the area is very complex consisting of folded and faulted metamorphic rocks of Paleozoic and Mesozoic age, Mesozoic granitic rocks, Tertiary nonmarine sedimentary rocks, and Tertiary intrusive and volcanic rocks. The area has not been investigated by the U.S.G.S. or U.S. Bureau of Mines, but available references indicate it may have occurrences of chromium, cobalt, nickel, copper, iron and manganese, the significance of which is not known. A majority of the area is classified "prospectively valuable" for coal; the eastern tip is classified "prospectively valuable" for oil and gas; and the western-most 600 acres are classified "prospectively valuable" for geothermal resources. The southeast portion of the area is subject to an existing oil and gas lease, but there are no pending applications for any of the leasable commodities. Bureau of Land Management records (1/23/85) indicate that there were 68 lode claims and one placer claim located within the area. Sixty-five of those are considered abandoned for lack of assessment work.

H. Cultural-Historical

This area encompasses several known archaeological sites and possesses exceptionally high cultural resource sensitivity. A major prehistoric travelway passes through the area. Along its western margins is a locality of present cultural concern to the Yakima Nation. Historically, the area includes sheep allotments dating from the turn-of-the-century as well as the sites of the former Big Creek (1931-1955) and North Ridge (1932-1955) Lookouts. Documents' research and further field study will undoubtedly augment the limited information available to date.

I. Land Use

J. Fire

Annual fire occurrence is moderate; fuel loadings are moderate and often broken by small meadows and openings. Periodic large fires have occurred.

K. Insects and Disease

The eastern portion of this area was heavily impacted by the spruce budworm in 1974-1977. Root rots and mistletoe are especially damaging in the Taneum and Little Creek drainages.

Stands nearer the crest of the Cascades have much fewer insect and disease problems. However, wind damage and blowdown have periodically occurred in the silver fir-hemlock stands.

L. Private Lands

There are 18,135 acres of "checkerboard" Burlington Northern Railroad lands. Some of this is managed by the Plum Creek Timber Company and accessed from the outside, but further access is planned. Opportunities for exchange are considered fair. Little discussion about exchange has occurred in the past but more is planned for the near future. Other information on these lands is as follows:

In T.19N., R14E., W.M., Burlington Northern proposed to construct a road this year which will come off the Spex Arth road in Section 16 and will access Sections 17 and 18.

In the same township and range, Burlington Northern extended roads from Section 21 through Sections 28, 33, and 27, and a spur into Section 29 in 1984.

In T.18N., R15E., there are now existing Burlington Northern roads in Sections 2 and 3.

In T.19N., R.15E., W.M., Burlington Northern has roaded Section 35.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located within a few miles of the Alpine Lakes (393,360 acres), Norse Peak (50,923 acres), William O. Douglas (167,195 acres), and Goat Rocks (105,633 acres) Wildernesses and is adjacent to the Quartz Mountain and Manastash roadless areas.

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through wilderness classification.

D. Interest by Proponents, Including Congressional

There has been no interest for additional wilderness classification for this area by proponents or Congressional factions.

However, there have been proposals by both environmental and off-road vehicle users to maintain roadless status for the area.

E. Public Input

Local area Scout leadership is interested in a continuous 50 mile non-wilderness hike which traverses this area. There has been no interest in other classifications to date.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area.

There is a difference of opinion as to the area being for motorized or nonmotorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Taneum roadless area consists of 25,122 acres and is located within Kittitas County, adjacent to the Quartz Mountain and Manastash roadless areas. Approximately 18,600 acres are inventoried as available and tentatively suitable for timber harvest. Approximately 7,000 acres are inventoried for wildlife management.

The roadless area has been inventoried according to the Recreation Opportunity Spectrum (ROS). The inventory shows that the area is primarily capable of providing Motorized, Dispersed Recreation, with a lesser amount of Non-motorized, Dispersed Recreation. The entire area is in a “checkerboard” pattern of ownership. Continued development of access into private lands will restrict opportunities for Non-motorized, Dispersed Recreation, although significant portions of the area have difficult access and will likely remain unroaded. Approximately 90 percent of the area is capable of providing Motorized, Dispersed Recreation, under a no-harvest management scheme. At the other extreme, approximately 10 percent of the area would provide opportunities for Motorized, Dispersed Recreation, if maximum harvest potential were realized.

Alternatives E and F would allocate eight and five percent of the area, respectively, to Non-motorized, Dispersed Recreation. Under these alternatives there would be no harvest activities in the area. Approximately 90 percent of the area would be allocated to Motorized, Dispersed Recreation. The recreation emphasis would be shifted primarily to trailbike and 4x4 use on the challenging terrain this area has to offer. The natural character of the area would be reduced as the network of trail systems increases.

Alternatives A/NFMA through D, and G through J, allocate between 10 and 25 percent of the area to Motorized, Dispersed use with none of the area being allocated to Non-motorized use. Under this strategy the trail system would remain similar to the current situation. Heavy use of the trail system would continue and change proportionately to the increases and decreases in trail mileage of the various alternatives.

Under Alternatives C and I, the portion of the trail system in this roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Blowout Mtn.	1318	--	2.3	--
North Ridge	1321	--	2.0	7.5
S. Cle Elum Ridge	1326	--	2.0	13.1
Granite Creek	1326.1	--	--	2.3
Red Mtn.	1330	--	6.7	--
Blazed Ridge	1333	--	3.6	--
Little Creek Basin	1334	--	--	5.0
Taneum Ridge	1363	--	--	11.8
Frost Mtn.	1366	--	--	3.7
Frost Mtn. Lookout	1366.1	--	--	0.3
Frost Water	1366.2	--	--	0.5
SF Taneum	1367.1	--	--	5.3
NF Taneum	1377	--	--	15.7
Lightning Point	1377.2	--	--	2.6
Fishhook Flat	1378	--	--	4.2
Manashtash Ridge	1388	--	18.7	--
Bear Creek	943	--	--	7.0
Little Bear Creek	943.1	--	--	2.5
Cub Creek	943.2	--	--	1.6
Mt Clifty	947	--	--	5.6
Totals			35.3	88.7

Potential Conflicts with Plans and Policies of Other Jurisdictions.

The pattern of private ownership within this area poses severe restrictions on recreation management. Trails continuously cross in and out of private ownership. The private landowner's management does not consider trail access as more than incidental to timber harvest. There is no obligation for the private landowner to protect or construct trails on their lands. Ability to manage the system is limited since only the segments located on National Forest administered lands are under control of the agency.

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semiprimitive Motorized and Semiprimitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	25	10	28	10	100	95	34	25	28	0

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	100/0	100/0	100/0	100/0	92/8	94/6	100/0	100/0	100/0	0/0

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may be reduced as road construction occurs. The roadless character of these portions would also be lost.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate approximately one-third of the areas each to Retention, Partial Retention, and Modification VQO. The upper end of ridgetops will be Retention VQO and most trails outside of the intermingled ownership lands will be Partial Retention VQO. The Taneum Creek area will be Maximum Modification VQO.

Alternatives B, D and J will allocate the majority of the land to Maximum Modification VQO. These areas are the Quartz Mountain to Blowout Mountain foreground and middleground areas. The existing off-road-vehicle trails will be heavily impacted. Some trails will be allocated to Retention VQO.

Alternatives C and I will allocate approximately one-half of the areas to Retention, and the other areas to Partial Retention and Maximum Modification VQO. The Quartz Mountain to Blowout Mountain area will have a wider area of Retention VQO. Most trails in the area will be allocated to Scenic Travel Partial Retention VQO. However, the middleground areas from the trails will be Maximum Modification.

The Naches drainage parts of Bear Creek Basin and the middleground of the Taneum Creek trails will be heavily altered.

Alternative E will allocate all areas to Retention VQO. All areas will have natural appearing landscapes. The scenic qualities of the area will be retained.

Alternative F will allocate most areas to Retention VQO. The Blowout Mountain along the Crest will be allocated to Preservation VQO. The rest of the area will have high visual quality.

Alternative G will allocate a little over one-half of the area to Retention and the rest of the area to Partial Retention and Maximum Modification. The foreground of trails will mostly be allocated to Retention VQO. The middleground will be generally managed as Maximum Modification VQO.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	14,628	10,048	17,680	10,048	24,677	24,147	16,599	14,628	17,680	7,335
Partial Retention	3,992	1,272	764	1,272	--	509	3,583	3,992	764	1,738
Modification	1,950	827	1,336	827	445	445	1,781	1,950	1,336	2,523
Maximum Modification	4,622	12,975	5,342	12,975	--	21	3,159	4,622	5,342	13,526
Total Acres	25,122	25,122	25,122	25,122	25,122	25,122	25,122	25,122	25,122	25,122

Preservation indicates that only natural ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road 75 percent and allow for timber harvest emphasis on 18 percent of the area. This would result in approximately one-half the impact of Alternatives B, D and J which would road over 90 percent and harvest over 66 percent of the area. Alternatives C and I would road 74 percent of the area; this would result in a similar effect on wildlife habitat as Alternatives A and H. Alternatives E and F would have minimal effect on wildlife. Alternative G would have an effect on wildlife habitat that would be less than A and D but considerably more than E and F.

6. Fisheries

a. Significant Effects

In Alternatives E and F, essentially all of the area would remain roadless, while in Alternatives B, D and J most all of the area would be available for timber management. In the other alternatives, the stream areas would be managed in a variety of different ways. Table (A) depicts these management prescriptions for the stream areas shown.

Roading these areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase. This would help to meet a portion of the fishing demand, but also could result in overfishing and reduction in both numbers and size of fish using the habitat. However, since the wild fisheries production is thought to be very low in many of these headwater-type stream systems, fishermen are unlikely to fish intensively in most areas and overfishing effects generally should not occur. It is also possible that if these areas remain roadless, access still would be readily available through the intermingled owner's lands.

Roading the unroaded areas could also result in environmental degradation to streams due to timber harvest and road construction in the basins. Some of these possible effects are addressed in the soil and water environmental effects section. Overall, even if all areas were roaded, it is not expected that there would be any significant effect on the resident fish populations.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas, the riparian protection zone prescription, the Wenatchee National Forest’s Best Management Practices (September 1980 and revised October 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

TABLE (A). Allocation of management prescriptions in the Taneum roadless area in lake and stream areas for Alternatives A/NFMA, C (Preferred), G, H and I. Where “Int.” is shown, this indicates that an intensive timber management strategy could dominate in that area. Where “Ext.” is shown, this indicates that an extended shelterwood timber management prescription would dominate in that area and would be executed primarily to meet visual objectives. Where “Rdls.” is shown, this indicates that the management prescription would be to maintain the area as roadless.

Stream/Lake	Alternative		
	A/H	C/I	G
Taneum Lake	All Rdls.	All Rdls.	All Rdls.
South Fk. Taneum	All Ext.	All Ext.	All Ext
Frost/Case Knife	All Int.	All Int.	All Int.
Blowout Creek	All Ext.	Half Ext. Half Int.	All Ext.

7a. Vegetation: Trees

Tree management through timber sales would be emphasized on 4,622 acres, or 18 percent, of the Taneum roadless area under Alternatives A/NFMA and H. This would increase to 12,975 acres, or 52 percent, under Alternatives B and D and 13,526 acres, or 54 percent under Alternative J.

Alternative E would not schedule any timber harvest. Alternative F is similar, but 5 percent of the area would be scheduled for other resource emphasis timber sales.

Alternatives C and I would propose 5,342 acres, or 21 percent, under timber emphasis prescriptions, and 7,037 acres, or 28 percent, as unroaded recreation. The remaining acres would be planned for other resource benefits including scenic travel routes.

Alternative G increases the unroaded motorized area to 8,649 acres, or 34 percent.

7b. Vegetation: Forage

This roadless area contains portions of one or more livestock allotments. (See the Livestock writeup under General Information for this area.) With the proposed vegetation manipulation in some alternatives, adequate forage will be produced for big game and livestock. This will offset the loss of forage due to natural succession and the exclusion of fire. Alternatives C, H, and I will contribute adequate forage. Forage in excess of expected needs will be produced in Alternatives A/NFMA, B, D and J. Needs for forage in the fourth and fifth decades will not be met for livestock in Alternatives E, F, and G.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Taneum area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternatives E and F because soil and water disturbing activities occurring would be minimal. Alternatives A/NFMA, B, C, D, G, H, I, and J could allocate up to 94 percent of the area to timber harvest and road building. In Alternatives B, D and J, 49 percent of the area allocated to timber harvest could also be allocated to domestic livestock grazing. The environmental effects of timber harvest, road building, and livestock grazing on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building activity. Alternatives A/NFMA, B, C, D, G, H, I, and J pose more risk of degrading the soil and water resource than Alternatives E and F due to more intensive management. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

c. Potential Conflicts with Plans and Policies of Other Jurisdictions

There are currently 18,635 acres of Burlington Northern Railroad lands within the area. More timber harvest has occurred on private land in the headwaters of North and South Rock Taneum Creeks, Little Creek, and Big Creek drainages than is occurring on National Forest lands. The Forest Service needs to examine land management practices on adjacent lands to consider the possibility of cumulative effects. The analysis of cumulative effects in this area is the same as that discussed in Chapter IV-Soil and Water sections.

9. Air

The additional prescribed burning generated in the Taneum roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

Since this area appears to have a low potential for the occurrence of mineral resources, the consequences on mineral resources do not appear to be extremely significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	13,397	10,090	14,373	10,090	24,613	23,978	16,048	13,397	14,373	8,120
Moderately Restrictive	7,103	1,230	5,407	1,230	509	1,123	5,915	7,103	5,407	2,649
Relatively Few Restrictions	4,622	13,802	5,342	13,802	0	21	3,159	4,622	5,342	14,353

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Miles	56	48	44	48	0	3	38	56	44	48

12. Fire

The fire management workload generated in the Taneum roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives E and F. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives A/NFMA, B, C, D, H, I, and J. The cost efficiency of fire suppression activities would be slightly increased in Alternatives A/NFMA, B, C, D, H, I, and J as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives E and F would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 73.9 jobs.

14. Wilderness Potential

This roadless area is in checkerboard land ownership and has extremely limited opportunities for Wilderness designation. The private land has extensive road systems and timber harvest units and has no Wilderness characteristics. Alternatives B, D, and J allocate for this roadless area about 52 percent of the area to General Forest. Alternatives A, C, H, and I allocate a more balanced allocation between all resource values with C and I allocating 5,342 acres to General Forest. Alternatives E and F retain the more natural conditions with 100 percent and 95 percent of the area in unroaded allocations.

MANASTASH ROADLESS AREA

Size: Gross Acres: 15,794

Net Acres: 8,798

I. GENERAL INFORMATION

A. History

The area did not qualify as roadless under RARE II due to the large amount of mixed ownership in the area. It is being addressed due to public interest expressed as to the area remaining unroaded.

B. Location and Access

This area is within Kittitas County and lies on both the Cle Elum and Naches Ranger Districts and is adjacent to the Taneum and Quartz Mountain roadless areas. Main access is via the Quartz Mountain Road.

D. Physiography and Soils

Part of this area is composed of a high gently rolling basalt plateau that has cliffs and talus slopes along its outer perimeter. This feature generally occurs in the southern part of this unit. The remainder of the area is composed of an undulating topography of clayey and rocky soils. Sag ponds are common, and the drainage patterns in this portion of the area are not well developed.

Elevations range from 3,800 to 6,300 feet. There are several different soil types in this area, so management may be complicated by the pattern and arrangement of the different soils. Forty-eight percent of the soils have developed in basaltic materials; 21 percent from pyroclastic materials; 17 percent from alluvium; and the remaining 13 percent from granitic materials. The basaltic materials and the pyroclastic materials tend to be slippery and sticky when wet, but are fine for trails and other recreational uses when dry. The alluvium and the granitic soils on the other hand are not slippery or sticky when wet, and are fine for most uses, including trails, even when wet.

E. Vegetation

This area is 40 percent tentatively suitable forest land. Upper elevation species including lodgepole pine, subalpine fir and Englemann spruce are the most common species. Douglas-fir and western larch occur on the lower elevation warmer areas.

Volcanic scree rock areas and meadows are intermingled with the forested areas.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Motorized Trail and 4x4 Use	1,000
Hunting	<u>2,500</u>
Total	3,500

The area contains the following Recreation Opportunity Spectrum (ROS) class:

<u>ROS Class</u>	<u>Acres</u>
Semi-primitive Motorized (SPM)	8,798

There are 17.8 miles of trail within the area of which all are open to motorized use. The area is also popular with 4x4 vehicle enthusiasts. The large amount of mixed ownership can cause problems in managing and maintaining the trail system in the area.

G. Appearance and Surroundings

The area has moderate visual variety in landforms, moderate to high variety in vegetation, rockforms, and waterforms (lakes and streams). High visual variety within the area occurs at Shoestring Lake basin, Basalt rock-formation, and Manastash Lake and Meadows.

The area contains a moderate to steep, highly textured landscape with broad ridgetops. One can find meadows, streams, and fall colors. The landscape is heavily vegetated.

The area is primarily viewed as foreground and middleground from the Quartz Mountain road, Manastash Ridge trail, and other trails. Middleground views are from Buck Meadows, and the South Fork of Manastash Creek and Bald Mountain. The area is viewed as background from viewpoints such as Little Bald.

The Manastash area is surrounded by the Quartz Mountain Road, Manastash Ridge, Bald Mountain and its upper ridgetops.

H. Attractions

There are no major scenic values. Basic physical features are Manastash Lake and the South Fork of Manastash Creek.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

As the area lies within two Ranger Districts, the characteristics will be discussed by District.

A. Manageability and Boundaries

Cle Elum:

This area is bordered as follows: On the north by the Quartz Mountain Road; on the east by a series of roads, heavily cut over areas, and private land, and on the south and west by the divide between the Naches and Manastash drainages. The eastern boundary does not follow any geographic form and would be difficult to locate on the ground.

The roads bordering this area are either gravel surfaced or native material single lane facilities.

Naches:

The Manastash roadless area south of Manastash Ridge is bordered by Forest roads, timber harvest units and private land lines. With the exception of the survey boundaries, the meandering Forest roads and

harvest unit boundaries would be difficult to locate on the ground or map. Private timber company and Forest roads deeply penetrate this area. These roads bring the sights and sounds of human intrusion into the protruding fingers of land and the periphery of the roadless area.

B. Natural Integrity

Cle Elum:

This area is long and narrow, with good road access to most of the boundary. There is a 4x4 road the length of the area and several 4x4 roads cross it. These are heavily used by short wheel base, four-wheel-drive vehicles. There are five trails in the area that provide access to pedestrians, horse users, and motorcyclists.

There are no other physical impacts of people in the area.

Naches:

This roadless area was not considered for Wilderness or Roadless Area classification in RARE because of its large amount of checkerboard ownership. Private ownership in a roadless area would pose a significant administration problem if the landowner is not in agreement with management direction of the area. This area is bordered by both private and government roads and timber harvest units which reflect man's activities. Within the roadless area, past human activity has been relatively minor even though some of those activities have been extensive. The trail system provides access to Manastash Ridge at several points. This trail system has a long history of motorized vehicle use, both summer and winter. There are several four-wheel-drive routes in the roadless area that are heavily used.

C. Natural Appearance

Cle Elum:

The area itself is natural appearing. As the area is narrow and has several vantage points, management activities outside the area are easily seen.

Trails and 4x4 roads are the only unnatural appearing items in this area. There are 13 miles of trail and 14 miles of 4x4 road.

Naches:

The Manastash roadless area is so exposed on the south side of Manastash Ridge that views from the roadless area include forest roads, timber harvest activities, fire lookouts, and microwave sites. It is difficult to get a feeling that this is a natural area away from human activity and development. Parts of this roadless area has some interesting rock formations and open ridges for viewing scenery, but the continuously closed canopy is somewhat monotonous.

D. Opportunities for Solitude

Cle Elum:

Due to the size and configuration of this area, the opportunity for solitude is limited. Nowhere in the area could a person be more than a half mile from a trail, 4x4 road, or road. There would be more opportunity for solitude during the winter months, although portions of the area are used by snowmobiles.

Naches:

The area south of Manastash Ridge offers few opportunities for solitude. The area is a very irregular shaped with slim fingers of land protruding out into the developed areas. The area is approximately six miles long and four miles wide at the widest point. Rock Creek, Milk Creek, and North Fork Wenas Creek are the principal drainages of the area. The area contains open rolling ridges with large openings and slightly dissected topography with a fairly even cover of vegetation which allows some screening from other people at short distances in the timbered areas. The open rolling ridgetops poorly screen people from points in the distance.

E. Opportunities for Primitive Recreation

Cle Elum:

The opportunities for primitive recreation are low with the exception of hunting and winter sports. During the snow season the area is inaccessible except for over-the-snow vehicles and on foot. Most of the area is used by snowmobilers but is generally too far from plowed roads to get use by pedestrians.

Naches:

This area has been heavily used by motorized vehicle users in summer and winter for many years. However, it has modest opportunities for primitive recreation. The size of the area and the absence of facilities contribute to the primitive character of the area. The area is served by high quality Forest roads on the perimeter and good trail system within; however, there are opportunities for big game hunting (elk, deer, and black bear), horseback riding, hiking, and some pack-in camping if desired, and scenic viewing from the many open ridges.

F. Challenging Experiences

Cle Elum:

The geography of this area does not lend itself to challenge during the summer months. There are no peaks, cliffs or major waterways. During the snow season there are opportunities to challenge the cross-country skier, snowshoer and snowmobilers. Depth of snow in the area varies from 4 feet to 10 feet and the nearest plowed access is 10 miles distant.

Naches:

The area offers few challenging experiences to the seasoned visitor and only a slight challenge to the inexperienced.

A 50 mile non-wilderness hike has been jointly proposed through this area by the Boy Scouts Council (Yakima) and the U.S.F.S. Such a hike is not possible for large groups within wilderness due to party size limitations. Continuous 50 mile non-wilderness hikes are extremely rare and such a trail is needed to satisfy the needs of large groups. While motorized users frequent this corridor, they seldom overnight here. A variety of high quality primitive experiences are still available in this area.

G. Special Wildlife Features

There are no known threatened or endangered species in this area. The extent of use in the area by sensitive species is unknown.

H. Historical and Scientific Study

There are opportunities for outdoor education, scientific and historic study in the area from an archeological standpoint.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities. Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in Potential Recreation Visitor Days Per Year</u>
SPM	26,000

B. Wildlife

The area provides summer range for a few elk and habitat for a variety of other forest animals and birds including deer, black bear, and grouse.

C. Fish

There are three lakes in this area: Lost, Manastash and Shoestring Lakes. Lost and Manastash are planted regularly--Lost Lake with at least cutthroat trout and Manastash with rainbow and Eastern brook trout. Both Lost and Manastash Lakes are located on intermingled ownership lands. Shoestring Lake probably supports cutthroat trout.

Lost Creek (below Lost and Manastash Lakes) supports rainbow, cutthroat and Eastern brook trout, a large part of which move downstream from the lakes.

Manastash Creek has been stocked in the roaded area. These rainbow and cutthroat probably migrate into the roadless reaches. Downstream of the Forest boundary, Manastash Creek is sometimes entirely dewatered due to irrigation withdrawals.

D. Water

There are no water related encumbrances or planned activities within the area.

E. Livestock

This roadless area is currently within two existing domestic stock allotments. The portion of the area on the Cle Elum Ranger District is in the Manastash Unit of the Manastash Cattle Allotment. The portion south of Manastash Ridge on the Naches Ranger District is in the Naches Sheep Allotment. There is no potential for a Recreation Stock Allotment.

F. Timber

The area contains 3,519 acres of tentatively suitable forest land. Stand, volume, and other data area as follows:

Ecotype	Stand Size	Acres	Estimated Standing	
			Volume (MMBF)	(MMCF)
Wet	Mature	1,781	50.5	9.3
Wet	Immature	1,611	29.0	5.3
Wet	Seedling-Sapling	106	---	---
Dry	Immature	21	.1	
	Total	3,519	79.6	14.6

The estimated maximum biological potential contribution to the long-term sustained yield is 1.1 MM Bd. Ft. (0.2 MM Cu. Ft.) per year. Timber sale programs for the private lands are not known, however harvesting of timber is one of the major objectives of the owner.

G. Minerals

This area is primarily underlain by Miocene volcanic rocks. The area has not been investigated by the U.S.G.S. or U.S. Bureau of Mines, but available references indicates that it contains no known mineral resource occurrences of interest. The northern part of the area is classified "prospectively valuable" for coal, while the southernmost third is classified "prospectively valuable" for oil and gas. Even though there are no known petroleum resources in the area, there are four existing oil and gas leases which have yet to be explored. According to BLM mining claim recordation data (1/23/85), eight mining claims were located in the area all of which are considered abandoned for lack of annual assessment work.

H. Cultural-Historical

The Manastash area exhibits a continuation of the same prehistoric use patterns that are present in the Taneum area. There have been large number of archaeological sites identified within the boundaries of this area and the likelihood that others exist is very high. Historic uses have not been adequately researched, although the area does include sheep allotments dating back at least 60 years.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is low to moderate, generally ignited by natural causes. Fuel loadings are often heavy but broken by small meadows and openings. Fire history is low in this area.

K. Insects and Disease

Extensive stands of lodgepole pine near Manastash Lake are becoming high risk areas for a mountain pine beetle epidemic.

L. Private Lands

There are 6,996 acres of private lands within the area belonging to the Burlington Northern Railroad Company. Exchange possibilities are considered to be fair.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located within a few miles of the Alpine Lakes (393,360 acres), Norse Peak (50,923 acres), William O. Douglas (167,195 acres), and Goat Rocks (105,633 acres) Wilderness areas and adjacent to the Quartz and Taneum roadless areas.

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through Wilderness classification.

D. Interest by Proponents, Including Congressional

There has been no expressed interest for additional Wilderness classification for this area by proponents or Congressional factions.

However, there have been proposals by both environmental and off-road vehicle users to maintain roadless status for the area.

E. Public Input

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area. Opinions differ as to the area being motorized or non-motorized.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Manastash roadless area consists of 8,798 acres and is located within Kittitas County adjacent to the Taneum and Quartz Mountain roadless areas. Approximately 40 percent of the area is inventoried as suitable for timber harvest. The roadless area has been inventoried according to the Recreation Opportunity Spectrum (ROS). The inventory shows the area is capable of Non-motorized Dispersed Recreation and/or Motorized Dispersed Recreation. Due to the mixed ownership pattern, roadless recreation management opportunities are severely limited. Approximately 45 percent of the area is inventoried as capable of providing Non-motorized Dispersed Recreation opportunities. Motorized Dispersed Recreation is potentially available on 40 to 70 percent of the area. Alternatives A/NFMA and H allocate approximately 45 percent of the area to motorized use. No acreage is allocated to Non-Motorized Dispersed Recreation. In Alternative E, the emphasis would be toward Motorized Dispersed Recreation in addition to a lesser amount of Non-motorized Dispersed Recreation. The emphasis would shift from the hunting experience to the challenge this terrain offers for motorized off-road use and to a lesser degree for hiking.

Alternatives B, C, D, F, G, and I allocate varying amounts of land to unroaded Motorized Dispersed Recreation with no allocation to non-motorized use. As the combination of timber harvest and wildlife management allocations increases, the motorized dispersed allocation decreases and vice versa. The character change brought about by increased harvest, therefore, reduces the dispersed recreation opportunities.

Alternative J allocated 62% of the area to General Forest with no allocation for unroaded recreation.

Due to the mixed ownership of this area, the current roadless condition can not be retained. Access to private lands will have a negative influence on the use of the area. Motorized dispersed recreation challenges will continue to exist, though the desirability is likely to decrease as the impact of timber harvest and road access to private lands becomes evident.

Under Alternatives C and I, the portion of the trail system in this roadless area is allocated as follows.

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Hereford Meadows	1207	--	3.8	--
Manastash Lake	1350	--	4.4	--
Shoestring Lake	1385	--	--	3.6
Koenan Meadow	1386	--	--	3.1
Gold Creek	966	--	--	2.9
Totals		--	8.2	9.6

There is no obligation for the private landowners to protect existing trails or to construct new trails as their management activities impact the system.

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semiprimitive Motorized and Semiprimitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	46	40	69	40	100	69	54	46	69	0

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	100/0	100/0	100/0	100/0	69/31	100/0	100/0	100/0	100/0	0/0

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may be reduced as road construction occurs. The roadless character of these portions would also be lost.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate the ridgetop areas to Retention and Partial Retention VQO. The Naches Ranger District side adjacent to Bald Mountain Areas will be allocated to Maximum Modification VQO.

Alternatives B, D and J will allocate over one-half of the area to Maximum Modification VQO. Heavily altered areas will be the lower end of the planning area below Manastash Ridge, on the Naches Ranger District side adjacent to Bald Mountain. Some areas will have high visual quality. The upper ridgetop of Manastash Ridge will be Retention VQO.

Alternatives C and I will allocate most areas to Retention VQO. The upper Manastash area and the middleground views from trails will have high visual quality. The Maximum Modification VQO allocation will be on the Naches Ranger District side adjacent to Bald Mountain.

Alternative E allocates all lands to Retention VQO. All areas will have a very high visual quality. Natural landscapes will dominate the landscapes.

Alternative F allocates most lands to Retention and a small area to Maximum Modification. Only the Naches Ranger District side adjacent to Bald Mountain will be allocated to Maximum Modification VQO.

Alternative G will allocate lands to Retention, Partial Retention, and Modification VQO. The Bald Mountain area will be General Forest. Some middleground area will also be heavily altered.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	5,301	3,731	7,081	3,371	8,798	7,124	5,873	5,301	7,081	191
Partial Retention	466	466	212	466	--	275	381	466	212	1,102
Modification	1,102	1,972	--	1,972	--	--	1,124	1,102	--	2,014
Maximum Modification	1,929	2,629	1,505	2,629	--	1,399	1,420	1,929	1,505	5,491
Total Acres	8,798	8,798	8,798	8,798	8,798	8,798	8,798	8,798	8,798	8,798

Preservation indicates that only natural ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road 54 percent and allow for harvest emphasis on 22 percent of the area. Alternatives B and D would road 60 percent and allow for harvest emphasis on 30 percent of the area. Alternatives A/NFMA and H would not have motorized recreation in the unroaded area, but B and D would allow the development of motorized recreation in 40 percent of the area. Alternative J would road 100 percent of the area with harvest emphasis on 62 percent of the area. Based on the amount of motorized recreation use, Alternatives A/NFMA and H would have less impact on wildlife than B, D and J. Alternatives C, F, G, and I would have less effect on wildlife than B, D and J but more than A/NFMA and H, based on the development of motorized recreation use in the area. Alternative E would have *minimal effect on wildlife when compared to the other alternatives*.

6. Fisheries

a. Significant Effects

In Alternatives E and F, all the areas with fish populations in this roadless area would remain roadless. Also, in all alternatives, Manastash and Shoestring Lakes would remain unroaded, as would all of the Manastash Creek area except the lower one-quarter mile. In the other alternatives, the stream and lake areas would be managed in a variety of different ways. Table (A), below, depicts these management prescriptions for the areas shown.

Roading these areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase. This would help to meet a portion of the fishing demand, but also could result in overfishing and reduction in both numbers and size of fish using the habitat. However, since the wild fisheries production is thought to be very low in many of these headwater-type stream systems, fishermen are unlikely to fish intensively in most areas and overfishing effects generally should not occur. It is also possible that if these areas remain roadless, access still would be readily available through the intermingled owner's lands.

Roading the unroaded areas could also result in environmental degradation to streams due to timber harvest and road construction in the basins. Some of these possible effects are addressed in the soil and water environmental effects section. Overall, even if all areas would be roaded, it is not expected that there would be any significant effect on the resident fish populations.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September 1980 and revised October 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

TABLE (A) - Allocation of Management Prescriptions in the Manastash Roadless Area in Lake and Stream Areas for Alternatives A/NFMA, B, C (Preferred), D, G, H, and I.

Where "Int" is shown, this indicates that an intensive timber management strategy could dominate in that area. Where "Ext" is shown, this indicates that an extended shelterwood timber management prescription would dominate in that area and would be executed primarily to meet visual objectives. Where "Rdls" is shown, this indicates that the management prescription would be to maintain the area as roadless. Where "Big Game" is shown, this indicates that the management prescription would be to maximally produce appropriate forage for big game. And where "Range" is shown, this indicates that the principal management prescription would be to benefit domestic livestock.

Stream/Lake	Alternative			
	A/H	B/D	C/I	G
Lost Lake Rdls.	All Rdls	All Range	All Rdls	All
Lost Creek Int	All Int.	All Range	All Int.	All
Manastash Creek Game lower 1/4 mile	Big Game	Range	Ext.	Big

7a. Vegetation: Trees

Tree management would be planned on 4,239 acres, or 48 percent of the area under Alternatives A/NFMA and H. Total vegetation manipulation area would be about the same under Alternatives B and D. However, under these alternatives the emphasis would be on timber production rather than other resource enhancement and protection. Alternative J would allow tree management on 87 percent of the area and would also emphasize timber production.

No timber management would be scheduled under Alternative E, and only 2,438 acres, or 28 percent, under Alternative F. Alternative G is similar to F but with slightly more harvest expected.

Alternatives C and I would manage 1,505 acres with emphasis on timber production (17 percent). In addition, 954 acres will be managed for other resource values that permit scheduled timber harvest.

7b. Vegetation: Forage

This roadless area contains portions of one or more livestock allotments. (See the Livestock writeup under General Information for this area.) With the proposed vegetation manipulation in some alternatives, adequate forage will be produced for big game and livestock. This will offset the loss of forage due to natural succession and the exclusion of fire. Alternatives C, H, and I will contribute adequate forage. Forage in excess of expected needs will be produced in Alternatives A/NFMA, B, D and J. Needs for forage in the fourth and fifth decades will not be met for livestock in Alternatives E, F, and G.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Manastash area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Alternatives A/NFMA, B, C, D, F, G, H, and I could allocate up to 60 percent of the area to timber harvest and road building. Alternative J allocates 100 percent. In Alternatives B and D, 20 percent of the area allocated to vegetation management could also be allocated to domestic livestock grazing. The environmental effects of timber harvest, road building, and livestock grazing on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building activity. Alternatives A/NFMA, B, C, D, G, H, I and J pose more risk of degrading the soil and water resource than Alternative E due to more intensive management. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are anticipated because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

The additional prescribed burning generated in the Manastash roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

Since this area appears to have a low potential for the occurrence of mineral resources, the consequences on mineral resources do not appear to be extremely significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	Alternative D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	4,559	3,985	6,339	3,985	8,798	6,360	5,152	4,559	6,339	1,123
Moderately Restrictive	2,310	212	994	212	0	1,039	2,226	2,310	954	170
Relatively Few Restrictions	1,929	4,601	1,505	4,601	0	1,399	1,420	1,929	1,505	7,505

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or Wilderness. The decision to close any road will be made on a case-by-case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Miles	10	6	6	6	0	4	6	10	6	10

12. Fire

The fire management workload generated in the Manastash roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives E and F. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives A/NFMA, B, C, D, G, H, I and J. The cost efficiency of fire suppression activities would be slightly increased in Alternatives A/NFMA, B, C, D, G, H, I, and J as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives E and F would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. That is, because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

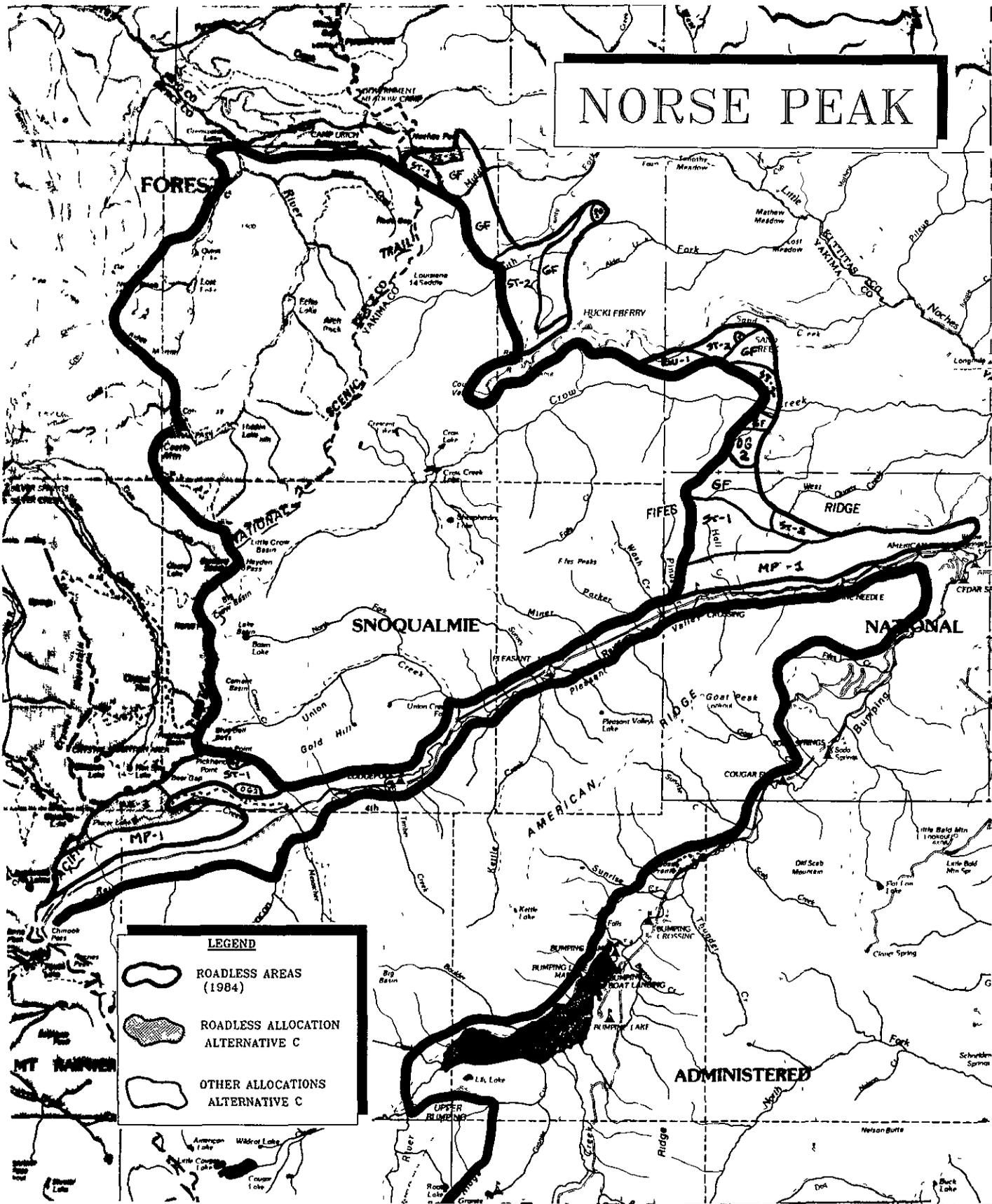
Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 13.4 jobs.

14. Wilderness Potential

This roadless area has very limited potential for Wilderness due to its location, size, and checkerboard land ownership pattern with private land. There is not a great difference in the allocations by alternative for this area. Alternative E allocates the entire area to unroaded. Alternatives B, D, and J, the most acreage to General Forest. There is little difference between Alternatives A/NFMA, C, F, G, H, and I.

NORSE PEAK



NORSE PEAK ADJACENT ROADLESS AREA

Size: Gross Acres: 11,470

Net Acres: 11,300

I. GENERAL INFORMATION

A. History

The area was inventoried and analyzed under RARE II and was recommended as non-Wilderness. It was re-examined under the analysis for the Washington State Wilderness Act Analysis of 1984 and 35,892 acres were made Wilderness.

B. Location and Access

The area is immediately adjacent to the east boundary of the newly created Norse Peak Wilderness within Yakima County on the Naches Ranger District. Access is via Highway 410 and the Little Naches and Raven's Roost roads.

C. Physiography and Soils

This unit occurs in three separate and very distinct parts, each having its own physiographic character. The portion near Chinook Pass has an open, semi-rounded character with lots of convex slopes. The timber grows in a rather open scattered pattern. The part by Naches Pass has a large open meadow area near the crest, with the rest of the unit composed of rather uniform slopes covered by dense stands of conifers. The third area is also characterized by uniform slopes covered by dense stands of conifers.

Elevations range from 3,300 to 5,100 feet. Most of the soils have developed in two kinds of parent materials, which are basaltic materials and pyroclastic materials. There are some soils that have formed in glacial till materials; however, they make up only about four percent of the area. The basaltic soils normally range from 20 to about 40 inches deep, and the pyroclastic soils tend to be a little deeper, normally ranging from about 36 to 60 inches deep. Both kinds of soil materials tend to be slippery or sticky when wet, and both are easily compacted when moist. The till soils, on the other hand, tend to be coarser textured and contain 15 to 55 percent coarse fragments (rocks). Also, although the glacial till may be many feet thick, the soils are generally only about two to three feet thick.

D. Climate

This particular roadless area is contained in a relatively narrow band but with a wide range of precipitation between 45 and 100 inches annually. There are no aerial marker or snow survey sites within this area, but its proximity to the high country indicates peak snow depths exceeding 200 inches, with yearly averages of approximately 120 inches throughout the area.

E. Vegetation

This area is 59 percent tentatively suitable timber area. Most of this (60 percent) is in mature, wet timber types.

Heavy volume Douglas-fir, spruce, hemlock, and western red cedar stands occur along the Chinook Pass Highway.

A small area of dry type occurs in the south slope east of Hall Creek. Here clumpy ponderosa pine, Douglas-fir and open rock areas are typical.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Hunting	1,000
Motorized Trail Riding	<u>200</u>
Total	1,200

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Non-Motorized (SPNM)	148
Semi-Primitive Motorized (SPM)	11,152

There are 14.4 miles of trail within the area of which all are currently open to motorized use.

G. Appearance and Surroundings

Visual variety in landforms, rockforms, vegetation, and waterforms (lakes and streams) is moderate.

The area has a broken, open vegetative pattern on the ridgeline. It has heavily textured vegetative patterns throughout, undulating slopes with moderate to steep hillsides. Textural patterns are dominant.

The area is primarily viewed as foreground from trails that lead into the Norse Peak Wilderness, and from the Mather Memorial Highway (Highway 410). Middleground views are from the Ravens Roost area and other Forest roads.

The Norse Peak area is surrounded by the Norse Peak Wilderness, Mather Memorial Highway, and the Quartz Creek, Crow Creek, North Fork, and Middle Fork of the Little Naches drainages.

H. Attractions

Main features are basalt cliffs and talus slopes. The Crow Creek, South Fork, and Naches Rivers are within the area.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The Morse Creek segment borders Mt. Rainier National Park to the west, Norse Peak Wilderness to the northeast and parallels State Highway 410 to the south. The intrusion of the Morse Creek road in the heart of the area and numerous private patented mining claims would make managing this roadless area segment very difficult. The Hall Creek Basin is bordered by the classified Wilderness to the west, State Highway 410 to the south, and numerous forest roads and harvest units to the northeast. This segment could be easily managed as roadless if the boundary was set on top of Fife Ridge. The segment north of Raven Roost is bordered on the west by classified Wilderness and forest roads and timber harvest units on the remaining sides. If the motorized trail mentioned in the 1984 Wilderness Act is excluded, there would be little area left to manage. Finding a manageable east boundary around cutting units and Forest roads would be difficult. The segments bordering State Highway 410 are in the Mather Memorial Parkway and are managed for recreation and scenic values.

B. Natural Integrity

The Norse Peak roadless area outside of the classified Norse Peak Wilderness has a number of signs of past human activity. The three segments that make up the Norse Peak roadless area are accessed by trails with predominantly motorized vehicle use. The Morse Creek road protrudes about two miles into the vicinity of the roadless area leaving about a quarter mile depth at the narrowest point. The Morse Creek drainage has nine patented mining claims with road access to two of the claims. The remaining claims are in the roadless area with evidence of mining activity. There is also an earth dam remaining from mining days prior to 1900 which has a wooden spillway and steel piped outlet. An old mining cabin on an existing unpatented mining claim has been in continued use for many years and is accessed by a trail lying within the roadless area.

In the other two segments of the Norse Peak roadless area are two trails (Raven Roost Trail #945A and Sand Creek Trail #963) that were left out of the classified Wilderness because they were heavily used by motorized vehicles.

C. Natural Appearance

Although most of the roadless area is a physical extension of the classified Wilderness much of the roadless segments appear to be disturbed by man's activities. This is especially true of the Morse Creek drainage. The reverse is true of the Hall Creek Basin. This basin was part of the Fife Peak Backcountry Management Unit. This basin is large enough and the topography and vegetation are such that persons visiting the area feel they are in a natural area away from human activity and development. State Highway 410 can be seen from higher points within this area but few other signs of man's activities can be seen. The rugged cliffs of Fife's Ridge and alpine benches reinforce a feeling of naturalness. The segment north of Raven Roost is a closed canopy of evergreens bordered by timber harvest units and Forest roads.

D. Opportunities for Solitude

The Norse Peak roadless area offers a variety of opportunities for solitude. Most of the 11,300 acre roadless area is exposed to human activities. Morse Creek drainage is impacted heavily with early mining and present mining activities. Forest Road #176 penetrates about two miles into the drainage, greatly reducing the possibility of solitude. The other two segments, especially the Hall Creek drainage, provide a high opportunity for solitude. This deeply dissected topography and vegetative cover easily screens people from one another at short distances.

E. Opportunities for Primitive Recreation

Like the opportunities for solitude, the opportunities for primitive recreation are varied. The presence of facilities and mining activities in Morse Creek drainage reduce the more primitive recreation pursuits. Gold panning, berry picking, some big game hunting, hiking, and horseback riding take place in this drainage. The Hall Creek Basin, with isolation and relative diversity and the absence of facilities, contributes to the primitive character of the area. This basin provides ample opportunity for quality big game hunting of elk, deer, black bear, and mountain goat when permitted, hiking, backpack camping, and scenic viewing. The segment north of Raven Roost is limited to trail activities for the most part due to the closed canopy and dense vegetation. Some big game hunting for elk takes place in this segment.

F. Challenging Experiences

Most of the Norse Peak roadless area segments provide some challenge. The rugged cliffs and terrain of the Hall Creek drainage and the dense vegetation of the area north of Raven Roost provide the inexperienced with a challenge.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. No other threatened or endangered species have been located in this area. The extent of use in this area by sensitive species is unknown.

H. Historical and Scientific Study

There are no special or unique opportunities for outdoor education and scientific or historic study in the area which cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
SPNM	200
SPM	<u>33,000</u>
Total	33,200

B. Wildlife

The area is elk summer range and also provides habitat for a variety of forest animals and birds, including black bear, deer, and grouse.

C. Fish

In the portions of Crow Creek and the South Fork of the Little Naches River included in this area, there are significant populations of wild cutthroat trout typical of the eastern Cascade crest area. These reaches of stream are very short within this area compared to their overall length.

Morse Creek in the vicinity of Chinook Pass has native bull trout and non-native Eastern brook trout. The populations are not significant in comparison to the main American River and some of its tributaries.

D. Water

There are no water related encumbrances or planned projects within the area.

E. Livestock

This roadless area is actually three small areas along the edge of the Norse Peak Wilderness. As part of a continuous larger roadless area within the Wilderness, they make up portions of the Little Naches and the Crow Creek recreation stock allotments. If combined with adjacent areas both inside and outside of the Wilderness, there is potential for a domestic stock allotment for sheep.

F. Timber

The area contains 6,699 acres of tentatively suitable forest land. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing	
			Volume (MMBF)	(MMCF)
Wet	Mature	4,049	114.7	21.0
Wet	Immature	1,992	35.8	6.6
Wet	Seedling-Sapling	85	---	---
Dry	Mature	191	2.4	0.4
Dry	Immature	382	3.7	0.7
	Total	6,699	156.6	28.7

The estimated maximum biological potential contribution to the long term sustained yield is 2.2 MM Bd. Ft. (0.4 MM Cu. Ft.) per year.

G. Minerals

This area is primarily underlain by Tertiary-aged volcanic and granitic rocks. Adjacent lands have been studied by the U.S.G.S. and U.S. Bureau of Mines as part of their Cougar Lakes-Mount Aix Wilderness investigation. As a result of that investigation, no lands immediately adjacent to the subject area were identified as having a "probable" mineral resource potential. The southernmost portion of the area near Placer Lake and Gold Hill does, however, have reported occurrences of arsenic, copper, lode gold, placer gold, lead, molybdenum, silver, zinc, chromium, and iron. This area lies adjacent to the Silver Creek mining district, and geologically it appears to have a "moderate" potential for the occurrence of low-grade copper, molybdenum, gold, and tungsten deposits. The northern two parcels do not appear to share this potential. According to BLM mining claim recordation data (1/23/85), 244 lode claims and 12 placer claims have been located within or adjacent to the southernmost parcel, whereas only two placer claims are recorded for the northern parcels.

Except for geothermal resources, the area is not classified "prospectively valuable" for leasable minerals. Even though it is not classified "prospectively valuable" for oil and gas resources, there are two existing leases and four pending lease applications involving the subject areas. Not having been explored, there is no basis for projecting an oil and gas potential for the area.

H. Cultural-Historical

There are no formally inventoried cultural resource sites within the Norse Peak adjacent unit, but there are recorded lithic scatters near both the northern and southern boundaries, and there is at least a moderate potential for the occurrence of archaeological materials within this unit. In addition, a huckleberry collecting area of special significance to the Yakima Indians once existed in the general vicinity of Raven's Roost Lookout. Historically, a portion of the area falls within the former Summit Mining District. Remnants of early prospecting and mining activity, dating from the late 19th century, still exist.

I. Land Use

There are no special uses within the area.

J. Fire

Annual fire occurrence is low to moderate with lightning causing most fires. Fuel loadings range from heavy accumulations of down fuels at lower elevations to scattered clumps of trees and small meadows at higher elevations. Periodic large fires have occurred in this area.

K. Insects and Disease

Blackhead budworm damage was visible along the Chinook Pass Highway in 1984. Entomologists expect this defoliation will not be a serious, long-term, damaging agent in this area.

In general this area has a good mix of species and less than average insect and disease losses.

L. Private Lands

There are 170 acres of private land within the area. Acquisition possibilities are considered to be fair.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located immediately adjacent to the 50,923 acre Norse Peak Wilderness and within two to three miles north of the 167,195 acre William O. Douglas Wilderness Area.

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through Wilderness classification.

D. Interest by Proponents, Including Congressional

The interest on segments of this roadless area has been mixed. The Morse Creek drainage has had interest by the private landowner to keep it non-Wilderness so he may develop the area into an alpine ski area. The area has been shown and inventoried as an expansion of the Crystal Mountain Ski Area for many years. The Crystal Mountain Ski Area borders the area on the northwest side. There has also been interest to leave the area open for mining. There are approximately 100 unpatented mining claims and 9 patented mining claims in the drainage with many more west of the Cascade Mountain Divide. These interests were taken into consideration when this segment was not included in the 1984 Wilderness Act.

The Hall Creek Basin was a candidate for Wilderness. It is in the Fife Peak Backcountry Management Unit or at least that portion south of Fife Ridge. This segment has had roadless area interest for local people and has had one appeal on a timber sale that was proposed on the edge of the area. The units that were controversial were left out of the timber sale.

The segment north of Raven Roost has had interest by local industry to keep it in General Forest classifications and available for timber harvest. There has been no other significant interest in this segment

E. Public Input

Of 7,296 responses under RARE II, 64 percent were for non-wilderness, 1 percent further planning, 13 percent for Wilderness with boundary adjustments, and 22 percent for Wilderness. A number of motor-bike users have shown considerable interest at public meetings to keep existing bike trails open to bikes

The private landowner, Ward Meeks, has made it clear he wished to develop his lands in conjunction with an alpine ski area. There has been some interest in keeping Hall Creek Basin from Fife Ridge south in some form of roadless classification.

F. Other Public Involvement

In addition to the Forest Plan public meetings, there have been timber sale plans adjacent to the roadless area that have had scoping with involvement from the Washington State Department of Game, interested public, and Forest Service permittees. Their input reflects similar views to those received in other public meetings on the roadless area. However, some timber sales were appealed because of the possible impact of specific units. These units were excluded from the sale where the concern was justified.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

Any roading in the Norse Peak Adjacent roadless area will reduce Semi-primitive, Non-motorized Recreation opportunities for the future. Scenic Travel retention areas along Chinook Pass but outside the Norse Peak Adjacent roadless area, will not significantly impact the roadless area.

Alternatives E and F would best accommodate roadless, non-motorized, use of the Hall Creek drainage which was the managed use under the Fifes Peak Backcountry Management Plan prior to Wilderness classification.

Proposed developed alpine ski area plans on private land, and in conjunction with Crystal Mt. Ski Area (Mt. Baker-Snoqualmie N.F.), have lead to the Developed Recreation Management prescriptions for all but Alternative E, which recommends an almost total Dispersed Recreation, Non-motorized prescription. Alternatives B, C, D, I, and J recommend a balanced use of developed recreation (at around 1,950 acres).

Alternatives B, D and J allcated about 48% of the area to General Forest.

Alternative E recommends this area be managed predominantly (11,236 acres) for Dispersed Recreation, Non-motorized, with the balance of 64 acres managed for special area (Historic Trail - non-scenic) considerations.

Alternatives A/NFMA and H suggest a prescription of 2,650 acres of Dispersed Recreation, Unroaded, Non-motorized.

Alternatives C and I allocate 64 acres to a Special Area non-scenic prescription along the Naches Pass Historic Trail Corridor. Alternatives B and D do not allocate any Special Area designation at this location.

Alternative F allocates 1,272 acres to Dispersed Recreation, Unroaded, Non-motorized, and 1,908 acres to Developed Recreation.

Under Alternatives C and I, the portion of the trail system in this roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
M Fork Naches	945	--	--	3.0
Middle Fork	945.1	--	--	0.2
W. Quartz Creek	952	--	--	1.0
Fifes Ridge	954	--	--	3.3
Sand Creek	963	--	--	3.0
Bear Gap	967	--	--	0.9
Totals		--	--	11.4

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semi-primitive Motorized and Semi-primitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	23	0	13	0	100	11	35	23	13	0

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0/100	0/0	4/96	0/0	0/100	5/95	98/2	0/100	4/960	0/0

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with a more Roaded Natural or Roaded Modified setting.

2. Wild, Scenic, and Recreational Rivers

A portion of the following river corridor (one-quarter mile either side of the river) is being located within this roadless area and is recommended for designation in Alternatives C and I:

<u>River</u>	<u>Recommended Classification</u>
American River	Segment 2 Scenic

More information concerning this recommendation can be found in Chapter III and Chapter IV.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate most areas to Retention, and Partial Retention VQO. Some large areas will be allocated to Maximum Modification. County Creek and the trail in the area will be heavily altered. The Mather Memorial Highway viewshed will be protected visually with Retention VQO. South of Crow Creek to Naches Pass will be Partial Retention VQO along the trail and General Forest Middleground for the rest of the planning area.

Alternatives B, D and J allocate approximately one-half of the area to Maximum Modification. The areas are from the Mather Memorial Highway 410 to the Fife Peak Area, to the the Naches Pass Area. Trails will also be heavily altered. The area west of Ravens Roost to the wilderness boundary and the middleground view from Highway 410 is allocated to Partial Retention VQO.

Alternatives C and I will allocate many areas to Retention and Partial Retention VQO. Some areas will be heavily altered. The Fifes Ridge trail and the middleground view will be allocated to Maximum Modification.

Alternative E will allocate all areas to Retention VQO. Most areas will be allocated to Dispersed Recreation, Unroaded, Non-motorized. The scenic quality will be preserved under this alternative.

Alternative F will allocate most areas to Retention and Partial Retention VQO. Only a very small area will be allocated to Maximum Modification. The Raven's Roost Area north will be allocated to foreground Partial Retention VQO. The middleground areas will be Maximum Modification.

Alternative G allocates areas to Retention, Partial Retention, and some areas to Maximum Modification. The Raven's Roost Area will be General Forest in the middleground. A larger foreground trail will be allocated to Scenic Travel Partial Retention VQO.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	6,955	5,342	6,529	5,342	11,300	8,607	8,353	6,955	6,529	2,756
Partial Retention	2,395	573	2,078	573	--	2,184	2,014	2,395	2,078	3,329
Modification	--	--	191	--	--	--	--	--	--	191
Maximum Modification	1,950	5,385	2,502	5,385	--	509	933	1,950	2,502	5,215
Total Acres	11,300	11,300	11,300	11,300	11,300	11,300	11,300	11,300	11,300	11,300

Preservation indicates that only natural ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road 77 percent and emphasize timber harvest on 17 percent of the area. Alternatives B, D and J would road all of the area and allow emphasis for timber harvest on 48 percent of the area. Alternatives C and I would road 88 percent of the area but would only allow timber harvest emphasis on 22 percent of the area. Therefore A/NFMA and H would have one-third the impact of B, D and J, and C and I would have less than one-half the impact of B, D and J. Alternative E would have no impact on the wildlife resources in this area. Alternatives F and G would have more impact than A and H, but less than E.

6. Fisheries

a. Significant Effects

In Alternative E, all the areas of the Norse Peak Adjacent roadless area with fish populations would remain roadless. In the other alternatives, the stream areas would be managed in a variety of different ways. Table (A), below, depicts these management prescriptions for the areas shown.

Roading these areas could change the recreational fishing opportunities, although the total mileage of streams in this roadless area is very small. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase slightly. This would help to meet a portion of the Forest's long-term fishing demand, but also could result in overfishing and reduction in both numbers and size of fish using the habitat.

Roading the unroaded areas could also result in environmental degradation to streams due to timber harvest and road construction in the basins. Some of these possible effects are addressed in the soil and water environmental effects section. Overall, even if all areas would be roaded, it is not expected that there would be any significant effect on the resident and anadromous fish populations.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September 1980 and revised October 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

TABLE (A). Allocation of management prescriptions in the Norse Peak Adjacent roadless area in stream areas for Alternatives A/NFMA, B, C (Preferred), D, F, G, H, I and J. Where "Int" is shown, this indicates that an intensive timber management prescription could dominate in that area. Where "Ext" is shown, this indicates that an extended shelterwood timber management prescription would dominate in that area and would be executed primarily to meet visual objectives. Where "Rdls" is shown, this indi-

cates that the management prescription would be to maintain the area as roadless. And, where "Recreation" is shown, this indicates that the management prescription would allow the opportunity to develop a special recreation area. (m = mile)

Stream/River	A/H	B/D/J	Alternative C/I	F	G
South Fork of Little Naches	all Int	all Int	lower 1/4 m: Int	lower 1/4 m: Int	lower 1/4 m: Int
			upper 1/2 m: Ext	upper 1/2 m. Ext	upper 1/2 m: Ext
Crow Creek	border of	all Int Ext & Int	all Int	all Rdls	all Rdls
Morse Creek	all Ext	Recreation	Recreation	Recreation	Recreation

7a. Vegetation: Trees

Tree management would be planned on 7,930 acres or 70 percent of the area under Alternatives A/NFMA and H. Total vegetation manipulation area would be similar under Alternatives B, D and J. However, under these alternatives, the emphasis would be on timber production rather than other resource enhancement and protection. The White Pass Ski Area developed recreation site could use any method, including timber sales, to remove trees from ski runs or new developed areas under all alternatives.

No timber management would be permitted under Alternative E, but 4,855 acres in Alternative F, or 43 percent, would have harvest permitted with most of the acres classified Scenic Travel, Retention.

Alternatives C and I would manage 2,502 acres with emphasis on timber production (22 percent). In addition 6,699 acres could be managed for other resource values, especially scenic travel, that permit scheduled timber harvest. Total suitable forest that would be manipulated through timber sales is 5,872 or 52 percent of the area.

Alternative G emphasizes management to provide nonroaded motorized recreation on 35 percent, or 3,923 acres. Timber management would be emphasized on 993 acres.

7b. Vegetation: Forage

This roadless area is made up of two small areas adjacent to the Norse Peak Wilderness (See the Livestock write up under General Information for this area). Forage produced on one of the individual areas as part of the Forest base is not significant; however, as part of the large adjacent wilderness, it does have potential to contribute important forage for big game and livestock. Alternatives A/NFMA, B, D and J will contribute forage in excess of needs. Alternatives C, H, and I will contribute adequate forage for both livestock and big game. Alternatives E, F, and G will not produce for livestock in the fourth and fifth decade.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Norse Peak area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Alternatives B, D and J could allocate the entire area, and Alternatives C and I could allocate 88 percent of the area to timber harvest and road building. Alternatives A/NFMA, F, G, and H could allocate up to 70 percent of the area to timber harvest activities. The environmental effects of timber harvest and road building on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building. Alternatives B, D, and J pose more risk of degrading the soil and water resource than Alternatives C and I and A/NFMA, F, G, and H, respectively, due to more intensive management. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are anticipated because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

The additional prescribed burning generated in the Norse Peak Adjacent roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

As the previous discussion indicates, the southernmost parcel is encumbered by 244 lode claims and 12 placer claims. It also has reported occurrences of arsenic, copper, talc, gold, lead, molybdenum, zinc, chromium, iron, silver, tungsten, pumice, and limestone, none of which have been investigated adequately to determine if commercial deposits exist. Portions of the area are also classified prospectively valuable for coal and geothermal resources. Since none of the alternatives call for withdrawing any part of the area from mineral entry, the consequences on mineral resources does not appear to be extremely significant nor do they vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	3,370	2,671	5,214	2,671	11,300	6,509	6,275	3,370	5,214	8,629
Moderately Restrictive	5,980	3,244	3,584	3,244	0	4,282	4,092	5,980	3,584	3,414
Relatively Few Restrictions	1,950	5,385	2,502	5,385	0	509	933	1,950	2,502	5,215

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested, approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or Wilderness. The decision to close any road will be made on a case-by-case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Miles	26	24	24	24	0	20	15	26	24	26

12. Fire

The fire management workload generated in the Norse Peak Adjacent roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives E and F. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives A/NFMA, B, C, D, H, I and J. The cost efficiency of fire suppression activities would be slightly increased in Alternatives A/NFMA, B, C, D, H, and I as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives E and F would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. That is, because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 26.9 jobs.

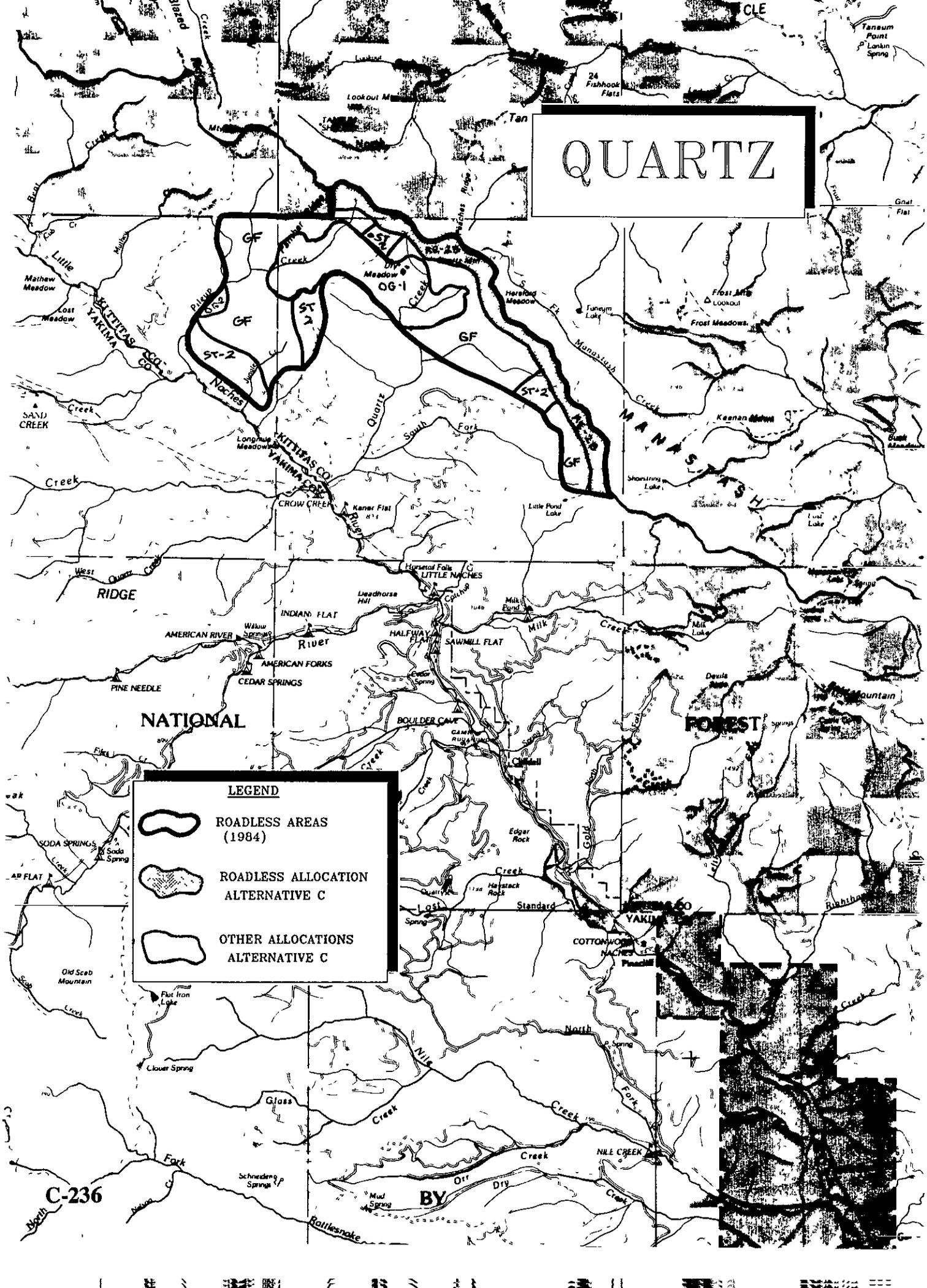
14. Wilderness Potential

The area has potential for Wilderness, however, all three areas that make up this roadless area were excluded in the analysis for the Norse Peak Wilderness. Any potential would be as additions to this Wilderness. Alternatives B, D, and J propose no allocation to unroaded prescriptions and propose the largest acreage of General Forest. Alternative E provides the most retention of Wilderness characteristics with a totally unroaded allocation. All other alternatives propose roading and development of nearly all the acres in this roadless area. There is some difference in the acreage of General Forest with Alternatives F and G allocating less than A/NFMA, C, H, and I.

QUARTZ

LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C



QUARTZ ROADLESS AREA

Size: Gross Acres: 8,756

Net Acres: 8,756

I. GENERAL INFORMATION

A. History

The area was inventoried and analyzed under the RARE II effort as area No. 6033 and was not recommended for Wilderness. It was also not considered for Wilderness as part of the Washington State Wilderness Act of 1984.

B. Location and Access

The area is in Kittitas County on the Naches Ranger District and adjoins the Manastash and Taneum roadless areas. Access is by Highway 410 and the Little Naches, Quartz Mountain, Kaner Ridge, and Pileup Creek Roads.

C. Physiography and Soils

The upper elevations of this unit are characterized by long, convex grass covered ridges. The lower part (between Pileup Creek and Quartz Creek) has the large long ridge that dominates the landform. This portion of the unit is covered with dense stands of conifers. Slopes are mostly convex and are fairly uniform.

Elevations range from 3,300 to 5,900 feet. The soils in this area have developed in many different kinds of parent material. Thirty-nine percent have formed in sandstone materials, 30 percent have formed in granitic materials, 18 percent have formed in basaltic materials, 11 percent have formed in pyroclastic materials, and 2 percent have formed in glacial till material. These materials have a wide range of properties, but do have some things in common that are important to man's activities. The sandstone, basaltic, and pyroclastic soils often become sticky and slippery when wet, and all are easily compacted when moist. The granitic and glacial till materials, on the other hand, are generally coarser textured and are usually not sticky or slippery when wet. They can be compacted when moist, but are less sensitive than the former group of soils.

D. Climate

The Quartz roadless area lies within the 50 to 70 inch rainfall zone with an estimated 65 percent of the effective moisture falling as snow. There are no aerial markers or snow survey sites within the area, but average snow depths are estimated at 75 inches annually.

E. Vegetation

This area is 57 percent tentatively suitable forest land. Douglas-fir, subalpine fir, western white pine, and lodgepole pine are the major species. Open bunchgrass forb communities are restricted to the highest elevation south slope around Quartz Mountain.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Motorized Trail Riding & 4x4	4,000
Hunting	2,000

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) classes.

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Non-motorized (SPNM)	3,498
Semi-Primitive Motorized (SPM)	5,258
Total	8,756

There are 19.0 miles of trail within the area and all are currently open to motorized use.

G. Appearance and Surroundings

The area has a moderate visual variety in landforms, vegetation, rockforms, and waterforms (lakes and streams). The highly textured steep hillsides have broad rounded sparsely vegetated ridgetops. Stream bottoms are densely vegetated while their slopes are patterned with broken, open mixed conifers.

Fall colors are present along the middle and upper slopes of the drainage.

The area is primarily viewed as foreground and middleground from trails, Quartz Mountain and Manastash Ridge. Middleground is viewed from the Little Naches road, with a portion from the Mather Memorial Highway (Highway 410), and the background is seen from Raven's Roost.

The Quartz Mountain area is surrounded by Manastash Ridge, the upper end of the Milk Creek drainage, the Little Naches drainage, and the Panther Ridge area.

H. Attractions

There are no unique features on the area. The main features are Manastash Ridge and basalt cliffs and talus slopes.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The Quartz Mountain roadless area is bordered on the northeast by Manastash Ridge, and Forest roads and harvest units to the south and west. While the Manastash Ridge boundary would be easy to find and manage, the other boundaries following various forest roads and timber harvest units would be somewhat difficult to locate on the ground or map.

The road to Quartz Mountain is of a low standard, but the Naches Pass road at the southwest edge is a double-laned paved road with considerable recreation and timber harvest traffic. This road and other forest roads bring the sights and sounds of human intrusion into the areas on the periphery.

B. Natural Integrity

This roadless area was considered for Wilderness in 1984 and was not selected. The impact of past human activity in this area has been relatively minor even though those activities have been extensive. A system of forest roads borders the area with timber harvest units adjacent in many places. An extensive trail system provides access to Manastash Ridge at many points. This trail system has a long history of motorized use. Two trails, the Kaner Flat and Manastash Ridge trails, are four-wheel-drive routes most of their length.

C. Natural Appearance

The Quartz Mountain roadless area is large enough and the topography and vegetation are such that persons visiting the area feel that they are in a natural area away from ordinary human activity and development. Forest roads, timber harvest activities, fire lookouts, and the Raven Roost microwave tower may be seen from the higher points within this area. Most of the area has a closed evergreen canopy which reinforces a feeling of naturalness even though it is somewhat monotonous.

D. Opportunities for Solitude

The area offers good opportunities for solitude. The 8,756 acres included occur in an irregular shape that is approximately 12 miles long and 5 miles at the widest point. The three principal drainages (of which Pileup Creek is the largest) that make up this area contain deeply dissected topography and vegetative cover which easily screen people from one another at short distances.

E. Opportunities for Primitive Recreation

Opportunities for primitive recreation experiences are moderately high. The size of the area and the absence of facilities contribute to the primitive character of the area.

In spite of the good access afforded by Forest roads on the periphery and the trail system within the area, there are good opportunities for big game hunting (elk, deer, black bear and some mountain lion), horseback riding, hiking, horse camping, and some scenic viewing.

F. Challenging Experiences

This roadless area is very limited in challenging experiences. The heavy evergreen forest might be challenging to travel through for the more inexperienced visitor. A Boy Scout 50-mile hike, usually undertaken in large groups, has been proposed through this area. Wilderness designation would limit group size. Few continuous 50-mile non-Wilderness hiking opportunities remain due to 1984 Wilderness legislation.

G. Special Wildlife Features

There is no known threatened or endangered species in this area. Use of the area by sensitive species is unknown.

H. Historical and Scientific Study

There are opportunities for outdoor education, and scientific and historic study in the area relating to the archeological field.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS Class is as Follows:

<u>ROS Class</u>	<u>Capacity in Potential Recreation Visitor Days per Year</u>
SPNM	3,500
SPM	<u>15,800</u>
TOTAL	19,300

B. Wildlife

Elk summer habitat is provided in the area. It is also inhabited by many of the common forest animals and birds including black bear and grouse. Some mule deer also use the area.

C. Fish

This area includes the headwaters of tributaries to the Little Naches River. There are significant populations of resident cutthroat trout in Quartz Creek. Pileup Creek is used for off-channel (of the Little Naches) rearing of resident trout. With construction of a fish ladder at Salmon Falls on the Little Naches (T.18N., R.13E., section 30) scheduled for 1987, Pileup Creek will probably be utilized by anadromous fish.

D. Water

There are no water related encumbrances or planned activities within this area.

E. Livestock

This roadless area is entirely within two existing allotments. The southern edge lays within a portion of the Naches Sheep Allotment, while the northern and western portion is in the Little Naches Recreation Stock Allotment. Both allotments are used annually by livestock.

The portion in the Little Naches recreation allotment may have some potential for livestock (sheep) use when combined with adjacent areas, particularly if access was improved and transitory range was created through timber harvest.

F. Timber

The area contains 4,961 acres of tentatively suitable forest land. Stand, volume, and other data are as follows:

<u>Ecotype</u>	<u>Stand Size</u>	<u>Acres</u>	<u>Estimated Standing Volume (MMBF)</u>	<u>(MMCF)</u>
Wet	Mature	2,035	57.7	10.6
Wet	Immature	2,693	48.4	8.9
Dry	Mature	127	1.6	0.3
Dry	Immature	106	1 0	0.1
		Total 4,961	108 7	19 9

This estimated maximum biological potential contribution to the long term sustained yield is 1.7 MM Bd. Ft. (0.3 MM Cu. Ft.) per year.

G. Minerals

This area is primarily underlain by Jurassic metamorphic rocks, Eocene volcanic rocks, and Eocene nonmarine sedimentary rocks. The area has been investigated by the U.S.G.S. or U.S. Bureau of Mines, but available literature indicates there are no known mineral resource occurrences of interest. The area is classified "prospectively valuable" for coal, but there appears to be no interest in leasing it. The area is not classified "prospectively valuable" for any other commodities, but it has been leased for oil and gas. Three of the four leases terminated in 1984. According to Bureau of Land Management mining claim recordation data (1/23/85), four placer claims have been located within the area, one of which is considered abandoned for lack of required assessment work.

H. Cultural-Historical

The Quartz Mountain unit includes several known archaeological sites, with a high potential for the occurrence of additional properties. Prehistoric use of this area was intensive and was likely carried on over a period of several thousand years. In fact, a portion of the Quartz Mountain unit may qualify as an archaeological district because of the significant concentration of sites. Additional research is necessary to determine the range of historic uses.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is moderate; fuel loadings are heavier at lower elevations and broken up by small openings at higher elevations. Fire history is low in this area.

K. Insects and Disease

Recent heavy mountain pine beetle damage to western white pine has occurred in Quartz Creek. Lodgepole pine stands to the east are also susceptible to this insect. Root rot and mistletoe are common at lower elevation in Douglas-fir.

L. Private Lands

There are no private lands within the area.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located near the Norse Peak (50,923 acre), William O. Douglas (167,195 acres), and the Goat Rocks (105,633 acres) Wildernesses and adjacent to the Manastash and Taneum roadless areas

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through wilderness classification.

D. Interest by Proponents, Including Congressional

There has been no active support to make the Quartz Mountain roadless area a Wilderness or designated as roadless, non-motorized. There has been interest by off-road vehicle enthusiasts to make the area roadless motorized. There has been about as much interest by the local timber industry to keep it General Forest and allow timber harvest. Congressman Morrison has supported the General Forest approach.

E. Public Input

Of 939 responses to RARE II, 86 percent favored non-wilderness, 3 percent further planning, and 11 percent Wilderness. During public meetings on the Forest Plan, motorbike users supported Roadless Motorized classification and timber industry supported General Forest classification. Local area Scout leadership is interested in a continuous 50 mile non-Wilderness hike route which traverses this area. There has been no interest in other classifications to date.

F. Other Public Involvement

In addition to the Forest Plan public meetings there have been timber sale plans adjacent to the roadless area soliciting comments. Very little interest has been shown from anyone other than the motorized vehicle users and the timber industry.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Quartz roadless area consists of 8,756 acres on the south slopes of Manastash Ridge below Quartz Mountain and above the Little Naches River on the Naches Ranger District.

The Quartz roadless area presently hosts dispersed recreation, motorized use along developed trails. This is predominantly motorbike trail day use and four-wheel-drive day use along the ridge top. Snowmobiles also use the open ridge top and corridor routes during winter. No alternatives except E would impact present motorized use, and most alternatives would enhance this activity.

Alternative E recommends a 2,502 acre Dispersed Recreation, Non-motorized classification within the Quartz roadless area. An isolated non-motorized area of less than 5,000 acres is both difficult to manage and use. Few conflicts exist in this area at present. The present designated 50 mile non-Wilderness hiking corridor along trails through this area offers a viable alternative for large hiking groups who wish to avoid group party size limitations imposed by local wilderness. The Scouts, for example, need a 50 mile, non-Wilderness, no party size limitation, hiking corridor which this area affords.

Alternative A/NFMA, B, D, H and J allocate very little to no opportunity for unroaded motorized to non-motorized recreation. In each alternative the allocation of General Forest includes about 90% of the roadless area. Alternatives A/NFMA and H do provide allocation for protection of scenic travel ways with a partial retention allocation.

Alternatives C and I provide an even allocation with 47% of the area allocated as General Forest and 27% of the area allocated to unroaded motorized recreation and partial scenic retention. Only Alternative E provides an allocation for unroaded non-motorized recreation.

In Alternatives C and I, the portion of the trail system in this unroaded area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Quartz Mtn.	948	--	--	8.0
Quartz Creek	949	--	--	7.0
Manastash 4x4 Route	1388	--	--	4.0
Totals		--	--	19.0

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semiprimitive Motorized and Semiprimitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	1	1	13	1	100	71	96	1	13	0

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	100/0	100/0	100/0	100/0	71/29	100/0	100/0	100/0	100/0	0/0

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with a more Roaded Natural or Roaded Modified setting.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate most lands to Maximum Modification VQO. Most areas except the middleground view from the Little Naches viewshed will have a heavily altered condition Quartz Mountain area viewing into Quartz Creek Basin will be heavily altered.

Alternatives B, D and J allocate almost the entire area to Maximum Modification VQO. The view from the Quartz Mountain area will be heavily altered looking west, northwest, and southwest. The middle-ground view from the Little Naches Road will be heavily altered.

Alternatives C and I will allocate much of the land to Maximum Modification VQO. The view from Quartz Mountain, Quartz Creek, and Pileup Creek basins will be allocated to General Forest. These lands will be heavily altered. Many foregrounds of trails in the area and the Little Naches viewshed will be Partial Retention VQO.

Alternative E will allocate all lands to Retention VQO. All areas will be natural appearing. Scenic quality will be retained to a very high degree.

Alternative F will allocate most areas to Retention and Partial Retention VQO. Parts of the lower end of the Little Naches viewshed will be Partial Retention VQO. Most unseen area of the Little Naches viewshed will be allocated to Maximum Modification.

Alternative G will allocate most land to Retention and Partial Retention VQO. Most areas will be Retention VQO allocated to Dispersed Recreation, Unroaded, Motorized.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	C PREFERRED	D	Alternative E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	2,099	657	4,473	657	8,756	7,675	8,607	2,099	4,473	466
Partial Retention	361	148	148	148	--	191	64	361	148	148
Modification	--	--	--	--	--	--	--	--	--	--
Maximum Modification	6,296	7,951	4,135	7,951	--	890	85	6,296	4,135	8,142
Total Acres	8,756	8,756	8,756	8,756	8,756	8,756	8,756	8,756	8,756	8,756

Preservation indicates that only natural ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA, C, H, and I would all have similar effects on wildlife. The effect of Alternatives A/NFMA, C, H, and I would be slightly less on wildlife than the effect of Alternatives B, D and J. Alternatives B, D and J would road up to 100 percent of the area and emphasize timber harvest up to 93 percent of the area. Alternative E would have an insignificant effect on wildlife. Alternatives F and G would have similar effects on wildlife which would be somewhat more than E, but considerably less than the other alternatives.

6. Fisheries

a. Significant Effects

In Alternatives E and F, all the areas with fish populations in this roadless area would remain roadless. In Alternatives A/NFMA, B, C, D, H, I and J, both the Quartz and Pileup Creek areas would become available for intensive timber harvest management. In Alternative G, the Pileup Creek and upper one-half of Quartz Creek areas would remain roadless. In Alternative G, the lower one-quarter of Quartz Creek in the roadless area would become available for intensive timber management.

Roading these areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that recreational fishing would increase. This would help to meet a portion of the fishing demand, but also could result in overfishing and reduction in both numbers and size of fish using the habitat. Quartz Creek, in particular, would probably experience increased fishing since there is already considerable fishing in its lower reaches.

It is also possible that roading the unroaded areas could result in environmental degradation to streams due to timber harvest and road construction in the basins. Maintaining high quality rearing habitat in the lower reaches of both Quartz and Pileup Creek for anadromous fish would be a key concern. Some of the possible effects of roading these areas are also addressed in the soil and water environmental effects

b. Mitigation Measures

In the alternatives that could road presently unroaded areas in the Quartz and Pileup Creek areas, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September 1980 and revised October 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Tree management emphasis would be planned on 6,296 acres, or 72 percent of the area, under Alternatives A/NFMA and H. Total vegetation manipulation area would be similar under Alternatives B, D and J. However, under these alternatives the emphasis would be on timber production rather than other resource enhancement and protection.

No timber management would be scheduled under Alternative E, and only 2,501 acres, or 29 percent under Alternative F.

Alternatives C and I would manage 4,135 for timber production emphasis (47 percent). An additional 3,328 acres will be managed for other resource values, especially scenic travel, that permit scheduled timber harvest.

Alternative G emphasizes management to provide motorized unroaded recreation on 96 percent, or 8,437 acres. Timber management would be emphasized on 85 acres. The remaining 234 acres would be managed through timber sales to enhance or protect other resource values.

7b. Vegetation: Forage

This roadless area contains portions of one or more livestock allotments. (See the Livestock writeup under General Information for this area.) With the proposed vegetation manipulation in some alternatives, adequate forage will be produced for big game and livestock. This will offset the loss of forage due to natural succession and the exclusion of fire. Alternatives C, H, and I will contribute adequate forage. Forage in excess of expected needs will be produced in Alternatives A/NFMA, B, D and J. Needs for forage in the fourth and fifth decades will not be met for livestock in Alternatives E, F, and G.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Quartz area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternatives E and G because soil and water disturbing activities occurring would be minimal. Alternative F could allocate up to 29 percent of the area to timber harvest and road building, while Alternatives A/NFMA, B, C, D, H, I and J could allocate up to 100 percent of the area to timber harvest activities. The

environmental effects of timber harvest and road building on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource in this area increases with more timber harvest and road building activity. Alternatives A, B, C, D, H, I, and J pose more risk of degrading the soil and water resource than Alternatives E and F due to more intensive management. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are anticipated because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

The additional prescribed burning generated in the Quartz roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

Since this area appears to have a low potential for the occurrence of mineral resources, the consequences on mineral resources do not appear to be extremely significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	Alternative D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	212	254	3,074	254	8,756	6,340	8,501	212	3,074	148
Moderately Restrictive	2,248	551	1,547	551	0	1,526	170	2,248	1,547	466
Relatively Few Restrictions	6,296	7,957	4,135	7,951	0	890	85	6,296	4,135	8,142

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
Miles	19	18	18	18	0	5	1	19	18	19

12. Fire

The fire management workload generated in the Quartz roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives E, F, and G. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives A/NFMA, B, D, H and J.

The cost efficiency of fire suppression activities would be slightly increased in Alternatives A/NFMA, B, D, H and J as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives E, F, and G would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. That is, because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 20.2 jobs.

14. Wilderness Potential

This roadless area has very limited potential for Wilderness. Its 8,756 acre size is a limiting factor as well as its isolation from other Wilderness.

Only Alternatives E, F, and G retain a large portion of the area in unroaded conditions. All other alternatives retain only a range of 1 percent to 6 percent of the area in unroaded condition. Alternatives B, D, and J propose a major portion of the area, up to 93 percent in General Forest. Alternatives C and I prescribe an even resource allocation with 4,135 acres allocated to General Forest. Alternatives A/NFMA and H allocate more acres to unroaded allocations and nearly the same acres to roaded allocations.

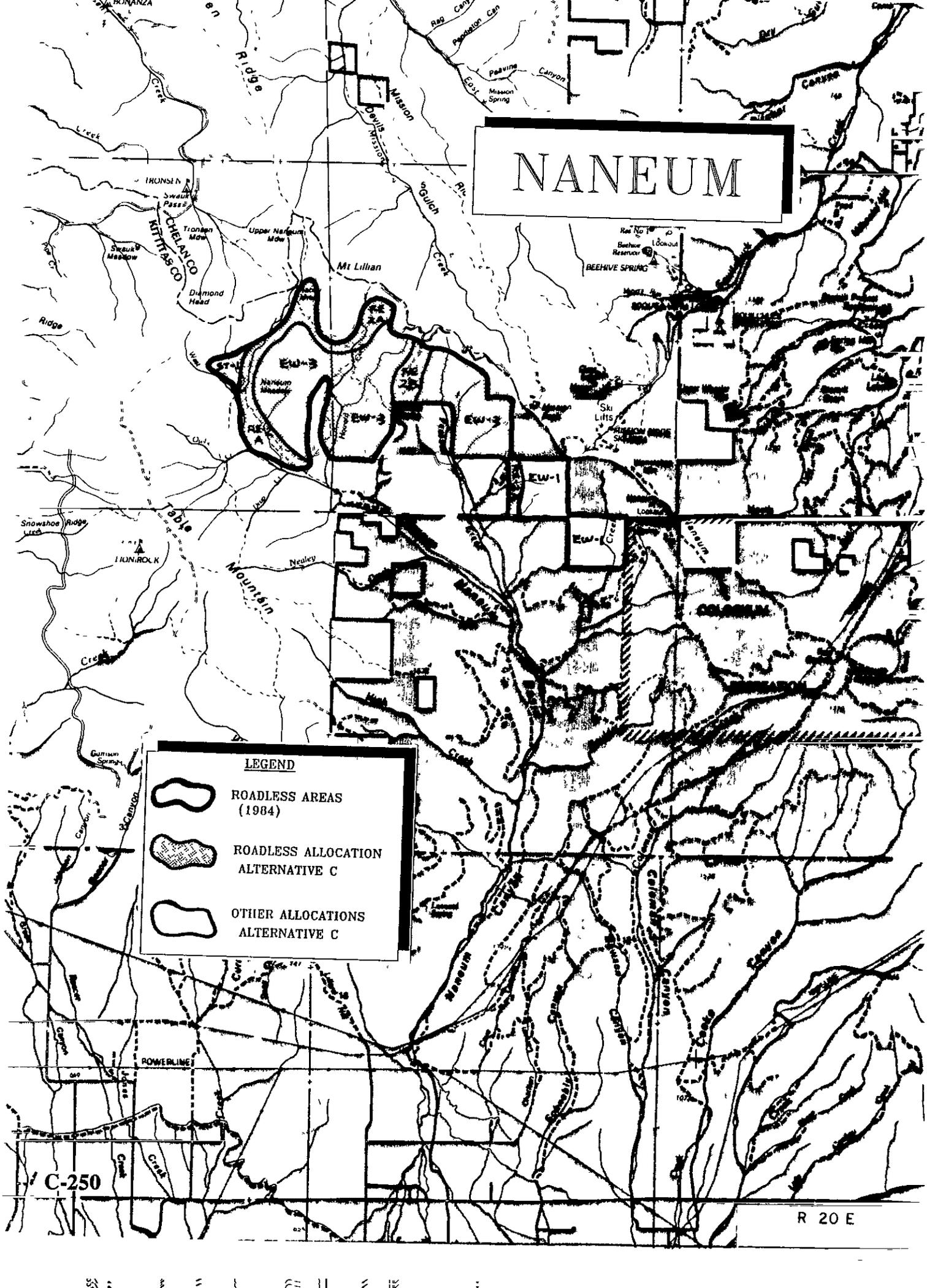
NANEUM

LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

C-250

R 20 E



NANEUM ROADLESS AREA

Size: Gross Acres: 8,310

Net Acres: 6,911

I. GENERAL INFORMATION

A. History

The area was inventoried and evaluated under RARE II as Area No. 6039 and was not recommended for Wilderness. It was not part of the Washington State Wilderness Act of 1984 assessment.

B. Location and Access

The area is located in Kittitas County on the Cle Elum Ranger District. Major access is obtained by the Liberty-Beehive and Howard Creek roads.

C. Physiography and Soils

This area is characterized by its position at the head of a large drainage basin. The slopes are fairly gentle and smooth and the area is covered with conifers. Elevations range from 4,900 to 5,700 feet. Most of the soils have formed in either basaltic materials or sandstone materials; however, there is a small percentage (two percent) of soils that have formed in colluvial materials. The basaltic soils are usually darker in color than the sandstone soils and most are medium textured whereas in the sandstone soils textures can range from coarse sandy loams to clay loams. Both soils can be sticky and slippery when wet; both are subject to compaction when moist. The sandstone soils tend to be more erosive than the basaltic soils. Soil depths can range from as little as 2 or 3 inches to as much as 60 inches; however, most are about 30 inches deep.

D. Climate

The Naneum Roadless Area is one of the more easterly locations with a uniform 25 inches of annual precipitation. This area is in the vicinity of Table Mountain in a rainfall zone of equal annual precipitation persisting over a relatively large area. Snow depth peaks at approximately 50 inches with the mean annual depth averaging 30 inches on March 1.

E. Vegetation

Fifty-two percent of this area is tentatively suitable forest land. This area supports an eastside, high, relatively dry vegetative type dominated at lower elevations by Douglas-fir and ponderosa pine. With increasing elevation, grand fir then Englemann spruce, lodgepole pine, and western larch replace Douglas-fir. Subalpine-fir is the most common species mixed with lodgepole pine on the higher elevation Table Mountain area. Both wet and dry meadows are interspersed in this area and support forbs and grasses developed through heavy use by both elk and domestic cattle grazing.

Some adjacent harvest areas were backlog reforestation problem areas. Severe pinegrass, sedge, domestic grass competition, and gopher damage were listed as the causes during a regional reforestation review. Shelterwood cuttings and reforestation with lodgepole pine and Englemann Spruce instead of Douglas-fir appears to have solved these problems on more recent harvest areas.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Snowmobiling	200
Horseback Riding	700
Hunting	1,000
Total	1,900

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Non-Motorized (SPNM)	2,946
Semi-Primitive Motorized (SPM)	3,965
Total	6,911

There are 13.8 miles of trail within the area and all are currently open to motorized use. The area trails are also very popular for horseback riders operating from Haney Meadows.

G. Appearance and Surroundings

The area has moderate visual variety in landforms, moderate to high variety in vegetation and rockforms, and moderate variety in waterforms (lakes and streams). Small streams and high elevation meadows have high visual variety as do Mission Peak and the adjacent ridgetops.

The area has a moderate-to-steep, broken, open textured landscape with interspersed rock formations. Fall colors occur on the contrasting ridgetops, and there is a high vegetative mix of conifers with meadows on moderate slopes and flat areas.

The area is primarily foreground and middleground when viewed from Liberty Beehive road, Mission Peak, Mission Ridge Ski Area, Naneum Point lookout, and the Naneum road. It is foreground from the few trails in the area.

The Naneum area is surrounded by the Liberty-Beehive road, the Chelan-Kittitas County line, the upper drainage of the Naneum basin, and Table Mountain.

H. Attractions

Major features are Naneum Creek and Meadows and Haney Meadow.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The Naneum roadless area is bordered on the west and north by Forest Service roads. The southeast portion of this area is "checkerboard" ownership and is identified by section lines. Prominent features in the area are Naneum Meadows and Haney Meadows. The remainder of the area is typically covered by dense stands of timber. The boundary is difficult to locate on the ground except where delineated by forest roads.

B. Natural Integrity

There are 13.8 miles of system trail in the area, consisting of portions of Trails 1381, 1389, 1372, and 1373. The Grouse Springs Road, a low-standard dirt road used mostly as a 4X4 route, bisects the area from north to south. There are fences around Haney and Naneum Meadows. All portions of the roadless area are within one mile of a road or trail.

The entire area is under a grazing allotment. Most of the area is covered by dense forest and relatively unaffected by management activities. The meadows are used by wildlife, and domestic and recreational livestock. Motorized use has largely been restrained in the meadows by fencing.

C. Natural Appearance

The dense forest contributes to the natural appearance of the area within a short distance of roads and trails. The dense vegetative screening readily absorbs the impacts of motorized and domestic livestock use in the area. Evidence of adjacent management is also well screened.

D. Opportunities for Solitude

The area receives moderate use by a variety of user groups. Horseback riding is a prominent use of the area, most often by small groups but with occasional use by large organized groups. Motorcyclists also use the area but seldom come in direct contact with other users.

Proximity to roads and trails along with multiple use on the trails minimizes the opportunities for solitude. Roads encircle the area and traffic can be heard from most locations. There is continued moderate use by both horseback riders and motorcyclists with occasional periods of heavy use. The lands surrounding this area attract a wide variety of recreation and management uses, thus drawing many people to this area as well.

E. Opportunities for Primitive Recreation

This roadless area has a low potential for primitive recreation. Topography and vegetation provide good screening; however, all points are close to the perimeter and are readily accessible. There is moderate diversity in the area and challenges are very limited. The primary types of primitive recreation occurring in the area are hunting and horseback riding, with lesser amounts of hiking and ski touring.

F. Challenging Experiences

The opportunities for challenging experiences are extremely limited. Uses of this area are typified by casual hiking, horseback riding, and motorized use. Hunters and touring skiers may find the area more challenging when using it in conjunction with adjacent areas thus increasing the distances traveled. The terrain lacks diversity and is too accessible to provide meaningful challenges in terms of distance or complexity. Opportunities for motorized winter use are very good. When considered with the adjacent lands, it provides both a large area and a long season for snowmobilers.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. No other threatened or endangered species have been found in the area. The extent of use in the area by sensitive species is unknown.

H. Historical and Scientific Study

A portion of this area is candidate for a Research Natural Area because it typifies high elevation lodgepole pine not currently represented in the RNA system.

Wilderness classification is not needed to accommodate the above.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in Potential Recreation Visitor Days Per Year</u>
SPNM	2,900
SPM	11,900
Total	14,800

B. Wildlife

The area is summer range for a large elk population and a small deer population. Black bear and grouse also make use of the area.

C. Fish

In this roadless area, the Naneum is the only major creek. Howard Creek and the main Naneum support cutthroat trout, which are probably all wild. Haney and Naneum Meadow have small populations of trout, although at times the creek almost goes dry.

Small portions of Pearson and Swift Creeks are also in the area, but probably have only minor cutthroat trout populations.

D. Water

There are no water related encumbrances or planned activities within the area.

E. Livestock

The eastern half of this area is within a portion of the First Creek Cattle Allotment. The western half is made up of four sections of checkerboarded private ownership. This portion along Mission Ridge is high elevation, with relatively steep topography and has little potential for allotments.

F. Timber

The area contains 3,604 acres of tentatively suitable forest land. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	1,484	42.1	7.7
Wet	Immature	1,526	27.4	5.0
Dry	Mature	276	3.5	0.6
Dry	Immature	318	3.1	0.6
	Total	3,604	76.1	13.9

The estimated maximum biological potential contribution to the long-term sustained yield is 1.2 MM Bd. Ft. (0.2 MM Cu. Ft.) per year.

G. Minerals

The area is primarily underlain by Miocene volcanic rocks (Columbia River basalts), but along the northern portion nonmarine sedimentary rocks of the Swauk formation outcrop on the surface. The area has not been investigated by the U.S.G.S. or U.S. Bureau of Mines, but available references indicate no known mineral resource occurrences of interest. The entire area is classified “prospectively valuable” for oil and gas and the north-half is classified “prospectively valuable” for coal resources. The area also has minor potential for the occurrence of gold resources, but direct evidence is lacking. It has also been nominated as an “area of critical mineral potential” through a Bureau of Land Management nomination process (Bee, 1983).

Even though the area has no proven mineral resources of a significant nature, there appears to be some interest in it. According to BLM mining claim recordation data, 173 lode claims and 2 placer claims have been located within or immediately adjacent to the area. Assessment work appears to have been maintained on most of these claims; however, it is not known whether the claims were located for known resources or in speculative response to the on-going activity near Wenatchee. Portions of the area have also been leased for its oil and gas resources, but it has not yet experienced any exploration drilling so its actual oil and gas potential is not known. There is no apparent interest in the area’s coal resource potential.

H. Cultural-Historical

The upper Naneum country, with its numerous meadows and open terrain, was once used by Indian groups in the collection of roots. There have been few cultural resource surveys of this area to determine actual archaeological distributions, but within undisturbed areas the potential is high for such occurrences. Historic uses have been minor, and relate primarily to cattle and sheep grazing.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is low with fuel loadings ranging from areas of heavy down accumulations of ground fuels to clean stands of lodgepole pine, and scattered alpine and sage meadow. Fire history consists of periodic fires of one to 20 acres in size.

K. Insects and Disease

Douglas-fir mistletoe is the most serious problem in this area. Both western spruce budworm and a related larch budworm were active in this area in 1976 prior to aerial spray programs.

L. Private Lands

The State of Washington owns 1,399 acres of land within the area.

In a nearly complete exchange with the State of Washington Department Natural Resources, the U.S. is trading out of T.21N., R.19E., W.M., Sections 28 and 32; T.20N. R.19E. W.M., Section 2 is also part of the trade.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located within 15 to 20 miles of the 393,360 acre Alpine Lakes Wilderness Area and south of the Mission Creek and northeast of the Lion Rock roadless areas respectively.

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through Wilderness classification.

D. Interest by Proponents, Including Congressional

Since the passage of the Washington State Wilderness Act of 1984, there has been no expressed interest for Wilderness classification for this area by proponents or Congressional factions.

However, there have been proposals by both environmental and off-road vehicle users to maintain roadless status for the area.

E. Public Input

Public input during the RARE II and other planning efforts was obtained and supported unroaded allocations. Of 734 responses, results were 86 percent for non-wilderness, 3 percent for further study, and 11 percent for wilderness.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area. There is a difference of opinion as to whether this should be motorized or nonmotorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Naneum roadless area consists of 6,911 acres located in north Kittitas County, east of Table Mountain.

The roadless area has been inventoried according to the Recreation Opportunity Spectrum (ROS). The inventory shows that the area has the ability to provide 2,946 acres of Semi-primitive, Non-Motorized, and 3,965 acres of Semi-primitive, Motorized use.

Alternatives E and F allocate 5,957 acres to Dispersed Motorized Recreation as an extension of that allocated in Mission Creek to the north. This allocation would shift the recreation emphasis to primarily motorized trail use of the area. The visual appearance would remain similar to the current situation. The intensity will increase, resulting in more frequent encounters with other users.

Alternative E also allocates 424 acres to Non-motorized Dispersed Recreation which would increase the access for horseback trail riders and hikers. This allocation would increase access to scenic vista points in the area.

All alternatives, except E, provide for a limited development campground allocation in the Haney Meadows area. This area is a commonly used departure point for horseback trail riding. Horse use would continue to be the primary trail use in this area in all alternatives except E and F. In these two alternatives, the allocation to motorized will shift use away from horseback riding and toward trail bike use.

Alternatives A/NFMA, B, D, G, H and I allocate essentially no areas for unroaded motorized or non-motorized recreation. The emphasis in B and D is an intensive Range Management which would provide for recreation opportunities that would blend with range improvements and development. Alternative A, G, H and J emphasize a blend of commodity/amenity values. Disposed recreation opportunities would be most compatible with this emphasis.

Alternatives C and I allocated a blend of emphasis with 67% of the area allocated to unroaded motorized recreation. The small trail system is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Grass Camp	1500	--	--	5.0
Howard Creek	1503	--	--	5.2
Old Ellensburg	1511	--	--	3.6
Totals		--	--	13.8

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semiprimitive Motorized and Semiprimitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	1	8	67	8	100	94	8	1	67	8

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	100/0	0/100	97/3	0/100	86/14	92/8	0/100	100/0	97/3	0/100

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with a more Roaded Natural or Roaded Modified setting.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate most lands to Partial Retention VQO. Some lands will be Retention and Maximum Modification VQO. The middleground view of the Liberty-Beehive travel route will be allocated to Maximum Modification.

Alternatives B and D allocate much of the land to Intensive Range Management. These lands will be heavily altered to provide maximum grasses for the animals. Most lands will be Maximum Modification VQO. The Liberty-Beehive travel route will be heavily altered. A small area is allocated to a Research Natural Area. These lands may be difficult to protect because the Intensive Range Management prescription surrounds the area. Alternative J allocates most of the area to big game habitat or intensive range management.

Alternatives C and I will allocate a large percentage of the area to Retention and Partial Retention VQO. Most areas will have Scenic Travel prescriptions. The Liberty-Beehive travel route will be Retention VQO. Trails in the area will be Partial Retention VQO. Most middleground view will be Partial Retention VQO.

Alternative E will allocate all lands to Preservation and Retention VQO. Scenic quality will dominate the landscape.

Alternative F will allocate all lands to Preservation, Retention and Partial Retention VQO. The Research Natural Area is surrounded by Dispersed Recreation, Unroaded Motorized allocations. These lands may need protection or trails to bypass the Research Natural Area.

Alternative G allocates all lands to Preservation, Retention, and Partial Retention. Most foreground trails will be Retention VQO. The middleground view will be allocated to Partial Retention VQO.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	530	--	530	530	530	530	--	--	530
Retention	2,883	466	4,982	466	6,381	6,212	1,759	2,883	4,982	275
Partial Retention	933	636	42	636	--	169	1,484	933	42	636
Modification	2,205	5,279	1,887	5,279	--	--	3,138	2,205	1,887	5,470
Maximum Modification	890	--	--	--	--	--	--	890	--	--
Total Acres	6,911	6,911	6,911	6,911	6,911	6,911	6,911	6,911	6,911	6,911

Preservation indicates that only natural ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road essentially all of the area but only emphasize timber management on 11 to 13 percent of the area. Alternatives B, D and J would road 92 percent of the area, have no General Forest allocation, but would have a range allocation on up to 63 percent of the area. Alternative J allocate 79 percent of the area to either big game habitat or intensive range management. Since the potential for conflict with elk management in the area from the range allocation is greater than that from the timber allocation, Alternatives A/NFMA, C, H, and I would rate better than B, D and J Alternatives G, and H would have similar impacts on wildlife. These impacts would be similar to Alternatives A/NFMA and H due to the amount of roads in the area. Alternatives E and F would have the least impact on wildlife. Alternatives C and I would have the next least impact with 75 percent of the area allocated to big game habitat, roaded and unroaded.

6. Fisheries

a. Significant Effects

In Alternatives E and F, all areas with fish populations in this roadless area would remain roadless. In the other alternatives, the stream and meadow areas with fish would be managed in a variety of different ways. Table (A) depicts these management prescriptions.

Roading these areas could change the recreational fishing opportunities, although the total mileage of streams in this roadless is quite small. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase slightly. This would help to meet a portion of the long-term fishing demand, but also could result in overfishing and reduction in both numbers and size of fish using the habitat. This would be of particular concern at both Haney and Naneum Meadows which have very small and possibly special populations of fish.

Roading the unroaded areas could also result in environmental degradation to streams due to timber harvest and road construction in the basins. Some of these possible effects are addressed in the soil and water environmental effects section.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September 1980 and revised October 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations. Any roads constructed near Haney and Naneum Meadows should be located and designed to help preserve the native fish populations at these sites.

TABLE (A). Allocation of management prescriptions in the Naneum Roadless Area in stream areas for Alternatives A/NFMA, B, C (Preferred), D, G, H, I and J. Where "Ext." is shown, this indicates that an extended shelterwood timber management prescription would dominate in that area and would be executed primarily to meet visual objectives. Where "RNA" is shown, this indicates that the area would be designated a Research Natural Area, and managed as such. Where "Big Game" is shown, this indicates that the management prescription would be to produce maximum appropriate forage for big game. And where "Range" is shown, this indicates that the principal management prescription would be to benefit domestic livestock. (M = mile)

Stream/River	Alternative			
	A/H	B/D/J	C/I	G
Naneum Creek	Lower 1 1/2 M: Big Game Upper 1 1/2 M: Ext.	All Range	All Ext.	All Ext.
Haney Meadows	All Ext	All Range	All Ext	All Ext.
Naneum Meadows	All Big Game	All RNA	All Range	All RNA

7a. Vegetation: Trees

As presently allocated under the Kittitas Land Use Plan, and proposed in Alternatives A/NFMA and H, most of the vegetation manipulation proposed for this area is for scenic travel or big game management.

Under Alternatives B and D the emphasis would switch from big game and scenic travel emphasis to intensive range management. Alternative J would emphasize big game habitat and intensive range management.

Alternatives C, I and G would eliminate any timber emphasis and increase big game habitat management over the current situation. They would also decrease the scenic travel retention area while slightly increasing the partial retention. Alternative C and I also allocate 3,307 acres (48 percent) to an unroaded big game habitat prescription.

All alternatives except A/NFMA, C, H and I would establish a 530 acre Research Natural Area. All alternatives except A/NFMA and E would propose to establish old-growth management areas. Under Alternative E, the entire area would be unroaded recreation with emphasis on motorized use.

7b. Vegetation: Forage

This roadless area contains portions of one or more livestock allotments. (See the Livestock writeup under General Information for this area) With the proposed vegetation manipulation in some alternatives, adequate forage will be produced for big game and livestock. This will affect the loss of forage due to natural succession and the exclusion of fire. Alternatives C, H, and I will contribute adequate forage. Forage in excess of expected needs will be produced in Alternatives A, B, and D. Needs for forage in the fourth and fifth decades will not be met for livestock in Alternatives E, F, and G.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Naneum Area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternatives E and F because soil and water disturbing activities would be minimal. Alternatives A/NFMA, H and J could allocate up to 100 percent of the area to timber harvest and road building. Alternatives B, D, and G allocate 92 percent of the area to potential roaded prescription. In Alternatives B and D, 76 percent of the area could be allocated to domestic livestock grazing. Alternatives C and I allocate 67 percent of the area to unroaded allocations. The environmental effects of timber harvest, road building, and livestock grazing on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource in this area increases with more timber harvest and road building activity. Alternatives A, B, D, G, H, and J pose more risk of degrading the soil and water resource than Alternatives C, E, F and I due to more intensive management. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are anticipated because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

The additional prescribed burning generated in the Naneum roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

As the previous discussion indicates, the area is encumbered by 173 lode claims and 2 placer claims, and it has been leased for oil and gas. Even though it has no known mineral resource occurrences, it is considered to have potential for the occurrence of gold and oil and gas, and it has been identified as an area of critical mineral potential. The management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e. special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions Alternative									
	A	B	C <i>Preferred</i>	D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	530	0	530	530	530	530	0	0	530
Highly Restrictive	975	657	4,685	657	6,381	6,021	657	975	4,685	647
Moderately Restrictive	5,046	445	2,226	445	0	360	5,724	5,046	2,226	3,370
Relatively Few Restrictions	890	5,279	0	5,279	0	0	0	890	0	2,354

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the DEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-Wide Standards and Guidelines.

	<u>Alternative</u>									
	A	B	C	D	E	F	G	H	I	J
			Preferred							
Miles	16	7	4	7	0	0	7	16	4	7

12. Fire

The fire management workload generated in the Naneum roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives E and F. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives A, B, C, D, H, and I. The cost efficiency of fire suppression activities would be slightly increased in Alternatives A, B, C, D, H, and I as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives E and F would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, each individual must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 13.4 jobs.

14. Wilderness Potential

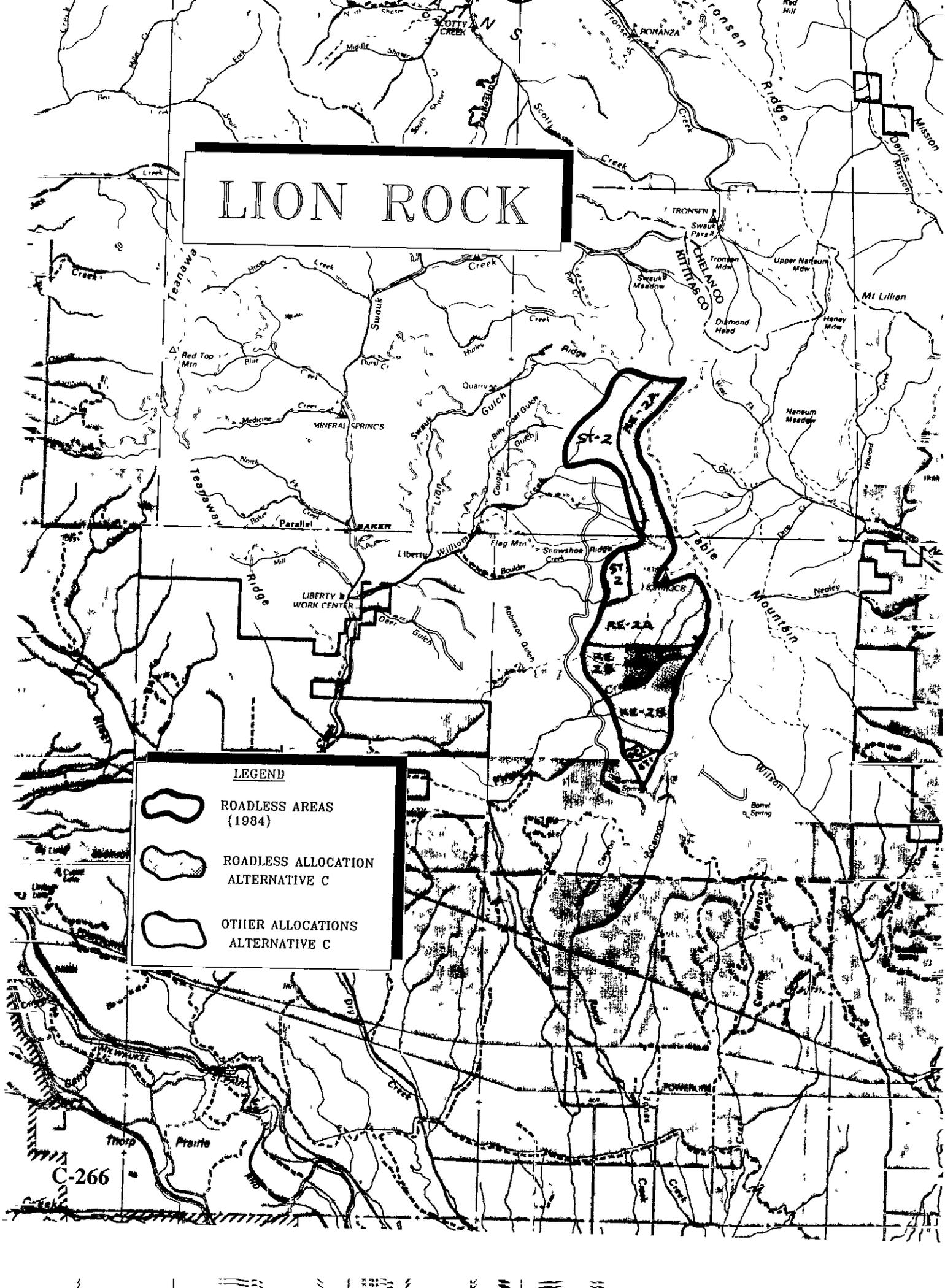
This roadless area has very limited potential for wilderness designation. The area has wilderness attributes but is small in size, only 6,911 acres. Alternatives A, B, D, G, H and J allocate very small acreage to unroaded prescriptions (1 to 8 percent). Alternatives B, D, and J allocate large portions to intensive range management. Under this emphasis, there would be extensive development of range improvements. Vegetation manipulation by livestock would be visible and apparent to recreation visitors. Reduction of the natural conditions would be moderate. Only Alternatives A and H allocate acres to General Forest and at 890 acres would not affect a large portion of the area. Alternatives C and I allocate 67 percent of the area to unroaded prescriptions with most of the acreage in unroaded big game habitat. Alternatives E and F would retain the entire area in unroaded, natural condition.

LION ROCK

LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

C-266



LION ROCK ROADLESS AREA

Size: Gross Acres: 5,470

Net Acres: 4,834

I. GENERAL INFORMATION

A. History

The area was inventoried and evaluated under RARE II as Area No. 6038 and was not recommended for wilderness. The area was not analyzed and considered as part of the Washington State Wilderness Act of 1984 process. Due to its limited size, the area was not classed as roadless during the initial stages of the current Forest Planning efforts. It is being re-addressed because interest for its unroaded character has recently been expressed.

B. Location

The area is located in Kittitas County on the Cle Elum Ranger District and is accessed primarily by the Table Mountain and Crystal Roads.

C. Physiography and Soils

This area follows along the western edge of the Table Mountain plateau. The tall basalt cliffs along this edge, along with the massive talus slopes below, are very striking and distinctive. Below the talus zone, the topography is undulating, but with an overall tilt towards the west. There are sag ponds and wet areas scattered throughout the area.

Elevations range from 3,300 to 6,000 feet. More than 90 percent of the soils have formed in basaltic material, and the remainder have formed in alluvium or else either pyroclastic or sandstone materials. Most of the area lies above 5,000 feet in elevation on a high plateau. The basaltic soils are mostly medium textured, and they often become slippery and sticky when wet. Soil depths for these soils range from about 20 inches to about 40 inches. Slopes on the top of the plateau range from about 3 to 115 percent.

D. Climate

This roadless area has a relatively narrow rainfall zone that ranges from 20-25 inches annually. The area is drier than the Naneum area with less snowfall. The estimated mean annual snow depth averages 25 inches.

E. Vegetation

Approximately 30 percent of this area is tentatively suitable forest land. Most of the area is classified as wet ecotype with Douglas-fir, grand fir, western larch, and ponderosa pine at lower elevations. At higher elevations, especially on flat benches, lodgepole pine is the predominate species.

Numerous wet areas and dry rocky areas support willow, ocean spray, serviceberry, and false hellebore.

Numerous wet areas and dry rocky areas support willow, ocean spray, serviceberry, and false hellebore. There are 1,590 acres of unsuitable forest land timber mapped in this area along the edge of Table Mountain. Large basalt rock flows are interspersed with alpine fir, western larch, and Douglas-fir timber stringers and pockets.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Motorized Trail Riding	200
Hunting	1,000
Total	1,200

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Motorized	4,834

There are 6.2 miles of trail within the area with all open to motorized use.

G. Appearance and Surroundings

The area has very high visual variety in landforms and rockforms, moderate to high vegetative variety, and low variety in waterforms (lakes and streams).

The area is dominated by steep talus basalt flows bisected with stringers of vegetation. A mixture of conifers and fall colors occur throughout the upper edges of the basalt flow.

The area is primarily foreground and middleground when viewed from the highly visible Table Mountain Road and the dispersed recreation areas along the scarp of the basalt flow.

The Lion Rock area is bounded by Table Mountain to the east and the upper reaches of First Creek, Boulder Creek, Cougar Gulch and ridges to the west, the upper Swauk Creek to the north and Garrison Springs to the south.

H. Attractions

The area is dotted with basalt features with various cliffs, formations, and talus slopes. The more prominent of these are Table Mountain to the east and Lion Rock itself.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The Lion Rock roadless area is bordered on the east by the Table Mountain Road #3500, on the south and west by the Crystal Road, and on the north by the Liberty-Beehive Road #9712. The Table Mountain Road follows prominent geographic features on top and is easy to locate on the ground. The remainder of the roads bordering the area are used for timber access in a meandering fashion. A small portion of the boundary, the northwest corner between Crystal Road and Road 9712, follows contour lines and the head waters of Williams Creek. This relatively short section of boundary is somewhat difficult to locate on the ground.

The roads bordering this area are a mixture of single lane paved, single lane gravel, and unimproved native material roads. As a result, the types of use and speed of travel vary widely along the area boundary.

B. Natural Integrity

The area is long and slender and nearly encircled by roads. As a result, access is readily available to all portions of the area. Trails #1374, 1368, 1224, and a 4X4 road dissect the area, leaving no point further than three-fourths of a mile from a road or trail. There are both rock pits and gold mines within the boundary of this area.

C. Natural Appearance

The area itself is natural appearing. There are many vantage points along the boundary and from within the area where management activities are visible in the middle ground or background, thus limiting the sense of isolation of this area to the visitor. There is approximately one mile of fence within the area

D. Opportunities for Solitude

The Lion Rock area provides somewhat limited opportunities for solitude because of the close proximity to trails and roads. The sights and sounds of human activities are common adjacent to and from within this area. The trails are used by horsemen, hikers, and motorcyclists. All of the area is grazed by sheep or cattle.

E. Opportunities for Primitive Recreation

The opportunities for primitive recreation are moderately low. There are few challenges and little diversity for the pedestrian user. Distance from the perimeter is short.

F. Challenging Experiences

There are many cliffs in the north and east portions of the area, with opportunities existing here for climbers. The remainder of the area does not provide significant opportunity for the visitor to practice self-reliance or develop wilderness skills.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. No other threatened or endangered species have been located in the area. The extent of use in the area by sensitive species is unknown.

H. Historical and Scientific Study

There is a potential opportunity for outdoor education and scientific or historic studies pertaining to prehistoric subsistence patterns of the Table Mountain area.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in Potential Recreation Visitor Days Per Year</u>
SPM	4,800

B. Wildlife

The area contains mule deer and elk summer habitat and supports a variety of small animals and birds including grouse.

C. Fish

Only First Creek is in this roadless area. This very small creek is probably used by a minor number of native cutthroat trout. Below the roadless area, the creek is occasionally dewatered by an irrigation diversion.

D. Water

There are no water related encumbrances or planned projects within the area.

E. Livestock

This small roadless area lays entirely within two domestic stock allotments. The north half is in the Table Mountain Sheep Allotment while the south half is part of the First Creek Cattle Allotment. All grazing resource potential for this roadless area is currently being managed through existing allotment plans.

F. Timber

The area contains 1,140 acres of tentatively suitable forest land. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	551	15.6	2.9
Wet	Immature	551	9.9	1.8
Wet	Seedling-Sapling	148	---	---
Dry	Mature	21	---	---
Dry	Immature	169	1.7	.3
	Total	1,440	27.2	5.0

The estimated maximum biological potential contribution to the long-term sustained yield is 0.50 MMBF (0.09 MMCF) per year.

G. Minerals

This area lies along the west edge of Columbia River basalts, and is underlain by both Miocene volcanic rocks and by Tertiary and Cretaceous nonmarine sedimentary rocks. The area has not been investigated in detail by either the U.S.G.S. or U.S. Bureau of Mines, but available references indicate there are no known mineral resource occurrence of interest in the area. The entire area is classified "prospectively valuable" for oil and gas; most of the area is classified "prospectively valuable" for coal resources; and the entire area was identified as an "area of critical mineral potential" in a BLM nomination process (Bee, 1983). Based upon geology and proximity to the Liberty Mining District to the west and Wenatchee Gold Area to the east, the area does have a moderate potential for the occurrence of gold deposits.

Even though the area has no proven mineral resources of a significant nature, there appears to be interest in it. According to BLM mining claim recordation data (1/23/85) there have been 193 lode claims and 4 placer claims located within or adjacent to the area which have had assessment work recorded through 1984. The area also lies within three oil and gas leases, however, there appears to be no interest in the potential coal resources of the area. Since the area has not been explored, it is not known if the claim-staking and leasing has been done in speculative response to mining and exploration conducted elsewhere or done in response to a knowledge of the area.

H. Cultural-Historical

This Unit encompasses an area of reported prehistoric use (travelways and food gathering) as well as recorded archaeological occurrences. The Lion Rock unit is also adjacent to and includes the eastern fringes of the former Swauk Mining District, some features of which are eligible for inclusion in the National Register of Historic Places.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is low with fuel loadings ranging from areas of heavy accumulations of ground fuels to clean stands of lodgepole pine and scattered alpine and sage meadow. Fire history consists of periodic fires of from 1 to 20 acres in size.

K. Insects and Disease

This area experienced heavy budworm defoliation in the grand fir/Douglas-fir stands in the 1970's. Mistletoe and phellinus root rot are also severe in these species. Up to 30 percent of the trees are dead as the result of these 3 damaging agents in the old growth grand fir/Douglas-fir stands. New sales in the area will emphasize clearcutting to eliminate heavy disease and insect losses in this area.

L. Private Lands

There are 636 acres of State lands within the area which are accessed by foot. Acquisition possibility is considered excellent.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located within 10 to 15 miles of the southeastern boundary of the 393,360 acre Alpine Lakes Wilderness Area and southwest and west of the Mission Creek and Naneum roadless areas respectively.

B. Distance from Population Centers

The area is reachable within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through wilderness classification.

D. Interest by Proponents, Including Congressional

Since the passage of the Washington State Wilderness Act of 1984, there has been no expressed interest for wilderness classification of this area by proponents or Congressional factions.

However, there has been interest expressed by environmental and off-road vehicle users to maintain roadless status for the area.

E. Public Input

Public input during the RARE II and other planning efforts was obtained and supported unroaded allocations. Of 763 responses, results were 84 percent for non-wilderness, 3 percent for further planning, and 13 percent for wilderness.

F. Other Public Involvement

Public input solicited during the formulation of alternatives for this plan indicated much support for dispersed, unroaded recreation use for the area. Opinion differs as to whether the allocation should be for motorized or nonmotorized use.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Lion Rock roadless area consists of 4,834 acres on the west side of Table Mountain in Kittitas County. The entire area was inventoried according to the Recreation Opportunity Spectrum (ROS) as Semi-Primitive Motorized. Due to the area's small size, the allocations do not vary significantly from one alternative to another, except for A and H which do not allocate any portion of the area to recreation use. In these alternatives, natural appearance would be altered by harvest activities. In the remaining 7 alternatives, the allocation to motorized dispersed recreation ranges from 70 to 100 percent.

Under Alternatives C and I, the portion of the trail system in this roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Ridge	1352	--	2.0	--
First Creek	1374	--	--	4.2
Totals		--	2.0	4.2

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. (These represent the Semiprimitive Motorized and Semiprimitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.)

Percent of the Area Having Unroaded Allocation

Alternative	A	B	C	D	E	F	G	H	I	J
	0	80	74	80	100	94	94	0	74	80

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A	B	C	D	E	F	G	H	I	J
	0/0	100/0	100/0	100/0	94/6	100/0	100/0	0/0	100/0	100/0

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with a more roaded natural or roaded modified setting.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A and H will allocate most of the land to Partial Retention VQO. The middleground view from the Table Mountain travel route will be slightly altered. A majority of the area is steep talus rocks and slides with high scenic value.

Alternatives B, D and J will allocate the highly scenic talus rocks and slides to Retention VQO. Most areas just outside of the area will be allocated to Maximum Modification. Table Mountain viewshed will be slightly altered.

Alternatives C and I will allocate most of the talus rocks and slides to Retention VQO. The majority of the area will have high scenic quality. Some areas along the lower elevations will be allocated to Maximum Modification. Table Mountain viewshed will be slightly altered to natural appearing.

Alternative E will allocate all the scenic rocks and slides and adjacent timbered land to Retention VQO. Scenic quality will be preserved.

Alternative F will be allocated to Retention to Partial Retention VQO. Scenic quality will be very high. Table Mountain viewshed will retain its scenic qualities.

Alternative G is the same as Alternative F. Natural landscape will dominate the area. Scenic qualities will be retained as viewed from Table Mountain viewshed.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	Alternative									
	A	B	C	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	742	3,923	3,794	3,923	4,834	4,664	4,685	742	3,974	3,923
Partial Retention	3,477	21	1,040	21	--	170	149	3,477	1,040	21
Modification	509	21	--	21	--	--	--	509	--	21
Maximum Modification	106	869	--	869	--	--	--	106	--	869
Total Acres	4,834	4,834	4,834	4,834	4,834	4,834	4,834	4,834	4,834	4,834

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A and H would road all of the area but allow for timber harvest emphasis on only two percent of the area. Alternatives B, D and J would road 20 percent of the area and allow for timber harvest emphasis on 18 percent of the area. Alternatives B, D and J would also allow for development of off-road vehicle use on 80 percent of the area. The overall effect of the four alternatives mentioned above on wildlife resource in this area are similar. Alternatives C and I would also have effects on wildlife habitat that are similar to A, B, D, H and J. Alternative E would have minimal impact on wildlife resources in this area. Alternatives F and G would have somewhat more impact than E but less than the other alternatives.

6. Fisheries

a. Significant Effects

There is only one creek in this roadless area, First Creek, and it has very low numbers of native cutthroat trout. In Alternatives B, C, D, E, F, G, I and J the area would remain roadless. In Alternatives A and H, the lower one-half mile of the stream vicinity would be managed using primarily extended shelterwood timber harvest methods to maintain the visual objectives of the area. The upper one-half mile of stream area would be managed to produce maximum appropriate forage for big game.

In the alternatives that would road the area near the creek, it is unlikely that there would be any significant effects on the stream since only a one mile reach would be affected.

b. Mitigation Measures

In the alternatives that could road the First Creek area, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September 1980 and revised October 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied to protect any fisheries value discovered during project planning.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Under all alternatives it is expected that more area will remain unroaded than is roaded. The range of tree management activities is from 869 acres (18 percent) scheduled for timber emphasis in Alternatives B, D and J, to no scheduled harvest in Alternative E.

Alternatives A and H have 106 acres (2 percent) timber emphasis and an additional 4,474 acres of vegetation manipulation with other resource emphasis planned. However, much of this area is rocky, unsuitable forest area and would not be logged under any of the alternatives.

Alternatives C and I have identical acre allocations. Both have 1,210 acres which would be managed for other resource values that permit vegetative manipulation through timber sales. The primary difference between Alternatives C and I is the rate of harvest. Under Alternative I, more harvest activity would be scheduled in the first decade.

Alternatives F and G do not allocate any acres to timber emphasis. However, they do anticipate vegetative manipulation through timber sales on 275 acres or 6 percent of the area.

7b. Vegetation: Forage

The potential for production and utilization of forage in this small roadless area is currently being realized. The area is within portions of two existing livestock allotments and the roadless nature has no significant effect on the forage base. There is no difference in alternatives as to effects they have on the vegetative environment due to size of the area and vegetation types occurring in the area.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Lion Rock area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternatives C, E, F, G and I because soil and water disturbing activities occurring would be minimal. Alternatives B, D and J could allocate up to 20 percent, and Alternatives A and H could allocate up to 100 percent of the area to timber harvest and road building. The environmental effects of timber harvest, road building, and livestock grazing on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building activity. Alternatives A and H pose more risk of degrading the soil and water resource than Alternatives B, C, D, F, G, and I due to more intensive management. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

There will be little additional prescribed burning generated in the Lion Rock roadless area as a result of the alternatives. This would not have significant effects on air quality beyond those discussed in Chapter IV.

10. Minerals

As the previous discussion indicates, the area is encumbered by 193 lode claims, 4 placer claims, and 3 oil and gas leases. Even though it has no known mineral resource occurrences, it is considered to have potential for the occurrence of gold, coal, and oil and gas, and it has been identified as an area of critical mineral potential. Since none of the alternatives call for withdrawing any part of the area from mineral entry, the consequences on mineral resources do not appear to be extremely significant nor do they vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C Preferred	D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	360	3,944	3,688	3,944	4,834	4,558	4,579	360	3,688	3,944
Moderately Restrictive	4,368	0	1,146	0	0	276	255	4,368	1,146	1,526
Relatively Few Restrictions	106	890	0	890	0	0	0	106	0	890

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A/NFMA	B	C Preferred	D	E	F	G	H	I	J
Miles	6	3	1	3	0	0	0	6	1	3

12. Fire

The fire management workload generated in the Lion Rock roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. This is, that because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, each individual must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

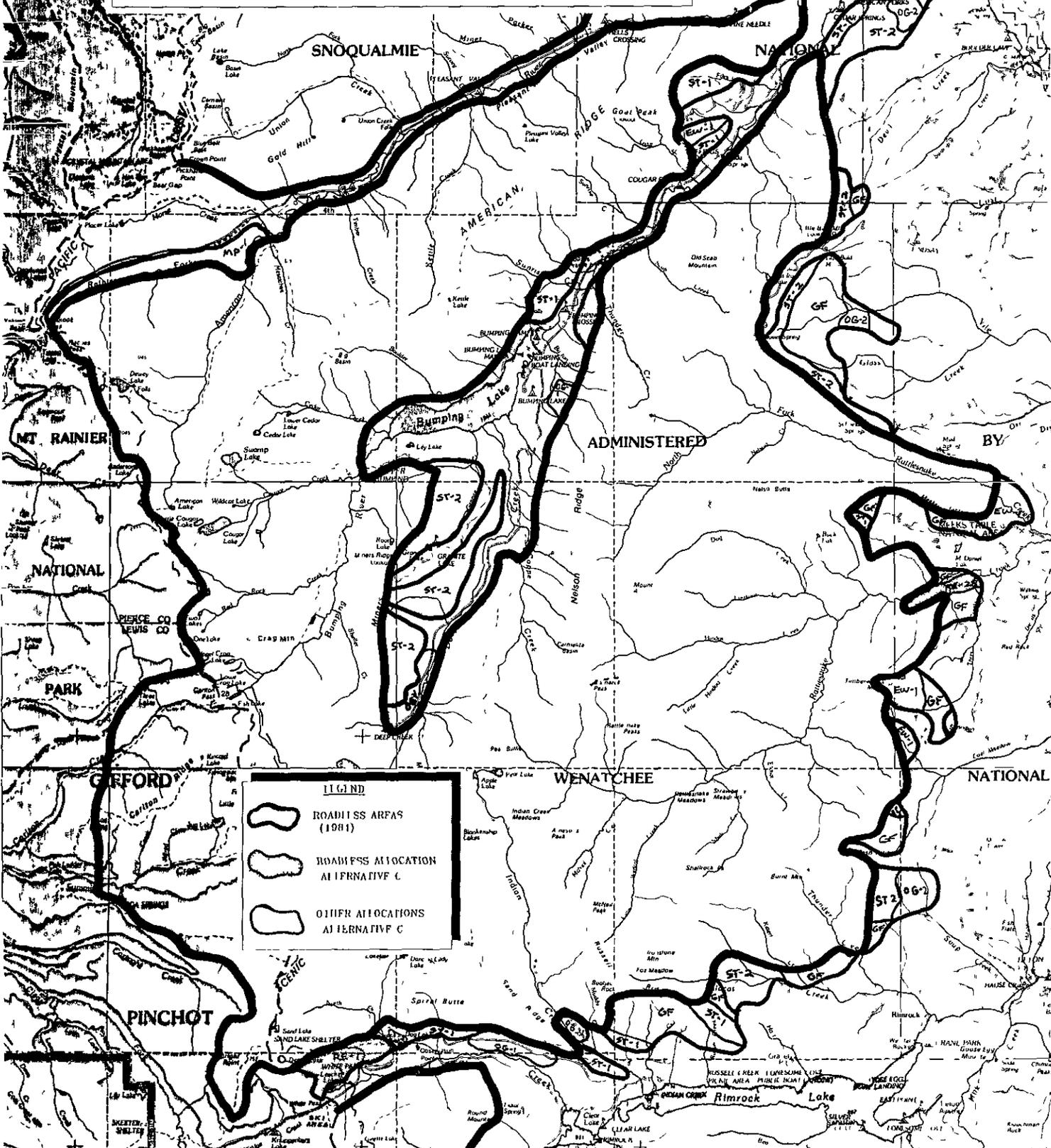
A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 6.0 jobs.

14. Wilderness Potential

This unroaded area has high recreation value as an unroaded area but at 4,834 acres in size and isolated from existing wilderness, it has little potential for wilderness.

Alternatives A and H retain no unroaded acres. Alternatives B, D, J, C, and I retain 71 to 80 percent of the area as unroaded. Alternatives E, F, and G retain almost all of the area as unroaded. Alternatives B, D, and J prescribe 869 acres to General Forest. All other alternatives emphasize a balance of resource values with no General Forest. Wilderness characteristics will receive a high level of retention in all alternatives except B, D, and J.

WILLIAM O. DOUGLAS ADJACENT



LEGEND

-  ROADLESS AREAS (1981)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

WILLIAM O. DOUGLAS ADJACENT ROADLESS AREA

Size: Gross Acres: 22,938

Net Acres: 22,938

I. GENERAL INFORMATION

A. History

This is adjacent to an area that has historically been advocated for wilderness. The original area was studied under RARE II as D6032 which was peripheral to the Cougar Lakes wilderness proposal areas. It was not recommended for wilderness. The entire area was inventoried as roadless in the fall of 1983. It consisted of the old RARE II areas C, D, and E6032 and was called Cougar Lakes. It was these three areas that were involved in various wilderness proposals including RARE II, Pritchard-Lowery, and President Carter. The majority of the area (146,451 acres) became wilderness under the Washington State Wilderness Act of 1984. The area was renamed William O. Douglas in honor of the late Supreme Court Justice who roamed the area throughout his life.

B. Location and Access

The remaining roadless area is made up of small parcels scattered along the new William O. Douglas Wilderness boundary and are accessed via Highways 410 and 12 and the Bethel Ridge, Bumping, and Nile Loop roads.

C. Physiography and Soils

The topography ranges from gentle to steep; the slopes are mostly convex and uniform. These units are small and scattered, but none are particularly striking. Generally, these units all lie on the lower slope positions.

Elevations range from 3,300 to 6,200 feet. About 50 percent of the soils have developed in basaltic materials, 20 percent in pyroclastic materials, 15 percent in granitic materials, 10 percent in glacial till, and the balance in alluvial materials. The basaltic and the pyroclastic materials tend to become slippery and sticky when wet and are easily compacted when moist. The granitic, glacial till, and alluvial materials, on the other hand, are usually not slippery or sticky when wet. These materials will also compact, but not as easily. Soil depths generally range from 20 to about 40 inches; however, the alluvial soils are often more than 60 inches deep.

D. Climate

The roadless area(s) lies in an approximate 45-90 inch precipitation zone. It experiences an average snow depth of nearly 136 inches annually with an estimated 56 inches of water equivalent.

E. Vegetation

As this area includes scattered parcels all along the east side of the William O. Douglas Wilderness, vegetation is variable. Areas near the crest, such as the White Pass-Dog Lake area, are climax mountain hemlock, Pacific silver fir, alpine fir and Alaskan yellow cedar. The other extreme in vegetation is the low elevation, dry, rocky, river bottom area below the confluence of the Bumping and American Rivers. This area is open ponderosa pine, Douglas-fir with an understory of pine grass, and pine mat, ceanothus, and Kinnikinnick. Tentatively suitable forest land occupies 62 percent of these scattered parcels.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Hunting	6,000
Motorized Trail Riding	1,000

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Non Motorized (SPNM)	10,980
Semi-Primitive Motorized (SPM)	11,958
Total	22,938

There are 17.7 miles of trail within the area of which 3.8 miles are not currently open to motorized use

G. Appearance and Surroundings

This area has moderate visual variety of landform, vegetation, rockform and waterforms (lakes and streams).

The area is a highly textured hillside, with a variety of vegetative patterns. The patterns are created by a large variety of species of mixed conifers, dense drainage bottoms, rocky ridges with some basalt rocks, and rock formations along the ridgetops of side drainages.

The area is primarily viewed as foreground and middleground from trails that lead into the William O. Douglas Wilderness; the Bumping Road, Mather Memorial Parkway (Hwy 410), Little Bald Mountain, White Pass (Hwy. 12), and other Forest roads.

The Cougar Lakes portion is bounded by the William O. Douglas Wilderness to the west, and a narrow area on the upper end of the drainage adjacent to the William O. Douglas Wilderness to the east. These roadless areas are narrow fringes of the unroaded areas adjacent to the William O. Douglas Wilderness.

H. Attractions

Main features are Dog and Granite Lake, North and South Fork of Rattlesnake Creek, and Indian Creek.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The many segments of the William O. Douglas Adjacent roadless area border the William O. Douglas Wilderness. Only the Devil's Rim segment offers a good opportunity to be managed as a roadless area. This unit has well defined boundaries and is isolated from man's activities. Most of the other segments are bordered by forest roads and timber harvest units and would be difficult to map and find on the ground. Obviously this is one of the reasons they were excluded from the classified wilderness.

The segments referred to as the Rainier Fork of the American River and part of the Devil's Rim within the Mather Memorial Parkway are managed for their recreation and scenic resources.

As these areas are scattered and diverse in some aspects, the natural integrity and natural appearing characteristics are being addressed by each small area.

B. Natural Integrity

Much of the William O. Douglas Adjacent roadless area outside of the William O. Douglas Wilderness are protrusions paralleled by forest roads and harvest units, and were excluded from the Washington State Wilderness Act of 1984. There are segments that have motorized trails specifically mentioned in the Act that would remain open to the usage and enjoyment of motorized visitors. This would indicate that some of the segments would no longer be considered as roadless non-motorized or future wilderness. Some of the protrusions are very scenic and would make desirable roadless areas.

Rainier Fork of the American River. There has been little impact of human activity in this segment except a very primitive mine-to-market road which is used occasionally by motorized vehicles. State Highway 410 is very visible on the north side of this segment and is very apparent from the entire roadless segment.

Chipmunk Creek Drainage. This area is adjacent to a forest road and timber harvest units. Most of the roadless area views the activities of man; however, a small portion of this segment above Soda Springs Campground has scenic rugged cliffs used regularly by mountain goats.

Miners Ridge. This segment is bordered and dissected by forest roads, with man's activities viewed from much of the area. There are a number of early mining activities within these segments. Motorized vehicle travel to the many unpatented mining claims on an old mine-to-market road continues to this day.

Devil's Rim. This segment is bordered by forest roads and timber harvest units. The Little Bald Mountain Trail #961, which is in this segment, was specifically mentioned in the Act as a motorized vehicle trail. It was constructed with funds from the Interagency Commission for Outdoor Recreation. The area below Devil's Rim is unroaded and provides an island for wildlife escapement. The segment west of Thunder Creek is heavily roaded with primitive woodcutter roads, drill site holes, and an access road for the proposed Bumping Lake Dam Enlargements.

Upper Nile. This segment has four-wheel-drive routes specifically mentioned in the Washington State Wilderness Act of 1984 as places where motorized vehicle use would continue. This segment is bordered by forest roads and timber harvest units. On high points within this segment the activities of man are evident.

Meeks Table. This segment is east of Meeks Table Research Natural Area. Within this segment the activities of man can readily be seen. There is little vegetation to screen man's activities from the Forest visitor.

Rattlesnake. Part of this segment includes the Rattlesnake Four-Wheel-Drive Route where a corridor was retained for continued motorized vehicle use in the Washington State Wilderness Act of 1984. This segment is bordered by Forest roads and timber harvest units. The other part of this segment lies north of Timberwolf Mountain and is heavily modified by fire as a result of early range burning. Many of man's activities can be seen from most of this segment. Timberwolf Mountain roaded observation site and former lookout location exist on the highest point of this segment.

MJB. Most of the area adjacent to this segment was classified as wilderness. These remaining segments were considered unmanageable as wilderness. This segment is bordered by forest roads used primarily by recreationists, wood cutters, and occasional timber harvesters.

Cash Prairie - Wildcat. These segments are bordered by Forest roads and timber harvest units and there are motorized vehicle routes within it. An operating Mercury Mine in the Wildcat has primitive road access to it and continues to operate.

White Pass. This segment has a patented mining claim with road access to it and a cross country ski trail that is groomed with a motorized trail groomer. Much of the area is under special use permit to White Pass Company, Inc., for cross-country skiing. A powerline with road access is within this segment.

C. Natural Appearance

To maintain continuity the many segments of the William O. Douglas Adjacent roadless area will be referred to by area.

Rainier Fork of the American River. This segment appears to be very natural. But when looking out from the roadless area, the impact of State Highway 410 makes the visitor feel like a person is in a very unnatural and developed environment.

Chipmunk Creek Drainage. From most of this area, one views Forest roads and timber harvest units; however, a small portion of this segment overlooking Soda Springs Campground is natural appearing. These rugged cliffs frequented by mountain goats reinforces a feeling of naturalness.

Miners Ridge. This area is fragmented by road penetration and mining activity. The views into this roadless segment are fairly scenic, but Forest roads are evident to the visitor looking out from the roadless area because the area is so small. The sound of motorized vehicles on the Forest roads is audible within most of the roadless area.

Devils Rim. This segment is divided into three pieces. The area west of Thunder Creek is heavily roaded with primitive roads and appears modified by man's activities. The area north of Little Bald is exposed to roads and timber harvest units but it has some scenic alpine meadows that suggest a feeling of naturalness. The area below Devil's Rim that borders the Bumping River appears near natural.

Upper Nile. Although this area is bordered by roads and timber harvest units, the activities of man are usually seen only from high points within the roadless area. The dense vegetation adds to the naturalness of the area.

Meeks Table. There are very few places within this segment that do not allow views of man's activities. Sparse vegetation and the smallness of these segments contribute to the unnaturalness of the area.

Rattlesnake. Most of the roads and timber harvest units adjacent to this segment can be viewed from the roadless area, greatly reducing any feeling of naturalness. Timberwolf Mountain observation site offers unique views into the wilderness.

MJB. These segments of roadless area are so small that adjacent activities of man are very noticeable to the visitor inside the roadless area.

Cash Prairie - Wildcat. In the very heart of the Wildcat there is the feeling of naturalness, but much of this segment looks out towards adjacent activities of man including State Highway 12, Rimrock Reservoir, Bethel microwave tower, and many Forest roads and timber harvest units.

White Pass. This segment looks out on the White Pass Ski Area, State Highway 12, and the REA Powerline. Few places within this roadless segment appear to be natural to the forest visitor. White Pass is a popular Cascade Crest light aircraft crossing area. The sight and sound of low flying planes and helicopters is common.

D. Opportunities for Solitude

Because of the small segments of land included in the William O. Douglas Adjacent roadless area, there are few opportunities for solitude. In many cases, roads have penetrated deeply into these segments lowering the opportunity for solitude. Of the many segments, Devil's Rim, Upper Nile, and Wildcat offer some solitude opportunities. These are the largest segments and because of topography and vegetation, they can screen people from one another at short distances.

E. Opportunities for Primitive Recreation

Most of the segments of this roadless area are very small and offer few opportunities for primitive recreation except for day use, and big game hunting for elk and deer. Devil's Rim, Upper Nile, and Wildcat offer better opportunities for big game hunting, hiking, backpack camping, and scenic viewing. The Rattlesnake segment provides goat viewing at Timberwolf Mountain lookout site.

F. Challenging Experiences

Opportunities for primitive recreation and challenging experiences are limited because the many segments of the William O. Douglas Adjacent roadless area are isolated protrusions surrounded by activities of man. The dense vegetation and irregular topography of the Devil's Rim, Upper Nile, and Wildcat would offer some challenge to the inexperienced.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. No other species of threatened or endangered wildlife have been found in the area. Use by sensitive species is unknown.

H. Historical and Scientific Study

There are no special or unique opportunities for outdoor education, and scientific or historic study in the area, which cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities. Estimated carrying capacity by ROS Class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
SPM	11,000
SPNM	<u>35,800</u>
Total	46,800

B. Wildlife

Major big game species such as elk, mule and black tail deer, and black bear are found in the area, as well as mountain goat which inhabit the areas of Timberwolf Mountain, Mt. Aix, and American Ridge.

Blue grouse and ruffed grouse are among the game birds in the area.

C. Fish

This area encompasses only very small portions of a number of stream systems. Granite Creek produces substantial populations of native wild cutthroat trout and a small population of non-native Eastern brook trout.

The portions of the North and South Forks of Rattlesnake Creek within the area have some potential to be used by anadromous fish, but probably do not at this time. Downstream of their intersection, there is anadromous fish use. There are productive populations of resident trout in both forks.

Wildcat Creek has a small population of cutthroat trout.

Dog Lake has Eastern brook trout and rainbow trout which are both stocked. There are very few wilderness fishing qualities because of its vicinity to U.S. Highway 12.

D. Water

A potential impact to the William O. Douglas Adjacent areas "DD" and "DE" exist if a proposed small hydroelectric project is constructed on Rattlesnake Creek.

This roadless area currently is encumbered by an Executive Order dated 2/20/23 that designated the Rattlesnake watershed to be managed by the Forest, but protected it from potential land exchange and mining activity. The intent of President Harding's E.O. was to protect the City of Yakima's water supply. This affects all adjacent roadless area lands that are located within the E.O. designated area of the Rattlesnake drainage basin.

Recently, the City of Yakima filed a preliminary permit application with the Federal Energy Regulatory Commission to study an area within the Rattlesnake drainage contemplating construction of a small, hydroelectric project. The proposed project could affect portions of Sections 9, 10, and 11; T15N, R14E WM. Information currently available is conjectural regarding the impact that this proposal would have on the roadless area. The probability of construction is unknown at this time.

There is also a proposed watershed withdrawal by the City of Yakima dated January 20, 1964, that either affects portions of this roadless area or land immediately adjacent to them.

E. Livestock

This roadless area is now made up of 10 to 15 small roadless parcels adjacent to the William O. Douglas Wilderness. All are now within portions of various recreation and livestock allotments. The grazing potential is currently being realized as part of eight inventoried allotments, four of which are recreation and four domestic.

F. Timber

The area contains 14,140 acres of tentatively suitable forest land. Stand, volume and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	8,268	234.3	43.0
Wet	Immature	4,345	78.1	14.3
Wet	Seedling-Sapling	211	----	----
Dry	Mature	658	8.2	1.5
Dry	Immature	616	6.1	1.1
Dry	Seedling-Sapling	42	----	----
	Total	14,140	326.7	59.9

The estimated maximum biological potential contribution to the long-term sustained yield is 4.6 MMBF (0.8 MMCF) per year.

G. Minerals

The parcels are primarily underlain by Tertiary volcanic and by Tertiary intrusive igneous rocks of granitic composition. The area adjacent to these parcels has been investigated by the U.S.G.S. and U.S. Bureau of Mines as part of their study of the William O. Douglas Wilderness Area. As a result of their study, they only identified one area near the subject parcels which has a "probable" mineral potential. This is the Miners Ridge area lying south of Bumping Lake. The parcels do, however, lie within a north-northwest trending metallogenic province which includes the Morris Creek-American Ridge, Copper City-Deep Creek, Bumping Lake, Rattlesnake, and Wildcat-Indian Creek mineral potential areas (see Figure III-14 in the DEIS). The minerals of interest occurring within this area include copper, gold, silver, molybdenum, tungsten, mercury, and manganese.

Of much interest are those parcels lying within the Copper City-Deep Creek or Miner's Ridge area which have potential for the occurrence of tungsten, and a copper-molybdenum deposit. Those parcels lying within the other areas identified on Figure III-14, however, also have inadequately investigated potentials for similar commodities, as well as, for mercury, manganese, and iron. Based upon BLM mining claim recordation data (1/23/85), there does not appear to be a lot of interest in the subject lands. That data indicates that only nine lode claims and three placer claims have been located on the roadless area parcels, and these have been in the Bumping Lake and Rimrock Lake areas.

Most of the area has been classified "prospectively valuable" for geothermal resources, while only a small area around the headwaters of Nile Creek have been classified "prospectively valuable" for oil and gas. Interest in the areas' geothermal resource potential is indicated by eight pending applications. Even though the area has little apparent oil and gas potential, the subject lands have either been leased as part of six existing leases or are involved in one of 12 pending applications. Without the benefit of exploration results the actual potential for the development of these two commodities remains unknown.

H. Cultural-Historical

There are few known historic sites and no recorded prehistoric sites within the small, scattered parcels of the William O. Douglas Adjacent units. Historically, the area was peripheral to the developments along the Naches and Tieton River valleys to the east, as well as to the Summit and Bumping Lake Mining Districts to the west. However, the long-term use of the Cougar Lakes area for livestock grazing and fur trapping is undoubtedly represented by currently undiscovered cultural resources.

There was intensive prehistoric use of the area to the east and west of the William O. Douglas units. Major camps were established along the Naches River and its major tributaries by ancestors of the Yakima Indians. From these base camps, regular and patterned excursions were made to hunt and trap, to collect vegetable foods (roots, berries and medicinal plants), to obtain specific lithic materials, and/or to travel via the passes and divides to neighboring Indian camps and villages. There was also a great spiritual attachment to the land; prominent landform features and areas of particular aesthetic beauty or resource abundance were likely to have held a special religious significance for the American Indians. Further field examination, based on landforms and exploitable resource distributions, as well as continued cooperation with the Yakima Nation, is vital to our understanding and appreciation of the cultural significance of this area.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is low with most fires caused by lightning. Fuel loadings are heavy down accumulations at lower elevations, and scattered meadows and clumps of trees at higher elevations. Fire history is primarily small, isolated fires with some periodic larger fires occurring.

K. Insects and Disease

Mountain pine beetles have killed large volumes of western white pine in the Bumping and Clear Lake areas. Root rots also have killed scattered pockets of Douglas-fir and grand fir in most of the lower elevation areas. Entomologists expect the spruce budworm to spread through the Douglas-fir and grand fir dominated stands below 5,000 feet elevation.

L. Private Lands

There are no private lands within the area.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

These areas are located immediately adjacent to the 167,195 acre William O. Douglas Wilderness area.

B. Distance from Population Centers

The area is within two to four hours driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through wilderness classification.

D. Interest by Proponents, Including Congressional

These scattered segments were left out of the classified wilderness because they were considered to be insignificant and/or unmanageable by the Congressional delegations. There was, and still is, some interest by interested individuals to keep the Miners Ridge, Upper Nile, and Devil's Rim segments unroaded. There is interest in the White Pass segment to expand the existing White Pass Ski Area into this roadless area for a higher density cross-country, machine packed, ski trail system.

Environmental organizations have expressed interest in adding portions of the area to the National Wilderness Preservation System in the future.

There is interest in the Miners Ridge and Wildcat segments for mining. There are several unpatented mining claims at the present time.

Off-road vehicle enthusiasts favor unroaded status for parts of Devil's Rim, Upper Nile, and Wildcat segments. Most of the William O. Douglas Adjacent roadless segments are of interest to the local timber industry for saw timber.

E. Public Input

Public input during RARE II and at Forest Plan meetings reflect the same interest as mentioned under IV-D. RARE II response from 5,601 people showed 64 percent for non-wilderness, one percent for further planning, 17 percent for wilderness with boundary adjustment and 18 percent for wilderness as inventoried. There was and still is interest to enter the roadless area for activities other than those compatible with roadless classification.

F. Other Public Involvement

In scoping timber sale plans with interested parties and other agencies, there appears to be interest in keeping the Miners Ridge, Devil's Rim, Upper Nile, and Rattlesnake segments roadless. Most would prefer roadless motorized but, in the case of Miners Ridge, they would prefer roadless unmotorized. None of the sales adjacent to the roadless segments have been appealed to date.

V. ENVIRONMENTAL CONSEQUENCES ASSOCIATED WITH THE ALTERNATIVES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

Alternatives B, D and J would not allocate any of the area to unroaded management. Under these alternatives the area would be entered for harvest. The area would lose its pristine character and present a roaded modified forest setting to the recreation user. All existing trail systems will be left intact but portions of trails will be crossed by roads.

Alternatives A, C, E, F, G, H, and I would allocate varying portions of the William O. Douglas Adjacent roadless area to roadless management objectives. Alternative C provides for 191 acres of Unroaded Semi-primitive, Motorized setting. Alternatives E, F, and G provide for the same Unroaded Semi-primitive, Motorized opportunities as Alternative C. Alternatives F and G provides for 1,187 acres of Unroaded Semi-primitive, Non-motorized Recreation opportunities in the Devil's Rim area. Alternative E provides 21,412 acres of Unroaded Semi-primitive, Non-motorized Recreation opportunities. This alternative allows for the maximum roadless recreation opportunities and wilderness potential.

Under Alternatives C and I, the portion of the trail system in this roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Wild Cat Creek	1113	1.4	--	1.4
American Ridge	958	2.0	--	2.0
Little Bald Mtn	961	--	--	10.1
Mt. Aix	982	0.4	--	0.4
Totals		3.8	--	13.9

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semi-primitive Motorized and Semi-primitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C Preferred	D	E	F	G	H	I	J
	3	0	1	0	100	11	6	3	1	0

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C Preferred	D	E	F	G	H	I	J
	0/100	0/0	100/0	0/0	1/99	65/45	14/86	0/100	100/0	0/0

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with a more roaded natural or roaded modified setting.

2. Wild, Scenic, and Recreational Rivers

A portion of the following river corridors (one-quarter mile either side of the river) is being located within this roadless area and is recommended for designation in Alternatives C and I:

<u>River</u>	<u>Recommended Classification</u>
American River	Segment 2 Scenic

More information concerning this recommendation can be found in Chapter III and Chapter IV.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A and H allocate much of the area to Retention and Partial Retention VQO. The Bumping Lakes viewshed will be allocated to Retention VQO. The Middleground view will be allocated to Maximum Modification VQO. Most of the area along the trail will have high scenic quality.

Alternatives B, D and J will allocate most of the area to Maximum Modification. A very high percentage of the area adjacent to the wilderness will be heavily altered. The Bumping Lake viewshed will be Maximum Modification. Unnatural landscapes will dominate the area.

Alternatives C and I will allocate approximately two-thirds of the area to Retention and Partial Retention. Most trails will have some scenic quality. Most foreground will have a Partial Retention VQO. Outside of the foreground areas, the land will be heavily altered. The area adjacent to Meeks Table will be Maximum Modification. Bumping Lakes viewshed will have high scenic quality.

Alternative E will allocate all lands to Retention VQO. Scenic quality will be at a very high level. Natural appearing landscape will dominate the landscapes.

Alternative F will allocate most of the land to Retention and Partial Retention VQO. Bumping Lakes viewshed and other trails will have high visual quality. A few areas outside of the foreground area will be heavily altered.

Alternative G will allocate most lands to Retention and Partial Retention VQO. The Bumping Lakes viewshed is allocated to Retention VQO. Most middleground will be Partial Retention VQO. A few areas in the middleground views will be heavily altered. A slightly altered condition will be the overall middleground view.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	C Preferred	Alternative		F	G	H	I	J
				D	E					
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	17,829	5,194	8,225	5,194	22,874	16,853	16,854	17,829	8,225	3,032
Partial Retention	657	1,717	7,950	1,717	--	4,452	4,452	657	7,950	3,815
Modification	--	572	1,569	572	64	64	445	--	1,569	1,526
Maximum Modification	4,452	15,455	5,194	15,455	--	1,569	1,187	4,452	5,194	14,565
Total Acres	22,938	22,938	22,938	22,938	22,938	22,938	22,938	22,938	22,938	22,938

Preservation indicates that only natural, ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A, C, H, and I would have similar effects on wildlife. These effects would be one-third the effects that Alternatives B and D would have. Alternatives B and D would road all of the area and emphasize timber harvest on 70 percent of the area. Alternative E would have no effect on the wildlife resources. Alternatives F and G would have considerably more effect on wildlife than E but less than the other alternatives.

6. Fisheries

a. Significant Effects

In Alternative E, all the areas of the William O. Douglas Adjacent roadless area with fish populations would remain roadless. In the other alternatives the stream and lake areas would be managed in a variety of different ways. Because Dog Lake is immediately next to a highway and appears to have no wilderness characteristics for fish or fishing, it won't be covered in this discussion. Table (A) depicts the management prescriptions for the stream areas included in this roadless area.

Roading these areas could change the recreational fishing opportunities, although the total mileage of streams in this roadless area is small. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that fishing would increase slightly. This would help to meet a portion of the long term fishing demand but also could result in overfishing and reduction in both numbers and size of fish using the habitat.

Roading the unroaded areas could also result in environmental degradation to streams due to timber harvest and road construction in the basins. Some of these possible effects are addressed in the soil and water environmental effects section. Of particular environmental concern are the North and South Forks of Rattlesnake Creek which are directly upstream of anadromous fish habitat. However, the stream miles affected in this roadless area are insignificant compared to the total Rattlesnake Creek stream miles.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September 1980 and revised October 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. In the Rattlesnake drainages, there appears to be the opportunity to keep any new roading entirely away from the Creeks. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

TABLE (A). Allocation of management prescriptions in the William O. Douglas Adjacent roadless area in stream areas for Alternatives A, B, C, D, F, G, H, I and J. Where "Ext" is shown, this indicates that an extended shelterwood timber management prescription would dominate in that area and would be executed primarily to meet visual objectives. Where "Int" is shown, this indicates that an intensive timber management prescription could dominate in that area. Where "Rdis" is shown, this indicates that the management prescription would be to maintain the area as roadless.

Where "big game" is shown, this indicates that the management prescription would be to maximally produce appropriate forage for big game. And, where "recreation" is shown, a special interest recreation area would be designated. (M = mile)

Stream/River	A/H	B/D/J	Alternative C/I	F	G
Granite Creek	All Ext	Lower 2 M: Int.	All Ext.	All Recreation	All Ext.
North Fork Rattlesnake Ck.	All Int.	All Int.	All Game	All Ext.	All Game
South Fork Rattlesnake CK.	All Int.	Lower 1 M: Game	Lower: GF/Game	Lower 1/4 M: Ext.	All Rdls.
		Upper 1 M: Int.	Upper Rdls	Upper: 1 M Rdls.	
Wildcat Creek	All Ext.	All Int	All Ext.	All Ext.	All Ext.

7a. Vegetation: Trees

Tree management would be planned on all but 784 tentatively suitable acres under Alternatives A/NFMA and H. Total vegetation manipulation area would be similar under Alternatives B, D and J. However, under these alternatives the emphasis would be on timber production rather than other resource enhancement and protection.

No timber management would be permitted under Alternative E, but would be permitted on 17,829 acres, or 78 percent, under Alternative F.

Alternatives C and I would manage 5,194 acres for timber production emphasis (23 percent). In addition, 14,394 acres will be managed for other resource values, especially scenic travel, that permit scheduled timber harvest.

Alternative G emphasizes management to provide scenic travel on 16,621 acres, or 72 percent. Timber management would be emphasized on 1,187 acres. Like Alternative F, this alternative would establish a 1,187 acres unroaded non-motorized zone for recreation.

7b. Vegetation: Forage

This roadless area is made up of 10-15 areas adjacent to the William O. Douglas Wilderness. (See the Livestock writeup under General Information for this area.) Forage produced on one of the individual areas as part of the Forest base is not significant; however, as part of the large adjacent wilderness, it does have potential to contribute important forage for big game and livestock. Alternatives A, B, D and J will contribute forage in excess of needs. Alternative C, H, and I will contribute adequate forage for both livestock and big game. Alternatives E, F, and G will not produce for livestock in the fourth and fifth decade.

8. Soil and Water

a. Significant Effects

No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Alternatives A, B, C, D, F, G, H, I and J could allocate up to 100 percent of the area to timber harvest and road building activity. The environmental effects of timber harvest and road building on soil and water are discussed in Chapter IV - Soil and Water sections

The risk of degrading the soil and water resource increases with more timber harvest and road building activity. Alternatives A, B, C, D, F, G, H, I and J pose more risk of degrading the soil and water resource than Alternative E due to the amount of activity. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are anticipated because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

As a result of the alternatives, the additional prescribed burning generated in the William O. Douglas Adjacent roadless area would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

The area is encumbered by 9 lode claims, 3 placer claims, 8 pending geothermal lease applications, 6 oil and gas leases, and 12 pending oil and gas lease applications. A portion of the area has a probable potential for the occurrence of copper, gold, silver, molybdenum, tungsten, mercury, and manganese, while most of the area is prospectively valuable for oil and gas. Since none of the alternatives call for withdrawing any part of the area from mineral entry, the consequences on mineral resources do not appear to be extremely significant nor do they vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. The relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C Preferred	D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	2,416	2,416	4,240	2,416	22,874	6,911	3,307	2,415	4,240	2,056
Moderately Restrictive	16,070	5,067	13,504	5,067	64	14,482	18,444	16,070	13,504	6,317
Relatively Few Restrictions	4,452	15,455	5,194	15,455	0	1,569	1,187	4,452	5,194	14,565

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case by case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A	B	C	D	E	F	G	H	I	J
Miles	52	49	48	49	0	42	45	52	48	49

12. Fire

The fire management workload generated in the William O. Douglas Adjacent roadless area as a result of the alternatives, will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternative E. Additional road access due to increased timber harvest activity would also increase risk of fire in Alternatives B, D and J.

The cost efficiency of fire suppression activities would be slightly increased in Alternatives B, D and J as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternative E would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. That is, because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, each individual must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

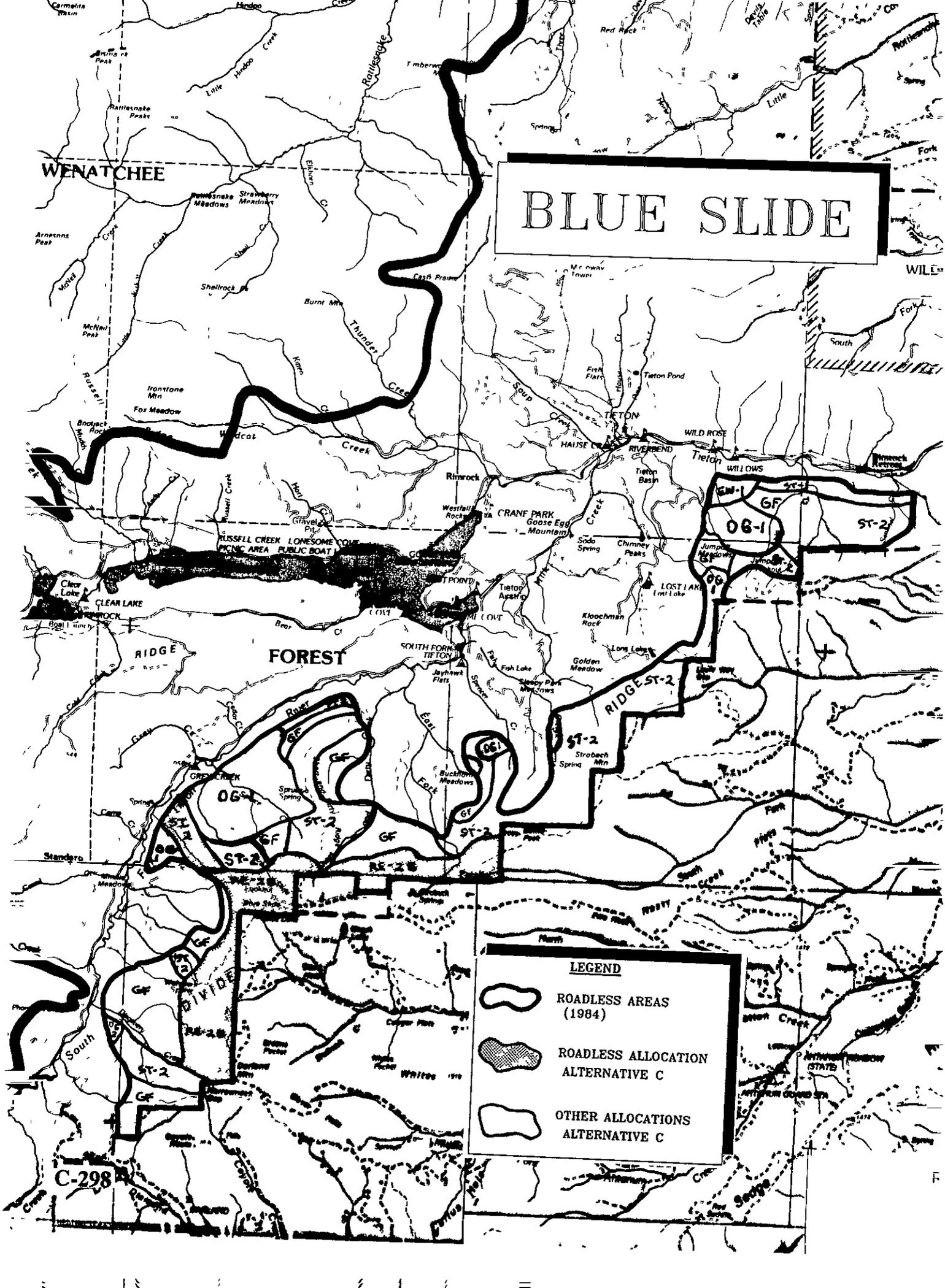
A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 53.8 jobs.

14. Wilderness Potential

This roadless area has very limited potential for wilderness. This area is composed of unroaded segments not included in the William O. Douglas Wilderness during the analysis of that area as wilderness. The only potential for these segments would be as additions to the William O. Douglas Wilderness.

Alternative E prescribes unroaded allocation to 100 percent of the area which retains the wilderness attributes of the area. The remainder of the alternatives prescribe only small acreages to remain unroaded. Alternatives A, H, B, D, and J allocate about 19,000 acres to roaded allocations including General Forest where road construction and timber management activities will occur. Alternatives C and I about 16,000 acres with 5,000 General Forest, to roaded allocations. These alternatives place high emphasis on retention of visual qualities. Alternatives F and G also allocate less acres to roaded prescription with a balance of resource allocations, but with minor emphasis on unroaded allocation.

BLUE SLIDE



WENATCHEE

FOREST

LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

C-298

BLUE SLIDE ROADLESS AREA

Size: Gross Acres: 19,695

Net Acres: 18,571

I. GENERAL INFORMATION

A. History

A portion of this area was allocated to roadless recreation under the multiple use plan. That portion plus some additional area inventoried and analyzed under RARE II as area No. 6035 was not recommended for wilderness. The area was not considered for wilderness under the Washington State Wilderness Act of 1984 legislative process.

B. Location and Access

The area is a short distance east of the Goat Rocks Wilderness in Yakima County on the Naches Ranger District. It is also located on the northern boundary of the Yakima Indian Reservation.

The area is readily accessible by roads and trail but main access is via U.S. Highway 12 and the Tieton and South Fork Tieton roads.

C. Physiography and Soils

This area generally lies below and to the north of the basalt cliffs along Divide Ridge. The basalt cliffs and the massive talus slopes below are very distinct. Below the talus slides the topography is somewhat undulating and bumpy in some places, indicating old landslide activity. There are also some areas with deeply incised canyons that have very steep sideslopes that give strong evidence of rapid downcutting.

Elevations range from 3,600 to 7,000 feet. Forty-seven percent of the soils have developed in basaltic materials, 30 percent in granitic materials, 20 percent in pyroclastic materials, 2 percent in sandstone, and the remainder in alluvial materials. The basaltic, pyroclastic, and sandstone materials tend to become slippery and sticky when wet and are easily compacted when moist. The granitic materials and the alluvium tend to be moderately coarse to coarse textured, so are generally not slippery or sticky when wet. They will compact, but not as easily as the former group.

D. Climate

The area lies within the 20-60 inch rainfall zone with an estimated 50 percent of the annual moisture falling as snow.

E. Vegetation

Forty-six percent of this area is tentatively suitable Forest land. Grand fir is probably the most common species on this predominantly north facing steep area, north of Divide Ridge. Lodgepole pine, western larch, and Douglas-fir are major species at lower elevations.

Most of the non-timbered areas are rock cliffs or active land slides. Some dry, shallow soil meadows and wet areas occur at the base of Divide Ridge. Jumpoff Meadow is one of the larger sedge, water and grass openings.

F. Current Uses

The current use is for dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Estimated Annual Recreation Visitor Days</u>
Motorized trail riding, including 4x4	2,000
Hunting	4,000
Total	6,000

The area contains the following Recreation Opportunity Spectrum (ROS) class:

<u>ROS Class</u>	<u>Acres</u>
Semiprimitive Motorized (SPM)	18,571

There are 20.5 miles of trail in the area, and all are currently open to motorized use.

G. Appearance and Surroundings

The area has high, visual variety in landforms, moderate to high variety in rockforms and vegetation, and low to moderate variety in waterforms (lakes and streams).

The area has steep rugged ridgetops with sparse vegetation on the upper slopes and a highly textured vegetative pattern throughout. The drainage bottoms are rather densely vegetated. Fall color occurs on parts of the upper slopes. Some basalt formations are present on ridges and ridgetops.

The area is primarily foreground and middleground when viewed from the South Tieton Road, trails that lead from the valley floor to Divide Ridge, and the Divide Ridge Trail. Middleground and backgrounds are viewed from White Pass Highway (Hwy. 12) and Goat Rocks Wilderness.

The Blue Slide area is surrounded by the Yakima Indian Reservation and the upper parts of the South Fork Tieton.

H. Attractions

The area contains many basaltic rock bluffs and talus slopes. There are no major lakes or streams, but there are many springs scattered along the main ridge. Blue Slide, for which the area is named, is a large land slip and is visible from the South Fork of the Tieton drainage.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The Blue Slide roadless area is bounded on the southwest by Divide Ridge, northeast by the breaks above the Tieton River, and northwest by the South Fork Tieton River and numerous Forest Service roads and harvest units. Divide Ridge is easy to find but the meandering roads and timber harvest units are somewhat difficult to locate on the ground or on a map. Most of the access roads to the Blue Slide area are graveled and provide easy access. All boundary roads, except the Divide Ridge primitive road, receive logging truck traffic as well as recreation traffic. All existing access roads have an effect on the sights and sounds of human intrusion on the area.

The Yakima Indian Reservation borders the southern section of this area south of Darland Mountain.

B. Natural Integrity

The impact of past human activity in the Blue Slide area has been relatively minor even though past activities have been extensive and motorized in nature. A system of existing roads nearly encircles the area. Several roads intrude into the area leaving less than half a mile wide strip of the roadless area in many places. An extensive trail system, which ties all branch trails to Divide Ridge, provides access to most of the area. All of the trail system and four-wheel-drive routes have had a history of motorized use for over 20 years. Several fire lookouts were built on the edge of this roadless area (Darland Mountain, Blue Slide, and Jumpoff). Only Jumpoff Lookout remains operational today.

C. Natural Appearance

The Blue Slide area is a long slender piece of land that, because of the topography, affords views of the drawdown of Rimrock Reservoir, State Highway 12 and several forest roads and many timber cutting units. Human activity is visible from most viewpoints within the area. The rugged cliffs of Divide Ridge have physically prevented roads to completely dissect the roadless area.

The segment of this area between Blue Slide Lookout and Jumpoff Lookout provides a unique scenic view corridor. Few continuous travelways on the Forest offer such splendid views for this distance. The hiking season on this view corridor is short due to water scarcity, and hikers generally abandon it by June 1. Though bikers do visit this corridor for riding challenges, the main attractions are the unique views.

D. Opportunities for Solitude

The area offers few opportunities for solitude. The 18,571 acres included occur in a fairly uniform northwest facing slope, exposing numerous activities of man to the roadless area visitor. The irregular side ridges of dissected topography with vegetative cover screen people from one another at short distances at the base of Divide Ridge.

E. Opportunities for Primitive Recreation

There are some opportunities for primitive recreation experience although all trails have been heavily impacted by motorbikes and four-wheel-drive activities. Because the area is heavily accessed by roads around the perimeter, big game hunting for elk and deer within the area is traditionally limited to day hunting.

F. Challenging Experiences

The primary challenge of the Blue Slide area is climbing the face of Divide Ridge and traversing Blue Slide itself. This could be very challenging as well as dangerous for the inexperienced.

G. Special Wildlife Features

There are no known threatened, endangered, or sensitive species in this area.

H. Historical and Scientific Study

There are opportunities for outdoor education, and scientific and historic study in the area relating to archeological research and early sheep grazing use.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
SPM	55,700

B. Wildlife

The area is summer range for several elk and deer herds. Black bear, grouse, and a number of other species utilize the area.

C. Fish

In this roadless area, there are three stream systems with wild populations of native cutthroat trout. Jumpoff Creek and Spruce Creek (and its south tributaries) have populations which could be considered significant, while Discovery Creek probably has only a small population. The population in Discovery Creek has not been field verified.

D. Water

The Bureau of Reclamation was granted 1st Form Withdrawal on portions of Section 28 and 30, T14N, R15E, WM. This granting was a result of an Executive Order dated August 8, 1907, called the Tieton Project. The withdrawn area presumably was considered as a reservoir site since the Project Area traverses the Tieton River in this portion of the roadless area.

Past records for stream discharge are excellent for the area. The gauging station, however, is no longer active. The last period of published record occurred in Water Year 1978. There are no official snow survey sites within the area. Average annual snow packs in the higher elevations are estimated at 150

inches. The majority of water derived from this roadless area and the Goat Rocks Wilderness is utilized for irrigation needs in the Yakima Valley.

E. Livestock

About 90 percent of this roadless area is within the existing Tieton Cattle Allotment. The remaining 10 percent is either part of the Conrad Meadow Cattle Allotment or a part of the South Fork Tieton Recreation Stock Allotment. The grazing resources potential is being realized through existing allotment plans.

F. Timber

The area contains 8,566 acres of tentatively suitable Forest land. Stand volume and other data area as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	3,625	102.7	18.9
Wet	Immature	3,541	63.7	11.6
Wet	Seedling-Sapling	170	---	---
Dry	Mature	339	4.2	0.8
Dry	Immature	891	8.7	1.6
	Total	8,566	179.3	32.9

The estimated maximum biological potential contribution to the long-term sustained yield is 2.7 MMBF (0.5 MMCF) per year.

G. Minerals

The geology of this area is dominated by Eocene sedimentary rocks, by Tertiary intrusive rocks, and by landslide or mudflow deposits of recent age. The area is bounded on the east by the Columbia River basalts. The area has not been investigated by the U.S.G.S. or U.S. Bureau of Mines, but available references indicate the only reported mineral occurrence of interest is bentonite which is of poor quality. The southern part of the area is classified "prospectively valuable" for coal resources, the western half of the area is classified "prospectively valuable" for geothermal resources, and the northeast one-third is classified "prospectively valuable" for oil and gas.

Bureau of Land Management mining claim recordation data (1/23/85) indicates there have been no mining claims located within the area; however, the area has been leased for its oil and gas resources under five existing leases. There are no pending applications and apparently little interest in the other two leasable commodities.

H. Cultural-Historical

The Blue Slide unit encompasses a portion of a major travelway, used by ancestors of the Yakima Indians to journey between their village sites in the Yakima Valley to areas in the upper Tieton Basin. One extensive lithic scatter has been inventoried and, considering the major ridgeline location of the unit and its proximity to the Yakima Reservation, Blue Slide has a high potential for the occurrence of other sites.

Historically, the unit was heavily utilized in the grazing of sheep and cattle. Three cabin sites identified in the Cold Creek and Grey Creek areas also indicate possible fur trapping use. In addition, there are two former lookout sites along the south edge of the Unit - Darland Mountain (1925-1966) and Blue Slide (1946-1971) - as well as the existing Jumpoff Lookout (built in 1958). Documents' research and further field study will undoubtedly augment the limited information currently available.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is low with most fires started by lightning. Fuel loadings are moderate with sparse timber stands and rocky peaks and meadows at higher elevations. Periodic smaller fires of 1 to 20 acres have occurred.

K. Insects and Disease

Mistletoe and root rots are very common to the grand fir and Douglas-fir stands occupying this area. Western spruce budworm is presently causing light defoliation in the eastern portion of this area. Entomologists expect this damage to intensify due to the large area of grand fir which is the preferred host of the budworm.

Following the 1977 drought year, some mature ponderosa pine were killed by the western pine beetle. However, most of these were salvaged along the lower portion of this area east of Jumpoff Meadows by 1979. More normal weather conditions have caused a return to low levels of beetle activity in this area.

L. Private Lands

There are 1,124 acres of private land within the area. The largest acreage belongs to the Burlington Northern Railroad Company and approximately half a section is owned by Ahtanum Irrigation.

Acquisition possibilities are considered fair for the railroad lands and poor for the other.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located just east of the 105,633 acre Goat Rocks Wilderness and south of the 167,195 acre William O. Douglas Wilderness.

B. Distance from Population Centers

The area is reachable within two to four hour's driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need For Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through wilderness classification.

D. Interest By Proponents, Including Congressional

There has been no interest to date to make this area Wilderness. Local public and political proponents have expressed an interest not to classify the area as Wilderness.

E. Public Input

Of 914 responses to RARE II, 86 percent were for non-wilderness, 3 percent as further planning, and 11 percent for wilderness. The majority of the public users have expressed a desire to continue big game hunting and off-road vehicle use in the Blue Slide area. The Washington State Game Department has expressed the desire to keep the area roadless or at least gate roads after timber harvest on a seasonal basis. Other publics prefer that the roads remain open at all times so they may harvest firewood, mushrooms, Christmas trees, etc., and pursue big game hunting adjacent to the roadway. To date there has not been a large number of people who would prefer either wilderness or unroaded non-motorized classification for the area.

F. Other Public Involvement

There has been no other public involvement scoping outside of RARE II and the forest planning process except Interdisciplinary Team efforts involving proposed timber sales adjacent to the Blue Slide roadless area. This scoping process has included Forest Service specialists and planners, other agency people such as the Washington State Game Department, and specific groups such as the Tieton Recreation Association.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

Alternatives A/NFMA, H, and J would not allocate any of the area to unroaded management. Under these alternatives the area would be entered for harvest. The area will lose its pristine character and present a Roaded Modified forest setting to the recreation user. Roadless character will be lost as a result of these management alternatives. All existing trail systems will be left intact but portions of trails will be crossed by roads.

Alternatives B, D, E, F, and G would allocate varying portions of the Blue Slide roadless area to Roadless Management objectives. Alternatives B and D would include 1,823 acres in Semi-primitive, Motorized. Only portions of the Divide Ridge four-wheel-drive route would be included in these alternatives.

Alternatives E, F, and G would allocate over 14,800 acres to Semi-primitive, Motorized use. These alternatives provide the most opportunities to develop Semi-primitive, Motorized recreation. Under all alternatives, Semi-primitive, Motorized recreation use would be at least maintained at current levels.

Alternatives C and I retain 2,947 acres for unroaded motorized recreation while maintaining a balance in other resource values including an emphasis on partial retention of scenic values.

Under Alternatives C and I the portion of the Trail System in the roadless area is allocated as follows:

Trail Name	Trail Number	Unroaded Non-Motorized	Unroaded Motorized	Roaded Motorized
Short and Dirty	1121	--	--	5.7
S. Divide Ridge	1136	--	--	3.0
Darland Mtn.	1137	--	--	2.8
Butcher Knife	1138	--	--	4.0
Blue Slide	1139	--	--	4.0
Long Lake	1145	--	--	1 0
Totals		--	--	20 5

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is Motorized and Non-motorized. These represent the Semi-primitive, Motorized and Semi-primitive, Non-motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0	10	16	10	100	80	80	0	16	0

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0/0	100/0	0/0	100/0	81/19	100/0	100/0	0/0	0/0	0/0

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with a more roaded natural or roaded modified setting.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H will allocate four-fifths of the area to Retention and Partial Retention VQO. The Middleground viewshed from White Pass will be allocated as Partial Retention VQO. The south fork of the Tieton travel route will have visual protection. Most areas outside of the foreground will be Maximum Modification. Much of the area will not be visible except from the South Fork Tieton viewshed. Some views from Goat Rocks will be altered to heavily altered.

Alternatives B, D and J will allocate much of the land to Maximum Modification. High visual impacts will be from the White Pass viewshed middleground, South Fork Tieton, Middleground views from trails, and the view from the Goat Rocks Wilderness looking into the South Fork Tieton Basin will be Maximum Modification. A heavily altered condition will dominate the landscape. The Divide Ridge trails, the Blue Slide natural slides, and most foreground trails will have Partial Retention VQO.

Alternatives C and I will allocate approximately two-thirds of the area to Retention and Partial Retention VQO. Most of the foreground of trails and roads, and the Divide Ridge Trail will have Partial Retention VQO.

The middleground views from trails, the South Fork Tieton, and the view from the Goat Rocks Wilderness road looking into the South Fork Tieton will be altered. The Middleground view from White Pass (Highway 12) viewshed as viewed across the Rimrock Lake will have slightly to some altered visual condition. Maximum Modification VQO will be allocated to most areas outside of the above areas.

Alternative E will allocate most areas to Retention. Natural appearing landscape will dominate all lands

Alternative F will allocate all lands to Retention and Partial Retention VQO. Most areas will have high visual quality. The middleground views will have a Partial Retention VQO. A slightly altered condition will be the general landscape condition in the middleground.

Alternative G allocates the majority of the lands to Retention and Partial Retention VQO. A very small area will be allocated to Maximum Modification VQO. All viewsheds will have high visual quality.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	8,098	5,957	7,992	5,957	18,401	14,447	17,468	8,098	7,992	4,134
Partial Retention	7,950	1,335	5,788	1,335	--	954	763	7,950	5,788	1,357
Modification	--	--	148	--	170	170	170	--	148	148
Maximum Modification	2,523	11,279	4,643	11,279	--	--	170	2,523	4,643	12,932
<u>Total Acres</u>	<u>18,571</u>	<u>18,571</u>	<u>18,571</u>	<u>18,571</u>	<u>18,571</u>	<u>18,571</u>	<u>18,571</u>	<u>18,571</u>	<u>18,571</u>	<u>18,571</u>

Preservation indicates that only natural ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road all of the area and allow for timber harvest emphasis on about 18 percent of the area. Alternatives B and D would road 90 percent of the area. Alternative J would allocate 97 percent to roaded prescriptions. Alternatives A and H would have one-third the effect on wildlife resources that B, D and J would have. Alternatives C and I would road all of the area and allow for timber harvest emphasis on 39 percent of the area. Alternatives C and I would have slightly more than one-half the impact to wildlife that B and D would have. Alternative E would have minimal effect on wildlife. Alternatives F and G would have considerably more impact than E due to the roading, but less impact than A and H.

6. Fisheries

a. Significant Effects

In this roadless area, Jumpoff, Spruce, and Discovery Creeks are the only stream systems with known fish populations. With implementation of Alternatives E, F, or G, all these areas would remain roadless. With implementation of Alternatives B, C, D, or I, all the stream areas would be managed for intensive timber production. In Alternatives A and H, the Jumpoff and South Fork of Spruce Creek areas would be managed for intensive timber production while the main fork of the Spruce Creek and Discovery Creek areas would be managed with an extended shelterwood timber prescription which would be executed primarily to meet visual objectives.

Roading these areas could change the recreational fishing opportunities. Since about two-thirds of the Forest's fishing occurs in roaded areas, it is expected that recreational fishing would increase. This would help to meet a portion of the fishing demand, but also could result in overfishing and reduction in both numbers and size of fish using the habitat.

It is also possible that roading the unroaded areas could result in environmental degradation to streams due to timber harvest and road construction in the basins. Some of these possible effects are also addressed in the soil and water environmental effects.

b. Mitigation Measures

In the alternatives that could road presently unroaded areas, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September, 1980 and revised October, 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Current management direction under Alternatives A/NFMA and H does not preclude roading or vegetative manipulations through timber sales on any of this area except in dedicated old growth. Timber emphasis is allocated on 2,523 acres or 14 percent of the area under these alternatives. The remaining area is zoned special resource management area where timber sales will be used to manipulate the existing vegetation.

Alternative E allocates the entire roadless area to unroaded recreation where no timber sales are scheduled. Alternative F is similar with 80 percent or 14,861 acres, allocated to roadless recreation with no timber harvest.

Under Alternatives C and I, 8,523 acres, or 46 percent, of the area is suitable for timber harvest.

Alternatives B and D would be similar to Alternatives C and I. However, these would establish a 1,823 acre unroaded motorized zone. Most of the acres suitable under Alternatives B, D and J would be timber emphasis acres. Under Alternative G, the largest block of acres would be established for unroaded motorized dispersed recreation.

Alternative J allocates 12,392 acres (67 percent) to timber harvest emphasis and unlike Alternatives B and D, would leave no areas in roadless prescriptions.

7b. Vegetation: Forage

This roadless area contains portions of one or more livestock allotments. (See the Livestock write-up under General Information for this area.) With the proposed vegetation manipulation in some alternatives, adequate forage will be produced for big game and livestock. This will offset the loss of forage due to natural succession and the exclusion of fire. Alternatives C, H, and I will contribute adequate forage. Forage in excess of expected needs will be produced in Alternatives A/NFMA, B, D and J. Needs for forage in the fourth and fifth decades will not be met for livestock in Alternatives E, F and G.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Blue Slide area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Alternatives F and G could allocate up to 20 percent to timber harvest and road building, up to 87 percent for Alternatives B, C, D and I, and the entire area could be allocated to timber harvest activities in Alternatives A, H and J. The environmental effects of timber harvest and road building on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource in this area increases with more timber harvest and road building activities, particularly if these activities enter the zone of instability of the landslides. Alternatives A and H pose more risk of degrading the soil and water resource than Alternatives B, C, D and I, and Alternatives F and G, respectively. Intensive timber management and road building in the zone of instability could result in significant loss in long-term site productivity if the slide were triggered to erode more area. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are expected to occur because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

The additional prescribed burning generated in the Blue Slide roadless area as a result of the alternative would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

As the previous discussion indicates, the area is not encumbered by mining claims, but it has been leased for oil and gas, and it is considered to be prospectively valuable for oil and gas, coal, and geothermal resources. Based upon currently available information, the area appears to have a low potential for the occurrence of mineral resources and, therefore, the consequences on mineral resources do not appear to be extremely significant nor do they vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative do restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). For example, a withdrawal precludes all mineral related activities except those authorized by prior existing rights; and a designation as a Roadless Non-motorized area or as a Developed Recreation site, Special Area or as a Wild and Scenic River calls for the area to be managed under highly restrictive management prescriptions. The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration within the area does vary slightly by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area.

This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	Alternative D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	3,562	5,808	6,658	5,808	18,401	15,709	15,794	3,562	6,658	4,134
Moderately Restrictive	12,486	1,484	7,270	1,484	170	2,862	2,607	12,486	7,270	1,505
Relatively Few Restrictions	2,523	11,279	4,643	11,279	0	0	170	2,523	4,643	12,932

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including

any adjacent roadless area or wilderness. The decision to close any road will be made on a case-by-case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

	<u>Alternative</u>									
	A	B	C	D	E	F	G	H	I	J
			PREFERRED							
Miles	25	21	21	21	0	5	5	25	21	25

12. Fire

The fire management workload generated in the Blue Slide roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives E, F, and G. Additional road access due to increased timber harvest activity would also increase the risk of fire under Alternatives A/NFMA, B, D, H and J.

The cost efficiency of fire suppression activities would be slightly increased in Alternatives A, B, D, H and J as road access would allow more area to be covered by ground based suppression resources. Cost efficiency levels in Alternatives E, F, and G would be less due to slower initial attack by ground forces or the use of more expensive aerial delivered resources such as helitak or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. That is, because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 33.6 jobs.

14. Wilderness Potential

This roadless area has limited potential as wilderness due to the evidence of human activity that is spread throughout the area. Motorized use of the area has been extensive.

Alternatives A/NFMA, C, H and I allocated some of the area to unroaded prescriptions. Alternative E at 100 percent, and F and G at 80 percent, provide high level allocations to unroaded conditions. Alternatives B, D and J allocate 13 percent of the area to unroaded allocations, and about 14,000 acres to roaded allocations. Alternatives C and I allocate a balance of resource allocations with about 9,000 acres allocated to roaded allocations. Alternatives E, F and G provide the greatest retention of unroaded attributes.

GOAT ROCKS ADJACENT ROADLESS AREA

Size: Gross Acres: 7,548

Net Acres: 7,357

I. GENERAL INFORMATION

A. History

The original area was analyzed and studied under RARE II as D6036 and was recommended for further planning. It was reanalyzed as part of the 1984 Washington State Wilderness Act of 1984 legislative activity, and 11,173 acres were added to the existing Goat Rocks Wilderness under that act.

B. Location and Access

These areas are immediately adjacent to the eastern boundary of the Goat Rocks Wilderness in Yakima County on the Naches Ranger District.

Access is by way of U.S. Highway 12 and the North Fork, South Fork and main Tieton River roads in addition to the Pinegrass road.

C. Physiography and Soils

There are six separate areas in this unit; however, all are similar. The slopes are mostly convex and reasonably uniform. The units all occur in the middle to lower slope positions.

Elevations range from 3,300 to 6,200 feet. About 80 percent of the area is made up of soils that have formed in basaltic materials, about 15 percent of soils that have formed in pyroclastic materials, and the remainder in either granitic material or glacial till. The basaltic and pyroclastic soils tend to be slippery and sticky when wet and easily compacted when moist. Soil depths for the basaltic soils generally range from 20 to about 40 inches, and soil depths for the pyroclastic soils usually range from about 30 to about 60 inches. The granitic and glacial till soils, on the other hand, are coarser textured so are usually not slippery or sticky when wet. Soil compaction is also less of a problem with these soils. Soil depths for both the granitic soils and the glacial till soils usually range from about 24 to about 36 inches.

D. Climate

Annual precipitation ranges from 45 to 70 inches, mostly as snow. Snow depths can range to 15 feet.

E. Vegetation

Fifty-six percent of this area is tentatively suitable forest land. The major species at high elevation, such as the area west of Section 3 Lake, is mountain hemlock, lodgepole pine, whitebark pine, and alpine fir. Western larch, Douglas-fir, western hemlock, and western red cedar occupy lower elevation areas.

False azalea, sedges, and huckleberry species are common understory plants. Pine grass occurs in association with sedges on lower Pinegrass Ridge.

F. Current Uses

Most current use is dispersed recreation. The major activity and its estimated annual use are as follows:

Activity Estimated Annual Recreation Visitor Days

Hunting 1,000

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes.

<u>ROS Class</u>	<u>Acres</u>
Semi-primitive Non-Motorized (SPNM)	3,880
Semi-primitive Motorized (SPM)	3,477
Total	7,357

There is only 0.5 of a mile of trail within the area which is open for motorized travel.

G. Appearance and Surroundings

The area has low to moderate visual variety in landforms and vegetation, and low variety in rockforms and waterforms (lakes and streams).

The area has highly textured sideslopes and is flat in topography. Rock formations and prominent landforms throughout the area are not dominant. The vegetation is a mixture of patterns with some fall colors occurring.

The area is primarily viewed as middleground from the North and South Fork Tieton roads and background from the Goat Rocks Wilderness.

The Goat Rocks roadless area is surrounded by the Goat Rocks Wilderness, the upper end of the South Fork of the Tieton River, and the North Fork of the Tieton River.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The Goat Rock roadless areas are found adjacent to the existing Goat Rocks Wilderness near Round Mountain, Pinegrass Ridge, south of Bear Creek near Phantom Lake, and west of Cirque Lake. Most of these areas are adjacent to forest roads and timber harvest units. Some of the boundaries would be difficult to find because there are few topographic or legal features to follow.

The south unit borders the Yakima Indian Reservation.

B. Natural Integrity

The impact of past human activity in Goat Rocks Adjacent roadless areas has been relatively minor even though those activities have been extensive. Existing roads border the area on the east. This roadless area is made up of scattered parcels of land that are joined together by the Goat Rocks Wilderness established on July 3, 1984. Because of the add-on effect, there are no trails serving the Goat Rocks Wilderness Adjacent roadless areas. There are no signs of motorized vehicle use in the additional areas except on the rim of Pinegrass Ridge overlooking the North Fork Tieton River. Two lookouts (Bear Creek Mountain and Round Top Mountain) were constructed in the area, but foundations are all that remain. Both sites lie within the existing Wilderness.

C. Natural Appearance

The Goat Rocks Adjacent roadless areas are not too different from the classified Wilderness except they protrude outward and are encircled by activities of man.

Even with the adjacent wilderness lands, persons visiting the area would not feel they were very far from human activity. Most of the roadless areas look out to harvested units and constructed roads. The rugged cliffs of Pinegrass Ridge offer the most significant feeling of naturalness of the Goat Rocks Adjacent roadless areas.

D. Opportunities for Solitude

The additional roadless areas offer little in the way of solitude by themselves. Without the adjacent wilderness to the west, there would be few opportunities for solitude. The 7,357 acres included in the 5 areas protrude outward from the classified Goat Rocks Wilderness providing little screening from man's activities except for short distances on Pinegrass Ridge.

E. Opportunities for Primitive Recreation

Considering the adjacent classified Wilderness, opportunities for primitive recreation experiences are moderately high.

F. Challenging Experiences

With only game trails for access, the add-on roadless areas would be challenging to travel in. The rugged cliffs west of Pinegrass Ridge would be challenging and dangerous for all but the most experienced mountaineer.

G. Special Wildlife Features

There have been sightings of peregrine falcon reported but no nesting sites have been located. No other threatened or endangered species have been located in the area, though there is a bald eagle nest at nearby Rimrock Lake. The extent of use of the area by sensitive species is unknown.

H. Historical and Scientific Study

There are no special or unique opportunities for outdoor education and scientific or historic study in the area which cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities.

Estimated carrying capacity by ROS Class is as follows:

ROS Capacity In Potential Recreation Visitor Days Per Year

SPNM	3,900
SPM	10,000
Total	13,900

B. Wildlife

Wildlife populations in the area include deer, elk, and black bear. Game birds such as blue, ruffed, and spruce grouse are present.

C. Fish

No special features regarding fish are known in this area. Cold Creek (Pinegrass Ridge) is known to have a very small population of native cutthroat trout.

D. Water

There are no water related encumbrances or planned projects within the area.

E. Livestock

This roadless area is now made up of five small areas along the edge of the Goat Rocks Wilderness. The three areas lie within portions of the North Fork and South Fork Recreation Stock Allotments. These may be potential for sheep grazing when combined with adjacent developed roaded areas.

F. Timber

The area contains 4,091 acres of tentatively suitable forest land. Stand, volume, and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume (MMBF)	(MMCF)
Wet	Mature	3,032	85.9	15.8
Wet	Immature	741	13.3	2.4
Wet	Seedling-Sapling	106	---	---
Dry	Mature	149	1.6	0.3
Dry	Immature	63	0.6	0.1
	Total	4,091	101.4	18.6

The estimated maximum biological potential contribution to the long-term sustained yield is 1.1 MMBF (0.2 MMCF) per year.

G. Minerals

This area is primarily underlain by volcanic and intrusive rocks of Quaternary and Pliocene age. The Goat Rocks Wilderness and adjacent roadless areas have been investigated by the U.S. Geological Survey and U.S. Bureau of Mines (Church, S.E. and others, Map MF-1653-A). As a result of their study, it does not appear that the subject land has any known mineral potential. The area has, however, been classified "prospectively valuable" for geothermal resources, and a small part has been classified "prospectively valuable" for coal. In addition, based upon magnetotellurics and gravity surveys, there is a possibility for the occurrence of oil and gas in the sedimentary rocks lying east of the Goat Rocks pluton

According to Bureau of Land Management claim recordation data (1/23/85), there are no mining claims located within the area. There are, however, two geothermal lease applications pending for area R-1, and R-2 is included in an existing oil and gas lease.

H. Cultural-Historical

The lands within the proposed Goat Rocks addition were marginal to most historic events and developments of the Naches and Yakima Valleys. Probable uses were confined to livestock grazing and sporadic trapping. Tribal groups now included within the Yakima Indian Nation are known to have regularly used the Goat Rocks Wilderness Area for resource collection, travel, and, possibly, religious observances. However, this unit is peripheral to the areas of known or suspected prehistoric use and consequently has a low to moderate probability for the occurrence of archaeological resources.

I. Land Use

There are no special land uses within the area.

J. Fire

Annual fire occurrence is low with most fires started by lightning. Fuel loadings are moderate with sparse timber stands, and rocky peaks and meadows at higher elevations. Periodic smaller fires, 1 to 20 acres, have occurred.

K. Insects and Disease

Root rots are the most damaging agent in this area. The large plantation on the adjacent Pinegrass Ridge was due to Englemann spruce bark beetle attacks. However, this roadless area has a relatively good mix of species and a less than normal risk of insect epidemic. Mountain pine beetles have, however, killed most of the scattered western white pine in the area.

L. Private Lands

There are 191 acres of private lands within the area. These lands are part of the Herke estates and acquisition possibilities are very poor.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area is located immediately adjacent to the 105,633 acre Goat Rocks wilderness area.

B. Distance From Population Centers

The area is reachable within two to four hour's driving time from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within the area in need of representation through wilderness classification.

D. Interest by Proponents, Including Congressional

The interest in the original Goat Rocks Wilderness additions was very high by proponents of wilderness and by Congressman Morrison; however, the establishment of the new 1984 Wilderness boundary concluded their interest for the most part. The remaining add-on roadless areas have not had strong support for either Wilderness or roadless non-motorized classification. An exception is the Washington State Department of Wildlife which prefers all unroaded areas to remain unroaded or at least prohibit vehicle use seasonally on roads.

E. Public Input

In the original RARE II public input, there was significant interest in adding the original Goat Rocks additions to the existing Wilderness, however, there has been little input on the add-on roadless areas as to the public's preference.

Of the 4,279 responses under RARE II, 67 percent were for non-wilderness, 1 percent further planning, 21 percent for wilderness with boundary adjustment, and 11 percent for wilderness as inventoried.

F. Other Public Involvement

The only scoping process in the area has been on adjacent areas outside of the roadless areas on timber sale plans. The scoping process has included outside agency people such as Washington State Department of Wildlife and specific user groups affected by the timber sale.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

1. Recreation

a. Significant Effects

The Goat Rocks adjacent area consists of 7,357 acres located in pieces and adjacent to the east boundary of the Goat Rocks Wilderness in the southern portion of the Naches Ranger District. Approximately 4,091 acres of the area are inventoried as suitable for Timber Management, General Forest. The majority of the remaining land is concentrated along the northwest edge of Pinegrass Ridge. It is capable of offering unroaded, non-motorized, dispersed recreation, due to its steep terrain and proximity to existing Goat Rocks Wilderness.

Due to the proposed expansion of the adjacent developed ski area at White Pass, and accommodating terrain, 212 acres have been determined suitable for that purpose under Alternatives B, C, D, F, G, I and J.

The roadless character of the Cirque Lake area and depth of the Goat Rocks Wilderness at Surprise Lake will be lost as a result of Alternatives B, C, D, F, G, and I. Ski area development allocated by all alternatives may affect the wilderness experience at Shoe Lake which already has an over-use problem associated with day use. These alternatives may also reduce the quality of present cross-country ski use along Hogback Ridge and increase conflicts with Pacific Crest Trail hiker use.

Alternatives A/NFMA and H would allocate 5,598 acres for Dispersed Recreation, Non-motorized. Alternative F resembles Alternatives A and H but reduces the amount of Dispersed Recreation, Non-motorized setting.

Alternative E quite simply favors Dispersed Recreation, Non-motorized over all other uses. There are no system trails in this roadless area other than a portion of the Tandy 4x4 route (0.5 miles) Under Alternatives C and I this route will be retained.

b. Summary

The following tables indicate, by alternative, the degree to which this area will be allocated to roadless management and, of the roadless management acres, what percent is motorized and non-motorized. These represent the Semiprimitive Motorized and Semiprimitive Non-Motorized Recreation Opportunity Spectrum (ROS) Classes. The area being allocated to roaded types of management activities will become Roaded Natural or Roaded Modified ROS opportunities depending on the intensity of development.

Percent of the Area Having Unroaded Allocation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	76	0	18	0	100	50	31	76	18	0

Percent of the Unroaded Allocation Area
In Terms of Motorized/Non-Motorized Recreation

Alternative	A/NFMA	B	C PREFERRED	D	E	F	G	H	I	J
	0/100	0/0	100/0	0/0	0/100	0/100	0/100	0/100	100/0	0/0

The area being allocated to roaded management activities will have increased dispersed roaded recreation opportunities and the possible opening of access to potential developed recreation sites. The trail miles within the area allocated to roading may provide a less semi-primitive recreation experience with more roaded natural or roaded modified setting.

2. Wild, Scenic, and Recreational Rivers

There are none associated with this roadless area.

3. Cultural Resources

Consideration of cultural resource values are required by a special set of historic preservation laws, regulations and policies. Particular efforts will be made in every alternative to inventory, evaluate, and provide for significant cultural resources in areas where Forest management activities are planned.

4. Scenery

Alternatives A/NFMA and H allocate much of the land to Retention VQO. The North Fork of the Tieton middleground view will be allocated to Partial Retention VQO. The Maximum Modification allocation will be in areas not visible from important recreation viewsheds.

Alternatives B, D and J allocate the majority of the area to Maximum Modification. Most areas adjacent to the Wilderness will be heavily altered. The Pinegrass area and the middleground view from the North Fork Tieton viewshed will be altered. The visual impression of the landscape will be a heavily altered one.

Alternatives C and I will allocate approximately one-half of the area to Retention and Partial Retention VQO. The North Fork Tieton middleground will be allocated to Partial Retention. The Pinegrass area will be allocated to Maximum Modification VQO.

Alternative E will allocate all lands to Retention VQO. The natural appearing landscape will be preserved. Scenic quality will dominate the landscape.

Alternative F will allocate most lands to Retention and Partial Retention VQO. A small area will be heavily altered. The Partial Retention of the middleground of the North Fork Tieton will keep the viewshed in a high visual quality.

Alternative G will allocate lands mostly to Retention and Maximum Modification. The recreational routes will be in a high visual quality. More lands in the middleground and the Pinegrass area will be Maximum Modification. A slightly altered condition will be the general landscape impression in most areas.

The following table summarizes the Scenic component of this area by alternative in acres of Visual Quality Objective (VQO).

VQO	A/NFMA	B	Alternative							
			C PREFERRED	D	E	F	G	H	I	J
Preservation	--	--	--	--	--	--	--	--	--	--
Retention	6,361	657	4,411	657	7,357	5,661	4,559	6,361	4,411	636
Partial Retention	530	191	1,823	191	--	297	530	530	1,823	191
Modification	--	--	--	--	--	--	--	--	--	--
Maximum Modification	466	6,509	2,588	6,509	--	1,399	2,268	466	2,588	6,530
Total Acres	7,357	7,357	7,357	7,357	7,357	7,357	7,357	7,357	7,357	7,357

Preservation indicates that only natural ecological changes will occur.

Retention indicates an essentially natural appearing landscape will be present.

Partial Retention indicates the landscape will be slightly altered.

Modification indicates a moderately altered landscape will be present.

Maximum Modification indicates a heavily altered landscape may be present.

5. Wildlife

Alternatives A/NFMA and H would road 24 percent and allow timber harvest emphasis on 6 percent of the area. Alternatives B, D and J would allow for timber harvest emphasis on 89 percent, and would road 97 percent of the area. Alternatives B and D would have 15 times the impact on wildlife habitat that A and H would have. Alternatives C and I would road 82 percent of the area and allow for timber harvest emphasis on 35 percent of the area. Alternatives C and I would have approximately one-third the impact on wildlife of B, D and J. Alternative E would have no effect on the wildlife resources in the area. Alternative F would road 50 percent of the area and allow for timber harvest emphasis on 19 percent of the area. Alternative G would road 69 percent and emphasize timber harvest emphasis on 31 percent of the area. Alternatives F and G would have the second and third least effect on wildlife habitat, respectively.

6. Fisheries

a. Significant Effects

Only a very small section of Cold Creek (less than one-half mile) is included in this roadless area, and it is the only stream with known fish populations. In Alternative E, the Cold Creek area would remain roadless, while in Alternatives A, C, F, G, H, and I the area would be managed with an extended shelter-wood timber harvest strategy, primarily to meet visual objectives. In Alternatives B, D and J, the area would be managed with a timber management emphasis. Since Cold Creek is very small, and is known to have very low numbers of resident fish, it is unlikely that implementation of any alternative would have a particular effect on the fisheries habitat capability of the stream.

b. Mitigation Measures

In the alternatives that could road the Cold Creek area, the riparian protection zone prescription, the Wenatchee National Forest's Best Management Practices (September 1980 and revised October 1982), and all standards and guidelines common throughout riparian areas of the Forest would be applied in stream zones. This treatment should adequately protect the streams from a reduction in fish habitat capability.

If the areas are roaded, road closures could be implemented to reduce the impact of enhanced access on the native fish populations.

7a. Vegetation: Trees

Vegetation manipulation is not currently planned on 5,598 acres (76 percent) of this area under Alternatives A/NFMA and H. This classification would increase to the total area under Alternative E.

Increased vegetative manipulation through timber sales would be expected under all other alternatives. Under Alternatives C, G, and I, it is expected that uneven-aged management would be used in the mountain hemlock type to achieve the increased scenic travel retention and partial retention.

Under Alternatives B, D and J, it is expected that with most of the acres in General Forest even-aged management would be used wherever possible.

7b. Vegetation: Forage

This roadless area contains portions of one or more livestock allotments. (See the Livestock writeup under General Information for this area.) With the proposed vegetation manipulation in some alternatives, adequate forage will be produced for big game and livestock. This will offset the loss of forage due to natural succession and the exclusion of fire. Alternatives C, H, and I will contribute adequate forage. Forage in excess of expected needs will be produced in Alternatives A/NFMA, B, D, and J. Needs for forage in the fourth and fifth decades will not be met for livestock in Alternatives E, F, and G.

8. Soil and Water

a. Significant Effects

The environmental consequences of allocating the Goat Rocks Adjacent roadless area to General Forest or Roadless Management are discussed by alternative below. No significant soil and water consequences are associated with Alternative E because soil and water disturbing activities occurring would be minimal. Alternatives A/NFMA, F, and H could allocate up to 49 percent to timber harvest and road building, Alternative G about 69 percent, Alternatives C and I about 82 percent, while Alternatives B, D, and J could allocate the entire area to timber activities. The environmental effects of timber harvest and road building on soil and water are discussed in Chapter IV - Soil and Water sections.

The risk of degrading the soil and water resource increases with more timber harvest and road building activity. Alternatives B, C, D, G, I and J pose more risk than Alternatives F, A, H, and E, respectively, due to the intensity of activity. However, since Wenatchee National Forest Best Management Practices (1982) and Forest Plan Standards and Guidelines will be employed, no unique soil and water effects are anticipated because of forest management in this area.

b. Mitigation Measures

The mitigation measures that will be used in this area are the same as those discussed in Chapter IV - Soil and Water sections.

9. Air

Any additional prescribed burning generated in the Goat Rocks Adjacent roadless area as a result of the alternatives would not have a significant effect on air quality beyond the impacts discussed in Chapter IV.

10. Minerals

Since this area appears to have a low potential for the occurrence of mineral resources, the consequences on mineral resources do not appear to be extremely significant nor do they appear to vary appreciably by alternative. However, the management prescriptions under which the area would be managed in each alternative would restrict mineral activities to varying degrees (i.e., special stipulations in leases and in approved operating plans). The effects of these restrictions cannot be quantified, but the negative influence they would have on interest in conducting exploration activities within the area does vary by alternative and will, therefore, affect the potential for discovering and/or developing any unknown mineral resources of the area. This relative variation between alternatives is depicted on the following table.

Consequences on Mineral Resources

Restrictive Nature of Management Prescriptions	Acres Restricted by Management Prescriptions									
	A/NFMA	B	C PREFERRED	Alternative D	E	F	G	H	I	J
Withdrawn from Mineral Entry (valid existing rights will be determined and recognized)	0	0	0	0	0	0	0	0	0	0
Highly Restrictive	5,640	212	1,505	212	7,357	4,410	2,460	5,640	1,505	212
Moderately Restrictive	1,251	636	3,264	636	0	1,548	2,629	1,251	3,264	1,526
Relatively Few Restrictions	466	6,509	2,588	6,509	0	1,399	2,268	466	2,588	6,530

11. Roads

The miles of local roads shown below for each alternative are those that are expected to be constructed to permit timber harvest. They are included in the totals for the various alternatives shown in Chapter IV of the FEIS. It is assumed that the bulk of these roads will be constructed within the next 20 years. An analysis of the road development in unroaded areas during the past ten years indicates that for every acre harvested approximately 5.5 acres are accessed. It is assumed that 50 percent of these roads will be closed to public traffic, and that the remainder will be suitable for travel by high clearance vehicles only.

These mileages are estimates based upon typical road densities necessary to harvest timber on different slope classes. The actual road miles that will result from the implementation of the various alternatives will be determined during project planning, design, and environmental analysis. The assumptions made for this analysis will be monitored. The construction of any road will be subject to the appropriate environmental analysis. That analysis will address the effects on resources that are dependent upon a roadless setting, including any adjacent roadless area or wilderness. The decision to close any road will be made on a case-by-case basis, according to the Forest Road Closure Policy found in the Forest-wide Standards and Guidelines.

Alternative

	A/NFMA	B	C	D	E	F	G	H	I	J
			PREFERRED							
Miles	6	14	14	14	0	8	12	6	14	14

12. Fire

The fire management workload generated in the Goat Rocks Adjacent roadless area as a result of the alternatives will not have a significant effect beyond the effects already described in Chapter IV.

A slight increase in risk of recreation related fires would occur in Alternatives A, E, F, and H.

The cost efficiency of fire suppression activities would be slightly decreased in Alternatives A, E, F, and H due to less access for ground force initial attack or the use of more expensive aerial delivered resources such as helitack or smokejumpers.

The impacts generated by slash disposal activities are discussed in Chapter IV.

13. Social/Economic

To measure this area in terms of its social value, a basic assumption is being made. That is, because of the expressed interest in keeping as much of the inventoried roadless areas as possible in an unroaded condition, the more that condition is reflected, the higher the social value.

This condition is reflected for each alternative in the summary chart under item 1, Recreation, at the beginning of this section (Section V), which indicates the acres of unroaded management.

Also, as there is varying opinion as to the mode of transportation allowed, individuals must judge for themselves which alternative best meets that aspect of the social setting. There is also a summary table reflecting this condition for each alternative as referenced above which indicates the amount of motorized versus non-motorized use within the unroaded allocation.

A general measure of timber oriented economic impacts can be made using the same table referenced above showing the amount of unroaded allocation. The larger the unroaded area, the greater the impact on timber oriented jobs. If all of the estimated long-term sustained yield per year for this area were available, it would support 13.4 jobs.

14. Wilderness Potential

The small segments of land that make up this roadless area are relatively undisturbed, unroaded areas that have good potential as wilderness. This potential only exists as additions to the Goat Rocks Wilderness. Alternatives B, D and J allocate more of the area to unroaded condition and 6,700 acres to roaded, timber harvest allocation. In these alternatives, wilderness characteristics would be foregone. Alternative E is 100 percent unroaded and would retain the wilderness attributes. Alternatives A and H allocate the percent of the area to unroaded prescriptions with only 1,611 acres in roaded, timber harvest allocations. Alternatives C and I allocate a balance resource emphasis with 5,407 acres allocated to roaded, timber harvest allocations.

NASON RIDGE ROADLESS AREA

Size: Gross Acres: 19,567

Net Acres: 19,123

I. GENERAL INFORMATION

A. History

This area was inventoried and allocated to various management categories during the Alpine Lakes management planning. It was not recommended for wilderness and is not being managed as such. It is being managed according to the Alpine Lakes Management Plan.

B. Location and Access

The area is located entirely in Chelan County on the Lake Wenatchee Ranger District just east of Stevens Pass. Access is via U.S. Highway 2 (Stevens Pass) and the Smith Brook-Rainy Creek Road #6700.

C. Physiography and Soils

This area is characterized by steep rock slopes and is highly visible from U.S. Highway #2 and from Lake Wenatchee. The ridge includes several prominent peaks, Round Mountain on the east, Alpine lookout, Mt. Mastiff, Mt. Howard, and Rock Mountain. The bedrock is mostly mezozoic granitic in origin, which includes granite, gneiss, schist, and some diorites. The lower slopes have been glaciated, but the upper slopes have not, so most of the outcroppings are angular and rugged. About 20 percent of the area is made up of cliffs and talus. There are several small lakes along the ridgetop.

Elevations range from about 3,300 to about 7,100 feet, and the precipitation ranges from 55 to 65 inches per year. About 70 percent of the soils have formed in granitic residuum, and about 20 percent formed in glacial till. The glacial till soils are generally located on the lower slopes. In general, neither of these materials become slippery when wet. Both have fairly high rock contents and both have good bearing strength. The remainder of the area is composed of several different parent materials. The glacial till soils tend to be more productive than the soils formed in granitic residuum. The surface layers of most of the soils have some volcanic ash in them.

D. Climate

The area lies within the 50-80 inch precipitation zone, with over half in the form of snow. There are no snow courses in the area but average snow depths are over 80 inches

E. Vegetation

Thirty-nine percent of this area is tentatively suitable forest land. This consists of a ridge area between Nason Creek and Lake Wenatchee. All but 254 acres of the area is wet ecotype with grand fir and Douglas-fir stands predominating at lowest elevations, and Pacific silver fir, western hemlock, and western red cedar the main species at mid-elevation. Upper slope species are subalpine fir, whitebark pine, lodgepole pine, and Englemann spruce.

Avalanche paths containing willow, mountain ash, mountain maple, and Sitka alder are common. These periodic avalanches also stimulate forbs and grasses important to the mountain goat herd that is often photographed and studied on Nason Ridge.

Present proposals are to let prescribed fire from slash treatment on adjacent timber sales burn up into this roadless area for goat habitat enhancement. Such burning releases nitrogen from existing vegetative growth for new higher protein forage.

F. Current Uses

The current use is all dispersed recreation. The major activities and their estimated annual use are as follows:

<u>Activity</u>	<u>Annual Recreation Visitor Days</u>
Motorcycle	400
Hiker	1,500
Horse	100
Total	2,000

The area contains the following Recreation Opportunities (ROS) class:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive, Motorized	19,123

There are 39 miles of trail within the area of which 10 miles are currently open to motorcycle use. The other miles are closed administratively.

G. Appearance and Surroundings

The area has a great deal of visual variety of landform, vegetation, rock formation, and water.

The area is steep with a rounded ridgetop and highly textured hillside, sparse vegetation on ridgetops and a broken, open, mixed-conifer vegetation pattern on most of the sideslopes. Fall colors are present along the mid and upper slopes of the ridge.

The area is viewed as foreground and middle ground from:

<u>Trails</u>	<u>Roads</u>
Nason Ridge	U.S. Highway 2
Round Mountain	State Highways 209 and 207
Merritt Lake	Little Wenatchee Road #6500
Rock Lake	Smithbrook - Rainy Creek Road #6700
Snowy Creek	Lake Wenatchee
Hidden Lake	Fish Lake
Dirty Face	

Attractions

The ridgetop and spectacular, panoramic views obtained from it are a drawing card. It is readily accessible from Highway 2. It is suitable for both day and overnight use. Alpine Lookout, Merritt Lake, and Rock Mountain Lake are focal points.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The roadless area boundaries are somewhat difficult to locate. They appear to follow timber type lines rather than readily definable topographic boundaries.

The heavily used major highways, with adjacent railroad and powerline corridors, bring sights and sounds of human intrusion all the way to the ridgetops.

B. Natural Integrity

This area was considered for wilderness during the Alpine Lakes Plan Development and was not selected. There are obvious signs of human activity within this area. The trail system is well developed and there is a fire lookout occupied during fire season. Development along Stevens Pass Highway to the south and towards Lake Wenatchee to the north can be readily seen from the ridge. Motorized (motorcycle) use is allowed along the eastern portion of the ridge.

C. Natural Appearance

The area is large enough and visitors are far enough away from major roads in some places that they get the feeling they are in a natural area relatively distant from human activity and development even though such activity is readily apparent in the valley bottoms. The sweeping panoramic views of the distant Pacific Crest give a feeling that the area has much greater depth than it actually has.

D. Opportunities for Solitude

The area offers limited opportunities for solitude. Use is confined to a few major access trails and the ridgetop due to the cliffy nature of the side slopes. Extensive overnight use is confined to a relatively few locations due to scarceness of water.

E. Opportunities for Primitive Recreation

Opportunities for primitive recreation are moderate. The size and access to the area are such that it is possible to visit any single location in a single day.

There are opportunities for limited goat and deer hunting, horseback riding, motorcycle riding, hiking, and camping.

F. Challenging Experiences

Some challenging experiences exist but have limited attraction. It would be very challenging to select bee-line routes from the valley floor straight up to the ridgetop but few if any would choose this means of access in favor of the trail system. No long distance hikes for Boy Scouts or other groups can be obtained in this area.

G. Special Wildlife Features

There is a herd of about 120 mountain goats which use the area as winter range.

There are no grizzly bear in the area.

Golden eagles have been observed and there are probably some nests in the cliffs.

H. Historical and Scientific Study

Game Department and University officials have been trapping and tagging goats for study.

No other special studies are in progress.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential for unroaded types of recreation. Estimated carrying capacity by ROS Class are:

<u>ROS</u>	<u>Capacity in Potential Recreation Visitor Days/Per/Year</u>
Semi-Primitive Motorized	57,369

B. Wildlife

Goat winter and summer range is provided in the area. The cliffs and talus provide excellent habitat for species dependent on this type of habitat.

C. Fish

High lakes, including Lost and Hidden Lakes, provide habitat for native trout. Many are periodically stocked and fished. There are no anadromous fish streams in the area although the streams in this area feed Nason Creek, the Little Wenatchee River, and Lake Wenatchee which do support an anadromous fishery. These latter streams provide abundant anadromous fish habitat.

D. Water

There are no water related encumbrances or planned activities within this area.

E. Livestock

There are no allotments within this area although in years past there has been some sheep grazing.

F. Timber

This area contains 7,441 acres of tentatively suitable forest land. The most common tree species is subalpine fir. Pacific silver fir, lodgepole pine, western hemlock, western white pine, Douglas-fir, noble-fir, and whitebark pine are also present. Other data on the existing suitable forest stands are as follows:

Ecotype	Stand Size	Acres	Estimated Standing	
			Volume MMBF	MMCF
Dry	Mature	254	3.2	.6
Wet	Mature	3,625	102.7	18.9
Wet	Immature	3,371	60.6	11.1
Wet	Seedlings and	191		
Wet	Saplings			
		7,441	166.5	30.6

The estimated maximum biological potential contribution to the long-term sustained yield is 2.5 MM Bd. Ft., or 0.4 MM Cu. Ft., per year.

G. Minerals

This area is underlain by pre-Tertiary metamorphic rocks and Mesozoic granitic rocks. Even though the area has not been studied in detail by the U.S. Geological Survey, available information indicates that the area has reported occurrences of molybdenum, graphite, garnet, asbestos, and quartz. None, however, are known to be deposits of a significant nature. Bureau of Land Management mining claim recordation data indicates that only nine mining claims have been located within the area, none of which have a reported history of production. The eastern two miles of the area have been classified "prospectively valuable" for coal resources, but available information indicates that any deposits would not be of commercial value. The area is not classified "prospectively valuable" for any other leasable commodity, and it is not encumbered by any mineral leases or pending lease applications.

H. Cultural-Historical

The Nason Ridge Roadless Area was marginal to most cultural activities in the Lake Wenatchee country, although it would have been an attractive travelway considering the high elevation and scenic vistas. There has been a negligible level of cultural resource survey conducted to verify the presence or absence of sites here. Historic uses are associated with early twentieth century sheep grazing, with the former site of the Rock Mountain Lookout (1933-1973), and with the original Alpine Lookout (1936-1975, after which it was replaced by the present structure).

I. Land Use

There is no special land use within the area. Some water transmission permits get water from streams originating in the area.

J. Fire

Annual fire occurrence is low. Fuel loadings are heavier at lower elevations. There is a fire history in the area. Mountain goat winter range was enhanced by the fire.

K. Insects and Disease

Dwarf mistletoe and root rots are common in the lower elevation Douglas-fir and grand fir stands. Mountain pine beetles are active in white pine and lodgepole pine. Whitebark pine is severely damaged by white pine blister rust.

L. Private Lands

There are 444 acres of land owned by the Longview Fibre Company within the area.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

The area is in very close proximity to the Henry M. Jackson Wilderness and the Alpine Lakes Wilderness. It is near the Glacier Peak Wilderness.

B. Distance from Population Centers

The distance from population centers is within 2-3 hours driving time from the Seattle-Puget Sound area which comprises 60 percent of the State's population.

C. Need for Ecosystem Representation

There is no need for the ecosystem representation.

D. Interest by Proponents, Including Congressional

E. Public Input

F. Other Public Involvement

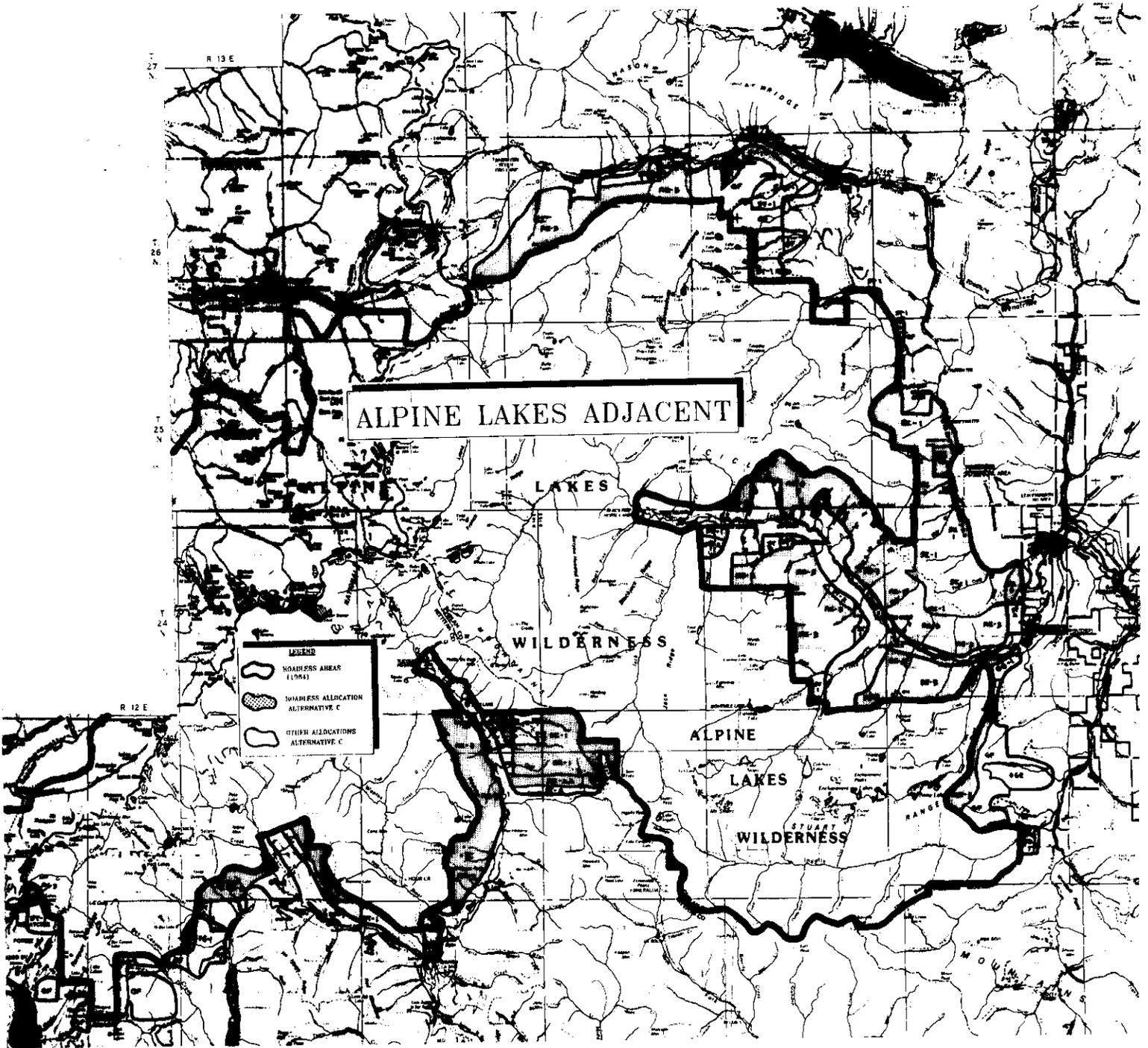
Interest by proponents, public input, and other public involvement are discussed on pages 113 through 119 in the 1980 Final Environmental Impact Statement for the Alpine Lakes Management Plan which is available for review in the Wenatchee National Forest Supervisor's Office. Comments covered a broad range of subjects including more restrictive management, four-wheel-drive use, road construction, timber sales, campground development, and land allocations. The Land allocation was the only subject mentioned for this area.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

As the management of this area will be that directed by the Alpine Lakes Management Plan and will not change by the alternatives being considered under this planning process, a full analysis is not being made here.

The environmental effects associated with the implementation of the selected plan for the Alpine Lakes Management Area are discussed by resource on pages 86 through 90 of the 1980 Final Environmental Impact Statement which is available for review in the Wenatchee National Forest Supervisor's Office.



ALPINE LAKES ADJACENT ROADLESS AREAS

Size: Gross Acres: 64,363

Net Acres: 44,393

I. GENERAL INFORMATION

A. History

The area was inventoried under the Alpine Lakes Management Plan. These are fragments left between the wilderness boundary and roaded development. These pieces were not considered for wilderness as part of the Washington State Wilderness Act of 1984 program.

B. Location and Access

The areas lie in Kittitas and Chelan Counties on the Lake Wenatchee, Leavenworth and Cle Elum Ranger Districts. They all border the Alpine Lakes Wilderness. Access is provided by three major highways (I-90, U.S. 97, and U.S. 2) and a network of county and National Forest system roads. Trails provide access through most of the larger units.

C. Physiography and Soils

This area is made up of five separate areas, two of which are very small (less than 150 acres), two are about 300 acres in size, and the fifth is fairly large (several sections). Most of the bedrock is granitic and the valleys have all been glaciated. The soils along the lower slopes have formed in glacial till. Most of the slopes are steep to very steep. The upper areas are poorly vegetated and rock outcrops are common.

Elevations range from about 1,300 to 7,000 feet. The soils that have formed in glacial till are moderately deep and are moderately productive. The till soils account for about 20 percent of the soils. Nearly 70 percent of the soils have formed in granitic materials. These soils occupy the upper slopes. They range in depth from a few inches to about 50 inches; the mean being about 33 inches. These soils are moderately productive. The balance of the area is made up of several different rock types, but their extent is small. Most of these soils have a thin cap of volcanic ash on them.

D. Climate

These lands lie within a range of 30 to 80 inch precipitation zone with an estimated 65 percent of the moisture falling as snow.

E. Vegetation

As this includes scattered parcels all around the east side of the Alpine Lakes Wilderness, vegetation is variable. Low elevation areas in such places as Tumwater Canyon and Icicle Creek are characterized by scattered ponderosa pine, Douglas-fir, and grand fir pockets interspersed with granitic rock boulders. Denser stands of Douglas-fir, grand fir, and western larch are typical of mid-elevation areas. Upper elevations are typified by alpine fir and lodgepole pine. Bigleaf maple is a very common hardwood species in the driest locations with black cottonwood and quaking aspen characteristic of wet areas.

Recent fires, such as the Eightmile fire, were seeded to grasses and provide abundant forage for wildlife. Tentatively suitable acres for timber management are 34 percent of the total area.

F. Current Uses

The current use is for dispersed recreation. The major activities are hunting, hiking, and mountain climbing.

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Non-Motorized (SPNM)	32,818
Semi-Primitive Motorized (SPM)	11,575

There are approximately 40 miles of trail in the areas all closed to motorized use.

G. Appearance and Surroundings

The area has moderate visual variety of land form, vegetation, rockform, and waterforms (lakes and streams). Most of the areas are steep sideslopes with moderate to heavy timber, especially stream bottoms and north aspects.

The area is primarily viewed as foreground and middleground views from trails and forest roads and in some areas Interstate and cross-state highways. Views from most major highways and forest roads are middle ground.

The areas are all bounded by Alpine Lakes Wilderness on one side.

H. Attractions

There are few unique features in the area, although there are several areas that have striking scenic qualities such as Tumwater Canyon and Icicle Canyon.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

As mentioned before, all of these areas border the existing Alpine Lakes Wilderness. Some of the smaller pieces would be hard to define with boundaries and maps; however, some of the larger blocks such as Icicle Ridge would be easy to locate on a map and easy to manage.

B. Natural Integrity

These roadless area blocks were not considered for wilderness in 1984. Most of the smaller blocks have forest roads and timber harvest units adjacent to them. Trail systems run through most of the larger units; however, motorized use is not allowed on any of the trails currently.

C. Natural Appearance

Sights and sounds of human habitation are evident from most of the units; however, some of the larger units do have enough land base to provide a feeling of naturalness and a departure from human development and activity.

D. Opportunities for Solitude

Opportunities for solitude are good in the larger blocks. There are lesser opportunities in the smaller units, due to closeness to roaded areas in most instances.

E. Opportunities for Primitive Recreation

Opportunities for primitive recreation experiences are good in most areas, again based on size of unit and nearness to roaded segments. There are excellent opportunities for big game hunting, hiking, horse camping, and mountain climbing.

F. Challenging Experiences

Some of the units offer excellent opportunities for mountain climbing on some of the best rock in the Cascade range. Many of the popular climbing routes are within these units, especially Icicle and Tumwater Canyons.

G. Special Wildlife Features

There are no known bald eagle or peregrine falcon nest sites or grizzly bear dens within the areas.

H. Historical and Scientific Study

There are no special or unique opportunities for outdoor education and scientific or historic study in the area which cannot already be found in the existing wilderness on the Forest.

II. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities. Estimated carrying capacity by ROS Class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
SPM	34,700
SPNM	32,800
TOTAL	67,500

B. Wildlife

Big game species such as elk, mule and black tail deer, and black bear are found, as well as occasional mountain goat on some of the units. Blue grouse, ruffed grouse, and fool hen are among the game birds found in the area.

C. Fish

These units encompass only small portions of stream systems. There are native cutthroat and rainbow trout in some of the larger streams. No anadromous fish use these streams although there is anadromous fish activity downstream.

D. Water

Water is of prime importance from these lands as well as from wilderness. Water for irrigation is much more significant on the east side of the Cascades. The critical source of the water is a narrow band along the east side of the Cascade Range above 4,500 feet in the 30-inch average precipitation range within which most of these units lie. Domestic water is also partially provided from these lands along with wilderness lands.

E. Livestock

These roadless area units have no commercial livestock grazing at present. One segment near Jim Hill Mountain on the Lake Wenatchee Ranger District lies within the Whitepine Grazing Allotment and a portion of Canal-Fortune Creek Allotment in the Cle Elum River drainage. Several of the parcels lie within Recreation Stock Allotment boundaries.

F. Timber

This areas contains 14,968 acres of tentatively suitable forest land. Stand volume and other data are as follows:

Ecotype	Stand Size	Acres	Estimated Standing Volume	
			MMBF	MMCF
Wet	Mature	6,127	173.6	31.9
Wet	Immature	6,404	115.2	21.1
Wet	Seedlings and Saplings	954	---	---
Wet	Bare Ground	127	---	---
Dry	Mature	551	6.9	1.3
Wet	Immature	741	7.3	1.3
Wet	Seedlings and Saplings	64	---	---
Wet		14,968	303.0	55.6

The estimated maximum biological potential contribution to the long-term sustained yield is 4.9 MM Bd. Ft., or 0.9 MM cubic feet, per year.

G. Minerals

Because of the widespread location of these parcels, their geology varies considerably. Primarily it consists of Tertiary sedimentary and volcanic rocks, pre-Tertiary metamorphic rocks and granitic rocks of Mesozoic age. Based upon the evaluation of the Alpine Lakes area itself, which was conducted by the U.S. Geological Survey and U.S. Bureau of Mines, it is surmised that portions of the area do have a "probable" potential for the occurrence of copper, gold, silver, and molybdenum resources. A large portion of the area lies within the Blewett, Cle Elum, and Mineral Creek mining districts. These districts have a long history of gold, silver, and lead production, and have a potential for the future production of nickel. The Northwest Mining Association indicates that the area has, in addition to numerous small occurrences, the following reported occurrences of a significant nature:

Mineral Creek, copper (T.22N.,R.13E., Section 5)

Cle Elum River, iron-nickel (T.22N.,R.16E., Section 8)

Pickwick, copper (T.23N.,R.15E., Sections 9 and 16)

Bureau of Land Management mining claim recordation data indicates that 231 mining claims have been located and recorded for lands lying within or immediately adjacent to the subject lands. The majority of these claims, however, have been located within T23N.,R.14E. to R.17E., which is generally within the Blewett mining district. The degree to which these claims have been explored, developed, and mined is not known.

Only a small southeast portion of the area has been classified "prospectively valuable" for coal and geothermal resources. However, little is known about the geothermal resource potential, and based upon available information any coal resources would not be of commercial value. Even though none of the area is classified "prospectively valuable" for oil and gas, the area is encumbered by four oil and gas leases. Based upon available information, it is surmised that these applications were filed in speculative response to oil and gas exploration activities being conducted on lands lying south and east of the Wenatchee N.F.

Most of the parent material is granite in these units and have had little interest from the mining segment. There are a few mining claims recorded in these areas but little actual mining is being done. The U.S. Geological Survey and the U.S. Bureau of Mines completed a geologic and mineral study of the lands within the Alpine Lakes Management Unit. The report was made available for public inspection in October 1973.

H. Cultural-Historical

Few cultural resources are known within any of the Alpine Lakes adjacent roadless areas, and the potential for the identification of new sites is moderate to low. A more complete discussion of the cultural resources, including suggestions for management direction, is presented within the Alpine Lakes Management Plan. This direction would apply to all cultural sites identified within the Alpine Lakes adjacent roadless areas.

I. Land Use

There are no special land uses in these areas.

J. Fire

Annual fire occurrence is low to moderate. Fuel loadings are heavy at lower elevations and within scattered meadows and alpine clumps of trees at higher elevations. Fire history indicates mostly small, isolated fires have occurred with some periodic large fires.

K. Insects and Disease

Heavy spruce budworm damage occurred in much of this area from 1974-1977. Aerial spray treatment was completed in 1977 and no evidence of defoliation has appeared since.

A recent biological survey in portions of the Icicle adjacent to the Alpine Lakes found pest damage in this area "well above average for the region." (Goheen, 1985)

Phellinus weirii, root rot, Douglas-fir mistletoe, and beetles have combined with the spruce budworm to kill up to 75 percent of the trees in some stands. These pest problems are posing danger to immediately adjacent stands. Removal of the high pest problem species of grand fir and Douglas-fir through clearcutting harvests is recommended. Replanting with pines should reduce the problems present.

L. Private Lands

Most of the large parcels have private lands involved, such as the lands in Icicle, Nason Creek, Cle Elum, and Kachess drainages. In some instances, these blocks are checkerboard with every other section being private. Private lands total 19,970 acres.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

All of these units border the Alpine Lakes Wilderness.

B. Distance from Population Centers

The areas are reachable within one to three hours from population centers such as Seattle-Tacoma, Yakima, Tri-Cities, and Wenatchee.

C. Need for Ecosystem Representation

There are no special or unique ecosystems within these areas that are not already represented in the Alpine Lakes Wilderness.

D. Interest by Proponents, Including Congressional

E. Public Input

F. Other Public Involvement

Interest by proponents, public input, and other public involvement are discussed on pages 113 through 119 in the 1980 Final Environmental Impact Statement for the Alpine Lakes Management Plan which is available for review in the Wenatchee National Forest Supervisor's Office. Comments covered a broad range of subjects including more restrictive management, four-wheel-drive use, road construction, timber sales, campground development, and land allocations. There were no comments addressed specifically to this area.

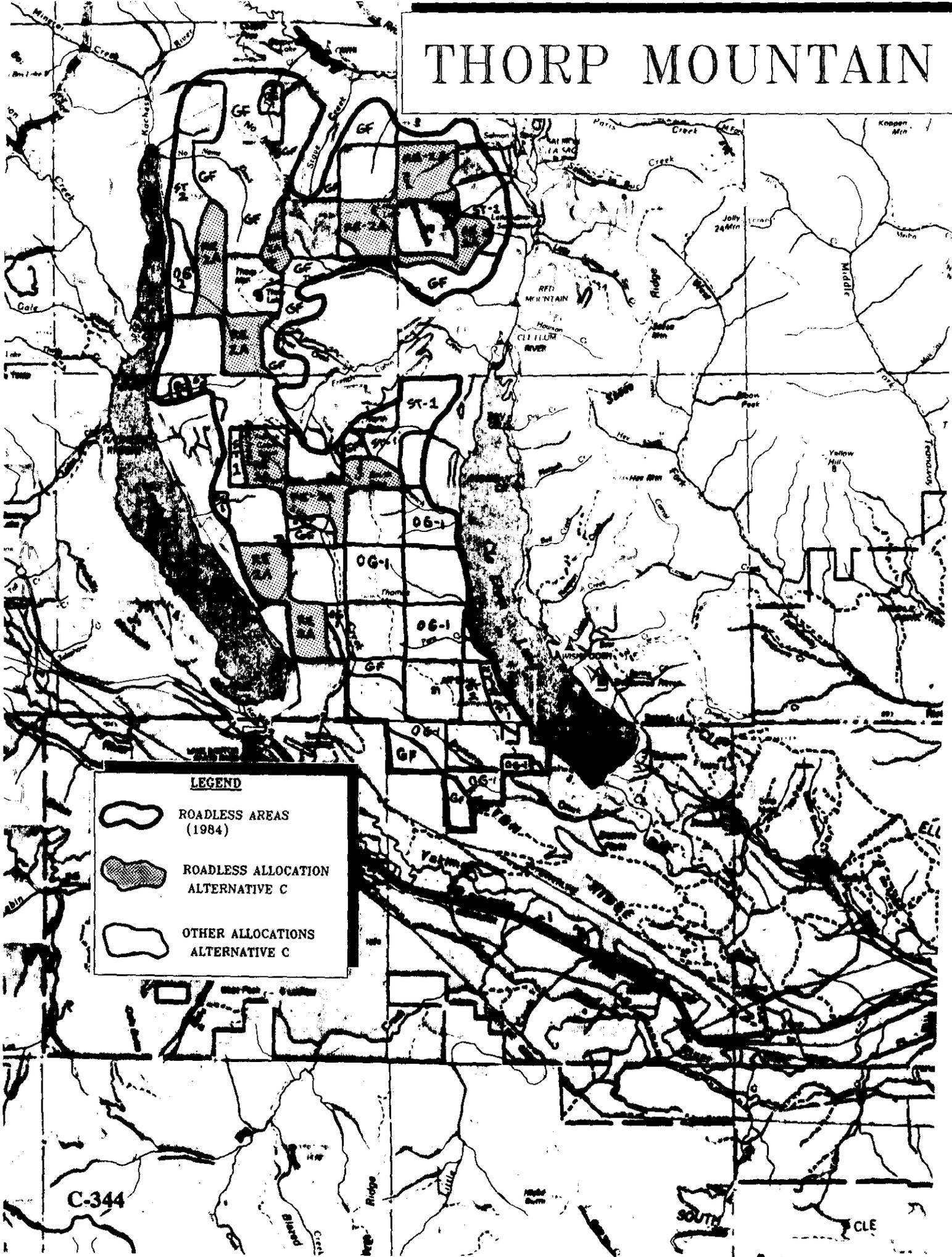
V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

As the management of this area will be that directed by the Alpine Lakes Management Plan and will not change by the alternatives being considered under this planning process, a full analysis is not being made here.

The environmental effects associated with the implementation of the selected plan for the Alpine Lakes Management Area are discussed by resource on pages 86 through 90 of the 1980 Final Environmental Impact Statement which is available for review in the Wenatchee National Forest Supervisor's Office.

THORP MOUNTAIN



LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

C-344

SOUTH

CLE

THORP MOUNTAIN ROADLESS AREA

Gross Acres: 27,857

Net Acres: 15,667

I. GENERAL INFORMATION

A. History

This area was analyzed under the Alpine Lakes Planning Process.

It is being addressed due to new criteria of public interest expressed in the roadless areas remaining roadless. Management direction for this area is currently directed by the Alpine Lakes Management Plan.

B. Location and Access

This area is within Kittitas County and lies within the Cle Elum Ranger District, between Lake Cle Elum and Lake Kachess. It lies adjacent to the Alpine Lakes Wilderness. Access is primarily via the Cle Elum Valley, French Cabin Creek, and Cooper Pass road systems.

C. Physiography and Soils

This area is characterized by steep slopes and hard bedrock materials. Glaciation has had a major role in shaping the surrounding areas, as well as part of this roadless area itself.

Elevations range from 2,400 to almost 6,000 feet. About 60 percent of the soils have formed in very hard sandstone and granitic parent materials. Glacial till soils account for about 30 percent of the area, and about 20 percent of the area soils have formed in schist materials. There are also a few areas of pyroclastic soils. Most of these soils are non-sticky and non-plastic and generally have a high bearing strength. They are all moderately productive and about 70 percent of the area is well suited to timber production. Most of the forested soils are moderately deep and well drained.

D. Climate

Annual precipitation in this area is estimated to be 45 inches, with approximately 50 percent falling as snow. Snow depth is estimated to average 80 inches.

E. Vegetation

Sixty-five percent of this area is tentatively suitable forest land, which consists of the ridge between Lake Cle Elum and Lake Kachess. It has a mostly dense conifer cover with Douglas-fir, Pacific silver fir, noble fir, and western hemlock the most common species. Lodgepole pine and western white pine occupy rocky areas such as Red Mountain.

Recent prescribed burning on the Nanny timber sale has demonstrated the potential of using fire to stimulate new browse vegetation for deer, elk, and mountain goats. Mountain maple sprouts were heavily used by big game immediately after burning on this sale on the boundary of this roadless area.

F. Current Uses

The current use is for dispersed recreation on National Forest lands and commercial timber harvest on private lands.

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Class</u>	<u>Acres</u>
Semi-Primitive Non-Motorized (SPNM)	3,329
Semi-Primitive Motorized (SPM)	12,338

There are 32 miles of trail in the area, 28 miles of which are open to motorized travel. Trail management on the area is made difficult due to the checkerboard ownership.

G. Appearance and Surroundings

The area has moderate visual variety of land form, vegetation, rock form, and water form (lakes and streams). The ridgetops have moderate to high visual variety.

The area is steep, with tree covered mid and lower slopes, and open grassy or rocky upper slopes and peaks. Vegetation is sparse on the upper slopes.

The area is primarily viewed as foreground and middleground from Lake Kachess and Lake Cle Elum. The ridgetops and higher peaks are also viewed as background from trails on the upper slopes and ridges.

The Thorp Mountain area is bounded by the Kachess River Valley and Lake Kachess on the west. It is bounded by the Cooper River Valley on the north, and by the Cle Elum River Valley and Lake Cle Elum on the east. The southern tip of this area extends to Domerie Flats and within 1-1/2 miles of the I-90 highway.

H. Attractions

Major attractions within the area are Thorp Mountain and Thorp Mountain Lookout, Thorp Lake, Red Mountain, Little Joe Lake, French Cabin Basin, and Domerie Peak.

II. CAPABILITY-WILDERNESS CHARACTERISTIC

A. Manageability and Boundaries

The west boundary is parallel to Kachess Lake and River; the north and east boundaries meander somewhere parallel to the Cooper and Cle Elum Rivers with the south ends of the west and east lines pinching together on Easton Ridge.

Most of the boundaries do not follow clearly defined physical features.

B. Natural Integrity

There are plans that will increase the impact from human activity along the northern portions of the area from road building, logging, and mining. The logging would be on both private and National Forest land. The mining is small in scale but proposals are for a road and larger scale ore removal.

There are six trails within the area. There is a lookout on Thorp Mountain and a lookout site on Red Mountain.

C. Natural Appearance

The area is long and narrow and nearly broken into two segments. The southern third of the area is the only place a person could be out of sight and sound of human activities.

D. Opportunities for Solitude

For the most part there are few chances for solitude in this area. The only area would be along Silver Creek which receives light use, except during hunting season.

E. Opportunities for Primitive Recreation

There are approximately 32 miles of trail within this area. Although about one-half of these trails are within sight and sound of other human activities, there are many opportunities for primitive recreation. Some of these are hiking, horseback riding, camping, hunting, and viewing scenery. There are lesser opportunities for fishing and berry picking.

F. Challenging Experiences

There are trailless areas that offer opportunities for cross country hiking challenges. The winter season offers opportunities for snow camping, snowshoeing, skiing, and other winter survival pursuits.

G. Special Wildlife Features

Spotted owls have been sighted near the north boundary of the area. It is not known if any are nesting within the area.

Sensitive wildlife species are listed in Chapter III. Their specific population and distribution are presently unknown.

H. Historical and Scientific Study

There are no special or unique opportunities for outdoor education and scientific or historic study in the area which cannot already be found in the existing wilderness of the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities. Estimated carrying capacity by ROS Class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days per year
Semi-Primitive Non-Motorized (SPNM)	3,300
Semi-Primitive Motorized (SPM)	37,000
TOTAL	40,300

B. Wildlife

The area serves as summer habitat for deer and elk, and provides habitat for a variety of non-migratory game and non-game animals.

C. Fish

There are two streams in this area that support trout: Domerie Creek and Silver Creek. Both streams are small and the amount of fish taken is small. Fishing is a minor activity.

The streams in this area include some of the headwaters for the Yakima River and, therefore, are of some importance to anadromous fish production.

D. Water

Domerie Creek is the water source for the town of Roslyn. Silver Creek is the water source for the town of Easton. Three applications to study hydropower potential have been submitted to the Federal Energy Regulatory Commission for streams that headwater within this area. They are Silver Creek, French Cabin Creek, and Thorp Creek.

E. Livestock

A portion of the Cooper-French Sheep and Goat allotment is within this area. This allotment is for 681 AUM's of sheep.

There is little potential for expansion of this allotment within the area.

F. Timber

This area contains 10,218 acres of tentatively suitable forest land. Other data on the existing suitable forest land is:

Ecotype	Stand Size	Acres	Estimated Standing	
			Volume MMBF	MMCF
Wet	Mature	5,809	164.6	30.2
Wet	Immature	3,456	62.2	11.4
Wet	Seedlings and	254		
Wet	Saplings			
Wet	Bare Ground	339		
Dry	Mature	360	4.5	.8
		10,218	231.3	42.4

The estimated maximum biological potential contribution to the long-term sustained yield is 3.3 MM Bd. Ft., or 0.6 MM Cu. Ft., per year.

G. Minerals

This area is primarily underlain by pre-Tertiary and Tertiary metamorphic and volcanic rocks; however, a small portion of the area near South Peak is underlain by Tertiary-aged sedimentary rocks. The area has not been investigated in detail by the U.S.G.S. or the U.S.B.M., but available references indicate the area has reported occurrences of copper, nickel, molybdenum, gold, and silver. Based on studies conducted on adjacent lands, the subject area can be inferred to have a "probable" mineral resource potential.

According to the Northwest Mining Association, Sections 29 and 30, T. 22N., R.14E. appear to have a porphyry copper deposit which they feel could have a "major" potential for future development. The deposit has not been thoroughly explored, and its production would require major multi-year exploration and development efforts. In the absence of a national emergency or a substantial change in the present economic conditions, however, it is unlikely that the deposit would be brought into production within the next 10 to 20 years.

The entire area is classified prospectively valuable for coal resources by the U.S.G.S., but the area is not known to contain a deposit of commercial value. Even though the area is encumbered by an oil and gas lease, it has not been classified prospectively valuable for oil and gas, nor has it been classified prospectively valuable for any other leasable commodity. Bureau of Land Management mining claim records indicate that 28 mining claims have been located within the area, mainly around the Red Mountain mineralized zone. It is assumed that these claims have been located for the copper and gold resource potential of the area, however, the degree to which these claims have been explored, developed, and mined is not known.

H. Cultural-Historical

Thorp Mountain lies between two areas of concentrated prehistoric use (Salmon La Sac to the east and Lake Kachess to the west), and probably experienced at least some transient use as a consequence. There are no known archaeological sites in the area, however, and surveys conducted on adjacent lands to the south have failed to locate any.

Historic uses include trapping; historic sites are the Red Mountain Lookout (1932-abandoned 1948), the existing Thorp Mountain Lookout (on private land), and the faint remains of one mining-related cabin. The entire locality was included within sheep allotments from the late 1800's until the 1920's, and some remnants of this use may still exist.

I. Land Uses

There are no special use permits in effect in this area.

J. Fire

Annual fire occurrence is low to moderate, generally ignited by lightning. Fuel loadings are light to heavy but broken by openings such as bare ridgetops.

K. Insects and Disease

Heavy western spruce budworm damage occurred in Thorp Creek and Domerie Creek drainages from 1974-1977. Aerial spray treatment for budworm was accomplished in 1977 and no evidence of damage has been apparent since then. Western white pine blister rust and mountain pine beetles are scattered through the area. Dwarf mistletoe is locally heavy in Douglas-fir. Grand firs and Douglas-fir stands are infected by root rots, especially in the Branch Creek area.

L. Private Lands

There are 12,190 acres of private land within the area, belonging to Burlington Northern Railroad Company. Exchange possibilities are excellent as these lands are included in a master exchange agreement with Burlington Northern.

IV. NEEDS

A. Nearby Wilderness and Other Roadless Areas

The Alpine Lakes Wilderness is one to two miles north of the Thorp Roadless area. The Teanaway Roadless area boundary is across the Cle Elum Valley approximately two miles to the east.

B. Need for Ecosystem Representation

There are no unique or special ecosystems within the area in need of representation through roadless classification.

C. Distance from Population Centers

The area is one to three hours driving time from population centers such as Seattle, Ellensburg, and Yakima.

D. Interest by Proponents, Including Congressional

E. Public Input

F. Other Public Involvement

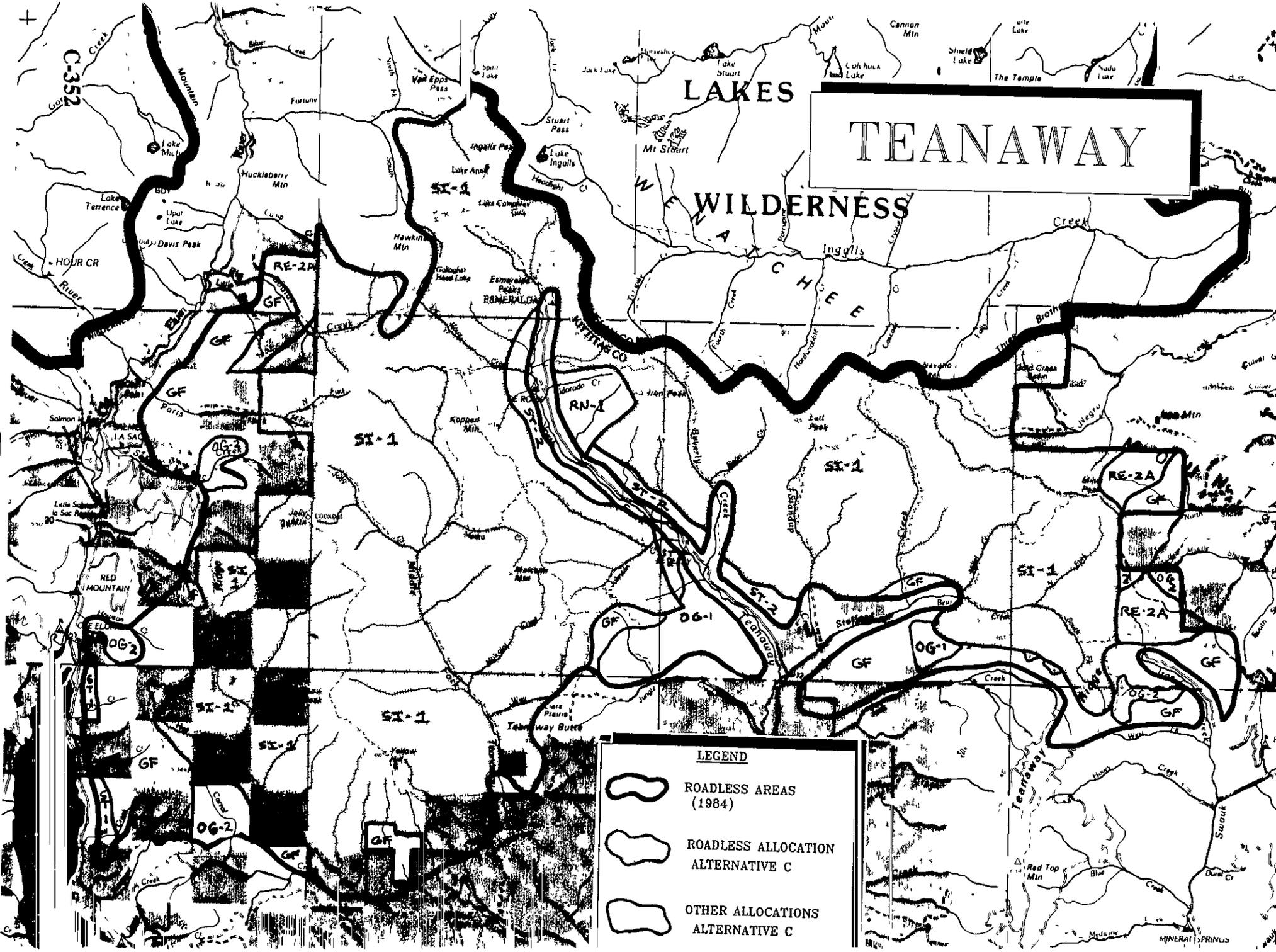
Interest by proponents, public input, and other public involvement are discussed on pages 113 through 119 in the 1980 Final Environmental Impact Statement for the Alpine Lakes Management Plan which is available for review in the Wenatchee National Forest Supervisor's Office. Overall comments covered a broad range of subjects including more restrictive management, four-wheel-drive use, road building, timber sales, campground development, and land allocations. There were no comments addressed specifically to this area.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

As the management of this area will be that directed by the Alpine Lakes Management Plan and will not change by the alternatives being considered under this planning process, a full analysis is not being made here.

The environmental effects associated with the implementation of the selected plan for the Alpine Lakes Management Area are discussed by resource on pages 86 through 90 of the 1980 Final Environmental Impact Statement which is available for review in the Wenatchee National Forest Supervisor's Office.



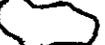
LAKES

TEANAWAY

WEST OF THE SIERRA NEVADA WILDERNESS

CHIEF

LEGEND

-  ROADLESS AREAS (1984)
-  ROADLESS ALLOCATION ALTERNATIVE C
-  OTHER ALLOCATIONS ALTERNATIVE C

TEANAWAY ROADLESS AREA

Gross Acres: 77,466

Net Acres: 66,293

I. GENERAL INFORMATION

A. History

The area was inventoried and analyzed under the Alpine Lakes planning process. It is currently being addressed due to the new criteria of public interest being expressed in roadless areas. Management direction for this area is currently being directed by the Alpine Lakes Management Plan.

B. Location and Access

The area is within Kittitas County and lies within the Cle Elum Ranger District. It is adjacent to the Alpine Lakes Wilderness. The primary access is by the North Fork Teanaway Road which bisects the area and terminates within three-quarter mile of the wilderness boundary. Other roads access the perimeter of the area: from the Cle Elum Valley, from the West and the Middle Forks of the Teanaway, and from The Stafford Creek, Iron Creek, and Jack Creek Roads. The area is crisscrossed by numerous trails including Westfork and Middle Fork Teanaway Trails, Yellow Hill Trail, Johnson Medra Trail, Boulder De Roux Trail, Beverly Bean, Standup, Miller Bear, and County Line Trails, plus several shorter trails.

C. Physiography and Soils

This area is characterized by a complex geologic pattern. The higher slopes bordering Ingalls Creek are made up mostly of serpentine materials and much of the area has bare exposed slopes (none or little vegetative cover). Between Lake Cle Elum and the North Fork Teanaway River, the high ridges are made up of very hard sandstone and granitic rock types. Below these rock types, the topography tends to broaden out. Here the area is dominated by Chumstick sandstone materials that have many pyroclastic and basalt dikes intermixed.

Elevations range from about 2,400 to more than 7,000 feet. Roughly 60 percent of the area is composed of soils that have formed in the Chumstick sandstone parent materials. These soils range in texture from sandy loam to sandy clay loam. They usually become sticky and plastic when wet, and the surface often becomes very slippery even during light rains. About 15 percent of the area is made up of the very hard sandstone and granitic parent materials. Soils that have formed in these materials tend to be non-sticky and non-plastic. They usually are not slippery and have good bearing strength. Serpentine soils make up about 11 percent of the area. They are chemically unbalanced, so most vegetative types do not do well on them. These soils tend to be very erosive. Except for the serpentine soils, they are all moderately productive. Most are well drained and moderately deep.

D. Climate

The Teanaway Roadless Area lies within the 40 to 80 inch precipitation zone with an estimated 60 percent of the moisture occurring as snow. Snow depths are estimated to range from 4-15 feet.

E. Vegetation

This area contains 40 percent tentatively suitable forest land. Most of the timbered area is along stream bottoms and north slopes. Past fires and shallow soils contribute to the open areas dominated by shrubs including ceanothus, bitter cherry, willow, and numerous forbs and grasses. Many of these open areas are gradually being encroached upon, primarily by Douglas-fir and grand fir. Subalpine fir and lodgepole pine are common at higher elevations.

F. Current Uses

This area is used for dispersed recreation. It is predominantly classified as the Teanaway Special Area which is protected for its unique and natural conditions. The Eldorado Research Natural Area is also located in this roadless area.

The area contains the following kinds and amounts of Recreation Opportunity Spectrum (ROS) Classes:

<u>ROS Classes</u>	<u>Acres</u>
Semi-Primitive Non-Motorized (SPNM)	22,790
Semi-Primitive Motorized (SPM)	43,503

There are approximately 147 miles of trail, 70 of which are open to motorized use.

G. Appearance and Surroundings

The area has a high variety of landforms, vegetation, and rockforms. The area ranges from rounded, broad ridgetops to steep, rocky rugged ridges. The hillsides and side slopes are steeply broken. The streams have dendritic patterns of drainage. Stream bottom vegetation is dense. Vegetation is sparse near the ridgetops with a broken, open mixed conifer vegetation pattern on the side slopes.

The area is primarily viewed as background except from the trails that pass through it. From trails the area is viewed as foreground and middle ground. The Teanaway River Corridor is classified scenic forest in the foreground and middle ground.

H. Attractions

The main features of this area are Engles Peak, Lake Ann, Gallagher Lake, and the line of peaks in the Wenatchee Mountains which makes up the county line between Kittitas and Chelan Counties. These include Iron, Earl, Navaho, and Miller peaks.

II. CAPABILITY-WILDERNESS CHARACTERISTICS

A. Manageability and Boundaries

The north boundary is the south boundary of the Alpine Lakes Wilderness on the crest of the Wenatchee Mountains. The remainder of the boundary is a meander line that takes in the Teanaway drainage and the southeastern portion of the Cle Elum drainage, excluding road corridors.

Except for the wilderness boundary, the boundaries do not follow clearly defined physical features.

B. Natural Integrity

The impact of past human use is evidenced by 147 miles of trail, 15 miles of abandoned mining roads, 3 mining complexes, 6 cabin sites, and 3 lookout sites. About 70 miles of trail are open to motorcycle use. The mining complexes and mining related cabins have been abandoned for many years. The lookouts were burned during the mid 1960's.

C. Natural Appearance

The Teanaway Roadless Area is large enough and the topography is such that persons visiting the area may seek out areas that appear natural and away from ordinary human activity and development.

It is, however, possible to view distant roads and timber harvest activities from the ridge and mountain tops.

D. Opportunities for Solitude

This area offers many opportunities, with the exception of the North Fork Teanaway Road; the area is essentially a trapezoid, 19 miles wide (east-west) and 13 miles deep (north-south). Two principal drainages are roadless (West and Middle Forks of the Teanaway) while the North Fork of the Teanaway has a road along the river. Most of the drainages and ridges have trails.

E. Opportunities for Primitive Recreation

There are many opportunities, such as hiking, horseback riding, camping, hunting, fishing, viewing scenery, and mountain climbing.

F. Challenging Experiences

There are several peaks and rock cliffs to offer challenges to rock climbers. There are trailless areas for cross-country enthusiasts. There are also opportunities for winter survival and other wilderness challenges.

G. Special Wildlife Features

Spotted owls have been sighted in Jungle Creek near the boundary of the area. It is not known if any are nesting within the area.

Sensitive wildlife species are listed in Chapter III. Their specific population and distribution are presently unknown.

H. Historical and Scientific Study

Most of the proposed Eldorado Research Natural Area is within this area. It contains unique combinations of plant groups and geology.

There are no other special or unique opportunities for outdoor education and scientific or historical study that cannot already be found in the existing wilderness on the Forest.

III. RESOURCES AND POTENTIALS

A. Recreation

The area has potential value for unroaded types of recreation activities. Estimated carrying capacity by ROS Class is as follows:

ROS Class	Capacity in Potential Recreation Visitor Days Per Year
SPNM	22,800
SPM	103,500
TOTAL	126,300

B. Wildlife

The area serves as summer habitat for deer and elk and provides habitat for a variety of non-migratory game and non-game animals.

C. Fish

There are six streams in this area that support trout: the West and Middle Fork Teanaway Rivers, Startup, Stafford, Miller and Bear Creeks. The two forks of the Teanaway River are the largest of these streams and present the only consistent fishing potential. The fish are mostly Eastern Brook Trout.

D. Water

There are no water related encumbrances or planned activities within the area.

E. Livestock

Portions of the Corral-Fortune Sheep and Goat, and the Stafford Cattle and Horse allotments are within this area. The Stafford allotment is for 70 AUM's of cattle every other year. The Corral-Fortune allotment is for 1,044 AUM's of sheep. There is no potential for expansion of these allotments.

F. Timber

This area contains 26,775 acres of tentatively suitable forest lands. Other data on the existing suitable forest stands is:

Ecotype	Stand Size	Acres	Estimated Standing	
			Volume MMBF	MMCF
Dry	Mature	2,629	33 0	6.0
Dry	Immature	3,519	34 5	6.3
Dry	Mature	4,494	127 4	23.4
Wet	Immature	20,309	284 4	52 2
Wet	Seedlings and	297	---	---
Wet	Saplings			
Wet	Bare Ground	21	---	---
	TOTAL	26,775	479.3	87.9

The estimated maximum biological potential contribution of this area to the potential allowable harvest is 8.6 MM Bd. Ft., or 1.6 MM Cu. Ft., per year.

G. Minerals

This area is primarily underlain by Tertiary sedimentary rocks; however, the south 20 percent is also underlain by Tertiary volcanics while the northern 20 percent is underlain by both Mesozoic ultramafic rocks and volcanic rocks of pre-Tertiary age. This area has not been studied in detail by the U.S. Geological Survey and U.S. Bureau of Mines. Available information, however, indicates the area has reported occurrences of copper, iron, nickel, chromium, cobalt, gold, and silver. The area lies within the Cle Elum-Blewett mining districts and within the Blewett nickel-iron province. Under present conditions it appears that any gold related activity would be relatively small scale, and nickel-iron-chromium related activity will depend on improvements in extractive technology and on major changes in the worldwide supply/demand environment for these commodities. Even though present activity appears to be relatively minor, the Northwest Mining Association indicates the area contains, in addition to numerous small occurrences, the following deposits which have a "major" potential for future development:

Cle Elum River iron-nickel deposit (T.22N.,R.14E.,Section 2 and 3)

Negro Creek iron-nickel deposit (T.22N.,R.16E., Section 8)

The area does have a potential for the occurrence of deep-seated deposits, but this resource potential has not been explored. Bureau of Land Management recordation data indicates that 187 mining claims have been located within or immediately adjacent to the subject area. Many may have been located in speculative response to the on-going activity at the Cannon Mine near Wenatchee. The degree to which these claims have been explored, developed, and mined is not known.

A large portion of the area is classified by the U.S. Geological Survey as being "prospectively valuable" for oil and gas resources; however, it is encumbered by only one oil and gas lease. None of the area is classified "prospectively valuable" for any other leasable commodity.

H. Cultural-Historical

Prehistoric use of the Teanaway roadless area was likely. Annual huckleberry picking expeditions were made into the country above Paris Creek and Salmon La Sac as late as the 1920's, and hunting and huckleberry gathering were common in the Teanaway (particularly around Koppen Mountain). Intensive field survey would be required to determine prehistoric site distributions.

Historically, the area encompasses a large portion of the old Cle Elum Mining District as well as some spillover from the Blewett Mining District to the east. Mining sites are numerous and include such diverse components as cabins, campsites, equipment, wagon roads, workings, and three known mill sites. The area was also used for sheep grazing between the late 1800's and the 1920's. Some of the herder's camps from this time period are identifiable by carvings on nearby trees. Finally, the area includes the former sites of the Jolly Mountain Lookout (1936-1968) and the Teanaway Butte Lookout (1935-1968).

I. Land Use

There is a special use permit in effect for the Eldorado Research Natural Area. An Outfitter/Guide is operating in this area under a permit.

J. Fire

Annual fire occurrence is low to moderate; generally ignited by lightning. Fuel loadings are light to heavy but broken by streams and bare ridgetops.

k. Insects and Disease

The low elevation grand fir, Douglas-fir stands in Miller, Standup, and Stafford Creek were heavily defoliated by western spruce budworm in the 1970's. In 1975 a trial aerial spraying was conducted using Fenitrothion in this area. This was unsuccessful in killing the budworms present. However, trees were already weakened and bark beetles have finished killing large areas in several of these drainages. Mistletoe is also common in the Douglas-fir, with root rot killing both grand and Douglas-firs.

L. Private Lands

There are 11,172 acres of private lands within the area belonging to Burlington Northern Railroad. Exchange possibilities are excellent as these lands are included in a master exchange agreement with Burlington Northern.

IV. NEED

A. Nearby Wilderness and Other Roadless Areas

This area shares approximately 16 miles of common boundary with the Alpine Lakes Wilderness.

B. Distance from Population Centers

The area is approximately one to three hours driving time from areas such as Seattle, Yakima, and Wenatchee.

C. Need for Ecosystem Representation

There are no unique or special ecosystems within the area in need of representation through wilderness classification.

D. Interest by Proponents, Including Congressional

E. Public Input

F. Other Public Involvement

Interest by proponents, public input, and other public involvement are discussed on pages 113 through 119 in the 1980 Final Environmental Impact Statement for the Alpine Lakes Management Plan which is available for review in the Wenatchee National Forest Supervisor's Office. Overall comments covered a broad range of subjects including more restrictive management, four-wheel-drive use, road construction, timber sales, campground development, and land allocations. Four-wheel-drive use on this area was specifically commented upon.

V. ENVIRONMENTAL CONSEQUENCES

A. Environmental Consequences Associated with the Alternatives

As the management of this area will be that directed by the Alpine Lakes Management Plan and will not change by the alternatives being considered under this planning process, a full analysis is not being made here.

The environmental effects associated with the implementation of the selected plan for the Alpine Lakes Management Area are discussed by resource on pages 86 through 90 of the 1980 Final Environmental Impact Statement which is available for review in the Wenatchee National Forest Supervisor's Office

APPENDIX D

STANDARDS AND GUIDELINES FOR ALL ALTERNATIVES

A. INTRODUCTION AND PURPOSE

Standards and guidelines were developed to meet resource objectives and to provide for the protection of resources. They were developed concurrently with management strategies and prescriptions. The original standards, guidelines, and prescriptions were prepared before the Alternatives displayed in the DEIS were developed.

Between the DEIS and the FEIS, standards and guidelines were reviewed and revised based on public comment. Also, as a result of public comment, three new prescriptions were developed which include: a Mather Memorial Parkway Prescription, an Unroaded Wildlife Prescription, and an Unroaded Harvest Prescription. The revisions between the DEIS and the FEIS resulted in variations between alternatives that are identified and discussed below. The revised Standards and Guidelines and Management Area Prescriptions are found in Chapter IV of the Forest Plan and apply to Alternative C, the Preferred alternative.

B. SOURCE

The Standards and Guidelines were developed by the Interdisciplinary (ID) Team working as a team and not as individual specialists. The ID team used the Forest Service Manual, various handbooks, the Regional Guide for the Pacific Northwest Region, and research publications as sources of information. The Interdisciplinary Teams working on the Standards and Guidelines included the Wenatchee National Forest Management Group (Forest Supervisor, Staff Specialists, and District Rangers), Ranger District specialists, and biologists from Washington State Departments of Wildlife and Fish.

C. STANDARDS AND GUIDELINES WHICH ARE DIFFERENT FROM THE PREFERRED ALTERNATIVE

The Forest-wide Standards and Guidelines and the Management Area Specific Prescriptions in Chapter IV of the Forest Plan are applicable to all alternatives with the exceptions noted below.

ALTERNATIVE NC (NO CHANGE)

In order to display the no change alternative the only standards and guidelines which could apply without changing outputs and objectives were those contained in existing plans, which include:

The Alpine Lakes Management Plan - 1982

The Chelan Unit Plan - 1976

The Kittitas Unit Plan - 1979

The Naches Ranger District Multiple Use Plan - 1961

The Tieton Ranger District Multiple Use Plan - 1968

The Wenatchee National Forest Timber Management Plan - 1963 as amended

The Snoqualmie National Forest (Naches-Tieton Working Circle) Timber Management Plan - 1969 as amended

ALTERNATIVES B AND D

These alternatives do not contain the following land allocations and therefore the prescriptions do not apply:

EW-3, Unroaded Wildlife which will allow management of Big Game in an unroaded setting.

MP-1, Mather Memorial Parkway which does not allow scheduled timber harvest.

RE-4, Unroaded Timber Harvest which will allow timber harvest without roads, neither temporary nor permanent.

WS-1, Scenic River.

WS-2, Recreational River.

WS-3, Wild River.

ALTERNATIVES A, G AND H

These alternatives do not contain the following land allocations and therefore the prescriptions do not apply:

EW-3, Unroaded Wildlife which will allow management of Big Game in an unroaded setting.

MP-1, Mather Memorial Parkway which does not allow scheduled timber harvest.

RE-4, Unroaded Timber Harvest which will allow timber harvest without roads, neither temporary nor permanent

ALTERNATIVES E AND F

These alternatives do not contain the following land allocations and therefore the prescriptions do not apply:

EW-3, Unroaded Wildlife which will allow management of Big Game in an unroaded setting.

RE-4, Unroaded Timber Harvest which will allow timber harvest without roads, neither temporary nor permanent.

ALTERNATIVE J

This alternative does not contain the following land allocations and therefore the prescriptions do not apply:

EW-3, Unroaded Wildlife which will allow management of Big Game in an unroaded setting.

MP-1, Mather Memorial Parkway which does not allow scheduled timber harvest.

RE-4, Unroaded Timber Harvest which will allow timber harvest without roads, neither temporary nor permanent.

WS-1, Scenic River.

WS-2, Recreational River.

WS-3, Wild River.

The Alpine Lakes Management Area is held constant in all alternatives including this alternative, and prescriptions within that area are the same as other alternatives. The following prescriptions are unique to areas outside of the Alpine Lakes Management Area in Alternative J:

EW, Wildlife Winter Range and RM, Range Management will be combined and managed for deer, elk and mountain goat winter range and livestock summer range. Timber yield tables are similar to the GF, General Forest (shelterwood) Permanent and seasonal road closures will provide wildlife habitat security. Emphasis will be placed on maximizing forage for both livestock and big game benefit.

ST, Scenic Travel Routes outside of the Alpine Lakes Area will be modeled as general forest with a 400 foot zone along all paved county/forest roads and a 200 foot zone along all non-motorized trails with emphasis on a shelterwood or partial retention cutting system.

APPENDIX E

ASSESSMENT OF RIVERS AS TO THEIR ELIGIBILITY AND SUITABILITY FOR DESIGNATION UNDER THE WILD AND SCENIC RIVERS ACT

I. INTRODUCTION

The Wild and Scenic Rivers Act, as amended, was enacted by Congress to provide Federal protection for selected free-flowing rivers within the United States. During the initial preparation of the Draft Environmental Impact Statement (DEIS) and The Proposed Land and Resource Management Plan for the Wenatchee National Forest, a study of certain rivers on the Forest was undertaken to determine their potential eligibility and suitability for inclusion in the Wild and Scenic River System. At that time, the study was confined, with the exception of the Entiat drainage, to those rivers listed on the Nationwide Rivers Inventory, originally published by the Department of Interior in 1980, and updated in 1982. This inventory was developed to identify rivers which would, by virtue of their exceptional natural, cultural, scenic or recreation resources, qualify for further consideration for inclusion in the National Wild and Scenic River System. The Wenatchee, White and Chiwawa Rivers, and Icicle Creek were identified in the inventory as meeting these criteria. The initial Forest planning effort also included the Entiat River and two tributaries, in response to public interest expressed at that time.

As a result of both in-Service review and the analysis of comments received from the public during the comment period for the DEIS, the Forest Supervisor assigned an Interdisciplinary (ID) Team the task of making a reassessment of eligibility for all rivers on the Wenatchee National Forest. An ID Team was also assigned the task of completing a suitability analysis for the resulting eligible rivers. The results of these studies were published in 1988 as a supplement to and correction of the original Appendix E that was distributed with the Wenatchee National Forest DEIS.

The present Appendix E is a modification and expansion of the 1988 Supplement. Based on additional study, new information, and public response to the Supplement, adjustments have been made in the data presented, including changes in certain river segment classifications. One notable modification is in the status of the Waptus River, on the Cle Elum Ranger District, which was reexamined and found to be eligible and suitable for inclusion in the Wild and Scenic River System.

II. ELIGIBILITY PROCESS

Rivers identified for evaluation were included in the eligibility study if they met any of the following criteria:

1. They were identified in the Nationwide Rivers Inventory (NRI), published by the National Park Service in 1982.
2. They were identified by the public, and appeared to meet the criteria outlined in the joint Department of Agriculture/Department of Interior Final Guidelines for Eligibility, Classification and Management of River Areas.
3. They were identified through in-Service study, had characteristics similar to the rivers identified in the NRI, and appeared to meet the criteria of the joint agency guidelines.

The list of rivers meeting the above criteria and a notation as to how they were identified are shown in Table E-1 below.

TABLE E-1
RIVERS CONSIDERED FOR ELIGIBILITY

RIVER	HOW IDENTIFIED
American	Public Interest
Bumping	Public Interest
Chiwawa	Nationwide Rivers Inventory
Cle Elum	Public Interest
Cooper	Forest Inventory
Entiat	Public Interest
Icicle Creek	Nationwide Rivers Inventory
Kachess	Forest Inventory
Little Naches	Public Interest
Little Wenatchee	Public Interest
Mad	Public Interest
Naches	Public Interest
Napeequa	Forest Inventory
North Fork Entiat	Public Interest
Rattlesnake Creek	Public Interest
Teanaway	Public Interest
Tieton	Public Interest
Waptus	Forest Inventory
Wenatchee	Nationwide Rivers Inventory
White	Nationwide Rivers Inventory

Once the list was developed, each river was evaluated to determine its eligibility. In order to be eligible a river must meet both of the following criteria:

- a. The river is free-flowing.
- b. The river or river segment possesses scenic, recreational, geological, fish, wildlife, historical, cultural or ecological values which are judged to be outstandingly remarkable.

The determination of whether a river area contains “outstandingly remarkable” values is a professional judgement. The interdisciplinary evaluation team was made up of specialists that included a Landscape Architect, Recreation Management Specialist(s), Geologist, Fisheries Biologist, Wildlife Biologist, Archaeologist, and individuals with backgrounds in ecology. The fourteen member team included representatives who were considered the most qualified river experts on each Ranger District.

ID team specialists consulted with specialists from other areas, both within the Forest Service and from various Federal, State, and private organizations, in order to develop preliminary evaluations of the “outstandingly remarkable” criteria. In addition to the ID team’s professional judgement, information and ratings from other sources were used, including the Nationwide Rivers Inventory, River Recreation in Washington: An Initial Inventory and Assessment, the Pacific Northwest Rivers Study-Washington, and other similar assessments.

During this phase of the eligibility determination, the ID team looked at both the entire river as well as individual segments, with the assumption that segments might be eligible for classification even if the entire river did not meet the free-flowing criteria.

A separate ID team conducted a suitability determination on all eligible rivers resulting from this effort. The results of the suitability determination is contained later in this Appendix.

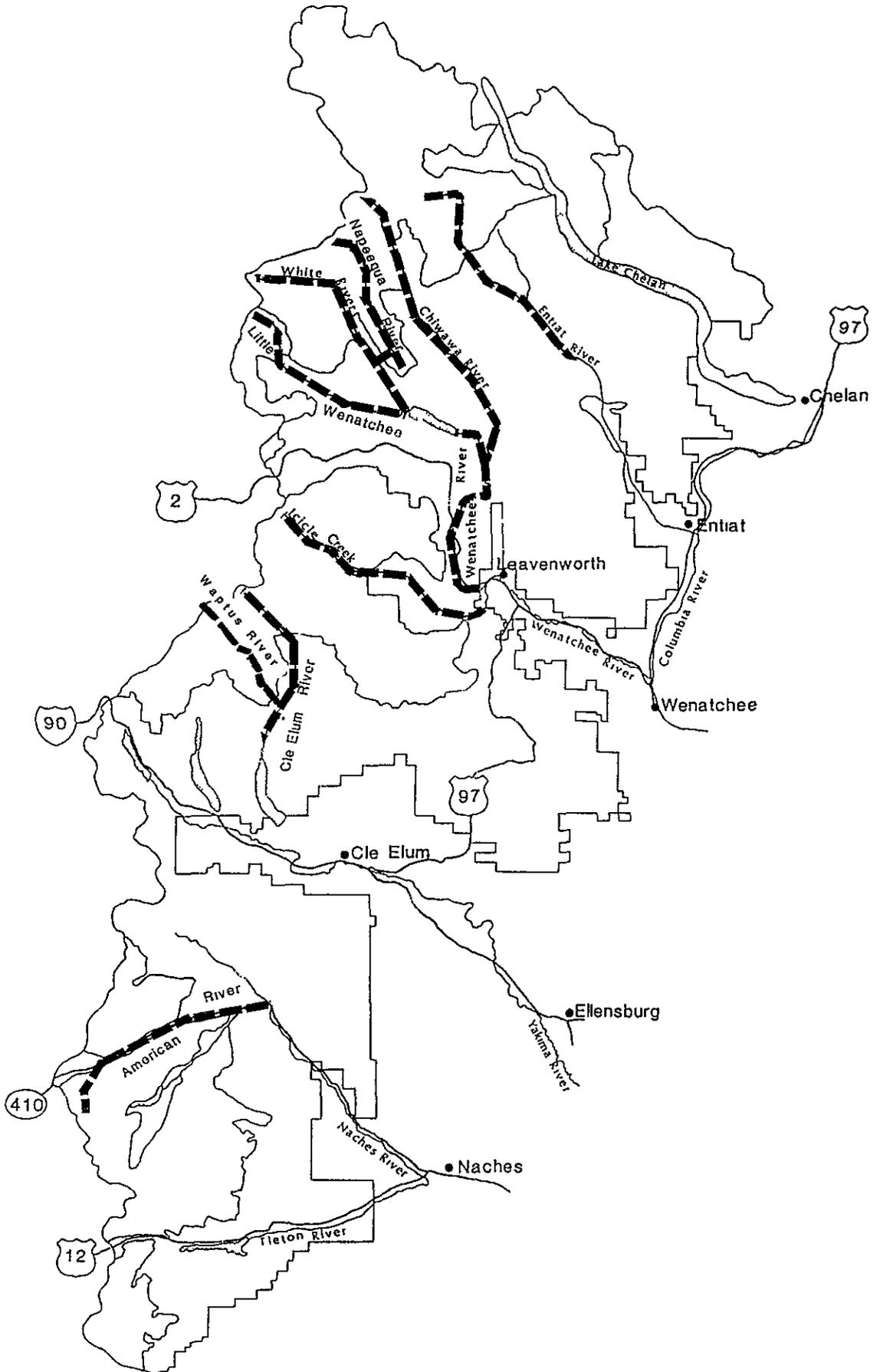
Thirteen rivers in addition to those listed above were also evaluated for potential eligibility as a result of public response to the 1988 Supplement. However, none were found to meet the eligibility criteria. The results of these findings are documented in the analysis file of the Forest Plan, and are further described in the Response to the Public Comments in Appendix K of the FEIS.

The Yakima River was not included in the eligibility determination due to the fact that National Forest lands make up less than one percent of the ownership in the drainage. However, the Yakima is listed as one of 26 rivers presently under consideration as part of the Washington State Scenic River Assessment program.

A. ELIGIBLE RIVERS

This section describes the results of the analysis of those rivers or river segments determined to be eligible for designation under the Wild and Scenic Rivers Act. The ID Team found, using the eligibility process described above, that at least segments of all of the rivers listed below are eligible for designation, and a suitability study was conducted for each. General setting, eligibility values and conclusions are discussed by Ranger District, for each river.

ELIGIBLE RIVERS UNDER THE WILD AND SCENIC RIVERS ACT



CLE ELUM RANGER DISTRICT

CLE ELUM RIVER

The Cle Elum River corridor, from the headwaters to the head of the Lake Cle Elum Reservoir, is being considered for designation as a potential Wild and Scenic River. Below this point, the river has been heavily modified by the Lake Cle Elum Dam, and as a consequence, does not meet the eligibility criteria. The total length of the portion of the corridor under study is 24.5 miles, with 45% of this being in private ownership. The upper four miles are located entirely within the Alpine Lakes Wilderness.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	13.5	4,320
Private	11.0	3,520
Total	24.5	7,840

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Cle Elum River originates east of the Cascade Crest in the Alpine Lakes Wilderness. The topography varies from a broad, glaciated, U-shaped valley in the upper reaches, to a predominantly rugged, steep-walled valley midsection, to somewhat rolling, open terrain in the lower reaches. Vegetation is a mixed conifer timber type with frequent meadow openings, including some extensive wetlands. The river flows through Little Hvas, Hvas and Tucquala Lakes, three natural bodies of water within the corridor.

A significant portion of the lower Cle Elum River was heavily modified by the construction of the Lake Cle Elum Dam in 1934. Because of this, neither the impounded area nor the segment below the dam were considered eligible for designation.

A potential water deflection development is under study near the mouth of the Cooper River. The development would consist of a number of large boulders, taken from a nearby rock source, placed in chevron and linear formations within the Cooper and Cle Elum River channels. The purpose of the structures is to deflect the water away from the west bank of the Cle Elum River, in the vicinity of the Salmon La Sac Campground, where the water is badly undercutting the bank and existing facilities. The structures would be natural appearing and would neither impede the free-flowing character of the river nor alter the present channel here. There are no other potential water resource development sites nor existing impoundments along the portion of the corridor under study.

Eligibility Determination - Description and Rating of Values

Scenery The upper Cle Elum corridor is a broad, flat, glaciated valley bottom that offers expansive views of the surrounding Cascade peaks, high alpine glaciers and permanent snowfields. Ribbons of old growth, avalanche chutes, talus and bedrock outcrops mark the slopes. In the valley bottom are situated Hyas and Little Hyas Lakes, which offer a spectacular view of brilliant green marshlands contrasted with the forest green of the surrounding trees. A profusion of wildflowers fill the upland meadows along the corridor in late spring and early summer. Below the wilderness boundary, the river valley narrows. Steep, rugged rock walls enclose the river course, which plunges downward in cascades, rapids waterfalls, and occasional deep pools. In the lowest segment, the valley widens once again, offering vistas of the surrounding terrain. Huge, polished rock outcrops dot a river course that is bordered by stands of large-diameter conifers.

RANKING: Outstandingly remarkable.

Recreational The Cle Elum River corridor provides a great variety of recreation opportunities. Hiking, camping, nature study, fishing, hunting, viewing scenery, bicycling, auto touring, kayaking, summer home use and picnicking draw large numbers of people from both sides of the Cascade Mountains. There is excellent accessibility to the area, with all but the last four miles of river being within 1/4 mile of a road. The corridor also serves as a major route into the Alpine Lakes Wilderness, and intersects the Pacific Crest National Scenic Trail in the upper reaches. Hyas, Little Hyas and Tacquala Lakes provide some boating opportunities, and kayaking and white water canoeing are popular on the river. A national kayak race is held at Salmon La Sac, which attracts over 200 entrants and 1000 spectators each year.

RANKING: Outstandingly remarkable.

Geologic The river originates in seasonal snowfields near the Cascade Crest, flowing from there through glaciated valleys characterized by precipitous rock outcrops, high elevation cirques, mountain peaks, and steep, forested slopes. In the lower reaches, the river channel flows through more gently sloping, terraced glacial deposits.

RANKING: Above average.

Fish Historically, the anadromous fisheries of the Cle Elum River Valley were a major contributor to the fish runs of the Yakima and Columbia River basins. Species using the Cle Elum system were sockeye, steelhead, chinook and coho salmon. The Cle Elum Dam now blocks all passage of anadromous fish into Cle Elum Lake/Reservoir. However, a study by the Northwest Power Planning Council is underway to look at the feasibility of reintroducing anadromous salmonoids into the upper Cle Elum. Initially, sockeye salmon are the main species of study, but eventually other species may also be considered.

There is also a fair resident fishery in the Cle Elum River, including rainbow, cutthroat and Brook trout, as well as the sensitive bull trout.

RANKING: Average.

Wildlife The Cle Elum offers excellent habitat diversity. The area is used by elk, deer, black bear, cougar and bob cat. Spotted owl habitat exists within the corridor, and there is potential bald eagle, lynx and grizzly bear habitat as well. There have also been bald eagle sightings at the upper end of the Lake Cle Elum Reservoir. In addition, the steep cliffs and precipitous outcrops along the middle stretches of the river are frequented by large numbers of mountain goat.

RANKING: Above Average.

Cultural/Historical There was extensive use of the Cle Elum drainage by the Yakima Indians for fishing, hunting, camping, access to huckleberry fields and travel via Deception Pass into the Skykomish country. The area has very high cultural values today for the Yakima Indian Nation. There is also a substantial mining history connected with the corridor. Several older claims, a settlement locality, cabin sites and millsite locations exist along the valley bottom, including the Salmon La Sac Guard Station, which is on the National Register of Historic Places.

RANKING: Outstandingly remarkable.

Other Values There are a large number of ecotypes within the Cle Elum River corridor, including wetlands, avalanche chutes, riparian vegetation, cliffs, old burns and areas of mixed conifer cover. However, no sensitive plant species have been identified within the portion of the river under study.

RANKING: Above Average.

Conclusion

The Cle Elum River, above Cle Elum Lake, meets the eligibility criteria for Wild and Scenic River classification. It has "**OUTSTANDINGLY REMARKABLE**" scenic, recreational, historical and cultural values. This river should be further evaluated for its suitability as an addition to the Wild and Scenic River System.

WAPTUS RIVER

The entire Waptus River, from the headwaters to the confluence with the Cle Elum River, is being considered for designation as a potential Wild and Scenic River. The total length of the corridor is 13.0 miles, with all of the acreage being National Forest. The upper 12.0 miles are located entirely within the Alpine Lakes Wilderness.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	13.0	4,160
Total	13.0	4,160

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Waptus River originates just east of the Cascade Crest in the Alpine Lakes Wilderness. Topography consists of a glaciated, U-shaped valley, interrupted by a narrow stretch of steep-walled gorge. Vegetation varies between a mixed conifer timber cover and both wet and dry meadow habitats.

The Waptus River is unmodified and free-flowing throughout its length.

Eligibility Determination - Description and Rating of Values

Scenery At its upper end, near Lake Ivanhoe, the Waptus River flows through a classic, U-shaped valley, offering a spectacular view of the pristine, timbered valley below, and of the surrounding, snow capped peaks. The river tumbles through two sizable mountain lakes and a series of falls, to its confluence with the equally scenic Cle Elum River. Old growth stands, and wet and dry meadow openings offer a diversity of vegetation for viewing, particularly the latter with their profusion of wildflowers and bog-associated plants.

RANKING: Outstandingly remarkable.

Recreational The Waptus River is tremendously popular for backcountry use by both hikers and those with stock. In fact, the Waptus River Trail #1310, an eleven mile long trunk trail that extends into the wilderness via the river corridor, is one of the most heavily used trails in the Pacific Northwest. This trail is also intersected along the way by several tributary trails as well as by the Pacific Crest Trail. Dispersed camping opportunities exist the entire length of the river.

RANKING: Above average.

Geologic The river rises in a glacially-carved, U-shaped valley. The course is typified by oxbow lakes in large, wet meadows, by sheer rock faces, and by numerous examples of glacial striations on the valley walls as well as glacial till, moraines and roches moutonnees. Near the lower reaches is a spectacular gorge, with pools and slabs characterizing the channel through there.

RANKING: Above Average.

Fish Because of the dam below Lake Cle Elum, the habitat in the lower Waptus is currently unavailable to anadromous fish. However, planted rainbow trout and the sensitive bull trout inhabit the river.

RANKING: Below Average.

Wildlife Wildlife in the Waptus corridor includes mule deer, elk, bear, coyote, cougar, spotted and barred owls, eagles, osprey, loons, many songbirds and small mammals. Excellent wildlife viewing opportunities exist in several areas along the river, including frequent mountain goat sightings on the cliffs and bluffs within the corridor.

RANKING: Average.

Cultural/Historical The Yakima Indians made use of the Waptus River corridor for backcountry hunting, plant gathering and travel. At least one prehistoric campsite has been documented within the drainage. Historic use was primarily oriented to low intensity fur trapping, represented today by the remnants of cabin sites, marten sets, and a dug-out canoe. Mining also took place within the corridor, particularly near the headwaters.

RANKING: Average.

Other Values There is a complex variety of ecotypes within the Waptus drainage. Among these are sizable old growth stands, riparian vegetation, cliffs, dry meadows, and wet lands that are characterized by a wealth of bog-associated vegetation, including the carnivorous sundew and bog orchids.

RANKING: Above Average.

Conclusion

The Waptus River meets the eligibility criteria for Wild and Scenic River classification. It has “**OUTSTANDINGLY REMARKABLE**” scenic values. This river should be further evaluated for its suitability as an addition to the Wild and Scenic River System.

ENTIAT RANGER DISTRICT

ENTIAT RIVER

The Entiat River corridor, from the headwaters to the private land boundary above Burns Creek, is being considered for designation as a potential Wild and Scenic River. Below Burns Creek, the Entiat River does not meet the eligibility criteria due to extensive straightening and channeling of the river course. The total length of the portion of the corridor under study is 31.5 miles, with all of the acreage being National Forest. The upper 12.5 miles are located entirely within the Glacier Peak Wilderness.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	31.5	10,080
Total	31.5	10,080

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Entiat River originates four and one-half miles east of the Cascade Crest in the Glacier Peak Wilderness. Topography varies from a narrow, steep, glaciated valley in the upper reaches, to a somewhat broader U-shaped valley through the middle and lower stretches. Vegetation is a combination of mixed conifer timber types, with Douglas-fir, ponderosa pine and meadow openings in the lower portion. There has been some modification of the landscape adjacent to the river due to the 1970 Entiat wildfires and as a consequence of timber management activities in the area between Burns Creek and Cottonwood Campground.

There are no shoreline modifications, diversions or impoundments of the Entiat River within the potential Wild and Scenic River corridor.

Eligibility Determination - Description and Rating of Values

Scenery The scenic values of the Entiat are considered to be outstandingly remarkable. Originating in the Glacier Peak Wilderness, this steep glaciated valley is bordered by extensive snowfields and alpine glaciers, high mountain peaks, and rugged slopes with large outcrops of granite and gneiss. The river plunges in cascading rapids, riffles and falls, to a meandering course in the broader valley of the lower reaches. A mixed conifer forest, interspersed with both patches of old growth and with natural openings, contributes to the pristine setting of the river.

RANKING: Outstandingly remarkable.

Recreational Recreation use of the Entiat attracts visitors from both east and west of the Cascades. The drainage serves as an access route to the Glacier Peak Wilderness, as well as for destination camping, fishing, hunting, picnicking, water play and trail bike riding. There is occasional boating and rafting on the lower portion of the river, and in the winter months, some snowmobiling and cross-country skiing.

RANKING: Above average.

Geologic In the upper Entiat, the river plunges from its headwaters at the Entiat Glacier on Mt. Maude, in a series of glacially quarried steps and basins, to the broader floodplain of the lower reaches. Outcrops of metamorphic schist and gneiss, intrusive granodiorite and quartz diorite are blanketed through much of the corridor by glacial till and alluvium. The characteristic U-shaped valley extends through all three segments.

RANKING: Above Average.

Fish Prior to 1898, there were significant runs of chinook and coho salmon, and steelhead trout up the Entiat River. These had become nearly non-existent by the 1930's. However, rehabilitation of the runs has been ongoing for the last 25 years, and today moderate numbers of these anadromous fish run the Entiat as far as Entiat Falls.

RANKING: Average.

Wildlife Wildlife in the corridor includes a large population of mule deer, as well as black bear, coyote and spotted owl. There is wolverine habitat in the upper reaches, and bald eagle roosts near the river.

RANKING: Average.

Cultural/Historical There was modest use of the river for salmon fishing by the Entiat Indians, whose permanent villages extended as far upriver as Ardenvoir. It is also likely that hunting parties camped along the river margins, branching from here into side canyons and tributaries. Historic uses were predominantly trapping (on the upper reaches), homesteading, logging and early Forest Service administration (1920's). Some evidence of these uses are still visible today, including historic Forest Service administrative sites at Silver Falls and Cottonwood.

RANKING: Average.

Other Values There are no known sensitive plants in the portion of the drainage under study. With respect to ecotypes, the corridor is a typical upland Cascade river valley.

RANKING: Average.

Conclusion

The Entiat River meets the eligibility criteria for Wild and Scenic River classification. It has "**OUTSTANDINGLY REMARKABLE**" scenic values. This river should be further evaluated for its suitability as an addition to the Wild and Scenic River System.

LAKE WENATCHEE RANGER DISTRICT

CHIWAHA RIVER

The entire Chiwawa River, from the headwaters to the confluence with the Wenatchee River, was identified as a potential Wild and Scenic River in the Nationwide Rivers Inventory published by the National Park Service in 1982. The total length of the river is 35.0 miles. Of the total Chiwawa drainage, only 11% is in private ownership, with most of this being in the lower 3 1/2 miles of the river. The upper five miles are located entirely within the Glacier Peak Wilderness.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	30.5	10,240
Private	4.5	1,280
Total	35.0	11,520

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Chiwawa River originates east of the Cascade Crest in the Glacier Peak Wilderness. Topography consists of a narrow, steep, glaciated valley in the upper reaches, a broader U-shaped corridor through the middle stretch, and rolling to somewhat flat terrain near the mouth. Vegetation is a combination of mixed conifer timber types, with Douglas-fir, ponderosa pine and meadow openings in the lower portion.

Some riprap and a diversion exist along the middle and lower reaches of the river. Approximately 150 to 200 feet of log and rock cribbing has been installed along the bank at Atkinson Flat Campground, in the NW 1/4 of Section 23, T.29N., R.16E. The six foot wide Wenatchee-Chiwawa Irrigation Canal takes off from an intake box on the south side of the Chiwawa in the NW 1/4 of Section 30, T.27N., R.18E., and parallels the west edge of the river corridor for approximately four miles, before diverging to the Wenatchee. Other small irrigation diversions exist along the lower three miles of the river, but none impede the free-flowing character of the Chiwawa.

One other development soon to be constructed by the Chelan County P.U.D. in the NE 1/4 of Section 1, T.26N., R.17E., and the SE 1/4 of Section 36, T.27N., R.17E. is a fish rearing station. The facility will consist of a large slotted concrete intake "box" along the north riverbank, a small stretch of riprap, an outflow pipe, and 200 feet upland of the river, fenced rearing ponds and support facilities. The intake will divert approximately 21 cfs from the Chiwawa to the rearing station. Associated with this will also be a small intake structure and outfall pipe on the Wenatchee River, approximately 1600 feet northwest of the rearing ponds. The development plans for the entire project have been reviewed by the National Park Service, and were determined to be consistent with the criteria established for the Recreational classification of this segment of the Chiwawa.

Eligibility Determination - Description and Rating of Values

Scenery The Chiwawa drainage is typified at its upper end by towering mountain peaks, extensive snowfields and imposing valley walls with numerous rocky areas. The river channel here is narrow and plunges downstream in frequent cascades and small falls, which gradually lessen in intensity as the river enters the broader, U-shaped valley of the mid- and lower segments.

RANKING: Outstandingly remarkable.

Recreational A naturally scenic environment, reasonable access, rustic campground developments, and good fishing, hunting, hiking and white water rafting opportunities attract large numbers of users to the Chiwawa every year. The middle stretches of the river provide one of the most popular recreation destinations in the Lake Wenatchee area. In the winter months, snowmobiling is a frequent activity, with the Trinity townsite serving as a destination location. The Chiwawa is also the most heavily used access route into the Glacier Peak Wilderness east of the Cascades.

RANKING: Outstandingly remarkable.

Geologic The geology of the Chiwawa is typical of the other river systems that are tributary to the upper Wenatchee drainage. The river rises in glaciers, seasonal snowfields, and meadows near the Cascade Crest, plunging from there through a steep-walled glaciated valley. Outcrops of Jurassic gneiss at the upper end are replaced by a mantle of alpine glacial outwash from a point just above Rock Creek down to the confluence of the Chiwawa with the Wenatchee River, where the topography is characteristically more open and rolling.

RANKING: Above Average.

Fish The Chiwawa is fairly unique in the upper Columbia River system because of the high number of wild, unsupplemented runs of spring chinook and steelhead. There is also an excellent resident fishery, and the bull trout, a sensitive species, inhabits the river.

RANKING: Outstandingly remarkable.

Wildlife Common animal life in the Chiwawa include mule deer, black bear, mountain goat, spotted, barred and great horned owl, pine marten, beaver and otter. In the lower Chiwawa are osprey, bald eagle and elk. Grizzly bear habitat has been identified in the drainage as well.

RANKING: Average.

Cultural/Historical There was substantial use of the Chiwawa by Wenatchi Indians for fishing, hunting and access to berry fields. A summer village was reportedly located near Rock Creek, and the Wenatchi people have retained a strong cultural association with the Chiwawa. Historic use of the drainage was directed primarily to mining and trapping. Numerous examples of cabin sites, mining features and a historic townsite remain.

RANKING: Above Average.

Other Values There is a good variety of ecotypes within the Chiwawa River corridor, including wetlands, cottonwood groves, wet site, old growth western red cedar and old growth, mixed conifer forest. No sensitive plant species have been identified within the portion of the river under study.

RANKING: Above Average.

Conclusion

The Chiwawa River meets the eligibility criteria for Wild and Scenic River classification. It has "**OUTSTANDINGLY REMARKABLE**" scenic, recreational and fishery values. This river should be further evaluated for its suitability as an addition to the Wild and Scenic River System.

LITTLE WENATCHEE RIVER

The Little Wenatchee River, from the headwaters to the outlet at Lake Wenatchee, is being considered for designation as a potential Wild and Scenic River. The total length of the river is 27.5 miles. Of the acreage in the corridor, 9% is in private ownership, this being concentrated along the lower reaches of the river. The upper six miles are located entirely within the Henry M. Jackson Wilderness.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	25 0	8,000
Private	2 5	800
Total	27.5	8,800

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Little Wenatchee River originates east of the Cascade Crest in the Henry M. Jackson Wilderness. Topography ranges from a broad, hanging valley at the far, upper end, to sections of steep-sided gorges in the upper and middle reaches, to a wide, meandering river channel along the lower eight miles. Vegetative cover also varies from open meadows to a mixed conifer timber cover.

The Little Wenatchee River is free-flowing throughout its length.

Eligibility Determination - Description and Rating of Values

Scenery At its upper end, the Little Wenatchee River meanders across a broad, meadow-filled, hanging valley ringed by sharply incised, snow-capped peaks. The river plunges from this valley in a spectacular falls, tumbling through a series of gorges, to a more sinuous course in the wider valley of the lower reaches.

RANKING: Above average.

Recreational Recreation use along the river is primarily directed to camping, fishing, hiking and hunting. The drainage serves as a popular access route to the Henry M. Jackson and Glacier Peak Wildernesses.

RANKING: Average.

Geologic The river rises in a glacially-carved, hanging valley near the Cascade Crest, tumbling from there through a series of steep-walled gorges characterized by numerous, metamorphic outcrops. In the lower reaches, the river channel is one of slower meanders due to the open, more gently rolling topography near Lake Wenatchee.

RANKING: Above Average.

Fish The Lake Wenatchee system, of which the Little Wenatchee River is a tributary, is one of only two remaining lake/river systems in the Columbia River drainage that still supports a natural run of sockeye salmon. The lower eight miles of the Little Wenatchee provides important spawning habitat for approximately 25% of this run. In addition, there are spring chinook salmon as well as steelhead in this lower eight mile stretch.

RANKING: Outstandingly Remarkable (in the lower, eight mile stretch).

Wildlife The mix of riparian vegetation, cliffs, slide areas, and variety of tree species provide habitat for the black bear, mule deer, spotted owl, osprey, great blue heron, bald eagle and peregrine falcon.

RANKING: Above Average.

Cultural/Historical The Wenatchi Indians made use of the Little Wenatchee drainage for access to the backcountry and as a travelway through the Cascades to what is now western Washington. It is likely that small fishing camps were also established along the lower stretches. Historic use was directed primarily to fur trapping and travel by early exploring expeditions.

RANKING: Average.

Ecological There is a high variety of ecotypes within the Little Wenatchee drainage, including alpine meadows, wetlands, riparian vegetation, cliffs, avalanche chutes, and old growth conifers. However, no sensitive plant species have been identified within the corridor.

RANKING: Above Average.

Conclusion

The lower eight mile segment of the Little Wenatchee River meets the eligibility criteria for Wild and Scenic River classification. It has "**OUTSTANDINGLY REMARKABLE**" fish values. This segment should be further evaluated for its suitability as an addition to the Wild and Scenic River System. Although the remainder of the river has above average values, none are "outstandingly remarkable." Classification of those river segments and determination of suitability is not recommended.

NAPEEQUA RIVER

The entire Napeequa River corridor, from the headwaters to the confluence with the White River, is being considered for designation as a potential Wild and Scenic River. The total length of river is 16.0 miles. Of the total acreage in the corridor, 6% is in private ownership, all of this being in the lowest mile of the river. The upper 15 miles are located within the Glacier Peak Wilderness, and include the main-stem of the Napeequa as well as the Twin Lakes Creek tributary.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	15.0	4,806
Private	1.0	314
Total	16.0	5,120

*Acres based on an estimated 1/4 mile corridor on each side of the river.

(The confluence of the Napeequa with the White River overlaps with acreage that is also part of the proposed Scenic River corridor of the White.)

The Napeequa River originates east of the Cascade Crest in the Glacier Peak Wilderness. The topography is dominated by a narrow, steep, talus-walled valley. Vegetation is a mixed conifer timber type with frequent natural openings.

There are no impoundments or diversions of the river, but riprap has been installed near the confluence of the Napeequa with the White River, as well as in the vicinity of the Tall Timbers Homeowners Association subdivision. These minor shoreline modifications do not impede the free-flowing characteristics of the river, however.

Eligibility Determination - Description and Rating of Values

Scenery The Napeequa River is noted for its outstanding scenery. The river flows through a high elevation glacial trough that eventually narrows to a steep, talus-walled valley. Towering mountain peaks, impressive alpine glaciers, extensive snowfields, rugged granitic outcrops, and a vegetative cover marked by scattered old growth, hardwoods, and interspersed meadow openings, characterize the corridor. The watercourse tumbles through this valley in a series of waterfalls, cascades and slow meanders.

RANKING: Outstandingly remarkable.

Recreational Most of the recreation use on the Napeequa is in connection with the developments on private land in the lowest stretches. Above this point, recreation use is light, being directed primarily to hiking, dispersed camping, hunting and fishing. The drainage also serves as a minor access route into the Glacier Peak Wilderness. Because of the low density of use, the Napeequa provides a good opportunity for solitude.

RANKING: Below Average.

Geologic The Napeequa River rises in glaciers, snowfields and meadows in the Cascade peaks, flowing through a pronounced, high elevation glacial trough that dramatically changes at midsection to a narrow, talus-walled, U-shaped valley.

RANKING: Outstandingly remarkable.

Fish The Napeequa is one of four rivers in Eastern Washington where a natural sockeye run still exists. However, because of a waterfall, the run is limited to the first few miles only. The bull trout, a sensitive species, also inhabits the river.

RANKING: Above Average.

Wildlife The Napeequa provides summer range for deer, and habitat for black bear, beaver, otter, spotted owl (in the lower reaches) and golden eagle. There is good mountain goat habitat the entire length, and at least one grizzly bear sighting has been reported in the drainage.

RANKING: Average.

Cultural/Historical Prehistoric use of the river is unknown. A Wenatchi Indian fishing camp was reportedly once situated on the White River, near the mouth of the Napeequa. However, no cultural resource survey work has been conducted along this drainage, and there are presently no sites identified. Historic uses are likewise unknown.

RANKING: Below Average.

Other Values There is a complex variety of ecotypes in this drainage, associated with the geologic formation and glacial history of the valley.

RANKING: Average.

Conclusion

The Napeequa River meets the eligibility criteria for Wild and Scenic River classification. It has "**OUTSTANDINGLY REMARKABLE**" scenic and geologic values. This river should be further evaluated for its suitability as an addition to the Wild and Scenic River System.

WENATCHEE RIVER

The Wenatchee River, from the outlet of Lake Wenatchee to the confluence with Icicle Creek, was identified as a potential Wild and Scenic River in the Nationwide Rivers Inventory published by the National Park Service in 1982. This portion of the river is approximately 30.0 miles in length. Twenty-eight of these miles are within the boundary of the Wenatchee National Forest, and include a mix of National Forest, Washington State and private ownership. The remaining 2.0 miles outside the Forest boundary are entirely private.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	12.25 miles	3920 acres
Wenatchee NF/Private Mix ^{1/}	5.00 miles	1600 acres
State of Washington	.5 miles	160 acres
State of WA/Private Mix ^{2/}	1.5 miles	480 acres
Private	10.75 miles	3440 acres
Total	30.0 miles	9600 acres

*Acres based on an estimated 1/4 mile corridor on each side of the river.

^{1/} National Forest on one side of the river through this portion of the corridor, private on the other.

^{2/} State of Washington on one side of the river through this portion of the corridor, private on the other.

The Wenatchee River originates at the outlet of Lake Wenatchee. Topography is flat or gently rolling from the Lake to the upper end of Tumwater Canyon. The canyon is well known for its spectacular cliffs, rugged outcrops, steep slopes and plunging river course. Vegetation consists of mixed conifer timber types, Douglas-fir and ponderosa pine, with meadows in the upper portion.

One impoundment and a diversion exist within the Tumwater Canyon portion of the river. The Tumwater Dam, a sixteen foot high concrete structure in the SE 1/4 of Section 33, T.25N., R.17E., was constructed in 1909 by Great Northern Railroad to divert water for power generation in the electrification of their railroad line. The dam resulted in the formation of Lake Jolanda, a pristine, three-quarter mile long reservoir located on private land behind the dam. With the exception of the dam itself, there are no longer any water diversion facilities at the site. The river is essentially unimpeded today (it spills freely over the dam), a fish ladder was recently reconstructed to allow more efficient passage of salmon and steelhead, and the shoreline and lakeshore remain natural and riverine in appearance. Because of its historic associations with Great Northern, whose line once traversed Tumwater Canyon, the dam and former powerhouse site provide an excellent opportunity for interpretation.

About one half mile above the mouth of Tumwater Canyon, on the south side of the river, is an old concrete diversion box and remnants of a canal. These facilities were built by the Leavenworth Fish Hatchery, but are no longer in use.

Near the mouth of the Chiwawa River, planning is under way for the construction of a water intake structure and outflow pipe along the river bank as part of a fish rearing station that is to be built on the Chiwawa. The intake will divert approximately 12 cfs from the Wenatchee River, to be used as warming water to supplement that being taken from the Chiwawa.

Eligibility Determination - Description and Rating of Values

Scenery The Wenatchee drainage ranges from gently rolling, forested terrain interspersed with open meadows in the vicinity of Lake Wenatchee, to spectacular cliffs, enormous boulders, craggy outcrops and cascading rapids through Tumwater Canyon. The canyon is particularly noted for its outstanding scenery viewing.

RANKING: Outstandingly remarkable.

Recreational The Wenatchee River experiences heavy recreation use due to the diverse, all season opportunities available. Camping, picnicking, hiking, driving for pleasure, viewing scenery, rock climbing, fishing, water play, cross country skiing, snowmobiling, horseback riding and photography draw people in steady numbers from both sides of the mountains to the corridor. The entire length of the river is accessible by road, it provides a strong attraction to those who enjoy white water rafting and boating, and the Tumwater Canyon stretch is perhaps one of the most scenic river segments in the State.

RANKING: Outstandingly remarkable.

Geologic The river originates at the outlet of Lake Wenatchee, meandering from there through flat to gently rolling terrain for two-thirds of its length above Tumwater Canyon. The lower third of the potentially eligible portion of the river is dominated by the rugged Tumwater Canyon, with its steep, nearly vertical walls, immense boulders, and plunging rapids.

RANKING: Above Average.

Fish The river is noted for its excellent fishing with high success ratios. There are resident planted fish as well as large runs of steelhead, sockeye salmon, and spring and summer/fall chinook salmon, which spawn or travel through the river. The Wenatchee River system is one of only two remaining river/lake systems in the Columbia River drainage that supports a natural, self-sustaining sockeye run. A sensitive species (bull trout) also inhabits this river.

RANKING: Outstandingly remarkable.

Wildlife There is good diversity in the wildlife habitat available, including an extensive riparian zone, many cliffs and rock outcrops, slide areas, and the variety of ecotypes associated with these. Among the more notable wildlife using the corridor are black bears, mule deer, spotted owls, osprey, great blue herons, bald eagles and peregrin falcons.

RANKING: Above Average.

Cultural/Historical The Wenatchee River corridor falls within the traditional fishing territory of the Wenatchi Indians. There was intensive use of the drainage prehistorically and in early historic times by these people for winter and summer settlements, fishing and as a major travelway to western Washington. This portion of the river drainage contains numerous identified archaeological sites, including the only known petroglyph site on the Wenatchee National Forest. There was early historic settlement of the drainage (beginning in the 1870's below Leavenworth and 1880's above), transportation use (Great Northern Railroad and turn-of-the-century highway development), hydroelectric development (in Tumwater Canyon) and placer mining.

RANKING: Outstandingly Remarkable.

Other Values The Tumwater Canyon portion of the Wenatchee River is exceptional ecologically because of the high variety of ecotypes present: the steep side slopes, rugged cliffs, and unusual soils. This is one of only two locations known where a small population of Hackelia venusta occurs. (This plant is being proposed for listing as an endangered species.) A Special Botanical Area has also been created within the canyon in recognition of the Lewisia tweedyi species that grows here.

RANKING: Outstandingly Remarkable.

Conclusion

The Wenatchee River meets the eligibility criteria for Wild and Scenic River classification. It has "**OUTSTANDINGLY REMARKABLE**" scenic, recreational, fishery, historical, cultural, and ecological values. This river should be further evaluated for its suitability as an addition to the Wild and Scenic River System.

WHITE RIVER

The entire White River corridor, from the headwaters to Lake Wenatchee, was identified as a potential Wild and Scenic River in the Nationwide Rivers Inventory published by the National Park Service in 1982. The total length of river is 34.0 miles. Of the total acreage in the corridor, 22% is in private ownership, all of this being in the lower third of the river. The upper 15 miles are located entirely within the Glacier Peak Wilderness.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	26.5	8,440
Private	7.5	2,440
Total	34.0	10,880

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The White River originates east of the Cascade Crest in the Glacier Peak Wilderness. Topography varies from a narrow, steep, glaciated valley at the upper end, to somewhat rolling terrain near Lake Wenatchee. Vegetation is a mixed conifer timber type, with extensive meadowlands in the lower portion.

A limited amount of riprap has been installed along the river bank five miles upstream of Lake Wenatchee and at the approaches to the Sears Creek bridge. As mentioned in the Napeequa analysis, there is also riprap along the Napeequa near its confluence with the White River. These are small, unobtrusive alterations, however, and there are no diversions or impoundments to impede the free-flowing character of the river.

Eligibility Determination - Description and Rating of Values

Scenery The White River is noted for its varied and outstanding scenery. Originating high in the Glacier Peak Wilderness, the river takes its name from the glacial silt that gives it a distinct milky appearance. At its upper end, the river plunges through a steep-walled glaciated valley that is bordered by stark mountain peaks, impressive alpine glaciers, precipitous cliffs, and numerous bare rock slopes, into the broader, more gently rolling terrain near Lake Wenatchee. The river corridor is one of cascading riffles and white water rapids, meanders, oxbows and wetlands. Patches of old growth interspersed with lush, green meadows add to the pristine ambience of the corridor.

RANKING: Outstandingly remarkable.

Recreational The White River has high recreation use. Stands of unusually large cottonwood and old growth conifers, quiet, riverside meadows, and a river course that ranges from thundering falls to pastoral meanders, plus opportunities for hiking, picnicking, camping, fishing, hunting, and rafting offer an irresistible attraction to visitors from both east and west of the Cascades. In addition, the drainage serves as an entry point to the Glacier Peak Wilderness. During the winter months, there are good cross-country skiing opportunities, particularly along the established road system.

RANKING: Above Average.

Geologic The river originates in high alpine glaciers and seasonal snowfields near the crest of the Cascade Mountains, tumbling from there through a steep-walled valley that is characterized by numerous metamorphic outcrops. The course is marked at the upper and mid-reaches by vigorous rapids, riffles and falls. The lower stretches, however, are distinctive for their sinuous meanders and oxbows, as the river enters the flatter terrain near Lake Wenatchee.

RANKING: Above Average.

Fish The Lake Wenatchee system, of which the White River is a tributary, is one of only two remaining lake/river systems in the Columbia River drainage that still support a natural run of sockeye salmon. Within the Lake Wenatchee system, the majority of these sockeye spawn in the White River. In addition, there are spring chinook, as well as steelhead runs up the White. The sensitive bull trout also inhabits the river.

RANKING: Outstandingly remarkable.

Wildlife The White River offers a great variety of wildlife habitat. In the lower stretches are such riverine species as osprey, great blue heron, beaver and otter. The area is also an important bald eagle wintering grounds and is currently being used as a bald eagle nesting site. The middle reaches are highly productive black bear habitat, and there has been at least one sighting of moose here. In the upper segment are spotted owl, grizzly bear and wolverine habitat. Mountain goats use the cliffs along the north side of the corridor, and mule deer, elk, cougar and marten can be found throughout the drainage. The White River also has the highest density of pileated woodpeckers on the Lake Wenatchee Ranger District.

RANKING: Above Average.

Cultural/Historical The White River drainage received substantial use by the Wenatchi Indians for fishing, cedar bark collection and access to backcountry berry fields and hunting localities. The drainage also provided a travelway to western Washington, with a connecting route into the Chiwawa drainage as well. There was early homesteading along the lower reaches, and historic fur trapping and sheep grazing use in the upper segment.

RANKING: Above Average.

Other Values The broad valley bottom, mix of vegetation, and presence of cliffs contributes to an above average variety in ecotypes within the river corridor.

RANKING: Above Average.

Conclusion

The White River meets the eligibility criteria for Wild and Scenic River classification. It has "**OUTSTANDINGLY REMARKABLE**" scenic and fishery values. This river should be further evaluated for its suitability as an addition to the Wild and Scenic River System.

LEAVENWORTH RANGER DISTRICT

ICICLE CREEK

Icicle Creek was identified as a potential Wild and Scenic River in Phase I of the Nationwide Rivers Inventory published by the National Park Service. The corridor, from the headwaters to the Forest boundary, is currently being considered for designation as part of the National System. Below the Forest boundary, the Icicle does not meet the eligibility criteria due to impediments to the free-flowing character of the river. The total length of the creek above the Forest boundary is 28.5 miles. Of the acreage in the corridor, 30% is in private ownership. The upper 12 miles are located entirely within the Alpine Lakes Wilderness.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	20.0	6,400
Private	8.5	2,720
Total	28.5	9,120

*Acres based on an estimated 1/4 mile corridor on each side of the river.

Icicle Creek originates east of the Cascade Crest in the Alpine Lakes Wilderness. Topography consists of a predominantly narrow, steep, glaciated valley, with sections of broader floodplain and more rounded hills. Vegetation varies from a mixed conifer timber type with frequent natural openings, to Douglas-fir and ponderosa pine in the lower elevations.

In midsection, 500 feet of riprap has been installed to protect the river bank and improvements here. The lower stretches have been affected to some degree by three water developments: the Leavenworth National Fish Hatchery diversion, which is located outside the Forest boundary; the Icicle Irrigation District dam and canal in the SE 1/4 of Section 28, T.24N., R.17E.; and the City of Leavenworth water intake, in the same general location.

Although the Fish Hatchery dam is downstream of the eligible segments of the river, it does have some effect on the quality of the upper river corridor in that the dam blocks all upstream fish passage. In addition, both the Fish Hatchery and the Irrigation District have facilities on some of the high mountain lakes that drain into the Icicle near the lower end of the corridor. These facilities allow the storage and release of additional water into the river on an "as needed" basis.

The Icicle Irrigation District dam is a small, spillway type of structure that serves to divert water into a nearby canal. There is no impoundment of the water behind it. The City of Leavenworth water intake, a block-like cement structure set into the river bank, also has no effect on the free-flowing character of the Icicle.

Eligibility Determination - Description and Rating of Values

Scenery The Icicle is a narrow, steep, glaciated valley characterized by a cascading water course that plunges downstream in a series of cataracts, riffles and rapids. Views from the river are of high, open ridges, extensive snowfields, majestic peaks, and rugged slopes with many granite cliffs and outcrops. The mixed conifer cover is interspersed with frequent natural openings.

RANKING: Outstandingly remarkable.

Recreational The Icicle drainage is exceptionally popular because of its easy accessibility to visitors from both the Puget Sound area to the west, and north central Washington and the Columbia Basin to the east. In addition, its proximity to the well known tourist village of Leavenworth substantially contributes to the public use along the corridor. The lower 16 1/2 miles are completely reachable by road, the upper twelve by trail. The valley is noted for several granite outcroppings of special appeal to rock climbers, and the upper drainage serves as an important entry point to the Alpine Lakes Wilderness.

RANKING: Outstandingly remarkable.

Geologic The river originates at Lake Josephine and in seasonal snowfields and meadows near the Cascade Crest, plunging from there through a U-shaped glaciated valley characterized by precipitous granite cliffs and outcrops, and rugged, forested slopes.

RANKING: Average.

Fish Because of the diversion dams on the lower reaches of the creek, the habitat above these is unavailable to anadromous fish. However, there is a fair resident fishery above these facilities.

RANKING: Average.

Wildlife A diversity of ecotypes offers habitat to both the spotted and barred owl, as well as to mule deer, elk and mountain goat.

RANKING: Average.

Cultural/Historical A prehistoric salmon fishery was once situated at the mouth of the Icicle, and the Wenatchi Indians used the upper corridor for the collection of plant materials, for travel into the backcountry and for overland access into the Cle Elum drainage. The corridor also served as a travelway in historic times for miners with claims in the upper Jack Creek and French Creek drainages. And finally, the Chatter Creek Guard Station near the confluence of Chatter Creek with the Icicle, is listed on the National Register of Historic Places.

RANKING: Average.

Other Values There are no known sensitive plants in the Icicle drainage. With respect to ecotypes, the corridor is a typical upland Cascade river valley.

RANKING: Average.

Conclusion

The Icicle Creek meets the eligibility criteria for Wild and Scenic Rivers classification. It has "**OUTSTANDINGLY REMARKABLE**" scenic and recreational values. This river should be further evaluated for its suitability as an addition to the Wild and Scenic River System.

NACHES RANGER DISTRICT

AMERICAN RIVER

The American River corridor, from the headwaters to the confluence with the Bumping River, is being considered for designation as a potential Wild and Scenic River. The total length of river is 22.0 miles, with all of the corridor being National Forest. The upper six miles of the river are located entirely within the William O. Douglas Wilderness.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	22.0	7,040
Total	22.0	7,040

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The American River originates east of the Cascade Crest at American Lake, in the William O. Douglas Wilderness. This is the only eligible river system on the Wenatchee National Forest occurring within the Recent High Cascades Landscape Type. Topography ranges from a broad, U-shaped, glaciated valley near the headwaters of the river, to a narrow, steep-walled rocky canyon in the lower reaches. Vegetation types likewise vary from mixed conifer forest in the upper end to Douglas-fir and ponderosa pine in the lower stretches.

The river is an important source for downstream irrigation, but there are no known water resource developments or modifications. The American River is free-flowing its entire length.

Eligibility Determination - Description and Rating of Values

Scenery The American River drainage is noted for its varied, outstanding scenery. Originating high in the William O. Douglas Wilderness, the upper course tumbles eastward through a broad, glaciated valley characterized, near the Cascade Crest, by immense, back-to-back cirque basins. At its lower end, the river corridor changes dramatically, as it plunges through a narrow, winding canyon accentuated by precipitous andesite cliffs. The river course is one of cascading rapids, riffles and white water areas throughout the segments under study. Lands adjacent to Highway 410, along the north side of the river, have been designated by the Secretary of Agriculture as the Mather Memorial Parkway "for the use and the enjoyment of the general public for scenic and recreation purposes..."

RANKING: Outstandingly remarkable.

Recreational The American River corridor serves as an access route to Mt. Rainier National Park, attracting both transitory and destination-oriented use. Visitors from the Yakima and Tri-Cities area to the east, and Puget Sound to the west, camp, fish, hunt, picnic, hike and view scenery along the the river. White water kayaking attracts the more adventuresome, and there is some cross-country skiing in the winter months. Trailheads along the river provide entry points into both the Norse Peak and William O. Douglas Wilderness.

RANKING: Above average.

Geologic Glaciation has left a distinctive pattern, at the upper end of the American River, of huge, back-to-back cirques and broad valley bottoms through which the river tumbles. Below Hell's Crossing, the corridor narrows to a winding canyon with steep andesite cliffs.

RANKING: Above Average.

Fish Although the spring chinook and steelhead runs are low at present, the American River has the highest quality fishery in the Naches River system in terms of probable genetic integrity of the species, and quality of the spawning habitat. The potential for enhancement of these species is high. There is also a good resident fishery, and a sensitive species, the bull trout, inhabits the river.

RANKING: Above Average.

Wildlife High quality old growth forest and high elevation wetlands, bogs and meadows in the drainage support a variety of wildlife species. The bald eagle, a threatened species, and the endangered peregrine falcon, both use the American River as a feeding source. The river corridor is also used by the Northern Spotted Owl, Rocky Mountain elk, mule deer and a number of small mammals.

RANKING: Above Average.

Cultural/Historical The American River was formerly within the territory of the Yakima Indians, and was used throughout the spring, summer and fall for hunting, fishing and travel. Archaeological evidence of this use has been identified throughout much of the corridor. Historic mining, livestock grazing and fur trapping occurred in the upper reaches, with occasional remnants still visible in the river corridor.

RANKING: Above Average.

Other Values The American River provides a good variety of ecotypes, including old growth forest, high elevation wetlands, bogs, meadows, riparian vegetation, talus slopes, cliffs and other rock forms. There are no known sensitive plants within the corridor.

RANKING: Above Average.

Conclusion

The American River meets the eligibility criteria for Wild and Scenic River classification. It has "**OUTSTANDINGLY REMARKABLE**" scenic values. This river should be further evaluated for its suitability as an addition to the Wild and Scenic River System.

B. INELIGIBLE RIVERS

This section describes the information and results of the eligibility analysis for the rivers determined to be ineligible for classification under the Wild and Scenic Rivers Act.

Using the eligibility process described earlier, ten of the twenty rivers considered in the Supplement were determined to be ineligible for designation because they did not meet the free-flowing criteria and/or, in the professional judgement of the ID team, they did not appear to have an outstandingly remarkable value. These rivers, and the rationale for their ineligibility, are summarized in Table E-2.

TABLE E-2
RIVERS FOUND INELIGIBLE

RIVER	WHY INELIGIBLE
Bumping	One segment not free-flowing, other segments without one outstandingly remarkable value.
Cooper	No outstandingly remarkable values.
Kachess	Large segment not free-flowing, other segments without one outstandingly remarkable value.
Little Naches	River channel modified for significant part of length.
Mad	No outstandingly remarkable values.
Naches	No outstandingly remarkable values
North Fork Entiat	No outstandingly remarkable values.
Rattlesnake Creek	No outstandingly remarkable values.
Teanaway	Segments not free-flowing; other segments without one outstandingly remarkable value.
Tieton	One segment not free-flowing; other segments without one outstandingly remarkable value.

A more detailed description of the ineligible rivers and their ratings are included below.

In the original Appendix E, distributed with the Wenatchee National Forest DEIS, the North Fork Entiat and the Mad Rivers were identified in an alternative proposed by a coalition of environmental groups, as eligible and recommended for further study. The eligibility of the rivers was based on the fact that they are free-flowing. However, a thorough assessment of their eligibility with respect to "outstandingly remarkable" values was not made. The Supplement completed this eligibility determination, and recommended no further study of the North Fork Entiat and Mad Rivers.

The following is a discussion of the general setting, eligibility values and conclusions for each of the ineligible rivers. With the exception of the reassessment of the Waptus River, and a rearrangement of the sequence in which the rivers are presented, these descriptions are presently unchanged from the 1988 Supplement.

CLE ELUM RANGER DISTRICT

COOPER RIVER

Total miles of river to the confluence with the Cle Elum River is 10.5 miles. All of the 10.5 miles are within the Wenatchee National Forest boundary and 3.0 miles are within the Alpine Lakes Wilderness. Approximately 2.0 miles are on private land.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	8.5	2,720
Private	2.0	640
Total	10.5	3,360

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Cooper River originates east of the Cascade Crest within the Alpine Lakes Wilderness, and is free-flowing for most of its length. There is one lake within the mid-portion of the drainage. Topography ranges from a glaciated valley to a somewhat narrow valley at the lower end. Vegetation type is primarily mixed conifer.

The river is paralleled by Forest road #4600 for approximately eighty percent of its length outside of the Wilderness. Some vegetation adjacent to the river is modified through timber harvest and roading. Access to the river is provided by Forest roads and trails.

Recreation is primarily hiking, camping, fishing and hunting. There are two Forest Service developed campgrounds and some undeveloped sites used for camping. There is no known use of the river by boaters. A water falls between Cooper Lake and the Cle Elum River inhibits use by floaters.

Eligibility Determination - Description and Rating of Values

Scenery The landform is dissected by ridges and moderately steep slopes. The river and streams have rapids and cascades with meandering segments. Heavy timber stands occur with frequent natural openings and rock outcrops.

RANKING: Above average.

Recreational Use along the river is primarily camping, fishing, and hunting. Serves as access to the Alpine Lakes Wilderness.

RANKING: Above Average.

Geologic The river rises in seasonal snowfields with mountain meadows and glaciated valleys. It flows through a narrow canyon at the lower end which is typical of many rivers.

RANKING: Average.

Fish The anadromous and resident fish habitat is low.

RANKING: Below Average.

Wildlife There is a large amount of high quality old growth habitat and some marsh habitat in this river bottom. This area is average for wildlife diversity.

RANKING: Average.

Cultural/Historical The drainage provided a travelway and access for acquiring food and household materials prehistorically. There is a known peeled cedar site and there are identified camp sites. Low intensity fur trapping occurred within historic times.

RANKING: Average.

Other Values The area has old growth habitats of Douglas-fir and white fir as well as the marsh land.

RANKING: Average.

Conclusion

While there are above average resource values within the Cooper River and its adjacent forests, none are "outstandingly remarkable." The Cooper River **is not eligible** for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

KACHESS RIVER

Total miles of river to the confluence with the Yakima River at Easton Lake is 2.5 miles. The entire 2.5 miles are within the Wenatchee National Forest boundary of which 1.0 mile is State of Washington or private land. In addition to these miles, there is a significant distance (approximately 10 miles) impounded by the Kachess Dam.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	1.25	400
State of Washington	0.75	240
Private	0.50	160
Total	2.50	800

*Acres based on an estimated 1/4 mile corridor on each side of the river

The Kachess River originates just outside the Alpine Lakes Wilderness (two of its tributaries extend into the Wilderness for short distances), and flows south to its confluence with the Yakima River. The Kachess is impounded for a significant length. Vegetation consists of mixed conifer timber types with frequent natural openings.

The river is paralleled for only a short distance at its upper end by Forest Road #4600, however, Kachess Lake has roads on the east and west shorelines. There are additional roads near the lake for short distances, and the adjacent landscape has been modified in places through vegetative manipulation during timber harvest.

Recreation in the drainage is primarily camping, fishing, and boating on the lake. There is one major Forest Service developed campground as well as some undeveloped sites used for camping.

Eligibility Determination - Description and Rating of Values

Scenery The landform is dissected by ridges and moderately steep slopes. The river and tributary streams have some rapids and cascades. The drainage contains heavy to scattered timber stands with frequent natural openings and small to medium size rock outcrops.

RANKING: Average.

Recreational Some of the roads in the drainage serve as an access route to the Alpine Lakes Wilderness from Interstate 90. Use along the river and lake is primarily for fishing, boating, camping and hunting.

RANKING: Below Average.

Geologic The glaciated terrain is sloping to rolling with some rock outcrops, which is typical of most east slope Cascade creeks.

RANKING: Below Average.

Fish The anadromous and resident fish habitat is low to moderate. There is low potential for developing new runs and increasing the existing runs of anadromous fish due to the Easton Dam on the Yakima River. This river has been a spawning stream for a sensitive species, bull trout.

RANKING: Average.

Wildlife There is average riparian and old growth habitat as well as average diversity in this drainage. There are spotted owls, Rocky Mountain elk and mule deer.

RANKING: Average.

Cultural/Historical Some prehistoric use was likely (as a hunting, fishing and travel corridor), although there are no known archaeological sites. Historically, there was low intensity mining and trapping.

RANKING: Below average.

Other Values The area has no distinct features and ecotypes are common.

RANKING: Below average.

Conclusion

There are no above average resource values within the Kachess River and its adjacent forests. The occurrence of a dam causes a significant segment of the river to not meet the free-flowing criteria. The Kachess River is **not eligible** for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

TEANAWAY RIVER

Total miles of river, which includes the three forks, is approximately 53.0 miles to the confluence with the Yakima River. There are 24.5 miles within the Wenatchee National Forest boundary of which 6.5 miles flow through private land. The remaining 28.5 miles outside the boundary are private lands. Approximately 0.5 miles inside and outside the Forest boundary flow through scattered tracts of State of Washington land.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	18.0	5,760
State of Washington	0.5	160
Private	34.5	11,040
Total	53.0	16,960

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Teanaway River originates on National Forest land south of the Alpine Lakes Wilderness, and is paralleled by highways and roads for much of its length outside of the National Forest boundary. There are no major impoundments, however, there are some irrigation diversions on private land. There is considerable development along the river, with continuous signs of human occupancy below the Forest boundary. Vegetation consists of mixed conifer trees in the upper portions of the three forks; Douglas-fir and ponderosa pine types change to ponderosa pine and grass-shrub types with grasslands and hay meadows in the lower portion.

The river is closely paralleled by State Highway 97, County Road 970, private roads and Forest roads. There are additional roads which follow the river or the three forks for short distances. The Middle and West Forks of the river have only limited roading.

Recreation is primarily camping, fishing, hunting, and scenery viewing from the State Highway and Forest roads. There are three Forest Service developed campgrounds in the North Fork drainage and four non-Forest Service recreation sites outside of the Forest boundary. There are numerous undeveloped sites used for camping.

Eligibility Determination - Description and Rating of Values

Scenery The landform is dissected by ridges with steep to moderate slopes. Rivers and tributary streams have rapids and cascades with a meandering river bottom in the West Fork. The view is one of mixed conifers, scattered timber, with natural openings and some small to medium size rock outcrops.

RANKING: The main Teanaway, Middle and West Forks are rated Average. North Fork is rated Above Average.

Recreational The North Fork serves as an access route to the Alpine Lakes Wilderness from the south. There is both transitory use along the river due to the State Highway, and destination use primarily for camping, fishing, hunting, and boating by users from the Yakima and Tri-Cities area from the east and the Puget Sound area from the west.

RANKING: The main River, Middle and West Forks are rated Average. North Fork is rated Above Average.

Geologic The terrain is gently sloping in the lower portion with some rock outcrops and dissected portions in the upper reaches. This is typical of most east slope Cascade rivers at these elevations.

RANKING: Average.

Fish The anadromous and resident fish habitat is low to moderate.

RANKING: Average.

Wildlife Much of the riparian habitat has been disturbed by private landowners in this high elevation, flat bottomed drainage.

RANKING: The main River and North Fork are rated Average. Middle Fork and West Fork are rated Above Average.

Cultural/Historical There was some use by Yakima Indians for hunting, fishing and berry collecting expeditions. There are historic mining claims along the Middle Fork and North Fork as well as remnants of a Mine-to-Market road along the Middle Fork.

RANKING: Average.

Other Values This area is ecologically common to the Forest.

RANKING: Average.

Conclusion

While there are above average resource values associated with the Teanaway River and its adjacent forests, none are "outstandingly remarkable." The Teanaway River **is not eligible** for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

ENTLAT RANGER DISTRICT

MAD RIVER

Total miles of river to the confluence with the Entiat River is approximately 24.0 miles. All of the 24.0 miles are within the Wenatchee National Forest boundary. Approximately 2.0 miles are on private land.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	22.0	7,040
Private	2.0	640
Total	24.0	7,680

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Mad River originates along a divide between the Entiat and Chiwawa Rivers, and is free-flowing for most of its length. There are minor diversions and impoundments in the lower three miles. Topography ranges from a meandering stream at its upper end to a cascading stream in a narrow steep canyon at the lower end. Vegetation type ranges from open high elevation meadows through mixed conifer to Douglas-fir and ponderosa pine types.

The river is paralleled by trail #1409 for most of its length. The lower four miles are paralleled by Forest road #5700 to Pine Flat campground. Some land adjacent to the river has been modified by private land development, the 1970 fires, and timber harvest and roading. Access to the river is provided by Forest roads, spur roads and developed trails.

Recreation is primarily trailbike riding, camping, fishing, hiking and hunting. There is one Forest Service developed campground and several undeveloped sites used for camping. There is no known use of the river by boaters.

Eligibility Determination - Description and Rating of Values

Scenery The drainage has mountain meadows with moderate slopes, to cascades with steep slopes and rock outcrops. There is a mixed conifer river bottom with some hardwoods.

RANKING: Above average.

Recreational Use along the river is primarily trailbike riding, camping, fishing, hiking and hunting.

RANKING: Above average.

Geologic The river rises in meandering meadows and flows through a steep, V-shaped canyon. There are numerous steep, cascading segments with rock outcrops.

RANKING: Above Average.

Fish There are good pool-riffle ratios and the possibility exists that a sensitive species (bull trout) occurs in this drainage. There is average resident trout use and some anadromous fisheries.

RANKING: Above Average.

Wildlife The area along the river is average riparian habitat with clearcuts and large burns of varying ages nearby. Mule deer and grouse are the most common species seen in this area.

RANKING: Average.

Cultural/Historical The upper Mad River country was reportedly used by the Wenatchi Indians, who approached the area via Alder Creek. There was some early recreational use and sheep grazing in historic times.

RANKING: Below average.

Other Values There is at least one sensitive plant species in this drainage. The lower river area has been burned or logged in the last 50 years.

RANKING: Above average.

Conclusion

While there are above average resource values within the Mad River and its adjacent forests, none are “outstandingly remarkable.” The Mad River **is not eligible** for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

NORTH FORK ENTIAT RIVER

Total miles of river to the confluence with the Entiat River is approximately 9.2 miles. All of the 9.2 miles are within the Wenatchee National Forest boundary and all are on National Forest lands.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	9.2	2,944
Total	9.2	2,944

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The North Fork Entiat River originates east of the Glacier Peak Wilderness in the Entiat Valley and is free-flowing for its entire length. Topography ranges from a glaciated headwall area to a V-shaped valley, and then to a somewhat narrow canyon at the lower end. Vegetation type is primarily high mountain meadows, brushy areas, and mixed conifer.

The river is paralleled by trail #1437 for most of its length, except in the lower two miles where Forest access roads climb on both sides of the drainage. Some land adjacent to the river is modified through timber harvest and roading in the lower two miles. Access to the river is provided by Forest roads, spur roads and developed trails.

Recreation is primarily camping, fishing and hunting. There is one Forest Service developed campground and some undeveloped sites used for camping. There is no known use of the river by boaters.

Eligibility Determination - Description and Rating of Values

Scenery The drainage is characterized by peaks, rocky areas, some cliffs, steep slopes, and meadows. The river has cascades and falls, mixed conifers and some old growth forests.

RANKING: Above average.

Recreational Use along the river is primarily hiking, fishing, and hunting. The drainage serves as an access to the Glacier Peak Wilderness.

RANKING: Average.

Geologic The river rises in seasonal snowfields with mountain meadows and a V-shaped valley. It flows through a narrow canyon at its lower reach.

RANKING: Above Average.

Fish Entiat Falls blocks anadromous fish from using this stream and the use by resident fisheries is limited.

RANKING: Average.

Wildlife The riparian vegetation has some old growth habitat but most of the habitat in the vicinity is about 100 years old as a result of past fires. Woodpeckers and spotted owls frequent this area as do mule deer.

RANKING: Average.

Cultural/Historical No known prehistoric sites have been identified. There was likely some early hunting and other backcountry use by the Entiat Indians. Historic use was minimal, with the exception of some small scale fur trapping.

RANKING: Below Average.

Other Values This area is ecologically common on the Forest.

RANKING: Average.

Conclusion

While there are above average resource values within the North Fork Entiat River and its adjacent forests, none are "outstandingly remarkable." The North Fork Entiat River **is not eligible** for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

NACHES RANGER DISTRICT

BUMPING RIVER

Total miles of river to the confluence with the Naches River is 28 miles. All of the 28 miles are within the Wenatchee National Forest boundary and 0.5 miles pass through private land. Eight of these miles occur above Bumping Lake, and the remainder are below the Bumping Lake dam.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	24.0	7,680
Private	0.5	120
Total	24.5	7,800

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Bumping River originates east of the Cascade Crest in the William O. Douglas Wilderness. The river is impounded by the Bumping Lake Dam. It is free-flowing below the dam from Bumping Crossing to its confluence with the Naches River. There is also a free-flowing segment above the lake within the wilderness. Topography below the dam consists of a glaciated valley in the west, narrowing at the east due to volcanic formations. Vegetation consists of Douglas-fir and ponderosa pine types.

The river is closely paralleled by Bumping River Road No. 18 for most of its length. The lower 2.5 miles flows adjacent to the Mather Memorial Highway, while the upper 7 miles are within the wilderness. Access to the river is by State Highway, Forest roads, spur roads, and by trail in the wilderness.

Recreation is primarily camping and fishing. Scenery viewed from the State Highway and Forest roads is rated high. There are five Forest Service developed campgrounds and numerous undeveloped sites used for camping. Boating is limited to intermediate kayaking and rafting.

Eligibility Determination - Description and Rating of Values

Scenery The drainage contains snowfields, peaks rising above 5,000 feet, steep slopes, a meandering river course, cascading water, mixed forest river bottom, and old growth forest.

RANKING: Above average.

Recreational The drainage serves as a major access route to the William O Douglas Wilderness from the east side. Use along the river is primarily for camping, fishing, hunting, and boating by users from the Yakima and Tri-Cities area from the east and the Puget Sound area from the west.

RANKING: Above average.

Geologic The river rises in seasonal snowfields with meadows, similar to most rivers of the Wenatchee Forest; it is a typical narrow, steep river valley with cascading water.

RANKING: Average.

Fish The spring chinook and steelhead runs are low but the potential for these species is high. There is a good resident fishery. The sensitive species (bull trout) inhabits this river.

RANKING: Above average.

Wildlife The mature, old growth and riparian vegetation is average for this area. Some common species are barred owls, Rocky Mountain elk, and mule deer. Bald eagles and peregrine falcons feed along the river.

RANKING: Average.

Cultural/Historical The Yakima Indians used the river for fishing and backcountry access, and there are several known archaeological sites. There were historic water reclamation developments and the drainage was used by miners, loggers, fur trappers, and early settlers and recreationists.

RANKING: Above average.

Other Values This area has some unusually high water tables that contribute to the dominance of western red cedar in the forest stands.

RANKING: Above average.

Conclusion

While there are above average resource values within the Bumping River and its adjacent forests, none are "outstandingly remarkable." The occurrence of a dam causes a significant segment of the river to not meet the free-flowing criteria. The Bumping River is not eligible for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

LITTLE NACHES RIVER

Total miles of river to the confluence with the Naches River is 12.0 miles. All of the 12.0 miles are within the Wenatchee National Forest boundary and 0.75 miles are on private land.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	11.25	3,600
Private	0.75	240
Total	12.00	3,840

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Little Naches River originates east of the Cascade Crest and north of Naches Pass. The river has had straightening, riprapping and channeling over a significant portion of its length due to rehabilitation after flooding. Topography ranges from a broad glaciated valley to a narrow steep-walled canyon at the lower end. Vegetation types run from mixed conifer forest in the upper end, to Douglas-fir and ponderosa pine types in the lower reaches.

The river is paralleled for most of its length by the Naches Pass Road #19 which provides access to the river from State Highway 410.

Recreation is primarily camping, fishing and hunting, with many of the trails used by ORV's. There are four Forest Service developed campgrounds and eight undeveloped sites used for camping. There is no known use of the river by boaters.

Eligibility Determination - Description and Rating of Values

Scenery Terrain in the drainage is steep sloping to rolling, a cascading and meandering river course, continuous cover with mixed conifer forest and some old growth adjacent to the river.

RANKING: Above average.

Recreational Use along the river is primarily camping, fishing, and hunting, with off-road vehicle use on adjacent trails.

RANKING: Average.

Geologic The river rises in seasonal snowfields with mountain meadows and glaciated valleys. It flows through a narrow canyon at the lower end which is typical of many rivers.

RANKING: Average.

Fish The spring chinook and steelhead runs are low but the potential for these species is moderate. There is a good resident fishery.

RANKING: Average.

Wildlife There is some use for feeding by bald eagles and peregrine falcons. Mule deer and Rocky Mountain elk commonly use the river and tributaries.

RANKING: Average.

Cultural/Historical There was intensive prehistoric use, with several known archaeological sites, and one identified Indian cultural site. The anadromous fishery is important to the Yakima Indians. The drainage was a major historic travelway to Puget Sound for Indians, explorers, military expeditions, cattle drives and wagon train parties (Naches Trail).

RANKING: Outstandingly remarkable.

Other Values This area is ecologically common to the Forest.

RANKING: Average.

Conclusion

While there are "outstandingly remarkable" values within the Little Naches River and its adjacent forests, the river does not meet the free-flowing criteria due to the extensive flood rehabilitation work. This included straightening and riprap in addition to modification of much of the stream bank. The Little Naches River is not eligible for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

NACHES RIVER

Total miles of river from the confluence of the Little Naches and Bumping Rivers to the confluence with the Tieton River is 24.5 miles. There are 9.0 miles within the Wenatchee National Forest boundary of which 1.0 is private. The remaining 15.5 miles outside the boundary flow through State of Washington and private lands.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres *
Wenatchee National Forest	8.0	2,560
State of Washington	3.0	960
Private	13.5	4,320
Total	24.5	7,840

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Naches River originates at the confluence of the Little Naches and Bumping Rivers, and follows State Highway 410 for its entire length. There are no major impoundments, however, there are some irrigation diversions and one diversion dam on private land (less than 4 feet high). There is considerable development along the river and there are continuous signs of human occupancy. Vegetation consists of Douglas-fir and ponderosa pine types, changing to Ponderosa pine and grass-shrub types surrounding the lower portion.

The river is closely paralleled by State Highway 410, Nile Road, and the Old River Road. There are additional roads which follow the river for short distances. Access to the river is by State Highway, Forest roads, County road, private roads, spur roads and by trail.

Recreation is primarily camping, fishing and boating. Scenery viewed from the State Highway and Forest roads is rated average. There are four Forest Service developed campgrounds and some undeveloped sites used for camping. Boating includes rafting and kayaking.

Eligibility Determination - Description and Rating of Values

Scenery The drainage is characterized by gently sloping to rolling terrain, rock outcrops and some basalt cliffs, and a meandering river course. Mixed conifer with hardwood types and some scattered old growth forest are found along the river.

RANKING: Average.

Recreational The drainage serves as an access route to Mt. Rainier National Park from the Yakima area. The river receives both transitory use due to the State Highway, and destination use primarily for camping, fishing, hunting, and boating by Yakima and Tri-Cities area residents from the east and the Puget Sound area residents from the west.

RANKING: Above Average.

Geologic The terrain is gently sloping with some rock outcrops and basalt cliffs, which is typical of most east slope Cascade rivers at mid and lower elevations.

RANKING: Average.

Fish The spring chinook and steelhead runs are low but the potential for these species is high. There is a good resident fishery.

RANKING: Above average.

Wildlife There is some use by wintering bald eagles and peregrine falcons. Mule deer and Rocky Mountain elk commonly use the river and tributaries. However, heavy human use and settlement lessens the value of wildlife habitat in the corridor.

RANKING: Below Average.

Cultural/Historical There was intensive prehistoric use, with several known archaeological sites. The river supports a major anadromous fishery. There was early historic settlement and the drainage was a key area during military expeditions of the 1850's, particularly along downstream stretches. An historic CCC camp and National Register-eligible former Ranger Station compound are located within the corridor, although these do not derive significance from, nor contribute directly to, the uniqueness of the Naches River.

RANKING: Above average.

Other Values This area is ecologically common to the Forest.

RANKING: Average.

Conclusion

While there are above average resource values within the Naches River and its adjacent forests, none are "outstandingly remarkable." The Naches River **is not eligible** for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

RATTLESNAKE CREEK

Total miles of creek to the confluence with the Naches River is 21.5 miles. There are 17.0 miles within the Wenatchee National Forest boundary of which 10.0 miles are within the William O. Douglas Wilderness. Of the remaining 4.5 miles outside of the National Forest boundary, 2.25 miles flow through State of Washington lands and 2.25 miles through private lands.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	17.00	5,440
State of Washington	2.25	720
Private	2.25	720
Total	21.50	6,880

*Based on an estimated 1/4 mile corridor on each side of the river.

Rattlesnake Creek originates within the William O. Douglas Wilderness and flows east to its confluence with the Naches River. The Creek is free-flowing for its entire length. Vegetation consists of mixed conifer, Douglas-fir and ponderosa pine types, changing to ponderosa pine and grass-shrub types at the lower portion.

The creek is paralleled by Forest Road #1500 for part of its length outside of the wilderness. There are additional roads which follow the creek for short distances, and the surrounding landscape is modified in places through vegetative manipulation during timber harvest.

Recreation is primarily hunting and fishing. There is one State of Washington developed campground and some undeveloped sites used for camping.

Eligibility Determination - Description and Rating of Values

Scenery The drainage has steep sloping to rolling terrain, rock outcrops, talus river gorges, and basalt cliffs; with some waterfalls and cascading water through the creek gorges. Vegetation is mixed conifer, with some old growth forest.

RANKING: Above average.

Recreational The drainage serves as an access route to the east side of the William O. Douglas Wilderness from the Yakima area. Use along the creek is primarily for fishing and hunting by local users, with a high opportunity for solitude within the wilderness.

RANKING: Average.

Geologic The terrain is sloping to rolling with some rock outcrops and basalt cliffs, which is typical of most east slope Cascade creeks.

RANKING: Average.

Fish The spring chinook and steelhead runs are low but the potential for these species is high. There is a good resident fishery.

RANKING: Above average.

Wildlife This area has spotted owl, Rocky Mountain elk, and mule deer. There are unique habitats such as cliffs and rims on one side of the river, and some deciduous woodlands habitat.

RANKING: Above Average.

Cultural/Historical The drainage has high cultural values for the Yakima Indians. The major historic use was sheep grazing.

RANKING: Average.

Other Values There is a high variety of ecotypes in this drainage.

RANKING: Above average.

Conclusion

While there are above average resource values within Rattlesnake Creek and its adjacent forests, none are “outstandingly remarkable.” Rattlesnake Creek **is not eligible** for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

TIETON RIVER

The total miles of river from the confluence of the Tieton River and Wildcat Creek to the confluence with the Naches River is 18.75 miles. There are 12.5 miles within the Wenatchee National Forest boundary of which 2.75 miles of the river are private. The remaining 6.25 miles outside the boundary flows through State of Washington and private lands.

Within the river corridor, the approximate mileage and acreage by ownership is:

Ownership	River Miles	Corridor Acres*
Wenatchee National Forest	9.75	3,120
State of Washington	3.25	1,040
Private	5.75	1,840
Total	18.75	6,000

*Acres based on an estimated 1/4 mile corridor on each side of the river.

The Tieton River originates east of the Cascade Crest in the Goat Rocks and the William O. Douglas Wildernesses. The river is impounded by two dams: Clear Lake and Rimrock. Flow is frequently manipulated throughout the year to meet downstream irrigation purposes. Fluctuating water levels detract from the naturalness of the river from Clear Lake to the Naches River. It is free-flowing below Rimrock Dam from Wildcat Creek to its confluence with the Naches River. The topography is a narrow canyon of volcanic formations through which the river has cut its way. Vegetation consists of Douglas-fir and ponderosa pine types.

The river is closely paralleled by State Highway 12 for most of its length. There are additional roads which follow the river for short distances on the south bank. Access to the river is by State Highway, Forest roads, spur roads and by trail in the wilderness areas.

Recreation is primarily camping, fishing and boating. Scenery viewed from the State Highway and Forest roads is rated high. There are five Forest Service developed campgrounds and numerous undeveloped sites used for camping.

Eligibility Determination - Description and Rating of Values

Scenery There are snowfields, mountain meadows, steep slopes to rolling terrain, with old growth forests above the dams. River gorges, and mixed forest river bottom typify the river below the dams.

RANKING: Above average.

Recreational Highway 12 serves as an access route to the White Pass Ski Area from the Yakima area. There is both transitory use along the river from travelers of the State Highway, as well as destination camping, fishing, hunting, and boating by users from the Yakima and Tri-Cities areas from the east and the Puget Sound area from the west.

RANKING: Above average.

Geologic The river flows from snowfields and mountain meadows in glaciated valleys above the dams. The river canyon has some steep rocky walls below the dams.

RANKING: Above average.

Fish Since the building of the Rimrock Lake impoundment the spring chinook and steelhead runs have been small. There is a good resident fishery.

RANKING: Average.

Wildlife The mature, old growth and riparian vegetation is average for this area. The species most commonly seen are Rocky Mountain elk and mule deer.

RANKING: Average.

Cultural/Historical There was intensive prehistoric use of the Tieton with settlements as far upriver as Rimrock. Included are several known archaeological sites and recorded pictograph localities of varying degrees of integrity. There are also historic irrigation and transportation developments of National Register significance within the drainage. Among the historic irrigation developments are the major impoundments of the river. An historic CCC work camp and a National Register-eligible former Ranger Station compound are located within the corridor, although these do not derive their significance from, nor contribute directly to, the uniqueness of the Tieton River.

RANKING: Above average.

Other Values This area is ecologically common to the Forest.

RANKING: Average.

Conclusion

While there are above average resource values within the Tieton River and its adjacent forests, none are “outstandingly remarkable.” The occurrence of dams causes a significant segment of the river to not meet the free-flowing criteria. The Tieton River is not eligible for Wild and Scenic River consideration. Classification of the river segments and determination of suitability is not necessary.

III. CLASSIFICATION AND SUITABILITY ANALYSIS

Based on the assessment of eligibility by an Interdisciplinary team (ID team), ten of the twenty rivers analyzed on the Wenatchee National Forest were considered eligible for designation under the Wild and Scenic Rivers Act. It was determined by the ID team that the ten rivers were essentially free-flowing and had at least one “outstandingly remarkable” value. Ten rivers were determined not to be eligible because they did not meet one or both of the eligibility criteria.

Each eligible river or river segment was assigned to one of three potential classes, based on the condition of the river and the adjacent lands as they presently exist. These classifications are defined in the Wild and Scenic Rivers Act as follows:

1. **Wild River Areas** - Those rivers or sections of rivers that are free of impoundments and are generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
2. **Scenic Rivers Areas** - Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
3. **Recreational River Areas** - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shoreline and that may have undergone some impoundment or diversion in the past.

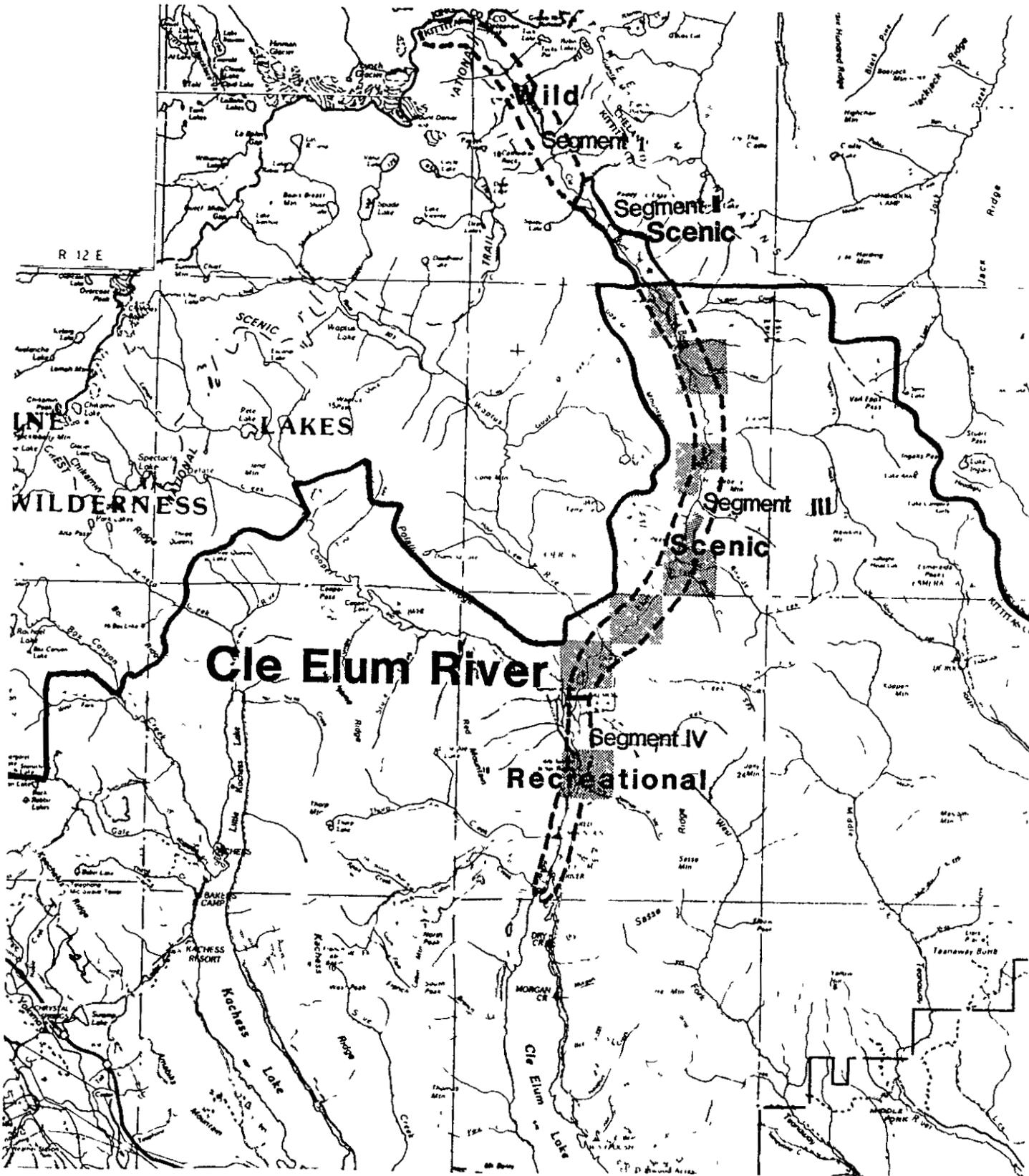
Following classification, a suitability analysis was conducted for each eligible river. This analysis provides the basis for the decision to recommend designation or nondesignation of an eligible river. The factors considered by the ID team in the determination of suitability of the eligible rivers and river segments on the Wenatchee National Forest were:

1. The characteristics that do or do not make the area a worthy addition to the system.
2. The current status of land ownership and use in the area.
3. The reasonably foreseeable potential uses of the land and water which would be enhanced, foreclosed, or curtailed if the area were included in the Wild and Scenic Rivers System, and the values which could be foreclosed or diminished if the area is not protected as part of the System.
4. Public, state, and local governmental interest in designation of the river, including the extent to which the administration of the river, including the costs thereof, may be shared by state and local agencies.
5. The estimated cost of acquiring necessary lands and interests in land and of administering the area if it is added to the System.
6. Other issues and concerns identified during the planning process.

The State of Washington is currently conducting an assessment of eighteen rivers in the State which possess the natural, cultural and recreational values that would make them suitable additions to the Washington State Scenic Rivers System. Among these eighteen is the Wenatchee River, from its outlet at Lake Wenatchee to its confluence with the Columbia River. The Forest Service study of the Wenatchee River is confined to those segments of the corridor located within the Wenatchee National Forest boundary. These segments were determined to be eligible for inclusion in the Wild and Scenic River System, and were recommended for further evaluation.

The results of the suitability analysis for each of the eligible rivers or river segments on the Forest are presented below, by Ranger District. In addition, a series of administrative and management guidelines are presented at the conclusion of the Appendix. These guidelines are proposed to guide the development of detailed management plans for those rivers on the Wenatchee National Forest that are Congressionally designated as Wild and Scenic Rivers.

CLE ELUM RIVER



Private Land 

CLE ELUM RANGER DISTRICT

CLE ELUM RIVER

Classification:

The Cle Elum River, from the headwaters to the head of the Lake Cle Elum Reservoir, is considered to be eligible for inclusion in the Wild and Scenic River system. In the course of determining eligibility, four distinct segments of the river were identified, based on a combination of physical changes in the river character, and differences in landownership and development along the river corridor. These segments consist of an upper section (Segment 1) extending from the headwaters in the NW 1/4 of Section 12, T.24N., R.13E. to the Alpine Lakes Wilderness boundary in the NW 1/4 of Section 28, T.24N., R.14E.; an upper middle section (Segment 2) extending from the wilderness boundary to the private land boundary at the north section line of Section 3, T.23N., R.14E.; a lower middle section (Segment 3) extending from the private land boundary to the Salmon La Sac bridge in the NW 1/4 of Section 16, T.22N., R.14E.; and a lower section (Segment 4) extending from the bridge to the head of Lake Cle Elum.

Based on their highest potential classification, Segment 1 meets the standards for classification as a Wild River, Segments 2 and 3 as a Scenic River, and Segment 4 as a Recreational River.

Segment 1

Segment 1, which is located entirely within the Alpine Lakes Wilderness, is approximately four miles in length. Trail #1376 parallels the river through much of the segment, and the Pacific Crest Trail intersects and crosses the corridor in the NW 1/4 of Section 28, T.24N., R.14E., near the headwaters. A public road easement, held by Kittitas County, extends from the end of the existing road in Section 28, T.24N., R.14E., to Hyas Lake. This two-mile-long easement, which is nearly all within the wilderness, was acquired by Kittitas County in 1888 for a Mine to Market Road, but the segment was never constructed. The Forest is recommending that the County abandon the easement.

Segment 2

Segment 2 is approximately two miles in length, and flows exclusively through National Forest land. Public Road #4330 follows the northeast side of the river through this segment, to the wilderness boundary. Other developments within Segment 2 are primarily small scale and recreation oriented. Hyas Lake Trailhead, at the end of the road, is a minimally developed campsite, with picnic tables, fire rings and pit toilet. One quarter mile south of here is the Deep Creek Trailhead, with similar facilities. At the lower end of the segment is the Fish Lake Guard Station and campground, the only formally developed site in Segment 2. There is also a remote automated weather station (RAWS) site in this segment, but the small building, sensory devices and antenna are situated out of view of the river.

Segment 3

Segment 3 is 14 miles in length. The corridor here is a mix of National Forest and private lands, with approximately 71% of the acreage in private ownership, including timber industry lands as well as a block of patented mining claims. In recent years, a portion of the private timber lands within the corridor were sold as individual recreation residence lots. Public Road #4330 parallels the river its entire length within this segment. The road offers scenic views, and access to camping sites and other recreational opportunities along the river. Numerous (about 30) private homes and summer cabins are located on the private lands adjacent to the road and river.

A user-built campground is located near Scatter Creek, and at least three trailheads and several dispersed sites are situated along the corridor.

Segment 4

Segment 4 is 4.5 miles in length. The ownership here is somewhat the reverse of Segment 3, with approximately 88% of the acreage being National Forest lands. County Road #903 parallels the river through the entire segment, offering access to scenic views and recreational sites. There are three Forest Service campgrounds in the corridor: Salmon La Sac with 120 units, Cle Elum River with 32 units, and Red Mountain with 11 units. Future plans call for the upgrading of the Boston Man site in the NE 1/4 of Section 32, T.22N., R.14E., to a developed campground. Also situated along Segment 4 are both the contemporary and historic Salmon La Sac Guard Stations, the latter building being listed on the National Register of Historic Places.

Suitability:

Suitability Factor #1 -Characteristics Which Make the Area a Worthy Addition to the System

The Cle Elum River encompasses a mix of outstandingly remarkable qualities: spectacular scenery, diverse recreation opportunities, significant cultural ties with the Yakima Indian Nation, and a substantial mining history that includes a National Register property.

The area is typified by rugged peaks and steep slopes, combined with patches of wetlands, open meadows and thick forests of old growth conifer and hardwoods on the valley bottom and gentler slopes. The deep pools and cascading rapids, riffles and waterfalls attract heavy recreation use along the length of the river. As a gateway to the Alpine Lakes Wilderness, the upper river corridor also experiences significant levels of recreation use, particularly hiking and dispersed camping.

Suitability Factor #2-Current Status of Land Ownership and Use

Forty-five percent of the Cle Elum River corridor is in private ownership, with most of these holdings being located in Segment 3. Plum Creek Timber Company is the primary landowner in this latter segment, but in recent years, Plum Creek has sold portions of their property as individual recreation residence lots. If this trend continues, there may be increasing sales of small parcels along the river for recreation use or development.

Under the Kittitas County Zoning regulations, the Cle Elum River above Lake Cle Elum is zoned as Forest and Range. Minimum lot size restrictions range from 7,200 square feet to one acre, depending upon the provisions for water and sewer systems. Cluster development is permitted provided community or public open spaces are retained. Minimum lot width is 60 to 100 feet, with a 100 foot setback requirement. Such industrial uses as timber harvest, mining, quarrying, and gas and oil exploration are permitted. However, under the State Forest Practices Act as well as the State Shoreline Management Act, more restrictive uses would apply.

National Forest lands below the wilderness boundary have been managed under a visual quality objective of retention, which emphasizes the scenic and recreational values of the corridor. Although timber harvest has taken place, efforts have been made to maintain the river area in its near natural condition.

Suitability Factor #3 -Foreseeable Potential Uses.

There would be no change in management of the National Forest lands as a result of designation. Segment 1 is currently managed as wilderness, which emphasizes the primitive, undeveloped character of the environment. Segments 2, 3 and 4 are currently managed under the Alpine Lakes Management Plan as a scenic corridor. The objective of this allocation is to retain or enhance the viewing and recreation experience in the Cle Elum, with timber management activities designed to meet this goal.

Mining activity has been ongoing within the corridor since the late nineteenth century, with several placer and lode claims patented in those early years. Segment 1 is now withdrawn from mineral entry because of its location within the Alpine Lakes Wilderness. However, Segments 2, 3 and 4 have been identified as being potentially valuable for coal, as well as for the occurrence of gold, silver, copper, chromite, iron and nickel. The corridor lands in Section 34, T.24N., R.14E., in Sections 2, 3, 14, 23, 26 and 34, T.23N., R.14E., and in Sections 4, 16, 28, 29 and 32 in T.22N., R.14E., were withdrawn from mineral entry under Powersite Classification No. 215, approved December 6, 1928. Public Law 359 of August 11, 1955, opened these powersite lands to mineral entry, but required, in each instance, that an analysis be done to determine the effects of placer mining on other resource uses when claims are located within the withdrawal area.

Scenic and Recreational classification would not affect continuing mining activity in the corridor. New claims and mineral leases are permitted, subject to 36 CFR 228, provided the activities are conducted in a manner that minimizes environmental degradation.

Designation might produce some effects on private lands in the corridor, particularly within Segment 3. The Scenic designation here would be compatible with the development of individual recreation residence lots. This classification allows for new structures, as long as these are modest in size, unobtrusive, and do not have a direct and adverse effect on river values. Concentrations of habitations may occur, but are limited to relatively short reaches of the river corridor. However, large scale developments or industrial uses that affect the significant river values, would have to be restricted.

Some scenic values in Segments 3 and 4 could be foreclosed if the river were not managed as part of the Wild and Scenic River System. Timber harvest on private land is controlled by State regulation. Under the State Shoreline Management Act of 1971, clearcutting is permitted to within 200 feet of the river shoreline, and selective cutting for commercial purposes within the 200 foot strip each side of the shoreline, as long as no more that 30% of the merchantable trees are harvested in any 10 year period. In addition, clearcutting incidental to preparation of the land for other uses authorized under the Shoreline Management Act may be permitted. The recently amended State Forest Practices Act further refines cutting practices within the riparian zone for the protection of wildlife habitat in these areas. In eastern Washington, a management zone of not less than 30 feet and a maximum of 50 feet is to be left on each side of the stream, the actual size of this strip being dependent upon the stream type. The zone is to be expanded where swamps, bogs, marshes and ponds occur adjacent to the water course. Selective logging is allowed within these zones, with the number of leave trees specified per thousand feet of shoreline. Road construction is also restricted within the riparian management zone. Beyond the narrow riparian strips established by the above laws, however, clearcutting, road construction and other facility development is permitted.

Although the intent of designation is to follow these existing State and County controls on private land, it is possible that designation would encourage greater sensitivity to the visual values within the Wild and Scenic corridor. In addition, designation would ensure protection of the free-flowing character of the Cle Elum River above the existing reservoir.

Suitability Factor #4 -Public, State, and Local Governmental Interest.

There has been a great deal of public support for designation of the Cle Elum River as an addition to the Wild and Scenic River System. Many have expressed the need to protect the outstanding scenic values and to maintain the excellent recreation opportunities that currently exist in the corridor. Several have expressed concerns for the present level of timber harvest along the drainage, particularly with respect to its effects on the wildlife, water quality, and visual resources of the drainage.

Kittitas County officials are strongly in favor of local control in the Cle Elum River corridor. They have indicated that the County would probably not support any proposal for inclusion of the Cle Elum River in the Wild and Scenic River System that affects their jurisdiction over private lands or their ability to riprap or carry out other erosion-control measures for the protection of their improvements. The only costs that would be shared in administration of the river would be those independent of designation, that are associated with existing County administration of the private holdings.

The Washington State Department of Wildlife is in full support of the proposed river designation, and in fact, recommends reassessment of additional rivers on the Forest for potential eligibility as Wild and Scenic Rivers. The Yakima Indian Nation, whose ceded lands include the Cle Elum River drainage, supports designation at the highest potential classification, although they have some concerns for potential conflicts between recreation use and the protection of fisheries and tribal fishing localities. The Yakima would like to be involved in any subsequent river management plans that might be developed.

If the Cle Elum River is included in the Wild and Scenic Rivers System, the Forest would rely on State and County controls for administration of private lands, to the extent that these provide adequate protection. The Forest would also recommend that a proviso be included in any Wild and Scenic legislation to allow riprapping for the preservation and protection of existing improvements.

Suitability Factor #5 -Cost of Acquisition and Interests.

There are no foreseeable plans to acquire lands or interests in lands along the Cle Elum River. Acquisition of easements from private landowners would occur only if key values were in jeopardy, and local government could not provide the necessary protection.

Costs associated with designation are related to planning and administration of the river corridor and are primarily directed to National Forest lands. The following are the expected funding needs for the Cle Elum River for a total five year period:

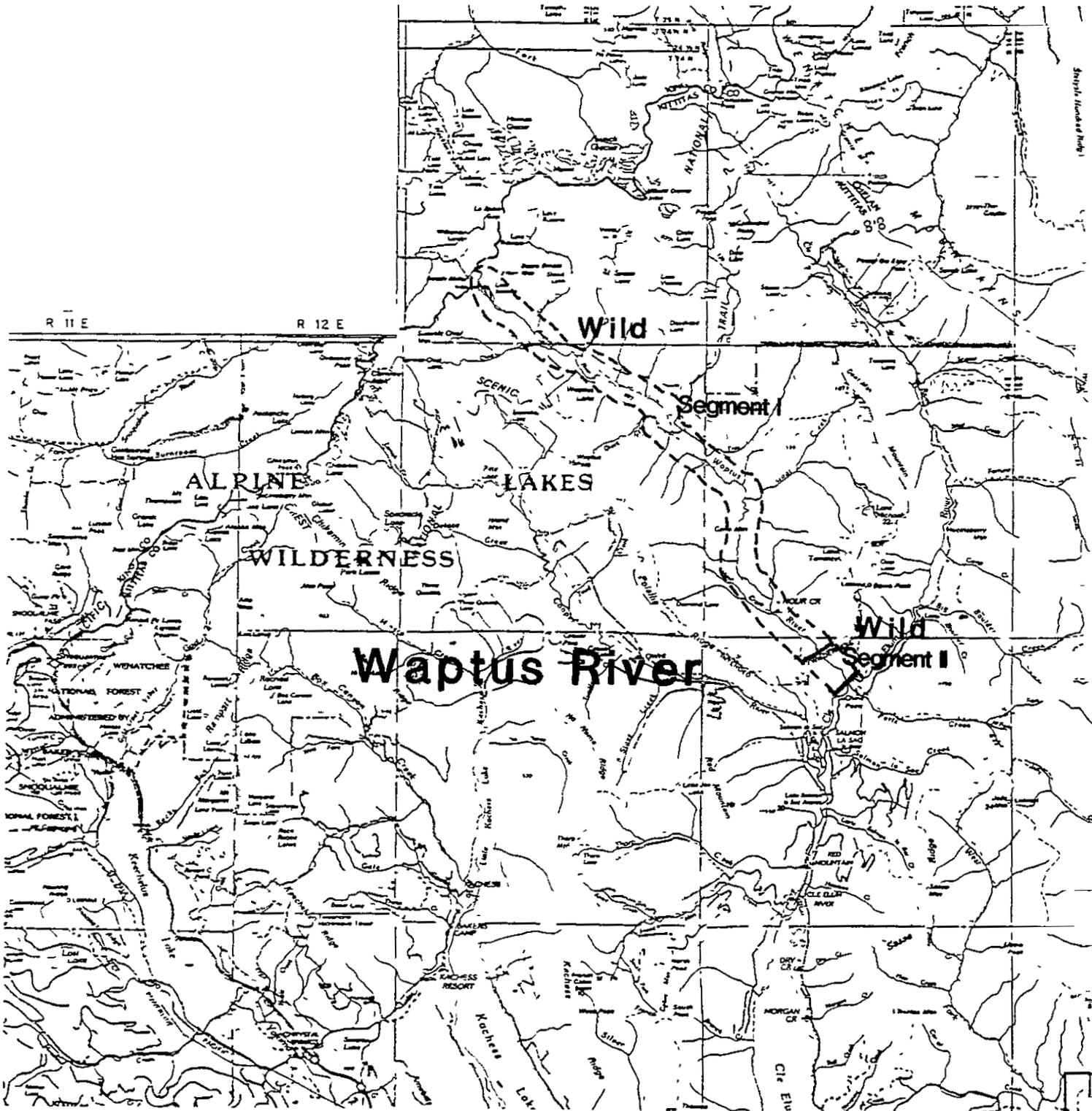
	<i>Expenses Expected Independent of Designation</i>	<i>Additional Expenses Expected with Designation</i>
General Administration	\$ 4,000	\$ 20,000
Costs of Implementation		\$ 25,000
Development of Management Plan		\$110,000
Development Costs		\$100,000
Operation and Maintenance Costs	\$ 6,000	\$ 15,000
Total - First Five Years	\$10,000	\$ 270,000

General administration and operation and maintenance costs are estimated to continue at \$9,000 annually.

Suitability Factor #6-Other Issues and Concerns

No other major issues or concerns have been identified.

WAPTUS RIVER



WAPTUS RIVER

Classification

The Waptus River, from the headwaters to the confluence with the Waptus River, is considered to be eligible for inclusion in the Wild and Scenic River System. In the course of determining eligibility, two distinct segments of the river were identified, based on the location of the corridor with respect to the Alpine Lakes Wilderness boundary. These segments consist of an upper section (Segment 1) extending from the headwaters above Lake Ivanhoe, in the SE 1/4 of Section 29, T.24N., R.13E., to the Alpine Lakes Wilderness boundary in the NW 1/4 of Section 4, T.22N., R.14E.; and a lower section (Segment 2) extending from the wilderness boundary to the confluence with the Cle Elum River in the SE 1/4 of Section 4, T.22N., R.14E.

Based on their highest potential classification, Segments 1 and 2 meet the standards for classification as a Wild River.

Segment 1

Segment 1, which is located entirely within the Alpine Lakes Wilderness, is approximately 12 miles in length. Trail #1310 parallels the river through two-thirds of the segment, and the Pacific Crest Trail intersects and crosses the corridor in the NE 1/4 of Section 3, T.23N., R.13E. At least four other trail systems intersect Trail #1310 from side drainages on both sides of the corridor. Above the Pacific Crest Trail, Trail #1362 provides access to within one half mile of the headwaters, and skirting Lake Ivanhoe before crossing the Cascade Crest at Dutch Miller Gap.

Segment 2

Segment 2 is one mile in length. Within the northeast boundary of the corridor are the remnants of two former clearcuts and the roads that accessed them. However, these harvest units have since regenerated and both they and the roads are discernible on the slope above the river only through a slight change in the age class and texture of the vegetation.

Suitability:

Suitability Factor #1-Characteristics Which Make the Area a Worthy Addition to the System.

Originating high in the Alpine Lakes Wilderness, this rugged, glaciated valley offers a spectacular view of the pristine, timbered landscape and adjacent snow capped peaks through which it flows. The river tumbles through two sizable mountain lakes and a series of cascades and falls, to its confluence with the equally scenic Cle Elum River. Old growth stands, interspersed with wet and dry meadow openings, offer a diversity of vegetation for viewing, particularly the latter with their profusion of wildflowers and bog-associated plants.

Suitability Factor #2-Current Status of Landownership and Use

The entire corridor is National Forest, with 12 of the 13 miles currently being managed as wilderness. Within the lower mile, the corridor is managed for a combination of scenic travel and unroaded, nonmotorized dispersed recreation.

There is one placer claim located in Segment 1, and a set of four lode claims in Segment 2, all of which have assessment work completed in 1988.

Suitability Factor #3-Foreseeable Potential Uses

Over ninety percent of the Waptus River is within wilderness, which emphasizes the primitive, undeveloped character of the environment. There would be no change in management along these upper 12 miles. Segment 2 is currently managed under the Alpine Lakes Management Plan as Scenic Forest, with an objective of retaining or enhancing viewing and recreation experiences. A small portion of the corridor is also managed for unroaded recreation. Since timber harvest is permitted within the Scenic Forest allocation, there would be a slight loss in timber production if this segment were classified as Wild.

Because Segment 1 of the Waptus River lies wholly within the Alpine Lakes Wilderness, it is withdrawn from mineral entry. The single placer claim near Trail Creek was located after this withdrawal, and thus is not a valid claim. However, there could be a conflict in Segment 2 between the four lode claims that have been located here, and a Wild classification of the river. Future development of these claims would require confirmation of prior, valid existing rights to mine before any activity could be approved. No portion of the drainage is classified as an area of critical mineral potential. However, it has been identified as prospectively valuable for coal resources, and that portion of the corridor lying in T.23-24N., R.13E. is prospectively valuable for geothermal resources.

There are probably few values that would be foreclosed or curtailed if the river were not protected as part of the System. As mentioned above, all but one mile of the river is within wilderness, and current management in the lower segment recognizes the scenic and recreational values here. The greatest potential threat to river values would be in future diversions or impoundments of the river. Designation would ensure the protection of the pristine free-flowing character of the Waptus River.

Suitability Factor #4-Public, State and Local Governmental Interests.

The public response to designation of the Waptus River as an addition to the Wild and Scenic River system has been positive. Many have expressed support for the recognition and protection of the special river values here, particularly with respect to the outstanding scenery, high recreation use, wildlife habitat, old growth stands, ecological diversity and water quality. There were no specific comments in opposition to designation of this river.

Kittitas County officials have been most concerned with how designation of rivers in general would affect their jurisdiction over private lands. However, there is no private land within the Waptus drainage.

The Washington State Department of Wildlife is in full support of the proposed river designation, and in fact, recommends reassessment of additional rivers on the Forest for potential eligibility as Wild and Scenic Rivers. The Yakima Indian Nation, whose ceded lands include the Waptus drainage, supports designation at the highest potential classification, although they have some concerns for potential conflicts between recreation use and the protection of fisheries and tribal fishing localities. The Yakima would like to be involved in any subsequent river management plans that might be developed.

Suitability Factor #5-Cost of Acquisition and Interests

There are no private lands included within the proposed Wild and Scenic corridor of the Waptus River.

Costs associated with designation are related to planning and administration of the river corridor. The following are the expected funding needs for the Waptus River for a total five year period:

	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	\$ 1,000	\$ 1,000
Costs of Implementation		\$ 5,000
Development of Management Plan		\$ 25,000
Development Costs		\$ 5,000
Operation and Maintenance Costs	\$ 2,500	\$ 10,000
Total - First Five Years	\$ 3,500	\$ 46,000

General administration and operation and maintenance costs are estimated to continue at \$2,900 annually.

Suitability Factor #6-Other Issues and Concerns

No major issues or concerns have been identified.

ENTIAT RANGER DISTRICT

ENTIAT RIVER

Classification:

The Entiat River, from the headwaters to the private land boundary above Burns Creek, is considered to be eligible for inclusion in the Wild and Scenic River System. This part of the drainage is exclusively comprised of National Forest lands. In the course of determining eligibility, three distinct segments of the river were identified, based on a combination of physical changes in the river character and the level of development along the shoreline. These segments consist of an upper section (Segment 1) extending from the headwaters in the SE 1/4 of Section 25, T.31N., R.16E., to the Glacier Peak Wilderness boundary in the SE 1/4 of Section 27, T.30N., R.17E.; a middle section (Segment 2) extending from the wilderness boundary to the Cottonwood Trailhead in the SW 1/4 of Section 7, T.29N., R.18E.; and a lower section extending from the trailhead to the private land boundary in the NE 1/4 of Section 29, T.28N., R.19E.

Based on their highest potential classification, Segments 1 and 2 meet the standards for classification as a Wild River, and Segment 3 as a Scenic River.

Segment 1

Segment 1, which is located entirely within the Glacier Peak Wilderness, is approximately 12.5 miles in length. Access along the corridor is provided by Trail #1400, which parallels the Entiat River along its east and north bank to within one mile of the headwaters. At least six other trail systems intersect Trail #1400 from side drainages on both sides of the corridor, between the headwaters and the wilderness boundary.

Segment 2

Segment 2 is four miles in length. As in Segment 1, Trail #1400 parallels the east bank of the river. A steel girder bridge across the Entiat River links this route with the Myrtle Lake Trail #1404 in the NE 1/4 of Section 34, T.30N., R.17E. Trail #1435 also intersects Trail #1400 on the east side of the river, in the NE 1/4 of Section 2, T.29N., R.17E.

Motorized bike use is presently permitted along Trail #1400 as far as the wilderness boundary. Long range plans anticipate terminating bike use one-half mile south of the wilderness boundary, at the junction with Trail #1404, and continuing motorized access up the latter trail as far as Myrtle Lake.

Segment 3

Segment 3 is 15 miles in length. Access along the river is provided by both Forest and private roads. National Forest Primary Route #51, a double lane paved road, follows the east side of the river to the North Fork Campground, where it is succeeded by a gravel surface road to its terminus at Cottonwood Campground. Secondary Forest roads intersect the corridor one-half mile above Entiat Falls, just below the confluence with the North Fork Entiat River, at Jungle Creek where the Tommy Creek Road #5605 crosses the Entiat River, and approximately one mile above Lake Creek. There are also two road bridges across the Entiat: one at Cottonwood Campground, and the second in connection with the Tommy Creek Road.

The remaining developments in Segment 3 are related to recreation use. There are trailheads at Cottonwood Campground (#1400 and #1429), North Fork Campground (#1434), and at Lake Creek Campground (#1443, #1423 and #1424), where a footbridge spans the Entiat. Developed camping/picnic sites are located at regular intervals along the east side of the corridor, and include Cottonwood Campground, Three Creek Campground (which is proposed for expansion as an ORV campsite, including construction of a bridge across the Entiat River for motorized use), Spruce Grove Campground, North Fork Campground, Silver Falls Campground, Lake Creek Campground and Fox Creek Campground. And finally, there are two recreation residence tracts encompassing a total of 17 recreation residences under permit to the Forest Service: the Riverside tract, approximately 1/4 mile above the Tommy Creek road bridge, and the Pope Creek tract, on both sides of Pope Creek near its confluence with the Entiat River.

Suitability:

Suitability Factor #1 -Characteristics Which Make the Area a Worthy Addition to the System.

Originating in the Glacier Peak Wilderness, this steep, glaciated valley is bordered by extensive snowfields and alpine glaciers, high mountain peaks, and rugged slopes with large outcrops of granite and gneiss. The river plunges in cascading rapids, riffles and falls, to a meandering course in the broader valley of the lower reaches. A mixed conifer forest, interspersed with patches of old growth and natural openings, contributes to the pristine setting of the river.

Suitability Factor #2 -Current Status of Land Ownership and Use.

The river corridor proposed for designation is located exclusively on National Forest lands. Major uses include recreation (fishing, camping, hiking, driving for pleasure, trail bike riding, snowmobiling, and cross-country skiing) and, below Garland Creek, a full range of timber management activities. The upper 15 miles of the river are managed as wilderness.

Suitability Factor #3 -Foreseeable Potential Uses.

There would be a little change in the management of the National Forest lands as a result of designation. Segment 1 is currently managed as wilderness, which emphasizes the primitive, undeveloped character of the environment. This value would not be affected. Until the passage of the Washington State Wilderness Act of 1984, the lands in Segments 2 and 3 were managed according to direction outlined in the Chelan Unit Plan, issued in April 1976. This plan specified that the river corridor above Garland Creek be included as a study area for potential wilderness consideration. Below Garland Creek, the river was to be managed for a full range of commodities and amenities. The Wilderness Act released the area above Garland Creek from required consideration as wilderness, thus potentially opening it to a full range of multiple use activities. Designation as a Wild river in Segment 2 would preclude future timber harvest in the 320 acre area between Garland Creek and Cottonwood Campground. However, in the preferred alternative to the Forest Plan, this same area is proposed for allocation as unroaded, non-motorized southwest of the river, and unroaded, motorized northeast of the river. There would be no scheduled timber harvest in this portion of the corridor. Motorized trail bike use might be appropriate, even with a Wild classification, where current use is taking place and the adjacent allocation of the area is compatible.

With respect to mineral potential, Segment 1 is currently withdrawn from mineral entry because it lies wholly within the Glacier Peak Wilderness. Segments 2 and 3 are not encumbered by any mining claims. Furthermore, the area has not been identified as having potential for the occurrence of locatable mineral resources, nor is it classified as being prospectively valuable for leasable mineral commodities.

Under current management direction, some scenic values in Segment 3 could be foreclosed if the river were not managed as part of the Wild and Scenic Rivers System, unless timber activities follow a visual quality objective of retention. The greatest potential threat to river values, however, would be in future diversions or impoundments. Designation would ensure the protection of the free-flowing character of the Entiat River.

Suitability Factor #4 -Public, State, and Local Governmental Interests.

There has been a great deal of support for designation of the Entiat River as an addition to the Wild and Scenic River System. Many have expressed a desire to protect the pristine condition and integrity of the river, to provide for fisheries habitat and to ensure free-flowing, sustainable flows of water. There is also a segment of the public that hopes to restrict ORV use in the Entiat corridor through designation of the river.

Most of the opposition to designation has come from landowners in the valley, below the proposed Wild and Scenic boundary. Many of these people view designation as a threat to their property rights, and feel that present federal, state and local controls are adequate protection for the river values. They fear that the Wild and Scenic boundaries will eventually be expanded, that condemnation will occur to take private property for public use, that there will be possible restrictions on existing water rights, and that property values will fall. Some worry that there will be a loss in timber-related jobs, and that an increase in public use will be harmful to the resources within the corridor. There are also a great number of people who are concerned that designation of Segment 2 as Wild would effectively eliminate trail bike riding in the upper Entiat Valley.

Chelan County officials have indicated they could not support any proposal for designation of the Entiat River unless the County retains jurisdiction of private lands within the designated corridor (of which there are none in the present proposal). There would be no sharing in the cost of administration of the river, since there are no private holdings within the proposed boundaries. The County has also expressed the same concerns as the private landowners regarding the possible effects of designation on water rights for agricultural lands, and the potential impacts of river designation on downstream private lands. However, the Entiat River below the proposed boundary was determined to be ineligible for inclusion in the National System due to extensive straightening of the channel and other modifications of the waterway. Designation could thus not affect the private lands. In addition, all valid, existing water rights would be unaffected by designation.

The Washington State Department of Wildlife is in full support of the proposed river designation, and in fact, recommends reassessment of additional rivers on the Forest for potential eligibility as Wild and Scenic Rivers. The Yakima Indian Nation, whose ceded lands include the Entiat River drainage, supports designation at the highest potential classification, although they have some concerns for potential conflicts between recreation use and the protection of fisheries and tribal fishing localities. The Yakima would like to be involved in any subsequent river management plans that might be developed.

Suitability Factor #5 -Cost of Acquisition and Interests.

There are no private lands included within the proposed Wild and Scenic corridor of the Entiat River. Consequently, there are no plans to acquire lands or interests in lands here.

Costs associated with designation are related to planning and administration of the river corridor and are directed to National Forest lands. The following are the expected funding needs for the Entiat River for a total five year period:

	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	\$4,000	\$ 16,000
Costs of Implementation		\$ 20,000
Development of Management Plan		\$ 70,000
Development Costs		\$100,000
Operation and Maintenance Costs	\$8,000	\$ 15,000
Total - First Five Years	\$12,000	\$231,000

General administration and operation and maintenance costs are estimated to continue at \$8,600 annually.

Suitability Factor #6-Other Issues and Concerns

Landowners in the Entiat Valley have expressed a major concern with respect to the amount of government regulation that already exists along the Entiat River. There are presently several overlapping National, State and County laws, regulations and executive orders that provide for protection of values within the river system. At the Federal level, these include the National Environmental Policy Act, the National Historic Preservation Act, the Endangered Species Act, the Fish and Wildlife Coordination Act, the Water Resources Planning Act, the Floodplain and Wetlands Executive Orders, the National Forest Management Act of 1976, and the Federal Land Policy and Management Act of 1976, in addition to the Wild and Scenic Rivers Act. At the State level, the Forest Practices Act and the Shorelines Management Act seek similar protection, and in Chelan County, there are further restrictions imposed by the Shoreline Master Program and the local zoning regulations. Several residents feel strongly that the present scope of government regulation is more than adequate to protect the river values. These same landowners also view designation as a threat to their individual rights and freedoms, and even though the eligible river segments do not include private land, they fear loss of their property through governmental acquisition of easements or interests in their lands.

LAKE WENATCHEE RANGER DISTRICT

CHIWAWA RIVER

Classification:

The entire length of the Chiwawa River, from its headwaters near the Cascade Crest to its confluence with the Wenatchee River, is considered to be eligible for inclusion in the Wild and Scenic River System. In the course of determining eligibility, three distinct segments of the river were identified, based on a combination of physical changes in the river character and significant differences in the level of development and land ownership along the river. These segments consist of an upper section (Segment 1) extending from the headwaters in the NE 1/4 of Section 36, T.31N., R.15E., to the Glacier Peak Wilderness boundary in the SE 1/4 of Section 21, T.30N., R.16E.; a middle section (Segment 2) extending from the wilderness boundary to Goose Creek in the SE 1/4 of Section 13, T.27N., R.17E., and a lower section extending from Goose Creek to the confluence with the Wenatchee River in the NE 1/4 of Section 1, T.26N., R.17E.

Based on their highest potential classification, Segment 1 meets the standards for classification as a Wild River, Segment 2 as a Scenic River, and Segment 3 as a Recreational River.

Segment 1

Segment 1, which is located entirely within the Glacier Peak Wilderness, is approximately five miles in length. The only visible developments along this segment are two foot trails and an unobtrusive foot-bridge. Trail #1550 parallels the east edge of the Chiwawa River corridor to within approximately 1 1/2 miles of the headwaters. A second route, Trail #1513, follows the east bank of the Chiwawa for the first 1/2 mile into the Glacier Peak Wilderness. This latter trail crosses the river by bridge in the NE 1/4 of Section 17, T.30N., R.16E., to begin the ascent up Buck Creek.

Segment 2

Segment 2 is twenty-four miles in length. The west bank of approximately the upper six miles of this segment are within the Glacier Peak Wilderness. The remainder of the segment is also National Forest, with the exception of two parcels of private land: an undeveloped area of about 280 acres at Chikamin Flats, in Sections 20, 21, and 28, T.28N., R.17E., and the old mining townsite of Trinity, just south of the wilderness boundary. Chikamin Flats was logged years ago, but today is a naturally-appearing combination of meadowland and forest cover. There is heavy dispersed recreation use in this area during the summer months. Trinity is the product of late nineteenth century mining developments in the upper Chiwawa. Four houses, a powerplant and a large, non-residential structure occupy a short stretch of the corridor here, maintained by a year-around caretaker.

National Forest Primary Route #62 and Secondary Route #6200, which is a gravel-surface extension of Road #62, closely parallel the northeast side of the Chiwawa to within 1 1/4 miles of the wilderness boundary. Intersecting Forest roads take off from the east side of the Chiwawa at Minnow Creek, and at Phelps Creek, near Trinity. The valley road also provides access to trailheads at Chikamin Creek, Finner Creek, Rock Creek and at Trinity, where Trail #1513 provides continuing passage up the Chiwawa into the wilderness. There is one major bridge crossing of the Chiwawa in this segment by Road #62 a short distance above Goose Creek, in the NW 1/4 of Section 13, T.27N., R.17E.

Other developments in Segment 2 include Trail #1548, which extends parallel to Road #62 along the east margin of the river corridor between Deep Creek in Segment 3, and Chikamin Flats to the north. Ten developed sites are situated at intervals along the east side of the Chiwawa between Meadow Creek to the south, and the Trinity townsite to the north. At one of these, Atkinson Flat Campground, approximately 150 to 200 feet of log and rock cribbing has been installed along the shoreline as bank protection. Most of these campgrounds are small and do not detract from the essentially primitive appearance of the river. At Finner Creek, in the SW 1/4 of Section 6, T.28N., R.17E. are the remnants of the historic Rock Creek Guard Station. The Guard Station itself was destroyed by fire in 1977, but the Civilian Conservation Corps-era garage is still standing. And finally, the Chiwawa Summer Home site, a tract of eight, rustic-appearing recreation residences, is located south and west of the river on National Forest land, near the south boundary of Segment 2.

Segment 3

Segment 3 is 6 miles in length. Most of the private land within the Chiwawa corridor is located along this segment, particularly in the lower half where only one small piece is National Forest. Agricultural, residential and recreational developments characterize the private lands here. Most are fairly light density, with the exception of Chiwawa River Pines in the W 1/2 of Section 31, T.26N., R.18E., which is a year-round residential subdivision. A second major development, Thousand Trails in the SE 1/4 of Section 31, T.26N., R.18E., is a popular private recreational camp, with trailer and tent units, clubhouse facilities and a swimming pool.

A network of County, Forest and private roads approach the Chiwawa in this segment. County Road #22 intersects the Chiwawa corridor at the Chiwawa River Pines subdivision, crossing the Chiwawa by way of a double-lane concrete bridge. Forest Roads #6100, east of the Chiwawa, and #6121 west of the Chiwawa, parallel the river from this point north to Goose Creek. An extensive array of private roads are threaded through Shugart Flats, just south of the confluence of the Chiwawa with the Wenatchee River.

There are also two developed campsites on National Forest land in Segment 3: Goose Creek Campground in the SE 1/4 of Section 13, T.27N., R.17E., which is currently being expanded and converted into an ORV campground with cooperative funding from Washington State; and the Deep Creek Campground, a small, rustic site in the SE 1/4 of Section 19, T.27N., R.18E.

There is one sizable water diversion in Segment 3, the Wenatchee-Chiwawa Irrigation Canal which takes off from an intake box on the south side of the Chiwawa River in the NW 1/4 of Section 30, T.27N., R.18E. The canal parallels the west edge of the river corridor for approximately four miles, before diverging to the Wenatchee River corridor. The Wenatchee-Chiwawa Irrigation District has held rights to divert water from the Chiwawa River since 1912. Other small irrigation diversions exist along the lower three miles of Segment 3, but none impede the free-flowing character of the Chiwawa.

Suitability:

Suitability Factor #1 -Characteristics Which Make the Area a Worthy Addition to the System.

The Chiwawa River is typified at its upper end by towering mountain peaks, extensive snowfields and imposing valley walls with numerous rocky areas. The river channel here is narrow and plunges downstream in frequent cascades and small falls, which gradually lessen in intensity as the river enters the broader, U-shaped valley of the mid- and lower segments.

There is heavy recreation use of the Chiwawa in the form of camping, fishing, hunting, hiking, and driving for pleasure by visitors from both east and west of the Cascades. In Segment 2, the

combination of moderate weather, diversity of recreation opportunities and ready access to all reaches of the river make this stretch one of the most popular recreation destinations in the Lake Wenatchee area. The upper drainage serves as the most heavily used access route into the Glacier Peak Wilderness east of the Cascades.

The Chiwawa is also notable for its anadromous fish population. Most other drainages in the upper Columbia River system have runs that are supplemented with hatchery-bred salmon. In contrast, the Chiwawa experiences a sizable, self-sustaining wild run of spring chinook each year, as well as a large run of steelhead.

Suitability Factor #2 -Current Status of Land Ownership and Use.

Only 11% of the Chiwawa drainage is in private ownership. The majority of these holdings are concentrated in the lower half of Segment 3, and consist of fairly light density agricultural, residential and recreational developments. The exception is the Chiwawa River Pines subdivision. Current zoning regulations have established a minimum lot size here of less than 1/2 acre. The remaining private land (including the Thousand Trails recreational development) in Segment 3 is zoned for agricultural uses. The minimum lot size along the river is one acre, with no major residential subdivisions permitted. Shoreline works and structures are permitted if they do not substantially change the character of the environment, and are part of a water-dependent or water-related project that would be rendered impossible without the shoreline modification.

The approximately 280 acres of private land at Chikamin Flats in Segment 2 serves as a heavily-used dispersed recreation site. The current owners have been very tolerant of this use, and it is common to find over 100 people camped here on a summer weekend. The historic mining developments at the townsite of Trinity have served as a public attraction, and add to the value of this segment.

National Forest land below the wilderness boundary has been managed under a visual quality objective of retention, which emphasizes the scenic and recreational values of the corridor. Although timber harvest has taken place, the river area has been maintained in its near natural environment.

Suitability Factor #3 -Foreseeable Potential Uses.

There would be no change in management of the National Forest lands as a result of designation. Segment 1 is currently managed as wilderness, which emphasizes the primitive, undeveloped character of the environment. Segments 2 and 3 are presently managed according to direction outlined in the Chelan Unit Plan, issued in April 1976. The plan identifies the Chiwawa River as a potential wild and scenic river, and specifies that management activities be designed to protect the wild, scenic and recreation qualities of the corridor until such time as a detailed study can be conducted. In addition, protection and/or enhancement of the fisheries habitat will continue to be an important part of management in this area. The Chelan County P.U.D. is in the process of developing plans for a spring Chinook fish rearing station near the mouth of the Chiwawa, that has been determined by the National Park Service to be consistent with the criteria established for the Recreational classification of this portion of the Chiwawa.

Off road vehicle use has been fairly heavy in Segments 2 and 3, particularly in the vicinity of Goose Creek, where the present campground is being expanded to accommodate ORV's. Scenic and Recreational River classifications both provide the latitude to permit, prohibit or restrict motorized travel. It is likely that ORV use will be allowed to continue unless those values for

which the river would be designated are threatened.

With respect to mining interests, the Chiwawa has a long history of mining activity. A mine-to-market road was constructed up the valley, a halfway house was established at Chikamin Flats for miners traveling to the upper drainage, and the townsite of Trinity was developed adjacent to a series of mining claims, twenty-two of which were patented. Today, Segments 1 and 2 are still encumbered by numerous unpatented placer and lode claims, several of which are maintained by annual assessment work. Some of those within Segment 1 predate the wilderness withdrawal, and may have valid existing mining rights. The BLM has classified Segments 1, 2 and 3 as prospectively valuable for geothermal resources, and Segments 2 and 3 as prospectively valuable for coal. A Forest Service materials inventory has also identified at least four rock sources along Segments 2 and 3, which range in volume from 10,000 to 100,000 cubic yards. Designation of the river would not affect the future mining potential in any of these segments. Since Segment 1 is within an existing wilderness, new claims and leases are already prohibited. Preexisting claims with valid mining rights would be allowed to continue, subject to regulation (36 CFR 228). Scenic and Recreational classifications do allow for new mining claims and mineral leases, subject to the same regulation as above, provided the mineral activity be conducted in a manner that minimizes environmental degradation.

The effects of designation on potential future uses of the private land in Segments 2 and 3 are likely to be minimal, due to the level of classification proposed for the river, and because of the present zoning and land use regulations that are in place. The majority of the private land is in Segment 3, where a Recreational classification allows for small communities as well as dispersed or cluster residential developments along the river. New structures are allowed for both habitation and for intensive recreation use. Lands may also be managed for a full range of agricultural uses, to the extent currently practiced. The Residential-Low Density and Plain Rural District Zones that cover Segment 3 appear to adequately protect the values that would be recognized through designation of the river. One constraint that would be introduced through designation would be in the modifications permitted along the river banks and channel. Existing structures (low dams, diversions, riprap and other minor structures) would be allowed, but ordinarily new structures would be prohibited, as would development of hydroelectric facilities. Variances to the existing zoning regulations might also need to be restricted in order to ensure protection of the values for which the river would be designated.

The Shoreline Master Program classifications of the private land in Segment 2 will generally provide adequate protection of the river values here. Additional restrictions might be imposed to require screening of any new structures from the river, to limit concentrations of habitations to relatively short reaches of the corridor, to constrain shoreline modifications, or to prevent any direct or adverse effects on river values.

There are probably few values that would be foreclosed or curtailed if the river were not protected as part of the System, as long as management continues to follow a visual quality objective of retention. As mentioned above, current management recognizes the scenic, recreational and fisheries values within the corridor, and present zoning provides a reasonable level of protection on private land. The greatest potential threat to river values would be in future diversions or impoundments. Designation would ensure the protection of the free-flowing character of the Chiwawa River.

Suitability Factor #4 -Public, State and Local Governmental Interests.

The overall public response to designation of the Chiwawa as an addition to the National Wild and Scenic River System has been positive. Many have expressed support for protection of the outstanding river values here. The major concerns expressed are with management of the private

land in the lower reaches of Segment 3. Some property owners are alarmed at the potential for additional government regulation of their holdings, and seek reassurance as to the future status of the Wenatchee-Chiwawa Irrigation System water rights. Some have proposed that designation of the river begin above the Chiwawa River Pines subdivision, so as to eliminate the most densely populated portion of the Chiwawa from inclusion in the National system.

Chelan County officials have indicated they could not support any proposal for designation of the Chiwawa unless the County retains jurisdiction of private lands within the designated river corridor. The only costs that would be shared in administration of the river would be those independent of designation, that are associated with existing County administration of the private holdings. The Washington State Department of Wildlife is in full support of the proposed river designation, and in fact, recommends reassessment of additional rivers on the Forest for potential eligibility as Wild and Scenic Rivers. The Yakima Indian Nation, whose ceded lands include the Chiwawa River drainage, supports designation at the highest potential classification, although they have some concerns for potential conflicts between recreation use and the protection of fisheries and tribal fishing localities. The Yakima would like to be involved in any subsequent river management plans that might be developed.

If the Chiwawa River is included in the Wild and Scenic River System, the Forest Service would rely on State and County controls for administration of the private lands. Valid existing water rights, such as those held by the Wenatchee-Chiwawa Irrigation District, would not be affected by designation.

Suitability Factor #5 -Cost of Acquisition and Interests.

There are no foreseeable plans to acquire lands or interests in lands along the Chiwawa River. Acquisition of easements from private landowners would occur only if key values were in jeopardy, and local government could not provide the necessary protection.

Costs associated with designation are related to planning and administration of the river corridor, and are primarily directed to National Forest lands. The following are the expected total funding needs for the Chiwawa River for the next five year period:

	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	\$ 3,000	\$ 12,000
Costs of Implementation		\$ 15,000
Development of Management Plan		\$ 65,000
Development Costs	\$50,000	\$100,000
Operation and Maintenance Costs	\$10,000	\$ 15,000
 Total - First Five Years	 \$63,000	 \$207,000

General administration and operation and maintenance costs are estimated to continue at \$8,000 annually.

Suitability Factor #6-Other Issues and Concerns

No other major concerns or issues have been identified.

LITTLE WENATCHEE RIVER

Classification:

The Little Wenatchee River, from the falls just below Riverside Campground in the SW 1/4 of Section 11, T.27N., R.15E., to the outlet at Lake Wenatchee, is considered to be eligible for inclusion in the Wild and Scenic River System. Although the river above this point was included in the initial eligibility study, the lack of outstandingly remarkable features excludes the upper portion of the river from further study. Following the determination of eligibility, this lower section of river was identified as Segment 1, since it is now the only segment of the drainage under consideration for designation. Based on its highest potential classification, this segment meets the standards for classification as a Scenic River.

Segment 1

Segment 1 is eight miles in length. The corridor here is a mix of National Forest and private lands, with approximately one third of the acreage being in private ownership. There are few developments along the segment. The north edge of the corridor is paralleled by Forest Road #6500, which approaches the river in places. The only existing structure is the Two Rivers Sand and Gravel Plant, situated on private land in the SW 1/4 of Section 15, T.27N., R.16E. The plant has an active quarry for the removal of floodplain gravels, but the operation, though visible from the river, does not physically intrude upon the river bank or channel.

Suitability:

Suitability Factor #1 -Characteristics Which Make the Area a Worthy Addition to the System.

The outstanding value in the Little Wenatchee River is the natural, successfully reproducing run of sockeye salmon. This river is part of only two remaining river/lake systems in the Columbia River drainage that still support a wild run of this lake-oriented, anadromous fish.

Suitability Factor #2 -Current Status of Land Ownership and Use.

Approximately 31% of Segment 1 is in private ownership, this being concentrated along the lower reaches of the river, close to Lake Wenatchee. Present Chelan County Shoreline Master program requirements here call for a minimum lot size that varies from 1/4 to one acre through most of the corridor. The regulations governing shoreline modifications range from prohibition except where necessary to protect or preserve the character of the environment, to permitting limited modifications.

The major private use of the corridor is the Two Rivers Sand and Gravel Plant. There has been substantial quarrying of the floodplain, which has had a noticeable impact on the visual setting through this portion of the corridor.

National Forest lands north of the river are presently managed to protect those qualities of the water and adjacent corridor that might qualify the Little Wenatchee for designation as a Wild and Scenic River. South of the river, the corridor is managed for a full range of timber management activities that follow, to the extent possible, a visual quality objective of retention.

There are no mining claims presently located within Segment 1, nor have any prospectively valuable, leasable mineral commodities been identified within this reach of the river.

Suitability Factor #3 -Foreseeable Potential Uses.

A portion of the acreage in the lower mile of private land within the corridor is being subdivided and sold as recreational and second home sites, but because much of this land is flooded during spring runoff, no actual development of the sites has as yet been proposed. In addition, a Scenic classification here would likely be compatible with the development of individual recreation residence lots. This classification allows for new structures as long as these are modest in size, unobtrusive, and do not have a direct and adverse effect on river values. Concentrations of habitations may occur, but are limited to relatively short stretches of the river corridor. However, large scale developments or industrial uses that affect significant river values, would have to be restricted. This might have an effect on current clearcutting practices on private land, as well as on the Two Rivers quarrying operation (particularly any plans for expansion of the facilities). Finally, present county zoning regulations do allow for small scale shoreline modifications in places. Designation might further restrict these, or limit the modifications to those areas where they are necessary to protect or preserve the character of the environment.

There could also be some effect on the management of the National Forest lands along the south side of the river corridor. The north side of the Little Wenatchee River in Segment 1 is currently managed according to direction outlined in the Chelan Unit Plan, issued in April 1976. That document identified the Little Wenatchee River as a potential addition to the Wild and Scenic River System, and specified that management activities be designed to protect existing qualities of the waters and adjacent lands. However, National Forest land south of the river is presently managed under the Alpine Lakes Management Plan as General Forest. This allocation allows for a full range of timber management activities within view of the river, although these are to be shaped and blended to the extent practical with the natural landscape. Designation as a Scenic River would require that this portion of the corridor be managed for a visual quality objective of retention, with timber harvest activities designed to enhance the scenic values of the river.

Some scenic values could be foreclosed if the river is not managed as part of the Wild and Scenic River System. Quarry development on private land will continue to produce impacts to the shoreline area at the lower end of the corridor. Although the intent of designation is to follow existing State and County controls on private land, it is possible that designation would encourage greater sensitivity to the visual values within the Wild and Scenic corridor. In addition, designation would protect the free-flowing character of this eight mile stretch of the Little Wenatchee River.

Suitability Factor #4 -Public, State and Local Governmental Interests.

The overall public response to designation of the Little Wenatchee River as an addition to the Wild and Scenic River System has been positive. Many people expressed a desire to see the entire river designated (although only the lowest segment is eligible) in order to keep the present corridor unmodified. There was serious concern expressed for the protection of the sockeye spawning habitat. Mention was also made of the scenic and recreational aspects of the river, the diversity of habitats, the old growth stands in the upper stretches, and the extent and complexity of riparian communities near Lake Wenatchee. The only negative response from the public was directed to the level of classification, with one individual proposing recreational rather than scenic as the highest potential classification of the Little Wenatchee.

Chelan County officials have indicated they could not support any proposal for designation of the Little Wenatchee River unless the County retains jurisdiction of private lands within the designated river corridor. The only costs that would be shared in administration of the river would be those independent of designation, that are associated with existing County administration of the private holdings.

There were no comments from the State specifically directed to designation of the Little Wenatchee.

Suitability Factor #5 -Cost of Acquisition and Interests.

There are no foreseeable plans to acquire lands or interests in lands along the Little Wenatchee River. Acquisition of easements from private landowners would occur only if key values were in jeopardy, and local government could not provide the necessary protection.

Costs associated with designation are related to planning and administration of the river corridor and are primarily directed to National Forest lands. The following are the expected funding needs for the Little Wenatchee River for a total five year period:

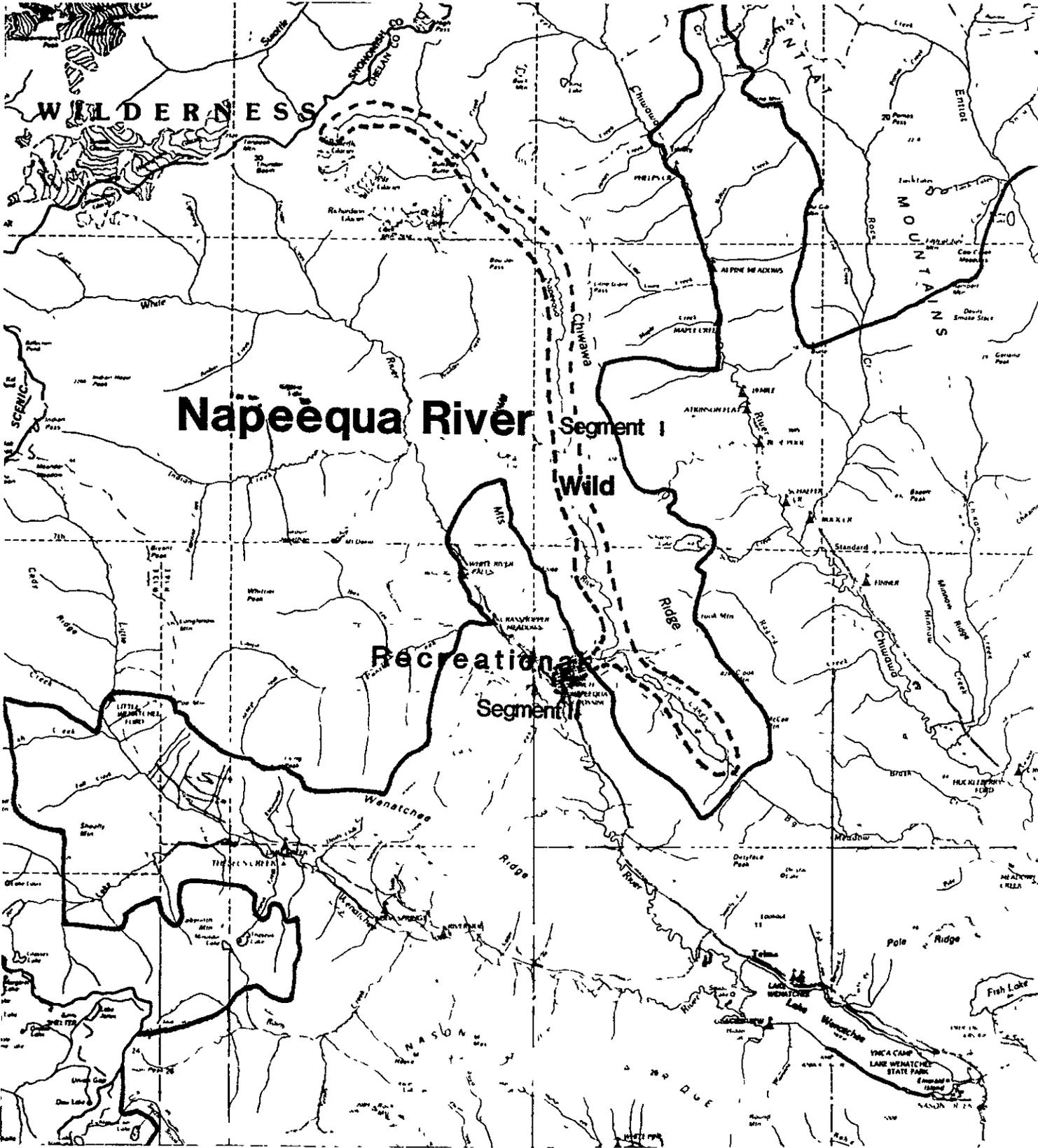
	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	\$300	\$ 3,000
Costs of Implementation		\$ 5,000
Development of Management Plan		\$30,000
Development Costs		
Operation and Maintenance Costs	\$500	\$ 3,000
Total - First Five Years	\$800	\$41,000

General administration and operation and maintenance costs are estimated to continue at \$1,400 annually.

Suitability Factor #6 Other Issues and Concerns

No other major issues or concerns have been identified.

NAPEEQUA RIVER



Private Land 

NAPEEQUA RIVER

Classification:

The entire length of the Napeequa River, from the headwaters near the Cascade Crest to the confluence with the White River, is considered to be eligible for inclusion in the Wild and Scenic River System. In the course of determining eligibility, two distinct segments of the river were identified, based on a combination of physical changes in the river character, and differences in landownership and the level of development along the corridor. These segments consist of an upper section (Segment 1) extending from the headwaters in the SW 1/4 of Section 21, T.30N., R.15E., to the Glacier Peak Wilderness boundary in the NW 1/4 of Section 17, T.28N., R.16E., and including the Twin Lakes Creek tributary; and a lower section (Segment 2) extending from the wilderness boundary to the confluence with the White River.

Based on their highest potential classification, Segment 1 meets the standards for classification as a Wild River, and Segment 2 as a Recreational River.

Segment 1

Segment 1, which includes the one mile stretch of Twin Lakes Creek, is approximately 15 miles in length. Trail #1518, which drops into the Napeequa via Little Giant Pass, parallels the river for a distance of four miles. Trail #1562 crosses the Napeequa in the NW 1/4 of Section 36, T.30N., R.15E., as it begins the ascent to Boulder Pass. The Twin Lakes Trail parallels Twin Lakes Creek in this segment, its full length to Twin Lakes.

The Washington State Department of Wildlife also uses Twin Lakes as a cutthroat trout rearing station. Improvements include a rustic cabin and associated structures, boat dock, board walks, and fish traps and holding pens under the surface of the lake. This long established use (eggs have been taken since 1916 and the present cabin was constructed about 1949) was recognized during legislative discussions leading to expansion of the Glacier Peak Wilderness in 1984. Although the area was added to the wilderness, this use, including operation of a motorboat, was allowed to continue. Use is periodic and, with the exception of the specific site, does not detract from the primitive setting here.

Segment 2

Segment 2 is one mile in length and flows almost exclusively through private land. There has been substantial development of the private land, including the Tall Timber Ranch, a Presbyterian Church facility which is used as a youth camp and for conferences, retreats, and similar functions; and the Tall Timber Home Owners Association subdivision. This latter development, which is located south of the river in the SE 1/4 of Section 18, T.28N., R.16E., consists of 53 lots, approximately half of which have been developed as summer homes and trailer sites.

The only Forest Service improvement in this segment is the Twin Lakes trailhead, which is adjacent to the confluence of the Napeequa with the White River. The trail approaches the southeast bank of the Napeequa near the section line between Sections 18 and 17, T.28N., R.17E., paralleling it from this point into the wilderness.

The White River Road #6400, which follows the east bank of the White River, crosses the Napeequa near its confluence by way of a concrete bridge. There are also several short, private road segments accessing the Tall Timber Ranch, and the above mentioned recreation residence lots.

Riprap has been installed near the confluence of the Napeequa with the White River as well as in the vicinity of the Tall Timber Homeowners Association recreation residence subdivision, to protect the developments here. There are no other shoreline modifications in this segment.

Suitability:

Suitability Factor #1 -Characteristics Which Make the Area a Worthy Addition to the System.

The scenic and geologic features of the Napeequa corridor are outstandingly remarkable. The river flows through a narrow, glaciated valley characterized by towering mountain peaks, impressive alpine glaciers, extensive snowfields, extremely steep slopes, rugged granitic outcrops, and a vegetative cover marked by scattered old growth, hardwoods, and interspersed meadow openings. The watercourse tumbles through this valley in a series of waterfalls, cascades and slow meanders.

Suitability Factor #2 -Current Status of Land Ownership and Use.

All of Segment 1 is National Forest and is currently managed as wilderness.

About 98 per cent of the land in the one mile stretch of Segment 2 is privately owned. This includes the Tall Timber Ranch and the Tall Timber Home Owners Association subdivision. Under the Chelan County Shoreline Master Program, the area is designated as Natural Environment, the most restrictive of the four shoreline classifications. The minimum lot size is one acre; residences are confined to single family units which must blend, to the extent possible, with their surroundings; minimum river frontage is 200 feet; and shoreline modifications such as diversions, retaining walls and riprap are prohibited except where necessary to protect or preserve the character of the environment.

Suitability Factor #3 -Foreseeable Potential Uses.

There would be no change in management of the National Forest lands as a result of designation. Segment 1 is currently managed as wilderness, which emphasizes the primitive, undeveloped character of the environment. With respect to the fish rearing facility at Twin Lakes, designation of the Twin Lakes Creek tributary of the Napeequa as Wild would be no more restrictive than the current wilderness designation. In fact, Wild River standards allow for structures and activities associated with fisheries enhancement projects, as long as these do not impact the values for which the river is being designated. Only two percent of the corridor in Segment 2 is National Forest. A portion of this area is occupied by the Twin Lakes Trail, which was relocated in 1978 to bypass private property along the river.

Because Segment 1 of the Napeequa River lies wholly within the Glacier Peak Wilderness, it is withdrawn from mineral entry. Segment 2 is not encumbered by any mining claims. Furthermore, the area has not been identified as having potential for the occurrence of locatable mineral resources, nor is it classified as being prospectively valuable for leasable mineral commodities.

The effects of designation on potential future uses of the private land in Segment 2 are likely to be minimal, due both to the level of classification proposed for this stretch of the river, and because of the present zoning and land use regulations that are in place. A Recreational classification allows for dispersed or cluster residential developments (including subdivisions) along the river. New structures are allowed for both habitation and for intensive recreation use. Lands may also be

managed for a full range of agricultural uses, to the extent currently practiced. The Natural Environment designation that covers Segment 2 through the County Shoreline Master Program, appears to adequately protect the values that would be recognized through Wild and Scenic designation of the Napeequa. However, variances to the existing county zoning regulations might need to be restricted in order to ensure protection of these values. Every effort would be made to retain the existing patterns of land use and ownership, provided the uses remain consistent with the purposes of the act. Acquisition of easements from private landowners would occur only if key values were in jeopardy, and local government could not provide the necessary protection.

There are probably few values that would be foreclosed or curtailed if the river were not protected as part of the System. As mentioned above, all but one mile of the river is within wilderness, and present zoning provides protection on private land. The greatest potential threat to river values would be in future diversions or impoundments of the river. Designation would ensure the protection of the free-flowing character of the Napeequa River.

Suitability Factor #4 -Public, State and Local Governmental Interests.

The overall public response to designation of the Napeequa River as an addition to the Wild and Scenic River System has been positive, especially with respect to that portion above the wilderness boundary. Many have expressed support for the recognition and protection of the outstanding river values here, particularly the unique geological characteristics and the pristine beauty of the setting. The major concerns expressed are with designation of Segment 2, because of the extent of private land here. Many of the landowners feel that designation would only increase the governmental restrictions on their property and curtail future development, that present county zoning regulations are adequate to protect the river values, and that designation would create potential security problems as a result of increased public use and access in the area.

Chelan County officials have indicated they could not support any proposal for designation of the Napeequa River unless the County retains jurisdiction of private lands within the designated river corridor. The only costs that would be shared in administration of the river would be those independent of designation, that are associated with existing County administration of the private holdings. The County has also expressed a verbal concern regarding the possible need for riprap to protect improvements.

The Washington State Department of Wildlife is in full support of the proposed river designation, and in fact, recommends reassessment of additional rivers on the Forest for potential eligibility as Wild and Scenic Rivers. The Yakima Indian Nation, whose ceded lands include the Napeequa River drainage, supports designation at the highest potential classification, although they have some concerns for potential conflicts between recreation use and the protection of fisheries and tribal fishing localities. The Yakima would like to be involved in any subsequent river management plans that might be developed.

If the Napeequa River is included in the Wild and Scenic River System, the Forest Service would rely on State and County controls for administration of the private lands. The Forest Service would also recommend that a proviso be included in any Wild and Scenic legislation to allow riprapping for the preservation and protection of existing improvements.

Suitability Factor #5 -Cost of Acquisition and Interests.

There are no foreseeable plans to acquire lands or interests in lands along the Napeequa River. Acquisition of easements from private landowners would occur only if key values were in jeopardy, and local government could not provide the necessary protection.

Costs associated with designation are related to planning and administration of the river corridor and are primarily directed to National Forest lands. The following are the expected funding needs for the Napeequa River for a total five year period:

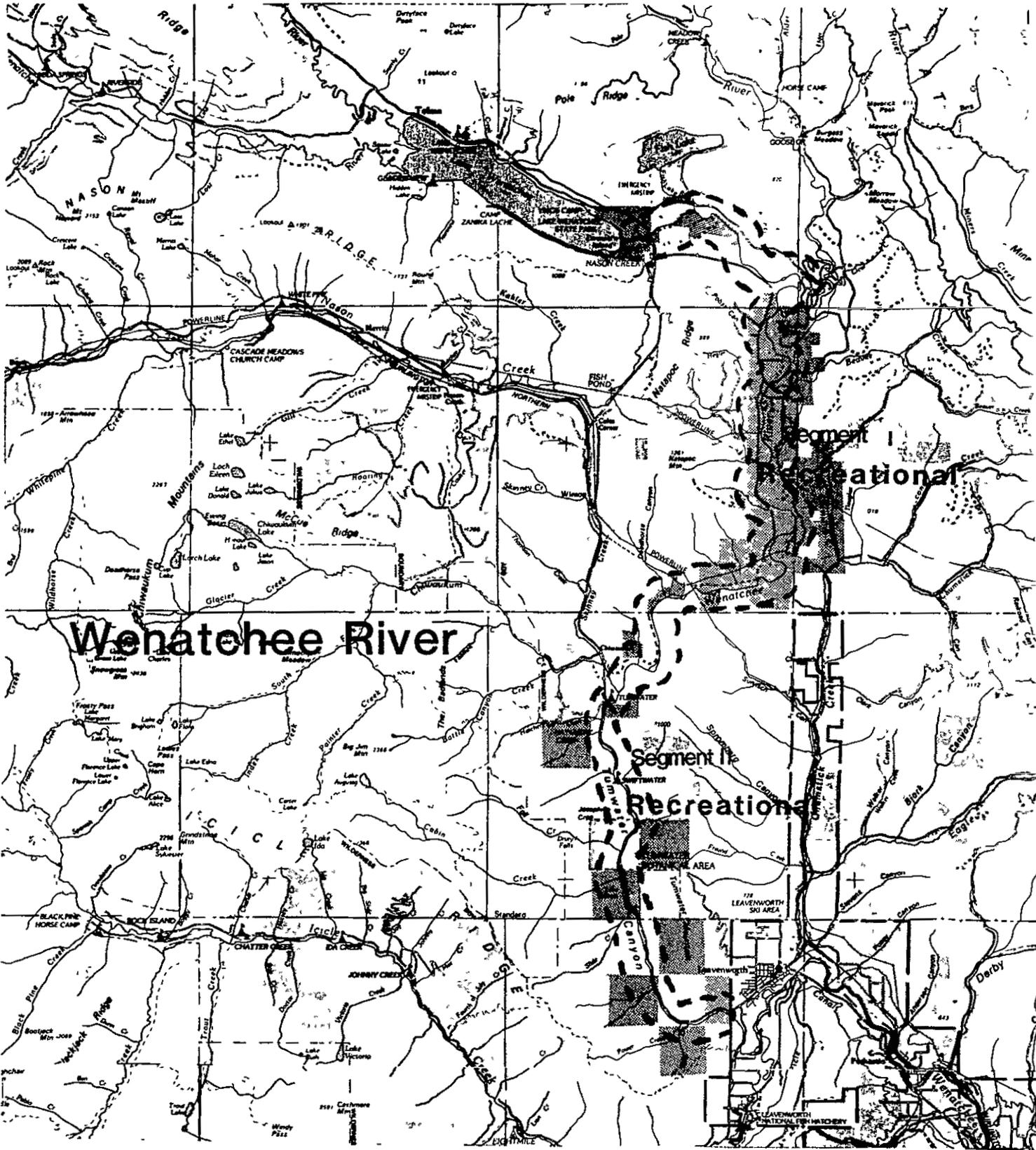
	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	\$1,000	\$ 1,000
Costs of Implementation		\$ 5,000
Development of Management Plan		\$30,000
Development Costs		\$ 5,000
Operation and Maintenance Costs	\$2,500	\$10,000
Total - First Five Years	\$3,500	\$51,000

General administration and operation and maintenance costs are estimated to continue at \$2,900 annually.

Suitability Factor #6-Other issues and concerns

No other major issues or concerns have been identified.

WENATCHEE RIVER



WENATCHEE RIVER

Classification:

The upper thirty miles of the Wenatchee River, from its source at Lake Wenatchee to the mouth of Icicle Creek near the town of Leavenworth, was determined to be eligible for inclusion in the Wild and Scenic River System. However, the Forest Service confined its study to the corridor between Lake Wenatchee and the Forest boundary, a total distance of twenty-eight miles.

In the course of determining eligibility, two distinct segments of the river were identified, based on a combination of the physical changes in the river character and differences in land ownership and level of development. These segments consist of an upper section (Segment 1) extending from the outlet of Lake Wenatchee in the SW 1/4 of Section 28, T.27N., R.17E., to Tumwater Campground in the SW 1/4 of Section 9, T.25N., R.17E., and a lower section (Segment 2) extending from the campground to the Forest boundary in the SW 1/4 of Section 11, T.24N., R.17E. Both segments meet the standards for classification as a Recreational River.

Segment 1

Segment 1 is approximately 21 miles in length, with the river flowing through private or state land for about 13 of these miles. The non-Federal holdings include the Lake Wenatchee State Park, three private subdivisions (Chiwawa River Pines, Alpine Acres and Ponderosa Estates), the small community of Plain, several residences and cabins not associated with the subdivisions or town of Plain, two county gravel pits (at Plain and at Shugart Flats), and scattered agricultural and timber land. Tumwater Campground is the only developed Forest Service recreation site currently existing in this segment of the river, although there are proposals for two additional Forest Service campgrounds closer to Lake Wenatchee. There are also a number of dispersed camping sites along the river on National Forest land in Segment 1.

Transportation routes providing access to the Wenatchee River in this segment include State Highway 209, which provides intermittent access to the river between its outlet at Lake Wenatchee and its intersection with the highway near the community of Plain; State Highway 207, which crosses the river near the outlet of Lake Wenatchee; the Wenatchee River Road, which closely parallels the north side of the river between the community of Plain and Tumwater Campground; and the Camp 12 Road, which traverses the corridor east of the river from Plain southward a distance of four miles. There are also numerous short road segments within the corridor between Lake Wenatchee and Tumwater Canyon, which serve as private access routes and driveways.

In addition, there are four major bridges crossing the river in connection with the highways: the U.S. Highway 2 bridge at Tumwater Canyon, the State Highway 207 bridge at Lake Wenatchee, the State Highway 209 bridge at Plain, and the Wenatchee River Road bridge, also at Plain.

Burlington Northern Railroad, which crosses the river in the SE 1/4 of Section 25, T.26N., R.17E., extends parallel to the northern boundary of the corridor for approximately two miles. Except for the bridge, the line is not visible from the river. The Wenatchee-Chiwawa Irrigation Canal, which originates in the Chiwawa drainage, parallels Segment 1 for approximately 1 1/2 miles before crossing to the west bank of the river via the old Wenatchee River road bridge at Plain. And finally, a BPA overhead power-line spans the river in the NW 1/4 of Section 24, T.26N., R.17E.

Segment 2

Segment 2, the Tumwater Canyon stretch, is 7 miles in length. Approximately two of these miles are in private ownership, most of this currently held by Longview Fibre. The remainder of the private land includes a few residences along the shoreline, and a candy/gift shop situated midway through the canyon on Lake Jolanda.

U.S. Highway 2, a major cross-state route, parallels and is in view of the river throughout this segment. Recreation developments include the Swiftwater Picnic Area and a few dispersed, camping sites. There is also a Forest Service summer home tract, with seven recreation residences, situated west and above the river.

There is one existing impoundment in Segment 2, the Tumwater Dam, a sixteen foot high concrete structure in the SE 1/4 of Section 33, T.25N., R.17E. With the exception of the dam itself, there are no longer any water diversion facilities at the site. The river is essentially unimpeded today (it spills freely over the dam), and a fish ladder was recently reconstructed to allow more efficient passage of salmon and steelhead. Also associated with the dam is the old penstock grade, which once extended from the dam to the former powerhouse site in the SW 1/4 of Section 33, T.25N., R.17E. The penstock was removed years ago, but the grade is still visible along the west edge of the river for a distance of approximately two miles. Today, the grade is occupied by a Chelan P.U.D. overhead powerline. In Section 10, the penstock bridge, which originally transported the penstock across the river to the power house site on the east bank, is still standing. This bridge is on the National Register of Historic Places as a result of its association with early Great Northern Railroad history.

About one half mile above the mouth of Tumwater Canyon, on the south side of the river, is an old concrete diversion box and remnants of a canal. These facilities were built by the Leavenworth Fish Hatchery, but are no longer in use.

Suitability:

Suitability Factor #1 -Characteristics Which Make the Area a Worthy Addition to the System.

The Wenatchee River drainage ranges from gently rolling, forested terrain interspersed with open meadows in the vicinity of Lake Wenatchee, to spectacular cliffs, enormous boulders, craggy outcrops and cascading rapids through Tumwater Canyon. White water conditions in late spring attract boating, kayaking and rafting use above the canyon, easy highway access provides outstanding scenery viewing, and there is heavy developed and dispersed recreation use throughout the summer months. The corridor falls within the traditional fishing grounds of the Wenatchi Indians, and today still experiences substantial runs of steelhead, sockeye salmon, and spring and fall chinook salmon. This portion of the river system also contains numerous archaeological sites, including the only known petroglyph site on the Forest. Finally, Tumwater Canyon is one of only two locations known where a small population of the Hackelia venusta plant occurs.

Suitability Factor #2 -Current Status of Land Ownership and Use.

Ownership throughout Segment 1 is quite complex, alternating between State and National Forest lands, private subdivisions, and individual private residences, farmlands, and timberland. Approximately 68% of the corridor in this segment is non-Federal, or a mix of National Forest and non-Federal land. Because of these ownership patterns, the river here is characterized by stretches of undeveloped meadowland, interspersed with a forest cover of mixed conifers, some agricultural hay fields, and heavily developed clusters of residences and cabin sites. There may be some further development of what is currently agricultural land near the community of Plain in the near future.

The majority of residents and property owners along Segment 1 wish to preserve the residential and agricultural image of the area. They favor limited growth and development, and recognize that the natural scenic beauty, open space outdoor recreation and water resources are the most valuable assets of the area. With this in mind, the Upper Wenatchee Valley Comprehensive Plan was completed by a Citizens Advisory Committee appointed by the Chelan County Commissioners, in 1988. This plan recommended a Plain Rural District zoning designation for most of the private land here, which specifies low density residential and agricultural uses. A maximum density of one unit per two acres is permitted, except in those shoreline areas where a density of one unit per acre is considered appropriate. Minimum frontage along the river is 200 feet. The plan also provides for open, undeveloped land in areas of significant scenic beauty. Shoreline works and structures are permitted if they do not substantially change the character of the environment and are part of a water-dependent or water-related project.

About 25% of Segment 2 is in private ownership, most of this belonging to Longview Fibre. However, a land exchange is underway that will eventually transfer ownership of the Longview Fibre holdings within the corridor to the Forest Service. A small candy/gift shop is located about midway through the canyon, and a few private recreational residences are situated in this stretch.

Suitability Factor #3 -Foreseeable Potential Uses.

There would be no change in management of the National Forest lands as a result of designation. Segment 1 is currently managed according to direction outlined in the Chelan Unit Plan, issued in April 1976. The plan specifies that management activities be constrained to protect the wild, scenic and recreation qualities of the waterway and an undefined strip of adjacent land. Segment 2 is presently managed under the Alpine Lakes Management Plan as a Special Scenic Area. Under this direction, any commercial forest land outside the existing highway corridor is placed in the unregulated timber component, with timber harvest permitted only where it will enhance or protect the special values here. In addition, a special botanical area was first established in Tumwater Canyon in 1938 to protect the special Lewisia tweedyi species which grows there. This area was formally designated as a Special Botanical Area under the Alpine Lakes Management Plan.

Several recreation developments are under consideration, that could be developed independent of designation. These include two developed campgrounds, three boat put-in/take-out areas, two interpretive sites, and an interpreted riverside trail. The developments would likely be enhanced by designation of the river.

According to BLM mining claim recordation data, Segment 1 has had at least eleven mining claims located along the river in the past. However, due to the lack of annual assessment work, it appears that all eleven have been abandoned. The BLM has also classified the area as being prospectively valuable for coal resources, but there are no coal leases or lease applications at this time, nor has there been any significant exploration or development activity with respect to leasable mineral commodities. In addition, a Recreational classification of the river would allow new mining claims and leases, subject to 36 CFR 228 and other regulations that the Secretaries of Agriculture and Interior may prescribe to protect values of rivers included in the National Wild and Scenic River System.

The effects of designation on potential future uses of the private land in Segments 1 and 2 are likely to be minimal, due both to the level of classification proposed for the river, and because of the present zoning and land use regulations that are in place. A Recreational classification allows for small communities as well as dispersed or cluster residential developments along the river. New structures are allowed for both habitation and for intensive recreation use. Lands

may also be managed for a full range of agricultural uses, to the extent currently practiced. The Plain Rural District and the Residential-Recreational District Zones that cover Segment 1 appear to adequately protect the values that would be recognized through designation of the river. The one constraint that would be introduced through designation would be in the modifications permitted along the river banks and channel. Existing structures (low dams, diversions, riprap and other minor structures) would be allowed, but new structures might be prohibited, as would development of hydroelectric power facilities. Variances to the existing zoning regulations might also need to be restricted in order to ensure protection of the values for which the river would be designated. Every effort would be made to retain the existing patterns of land use and ownership, provided the uses remain consistent with the purposes of the act. Acquisition of easements from private landowners would occur only if key values were in jeopardy, and local government could not provide the necessary protection.

Designation as a Recreational River would likely enhance an already thriving tourism trade in this area. As a consequence of an economic revitalization effort in the 1960's and early 1970's, tourism has become a major focus and source of income for the valley. Thousands of visitors come to Leavenworth each year, many of them to take advantage of the recreation opportunities along the Wenatchee River and its tributary systems. Including the river in the National System might provide an additional attraction for these visitors.

There are probably few values that would be foreclosed or curtailed if the river were not protected as part of the System. As mentioned above, current management recognizes the scenic and recreational values within the corridor, and present zoning provides protection on private land. The greatest potential threat to river values would be in future diversions of the river, or in reactivation and enlargement of the Tumwater dam to provide hydroelectric power. Designation would ensure the protection of the free-flowing character of the Wenatchee River.

Suitability Factor #4 -Public, State and Local Governmental Interests.

The overall response of the public to designation of the Wenatchee River has been positive. There has been particular mention of the excellent kayaking, rafting and canoeing opportunities on the river, and the wish to see these opportunities protected. Most of the concerns expressed have come from landowners in the upper valley, who oppose including the block of private lands along the river within the National System. These residents feel that the river corridor between the headwaters and the upper end of the Wenatchee River Road is best managed under existing County regulations. Some are also concerned about the potential impacts of increased public use on the resources and private property along the river.

Chelan County officials have indicated that they could not support any proposal for designation of the Wenatchee River unless the County retains jurisdiction of the private lands within the designated river corridor. They have also verbally expressed a concern regarding the possible need to use riprap for protection of improvements along the river bank. The Forest Service will recommend that a proviso to allow riprapping be included in legislation for Recreational river segments. The only costs that would be shared in administration of the river would be those independent of designation, that are associated with existing County administration of the private holdings.

The Washington State Department of Wildlife is in full support of the proposed river designation, and in fact, recommends reassessment of additional rivers on the Forest for potential eligibility as Wild and Scenic Rivers. The Yakima Indian Nation, whose ceded lands include the Wenatchee River drainage, supports designation at the highest potential classification, although they have some concerns for potential conflicts between recreation use and the protection of

fisheries and tribal fishing localities. The Yakima would like to be involved in any subsequent river management plans that might be developed.

If the Wenatchee River is included in the Wild and Scenic River System, the Forest Service would rely on State and County controls for administration of the private lands. Valid, existing water rights would not be affected by designation.

Suitability Factor #5 -Cost of Acquisition and Interests.

There are no plans to acquire lands or interests in lands along the Wenatchee River, with the exception of a short 200 foot right-of-way across private land, at the southwest corner of the Highway 209 bridge at Plain. The purpose of the right-of-way is to access a small, isolated piece of National Forest land, where parking and a boat put-in/take-out locality is proposed for development. Cost of acquisition (which includes appraisal and contract administration costs) is estimated to be approximately \$5700.

Other costs associated with designation are related to planning and administration of the river corridor. The following are the expected total funding needs for the Wenatchee River for the next five year period:

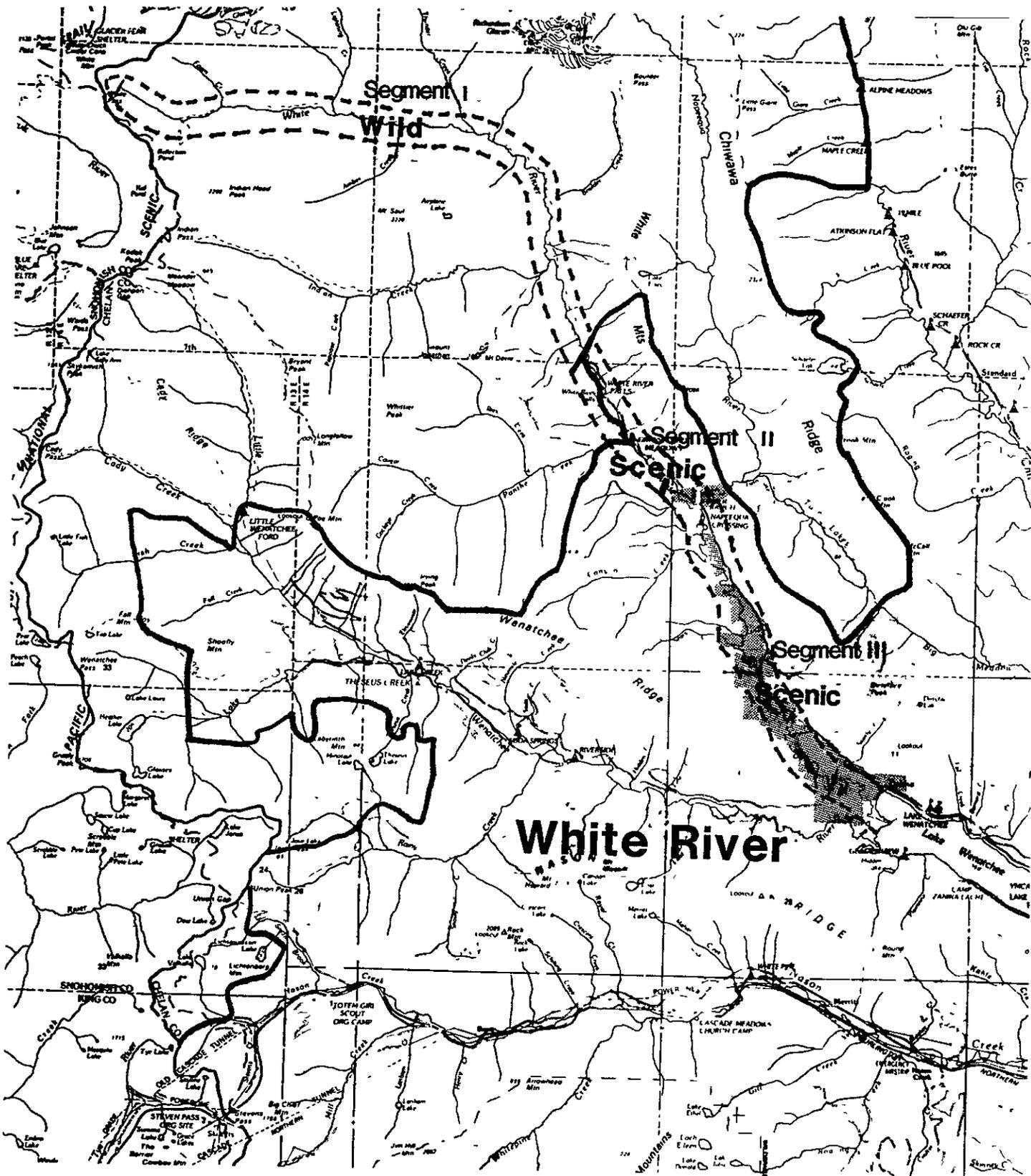
	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	\$10,000	\$ 12,000
Costs of Implementation		\$ 65,000
Development of Management Plan		\$130,000
Development Costs		\$156,500
Operation and Maintenance Costs	\$15,000	\$ 35,000
 Total - First Five Years	 \$25,000	 \$398,500

General administration and operation and maintenance costs are estimated to continue at \$14,400 annually.

Suitability Factor #6-Other Issues and Concerns

A major concern has been expressed by the public with respect to the amount of government regulation that already exists in the Wenatchee River corridor. There are presently several overlapping National, State and County laws, regulations and executive orders that provide for protection of values within the river system. At the Federal level, these include the National Environmental Policy Act, the National Historic Preservation Act, the Endangered Species Act, the Fish and Wildlife Coordination Act, the Water Resources Planning Act, the Floodplain and Wetlands Executive Orders, the National Forest Management Act of 1976, and the Federal Land Policy and Management Act of 1976, in addition to the Wild and Scenic Rivers Act. At the State level, the Forest Practices Act and the Shorelines Management Act seek similar protection, and in Chelan County, there are further restrictions imposed by the Shoreline Master Program and the local zoning regulations. Many residents of the Wenatchee Valley feel strongly that the present scope of government regulation is more than adequate, and that designation of the river is not only unnecessary, but would foreclose on future opportunities to consider other resource uses and benefits. Landowners in the upper valley also view designation as a threat to private ownership, fearing loss of their property through governmental acquisition of easements or condemnation.

WHITE RIVER



Private Land 

WHITE RIVER

Classification

The entire length of the White River, from the headwaters near the Cascade Crest to the terminus at Lake Wenatchee, is considered to be eligible for inclusion in the Wild and Scenic River System. In the course of determining eligibility, three distinct segments of the river were identified, based on a combination of physical changes in the river character and differences in landownership along the river. These segments consist of an upper section (Segment 1) extending from the headwaters in the SW 1/4 of Section 5, T.29N., R.14E., to the Glacier Peak Wilderness boundary in the SW 1/4 of Section 35, T.29N., R.15E.; a middle section (Segment 2) extending from the wilderness boundary to a point approximately 1/2 mile above the Tall Timber Ranch, at the east section line of Section 13, T.28N., R.15E.; and a lower section (Segment 3) extending from approximately 1/2 mile above Tall Timber Ranch to Lake Wenatchee.

Based on their highest potential classification, Segment 1 meets the standards for classification as a Wild River, and Segments 2 and 3 as a Scenic River.

Segment 1

Segment 1, which is located entirely within the Glacier Peak Wilderness, is approximately 15 miles in length. Access along the corridor here is provided by Trail #1507, which parallels the river nearly its entire length through this segment. The trail drops into the valley near the headwaters and extends downriver along the north and east banks to the Glacier Peak Wilderness boundary. Trail #1562, which connects the White River drainage with the Napeequa via Boulder Pass, intersects Trail #1507 in the SW 1/4 of Section 15, T.29N., R.16E.

The Indian Creek Trail #1502 follows the west bank of the White River southward from the Indian Creek bridge in the NW 1/4 of Section 27, T.29N., R.16E., to the wilderness boundary, a distance of approximately 1 1/2 miles.

The only other structures to be seen in this segment of the river are a couple of footbridges and the collapsed remnants of the historic Indian Creek Guard Station near the confluence of Indian Creek with the White River.

Segment 2

Segment 2 is seven miles in length and flows exclusively through National Forest land. The White River Road #6400 follows the east bank of Segment 2 to within approximately 1/4 mile of the wilderness boundary, providing scenic views of the creek and access to campgrounds and trailheads. Access continues from the end of the road into the wilderness by way of Trail #1507.

The Indian Creek Trail #1502 takes off from the same point as Trail #1507 and crosses the White River by way of a rustic footbridge near the trailhead. The route follows the west bank of the White River into the Glacier Peak Wilderness. Another segment of this trail heads south along the west bank of the White River for a distance of two miles, providing access to the Mt. David Trail #1521, and the Panther Creek Trail #1522.

Recreation developments within this segment include the White River Falls and Grasshopper Meadows Campgrounds.

Segment 3

Segment 3 is 12 miles in length. The corridor here is a mix of National Forest and private lands, with approximately 64% of the acreage in private ownership. Much of the private land in this segment was homesteaded in the late nineteenth century and many of the fields then cleared along the river are still in use for grazing and hay production. Because of their low level of development, they tend to appear as natural meadow openings to the average river visitor.

Several homes and outbuildings are also situated along Segment 3, though most are not readily noticeable from the river. Tall Timber Ranch and the Tall Timber Homeowners Association subdivision, which are described in the Napeequa River section, overlap with the White River corridor. These are the most heavily developed lands in the segment. In addition, there has been an aggressively marketed subdivision of 20 acre lots along the stretch of river between Lake Wenatchee and Sears Creek. The Twin Lakes Trailhead and the Napeequa Crossing Campground are the only Forest Service recreation developments in this segment.

The County road, which eventually becomes Forest Road #6400 above the confluence of the Napeequa with the White River, intermittently approaches the river throughout Segment 3. Other Forest roads intersect the White River Road just above Lake Wenatchee (the Little Wenatchee Road #6500) and near Sears Creek, and a private road system diverges from the main road at Tall Timber Ranch, near the mouth of the Napeequa. In addition, there are two bridge crossings of the river in connection with the road system: the Little Wenatchee Road bridge which spans the White River a couple miles above its outlet, and the Sears Creek Road bridge in the NE 1/4 of Section 5, T.27N., R.16E.

There is also a gaging station site in this segment, situated 200 feet downstream of the Sears Creek bridge. The station has been periodically in use since 1912.

Suitability:

Suitability Factor #1 -Characteristics Which Make the Area a Worthy Addition to the System.

The White River is noted for its varied and outstanding scenery. Originating high in the Glacier Peak Wilderness, the river takes its name from the glacial silt that gives it a distinct milky appearance. At its upper end, the river plunges through a steep walled, glaciated valley that is bordered by stark mountain peaks, impressive alpine glaciers, precipitous cliffs, and numerous bare rock slopes, into the broader, more gently rolling terrain near Lake Wenatchee. The river course is one of cascading riffles and white water rapids, meanders, oxbows and wetlands. Patches of old growth interspersed with lush, green meadows add to the pristine ambience of the corridor.

A second attribute of outstanding value is the fact that the White River is one of only two remaining lake/river systems in the Columbia River drainage that still support a natural run of the anadromous sockeye salmon.

Suitability Factor #2 -Current Status of Land Ownership and Use.

Twenty-two percent of the White River corridor is in private ownership, all of these holdings being located in Segment 3. With the exception of that portion of the Tall Timber Homeowners Association subdivision that overlaps with the corridor in Segment 3, these residential and recreational uses are light density. Under the Chelan County Shoreline Master Program, the area is designated as Natural Environment, the most restrictive of the four shoreline classifications. The minimum

lot size is one acre, residences are confined to single family units which must blend, to the extent possible, with their surroundings, and shoreline modifications are prohibited except where necessary to protect the character of the environment. Besides these regulations, the soil and other physical characteristics of the land here substantially limit the scale of development that might otherwise be anticipated.

National Forest land below the wilderness boundary has been managed under a visual quality objective of retention, which emphasizes the scenic and recreational values of the corridor. Although timber harvest has taken place, the river area has been maintained in a near natural condition. There is a small amount of livestock grazing (30 to 40 head of cattle, and breeding stock) associated with the private holdings.

Suitability Factor #3 -Foreseeable Potential Uses.

There would be no change in management of the National Forest lands as a result of designation. Segment 1 is currently managed as wilderness, which emphasizes the primitive, undeveloped character of the environment. Segments 2 and 3 are presently managed according to direction outlined in the Chelan Unit Plan, issued in April 1976. The plan identifies the White River as a potential wild and scenic river, and specifies that management activities be designed to protect the wild, scenic and recreation qualities of the corridor until such time as a detailed study can be conducted.

The mineral and energy resource potential of the White River is marginal. A small portion of Segment 2 once had mining claims located within the corridor, but there is no mention of these in the current BLM mining claim records. Currently, there are no reported locatable mineral resource occurrences along the river, nor does there appear to be much likelihood of future exploration or development. The river has been classified by the BLM as being prospectively valuable as a source of geothermal energy, the only leasable mineral resource with any potential for exploration in the White River drainage. However, designation of the river would not affect future mining or mineral lease potential. Since Segment 1 is within an existing wilderness, new claims and leases are already prohibited. Scenic classification does allow for new mining claims and mineral leases, subject to regulation (36 CFR 228), and provided the mineral activity be conducted in a manner that minimizes environmental degradation.

The White River provides vital sockeye salmon spawning habitat. One potential limitation that could occur on National Forest land as a result of Scenic designation might be in the type of structures or improvements that could be constructed to enhance this habitat.

The effects of designation on potential future uses of the private land in Segment 3 are likely to be minimal, due to the present County land use regulations that are in place. Scenic designation allows for new structures, as long as these are modest in size, unobtrusive, and do not have a direct and adverse effect on river values. Concentrations of habitations may occur, but are limited to relatively short reaches of the river corridor. Agricultural use is permitted to the extent currently practiced. Shoreline Master Program classification of the private land as a Natural Environment, the most restrictive of the four classifications, incorporates these objectives and would appear to adequately protect the values that would be recognized through designation of the river. However, variances to these regulations might need to be restricted in order to ensure protection of the river values.

There are probably few values that would be foreclosed or curtailed if the river were not protected as part of the System, as long as management continues to follow a visual quality objective of retention. As mentioned above, current management recognizes the scenic and recreational values within the corridor, and present county land use regulations provide a reasonable level of protection on private land. The greatest potential threat to river values would be in future impoundments. Designation would ensure the protection of the free-flowing character of the White River.

Suitability Factor #4 - Public, State and Local Governmental Interests.

The overall public response to designation of the White River as an addition to the Wild and Scenic River System has been positive. Many have expressed support for protection of the outstanding river values here, particularly the white water opportunities, the fisheries and the scenery. The major concerns expressed are with management of the private land in Segment 3, especially in the area around Tall Timber Ranch. The Ranch owners and administrators are fearful of the effect on future development that a Scenic designation might have, as well as of the disruptive influence and potential security problems that might result from increased public use and access in the area. A few property owners are alarmed at the potential for additional government regulation of their holdings if the river were to be designated.

Chelan County officials have indicated they could not support any proposal for designation of the White River unless the County retains jurisdiction of private lands within the designated river corridor. The only costs that would be shared in administration of the river would be those independent of designation, that are associated with existing County administration of the private holdings. The County has also expressed a verbal concern regarding the possible need to riprap to protect improvements.

The Washington State Department of Wildlife is in full support of the proposed river designation, and in fact, recommends reassessment of additional rivers on the Forest for potential eligibility as Wild and Scenic Rivers. The Yakima Indian Nation, whose ceded lands include the White River drainage, supports designation at the highest potential classification, although they have some concerns for potential conflicts between recreation use and the protection of fisheries and tribal fishing localities. The Yakima would like to be involved in any subsequent river management plans that might be developed.

If the White River is included in the Wild and Scenic River System, the Forest Service would rely on State and County controls for administration of the private lands. The Forest would also recommend that a proviso be included in any Wild and Scenic legislation to allow riprapping for the preservation and protection of existing improvements.

Suitability Factor #5 -Cost of Acquisition and Interests.

There are no foreseeable plans to acquire lands or interests in lands along the White River. Acquisition of easements from private landowners would occur only if key values were in jeopardy, and local government could not provide the necessary protection.

Costs associated with designation are related to planning and administration of the river corridor and are primarily directed to National Forest lands. The following are the expected funding needs for the White River for a total five year period:

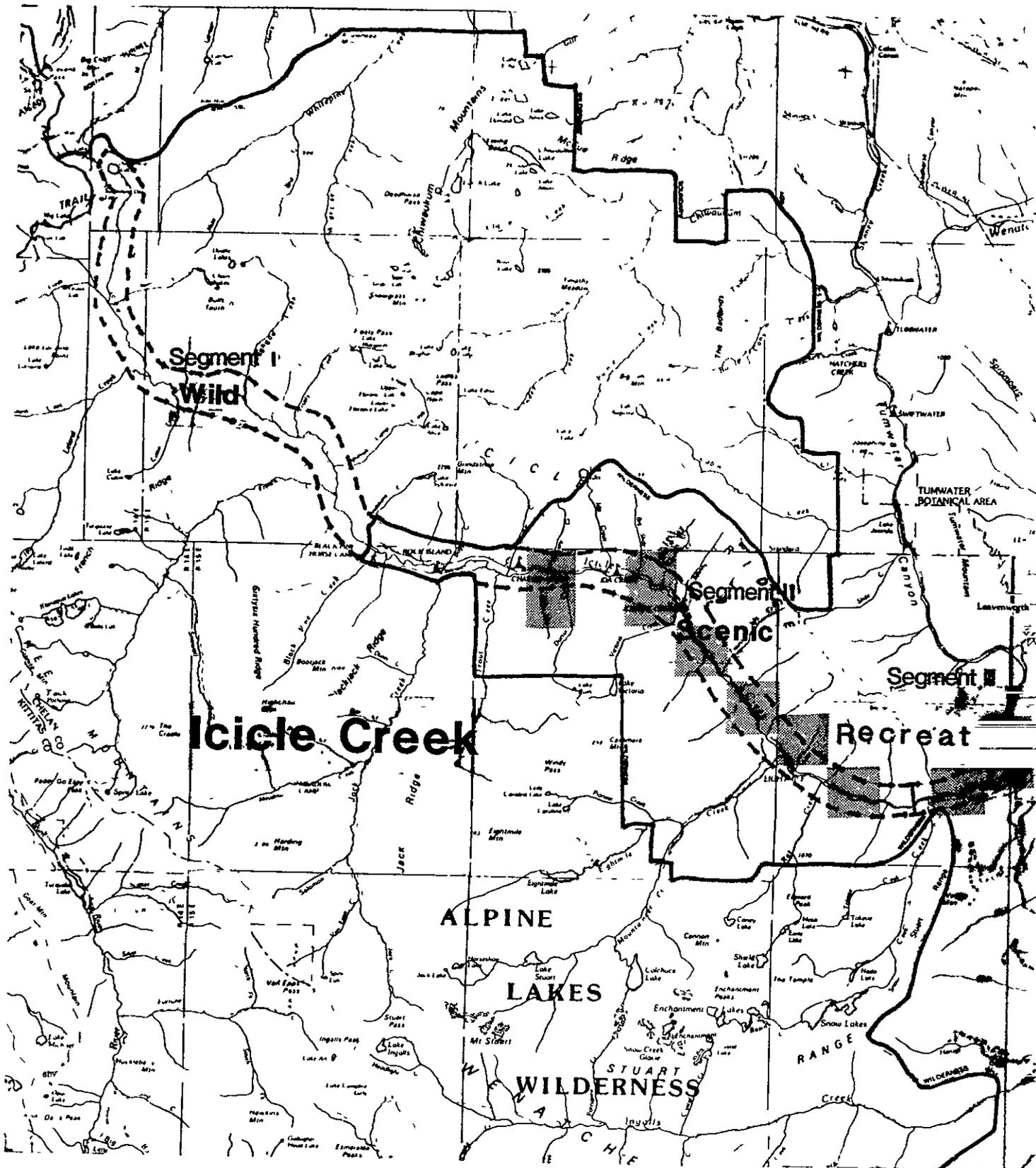
	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	\$ 2,500	\$ 5,000
Costs of Implementation		\$12,000
Development of Management Plan		\$65,000
Development Costs	\$30,000	\$60,000
Operation and Maintenance Costs	\$ 8,000	\$26,000
Total - First Five Years	\$40,500	\$168,000

General administration and operation and maintenance costs are estimated to continue at \$8,300 annually.

Suitability Factor #6-Other Issues and Concerns

No other major issues or concerns have been identified.

ICICLE CREEK



Private Land 

LEAVENWORTH RANGER DISTRICT

ICICLE CREEK

Classification:

The Icicle Creek, from the headwaters to the Wenatchee National Forest boundary in the NE 1/4 of Section 26, T.24N., R.17E., is considered to be eligible for inclusion in the Wild and Scenic River System. In the course of determining eligibility, three distinct segments of the river were identified, based on a combination of physical changes in the river character, and differences in landownership and development along the river corridor. These segments consist of an upper section (Segment 1) extending from the headwaters at Josephine Lake to the Alpine Lakes Wilderness boundary in the NE 1/4 of Section 3, T.24N., R.15E.; a middle section (Segment 2) extending from the wilderness boundary to the City of Leavenworth water intake in the SE 1/4 of Section 28, T.24N., R.17E.; and a lower section (Segment 3) extending from the water intake to the Forest boundary.

Based on their highest potential classification, Segment 1 meets the standards for classification as a Wild River, Segment 2 as a Scenic River, and Segment 3 as a Recreational River.

Segment 1

Segment 1, which is located entirely within the Alpine Lakes Wilderness, is approximately 12 miles in length. Trail #1551 parallels and criss-crosses the Icicle in this segment, and is intersected at various points by trails associated with the side drainages. Numerous undeveloped sites provide camping opportunities along this portion of the corridor.

Segment 2

Segment 2 is 14 miles in length. Approximately 46% of the corridor is in private ownership, the lands being intermingled in checkerboard pattern with National Forest System lands. Most of these private holdings have been surveyed and are being sold for individual cabin development. Five of the lots currently have structures on them, but the buildings are screened by vegetation and/or topography from the creek. The Church of Moses Lake has also applied for a conditional use permit to build a small RV Park on their property in Section 13, T.24N., R.16E. As with all developments in the Icicle corridor, their proposal will be closely scrutinized by the Icicle Valley Design Review Overlay District, to ensure it meets the required land use standards established by the District for private land.

Access along the Icicle in this segment is provided by the Icicle River Road #7600, which follows the north bank of the creek to the upper end of the segment. In addition, three tributary roads intersect the corridor at Doctor Creek, Bridge Creek and Eightmile Creek. Branches of the Icicle Road are reached by a bridge spanning the Icicle Creek at Rock Island Campground. These branches trend both westward and easterly for short distances along the south bank of the creek.

In addition to the bridge at Rock Island, there are road bridges across the Icicle at Doctor Creek, Bridge Creek and Rat Creek, and trail bridges at Chatter Creek and Eightmile Creek.

Other developments in Segment 2 include seven camping/picnic sites situated in the corridor between Eightmile Creek and the wilderness boundary. At one of these, Ida Creek Campground, a 500 foot stretch of riprap has been installed along the river bank to protect the improvements here. The Chatter Creek Guard Station, an historic administrative complex that has been listed on the National Register of Historic Places, is adjacent to the Chatter Creek Campground in this segment.

Segment 3

Segment 3 is 2.5 miles in length and includes two water developments: the Icicle Irrigation District dam and canal, and the City of Leavenworth water intake, both located on National Forest land in the SE 1/4 of Section 28, T.24N., R.17E. In addition, the Leavenworth National Fish Hatchery (which is located on the Icicle below the Forest boundary) and the Icicle Irrigation District have facilities on some of the high mountain lakes which drain into the Icicle via Snow Creek. These facilities allow the storage and release of additional water into the river on an "as needed" basis.

As in Segment 2, the Icicle River Road hugs the north bank of the Icicle, to within 1/2 mile of the Forest boundary. The Snow Lakes parking lot, footbridge and trailhead are located on private land near the Icicle Irrigation District diversion, in the SW 1/4 of Section 27, T.24N., R.17E. A land exchange is pending between the Forest Service and the Icicle Irrigation District that would transfer the diversion facilities to the Irrigation District, with the Forest Service acquiring the Snow Lakes Trailhead facilities in return.

Suitability:

Suitability Factor #1 -Characteristics Which Make the Area a Worthy Addition to the System.

The narrow, steep, glaciated valley of the Icicle is characterized by a cascading water course, high, open ridges, extensive snowfields, majestic peaks, and rugged slopes with large outcrops of granite. The mixed conifer cover is interspersed with frequent meadow openings.

There is heavy recreational use of the Icicle for camping, hiking, fishing, hunting, rock climbing, and water play by visitors from the Wenatchee and Central Washington communities to the east, and Puget Sound to the west. The upper drainage also serves as a major access route into the Alpine Lakes Wilderness.

Suitability Factor #2 -Current Status of Land Ownership and Use.

Approximately 30% of the study corridor is in private ownership, with these holdings being check-boarded through Segments 2 and 3. In recent years the private sections along the creek have been surveyed and are being sold as individual parcels. However, because of the area's outstanding scenic qualities, its values to the City of Leavenworth and local recreationists, and in order to protect the quality of the water in the drainage (the Icicle is the source of Leavenworth's domestic water supply), the Icicle Valley Design Review Overlay District was established by Chelan County. The District has the authority to review and make recommendations on all matters subject to the local government permit process, and has established a set of stringent standards for developments in the Icicle. This includes a restriction of 20 acres as the minimum size tract that can be subdivided.

National Forest land below the wilderness boundary has been managed under a visual quality objective of retention, which emphasizes the scenic and recreational values of the corridor. Timber harvest activities are designed to maintain the near natural condition of the corridor. Recreation use is very high, with two of the developed campgrounds in the Icicle having been expanded to accommodate this use.

Suitability Factor #3 -Foreseeable Potential Uses.

Water from the Icicle Creek has been of crucial importance to both the City of Leavenworth and the upper Wenatchee Valley. It provides the domestic water supply for the residents of Leavenworth, and the Icicle Irrigation District supplies water from Icicle Creek to most of the fruit orchards in the upper Wenatchee Valley. In addition, a national salmon hatchery is located on the Icicle, just below the Forest boundary. Both the salmon hatchery and the Irrigation District regulate the volume of flow in the lower segment of the Icicle through damming of some of the lakes at the head of Snow Creek, a major tributary of the Icicle.

A Recreational classification would allow for the existing low dam and diversion canal, as well as the intake for the Leavenworth water supply in Segment 3. However, the City of Leavenworth and surrounding area are continuing to grow in population and level of development. As a consequence, there may be a future need to expand the existing facilities to accommodate this demographic change. This expansion could be curtailed if this portion of the river is designated.

The effects of designation on other potential uses of the private land in Segments 2 and 3 are likely to be minimal, due to the present zoning and land use regulations that are in place. Scenic designation in Segment 2, where most of the development is taking place, allows for new structures as long as these are modest in size, unobtrusive, and do not have a direct and adverse effect on river values. Concentrations of habitations may occur, but are limited to relatively short reaches of the river corridor. The Icicle Valley Design Review Overlay District incorporates these objectives and would appear to adequately protect the values that would be recognized through designation of the river. However, variances to these regulations might need to be restricted in order to ensure protection of the river values.

The City of Leavenworth is a nationally advertised tourist destination. Designation of the Icicle as a Wild and Scenic River would likely increase the number of visitors to the area, and would accentuate the recreational and scenic values that have long been recognized here.

There might be some change in the management of National Forest lands, and specifically of recreation use, as a result of designation. Segment 1 is currently managed as wilderness, which emphasizes the primitive, undeveloped character of the environment. Segments 2 and 3 are presently managed under the Alpine Lakes Management Plan as Scenic Forest. The objective of this allocation is to retain or enhance the viewing and recreation experience in the Icicle, with timber management activities designed to meet this goal. If designation takes place, it is likely that there would be tighter controls on recreation use along the corridor, to ensure that the potential increase in visitors does not result in the degradation of water quality or resources within the Icicle.

With respect to mineral potential, Segment 1 is currently withdrawn from mineral entry because it lies wholly within the Alpine Lakes Wilderness. Segments 2 and 3 are not encumbered by any mining claims. Furthermore, the area has not been identified as having potential for the occurrence of locatable mineral resources, nor is it classified as being prospectively valuable for leasable mineral commodities.

Some scenic values in Segments 2 and 3 could be foreclosed if the river were not managed as part of the Wild and Scenic River System. Timber harvest on private land is regulated under the State Forest Practices Act and the State Shoreline Management Act. These allow clearcuts to within 200 feet of the river shoreline. Although the intent of designation is to follow State and County controls on private land, it is possible that designation would encourage greater sensitivity to the visual values within the Wild and Scenic corridor. In addition, designation would ensure protection of the free-flowing character of the Icicle.

Suitability Factor #4 -Public, State and Local Governmental Interests.

The overall public response to designation of the Icicle Creek as an addition to the Wild and Scenic River System has been positive. Many have expressed support for protection of the outstanding scenery and excellent recreation opportunities in the corridor. The major concerns expressed are with the potential effects of designation on the private holdings. Some of the landowners view designation as a threat to their property rights, and feel that present federal, state and local controls are adequate protection for the river values. Some are worried that the public will be given access to their lands, and that property values will fall. The Icicle Irrigation District has also expressed concerns over the effects of designation on the rehabilitation, operation and maintenance of their dam and canal. The irrigation water they provide through their facility serves some 7500 acres of agricultural land.

Chelan County officials have indicated they could not support any proposal for designation of the Icicle Creek unless the County retains jurisdiction of private lands within the designated corridor. They are also concerned about the possible effects of designation on water rights for agricultural lands below the Forest boundary. The only costs that would be shared in administration of the river would be those independent of designation, that are associated with existing County administration of the private holdings.

The Washington State Department of Wildlife is in full support of the proposed river designation, and in fact, recommends reassessment of additional rivers on the Forest for potential eligibility as Wild and Scenic Rivers. The Yakima Indian Nation, whose ceded lands include the Icicle River drainage, supports designation at the highest potential classification, although they have some concerns for potential conflicts between recreation use and the protection of fisheries and tribal fishing localities. The Yakima would like to be involved in any subsequent river management plans that might be developed.

If the Icicle Creek is included in the Wild and Scenic River System, the Forest would rely on State and County controls for administration of private lands. Valid, existing water rights, such as those held by the Icicle Irrigation District, would not be affected by designation. Any Forest recommendation for Wild and Scenic River designation would exclude Segment 3, which includes the City of Leavenworth and Icicle Irrigation District water diversions and associated facilities.

Suitability Factor #5 -Cost of Acquisition and Interests.

Costs associated with designation are related to planning and administration of the river corridor and are directed to National Forest lands. The following are the expected funding needs for the Iccle River for a total five year period:

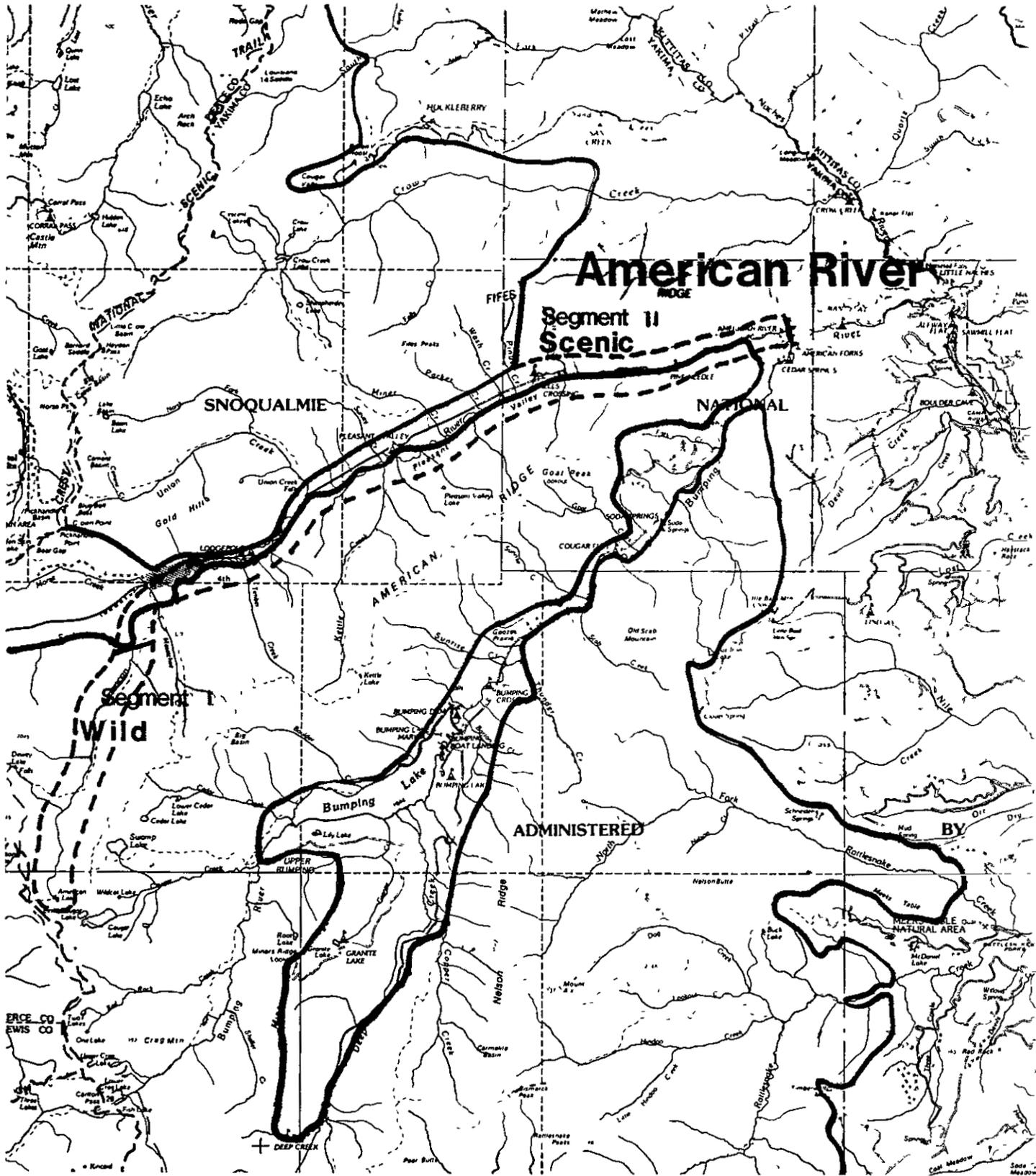
	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	\$10,000	\$ 10,000
Costs of Implementation		\$ 35,000
Development of Management Plan		\$120,000
Development Costs		\$ 25,000
Operation and Maintenance Costs	\$20,000	\$ 20,000
Total - First Five Years	\$30,000	\$210,000

General administration and operation and maintenance costs are estimated to continue at \$12,000 annually.

Suitability Factor #6-Other Issues and Concerns

No other major issues or concerns have been identified.

AMERICAN RIVER



Private Land 

NACHES RANGER DISTRICT

AMERICAN RIVER

Classification:

The American River, from the headwaters to the confluence with the Bumping River is considered to be eligible for inclusion in the Wild and Scenic River system. There are no private lands included within the corridor. In the course of determining eligibility, two distinct segments of the river were identified, based on a combination of physical changes in the river character, and differences in development along the river corridor. These segments consist of an upper section (Segment 1) extending from the headwaters at American Lake to the confluence with the Rainier Fork in the SE 1/4 of Section 9, T.16N., R.11E.; and a lower section (Segment 2) extending from the Rainier Fork to the confluence with the Bumping River.

Based on their highest potential classification, Segment 1 meets the standards for classification as a Wild River, and Segment 2 as a Scenic River.

Segment 1

Segment 1, which is located entirely within the William O. Douglas Wilderness, is 6 miles in length. Access along the corridor is provided by Trail #968, which parallels the east side of the river to within 2 1/2 miles of the headwaters. The trail crosses the river in the NE 1/4 of Section 29, T.16N., R.11E., for the ascent to Dewey Lake.

Segment 2

Segment 2 is 16 miles in length. The river forms the wilderness boundary through portions of this segment, with much of the south side of the corridor being located in the William O. Douglas Wilderness, and a small number of acres north of the river being situated in the Norse Peak Wilderness.

U.S. Highway 410, the Mather Memorial Parkway, closely follows the American River the length of Segment 2, providing access to the numerous campgrounds, trailheads, and recreation residence tracts that exist here. Bridges span the river in the NW 1/4 of Section 35, T.17N., R.11E., where the highway extends for a short distance to the southeast side of the river. The highway also bridges the river at Hell's Crossing and at Hall Creek. A fifth bridge spans the American near its confluence with the Bumping River, at the junction of Highway 410 with County Road #1050.

Most of the remaining developments in Segment 2 are related to recreation use. There are six trailheads along the river: Mesatchee Creek (Trail #969, which crosses to the south side of the American River via a rustic, single log footbridge in the SW 1/4 of Section 3, T.16N., R.11E.; there is also parking space for 12 vehicles at the trailhead); Union Creek (Trail #956); Pleasant Valley (Trail #957, which crosses to the south side of the American River by way of a substantial wooden trail bridge); Crow Lake Way (a fully developed trailhead for Trail #953); Fife's Peak (a minimally developed trailhead for Trail #954); and Hell's Crossing (Goat Peak Trail and Trail #999; the latter trail is a popular cross-country ski route which parallels the southern edge of the river between the Goat Peak Trail to the east and Trail #957 to the west).

There are also four developed campgrounds in Segment 2: the 34 unit Lodgepole, the 19 unit Pleasant Valley, the 17 unit Hell's Crossing, and Pine Needle Campground, a reservation campsite. In addition, six recreation residence tracts under permit to the Forest Service are scattered through the corridor here: the Timber Creek Tract with 13 residences, the Union Creek Tract with six residences, the Pleasant Valley Tract, with seven residences, the Sleepy Hollow Tract with 15 residences, and the American

River Tract with 11 residences. A Pacific Power and Light Company powerline extends from the eastern edge of Segment 2, westward along the north side of the river as far as the Sleepy Hollow Tract. A private telephone line also occupies the powerline corridor.

Suitability:

Suitability Factor #1 -Characteristics Which Make the Area a Worthy Addition to the System.

The American River is noted for its highly varied, spectacular scenery. Originating high in the William O. Douglas Wilderness, the upper course tumbles eastward through a broad, glaciated, U-shaped valley characterized, near the Cascade Crest, by immense, back-to-back cirque basins. At its lower end, the corridor changes dramatically, as the river plunges through a narrow, winding canyon accentuated by precipitous, andesite cliffs. The river course is one of cascading rapids, riffles and white water areas throughout the segments under study. Lands adjacent to Highway 410, along the north side of the river, have been designated by the Secretary of Agriculture as the Mather Memorial Parkway "for the use and the enjoyment of the general public for scenic and recreation purposes..."

Suitability Factor #2 - Current Status of Land Ownership and Use.

The proposed river corridor is located exclusively on National Forest lands. Major uses include recreation (fishing, hunting, camping, hiking, picnicking, kayaking, and cross-country skiing), and timber management activities. The lands outside the wilderness boundary have been managed under a visual quality objective of retention, which emphasizes the scenic and recreational values of the corridor. The upper six miles of the American River are managed as wilderness.

Suitability Factor #3 -Foreseeable Potential Uses.

There would be no change in management of the National Forest lands as a result of designation. Segment 1 is currently managed as wilderness, which emphasizes the primitive, undeveloped character of the environment. Segment 2, which includes the Mather Memorial Parkway, is managed primarily for scenic and recreational purposes, with special consideration given to maintaining or enhancing the visual quality of the area.

The American River has a long history of mining use. Today, Segment 1 is withdrawn from mineral entry because of its location within the William O. Douglas Wilderness. However, according to BLM mining claim recordation data, there are a total of 28 unpatented claims in Segment 2. The bulk of these are situated between the confluence of the American River with the Rainier Fork and the Pleasant Valley Campground, with the remaining three being located between Pine Needle and American Forks Campgrounds. Assessment work has been completed on all of these claims through at least 1987. There are also reported occurrences of basalt and placer gold in Section 35, T.17N., R.11E., and basalt in Section 18, T.17N., R.13E. In addition, that portion of the American River from Wash Creek westward is classified by the BLM as being prospectively valuable for geothermal resources, although the area has no reported history of geothermal exploration or development.

Designation of the river would not affect the future mining potential in Segment 2. Preexisting mining claims with valid mining rights would be allowed to continue, subject to 36 CFR 228. A Scenic classification also allows for new mining claims and mineral leases, subject to the same regulations, provided the mineral activity is conducted in a manner that minimizes environmental degradation.

There are probably few values that would be foreclosed or curtailed if the American River was not protected as part of the System. Timber management activities presently recognize the scenic and recreational values of the corridor, and the designation of the Mather Memorial Parkway further reinforces this direction. The greatest potential threat to river values, however, would be in future diversions or impoundments. Designation would ensure the protection of the free-flowing character of the *American River drainage*.

Suitability Factor #4 -Public, State and Local Governmental Interests.

The overall public response to designation of the American River as an addition to the Wild and Scenic River System has been positive. Many support recognition and protection of the outstanding scenic values here, as well as the enhancement of the recreation opportunities, and protection of the fisheries, wildlife habitat, and water quality. The few concerns expressed are with the potential effects of designation on timber harvest levels, and on mining along the river corridor.

Yakima County officials would probably not support any proposal for designation that affects their jurisdiction over private lands, or that significantly decreases the timber supply from the Naches Ranger District. However, as mentioned above, there are no private lands located within the American River segments under study for inclusion in the Wild and Scenic River System. In addition, the corridor overlaps with the Mather Memorial Parkway and, in some areas, with wilderness. Designation of the American River would have no additional effect on the timber supply.

The Washington State Department of Wildlife is in full support of the proposed river designation, and in fact, recommends reassessment of additional rivers on the Forest for potential eligibility as Wild and Scenic Rivers. The Yakima Indian Nation, whose ceded lands include the American River drainage, supports designation at the highest potential classification, although they have some concerns for potential conflicts between recreation use and the protection of fisheries and tribal fishing localities. The Yakima would like to be involved in any subsequent river management plans that might be developed.

Suitability Factor #5 -Cost of Acquisition and Interests.

There are no private lands included within the proposed Wild and Scenic corridor of the American River.

Costs associated with designation are related to planning and administration of the river corridor and are directed to National Forest lands. The following are the expected funding needs for the American River for a total five year period:

	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	\$ 6,000	\$ 20,000
Costs of Implementation		\$ 20,000
Development of Management Plan		\$ 40,000
Development Costs	\$50,000	\$100,000
Operation and Maintenance Costs	\$10,000	\$ 15,000
Total - First Five Years	\$66,000	\$195,000

General administration and operation and maintenance costs are estimated to continue at \$10,200 annually.

Suitability Factor #6-Other Issues and Concerns.

No other major issues or concerns have been identified.

IV. ADMINISTRATIVE AND MANAGEMENT GUIDELINES

The following administrative and management guidelines are proposed to guide the development of detailed management plans for those rivers on the Wenatchee National Forest that are Congressionally designated as Wild and Scenic Rivers:

1. The Forest Service will be the administering agency for designated rivers within the Wenatchee National Forest. As the administrative agency, the Forest Service intends to manage the surface waters of the rivers or river segments, as well as the National Forest lands within the designated corridors, in accordance with the Wild and Scenic Rivers Act.
2. River corridor boundaries will be established to protect the outstandingly remarkable values for each designated river segment. These boundaries may not exceed an average of 320 acres per river mile over the designated portion of the river. The boundary will be delineated using natural or manmade features (canyon rims, roads, ridgetops, etc.), and legally identifiable property lines.
3. Every effort will be made to retain the existing patterns of land use and ownership, provided these uses remain consistent with the purposes of the Act.
4. State and County laws and regulations may be sufficient to protect river values on non-Federal lands. Rather than impose another layer of control on these lands, it will be the intent of the Management Plan to rely on State and County controls for administration of the private land within the designated rivers.

5. The Forest Service will monitor the results of local controls against the values for which the various rivers or river segments were designated. In the event that local controls do not appear to provide the necessary protection, the Forest Service will initiate discussions with County and/or State Agencies to determine the action needed to obtain necessary protection.

6. If local government action cannot be implemented, it may be necessary to impose additional controls for protection of some segments of designated rivers. Where key values are in jeopardy, this would most likely require acquisition of easements from private landowners.

7. This management concept for non-Federal lands will require close and frequent coordination between the Forest Service and Counties. To clearly define the authorities and responsibilities between the Forest Service and Counties, a series of cooperative agreements will be prepared.

8. Conflicts between public use and private landowners will be minimized to the extent possible. Access easements across private lands will be used only where no viable alternatives exist. (At this time, the only private land access easement that has been identified for acquisition is at Plain, just upstream from the SR 209 bridge crossing of the Wenatchee River.) Designation as a Wild and Scenic River does not change or affect existing public access on private lands.

9. Public use and enjoyment of designated rivers will be provided for, while protecting the values that caused these rivers to be included in the System. In this regard, public use will be regulated and distributed, where necessary, to protect and enhance these values. Basic facilities will be provided to absorb user impacts on the resources, as appropriate.

10. Valid water rights will not be affected by Wild and Scenic River designation. Existing dams and diversions and similar water projects located on designated river segments will be allowed to continue, subject to other applicable laws and regulations. New water project proposals will be evaluated on their potential to directly or adversely affect the attributes which made the river eligible for inclusion in the Wild and Scenic River System.

11. A proviso to allow riprapping will be recommended for inclusion in legislation for designation of "Recreational" river segments on the Forest. The riprap would be confined to the use of natural appearing rock along the shoreline for the preservation and protection of those investments existing before designation of the rivers, providing that there are no other viable alternatives short of abandonment.

12. Development of the detailed river management plans will provide for full citizen participation by landowners and river users.

APPENDIX F

Analysis of Land Allocations by Subwatersheds and Alternatives

Twenty-five major subbasins have been identified on the Wenatchee National Forest. This appendix is a grouping by alternative of land allocations and ownerships within each of these subbasins. The allocations and their percentages within a subwatershed were used in the analysis of the consequences of the alternatives. This information was used to identify potential individual and cumulative impacts affecting the various environmental components. The descriptions of the column headings follow:

Total Acres: Acres in the subwatershed within the Forest boundary.

Private Acres: Acres within the Forest boundary which are in other ownership, private or other agency. In some cases, the private acres within a subwatershed may be concentrated in one area. This could be an important factor for evaluating cumulative effects in intermingled ownerships.

Wilderness Acres: These are acres in designated wilderness.

Intensive Harvest Acres: Those acres within the subwatershed which are allocated to intensive timber harvest prescriptions. "Intensive" harvest prescriptions include all General Forest (GF) allocations and the Range Management (RM-1) allocation.

Other Harvest Acres: Acres of land within the subwatershed on which timber will be harvested but not by intensive harvest prescriptions. The special yield tables were applied to timber harvests on these acres.

Unharvested Acres: Those acres in allocations which will not permit harvesting. Not included in these acres are private or wilderness acres which have been separated out in the special categories listed above.

TABLE F-1

**ACRES AND PERCENTAGES OF LAND ALLOCATIONS BY WATERSHED
IN ALTERNATIVE A/NFMA**

Watershed	Total Acres	Private		Wilderness		Intensive Harvest		Other Harvest		Non Harvest	
		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Stehekin River	91,097	0	0	91,097	100	0	0	0	0	0	0
Lake Chelan	285,079	7,462	3	110,517	39	34,620	12	60,845	21	71,635	25
Entiat River	174,202	9,095	5	25,398	15	49,608	28	56,075	32	34,026	20
Chiwawa River	119,188	4,918	4	37,652	32	24,974	21	20,649	17	30,995	26
White, Little Wenatchee R	173,354	5,745	3	105,407	61	9,010	5	38,627	22	14,565	8
Nason Creek	68,752	14,904	22	19,335	28	64	0	22,451	33	11,998	17
Wenatchee River	160,676	45,771	28	30,337	19	30,825	19	40,980	26	12,763	8
Mad River	61,035	5,851	10	0	0	30,401	50	17,363	28	7,420	12
Ice Creek	135,236	16,939	13	100,701	4	0	0	6,975	5	10,621	8
Cle Elum River	126,651	24,762	20	56,393	45	2,629	2	20,013	16	22,854	18
Yakima River	128,282	51,962	41	14,056	11	7,038	5	37,630	29	17,596	14
Teaaway River	78,420	14,840	19	0	0	2,862	4	10,982	14	49,736	63
Peshastin Creek	78,992	14,459	18	23,129	29	8,650	11	24,656	31	8,098	10
Mission Creek	40,959	3,201	8	0	0	16,685	41	11,067	27	10,006	24
Columbia R Minor Tribes	44,245	7,081	16	0	0	17,511	40	18,402	42	1,251	3
Swauk-Naneum Creeks	81,748	8,183	10	0	0	5,067	6	61,290	75	7,208	9
Taneum-Manastash Creeks	54,485	19,038	35	0	0	3,943	7	17,787	33	13,717	25
Little Naches River	94,023	11,151	12	22,112	23	30,019	32	28,684	31	2,057	2
American River	50,838	212	1	39,708	78	170	0	7,632	15	3,116	6
Bumping River	71,529	148	0	53,743	75	1,336	2	15,264	21	1,038	1
Minor Naches River Tribes	74,413	8,353	11	0	0	39,814	54	24,041	32	2,205	3
Wenas Creek	11,109	3,010	27	0	0	6,614	60	1,484	13	1	0
Rattlesnake Creek	75,430	0	0	48,972	65	8,183	11	15,031	20	3,244	4
Upper Teton River	122,346	6,150	5	52,937	43	13,165	11	37,249	31	12,845	10
Lower Teton River	55,290	9,964	18	6,296	11	12,127	22	25,631	46	1,272	2

TABLE F-2

**ACRES AND PERCENTAGES OF LAND ALLOCATIONS BY WATERSHED
IN ALTERNATIVES B & D**

Watershed	Total Acres	Private		Wilderness		Intensive Harvest		Other Harvest		Non Harvest	
		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Stehekin River	91,097	0	0	91,097	100	0	0	0	0	0	0
Lake Chelan	285,079	7,462	3	110,517	39	75,218	26	40,874	14	51,008	18
Entiat River	174,202	9,095	5	25,398	15	77,974	45	17,829	10	43,806	25
Chiwawa River	119,188	4,918	4	37,652	32	39,538	33	7,293	6	29,787	25
White, Little Wenatchee R	173,354	5,745	3	105,407	61	21,963	13	19,504	11	20,735	12
Nason Creek	68,752	14,904	22	19,335	28	594	1	21,942	32	11,977	17
Wenatchee River	160,676	45,771	28	30,337	19	39,644	25	32,161	20	12,763	8
Mad River	61,035	5,851	10	0	0	40,747	67	6,720	11	7,717	13
Ice Creek	135,236	16,939	13	100,701	74	0	0	6,508	5	11,088	8
Cle Elum River	126,651	24,762	20	56,393	45	2,777	2	19,822	16	22,897	18
Yakima River	128,282	51,962	40	14,056	11	17,808	14	28,959	23	15,497	12
Teanaway River	78,420	14,840	19	0	0	2,862	4	10,982	14	49,736	63
Peshastin Creek	78,992	14,459	18	23,129	29	10,346	13	22,960	29	8,098	10
Mission Creek	40,959	3,201	8	0	0	21,370	52	14,247	35	2,141	5
Columbia R Minor Tribs.	44,245	7,081	16	0	0	9,032	20	26,521	60	1,611	4
Swauk-Naneum Creeks	81,748	8,183	10	0	0	34,154	42	27,687	34	11,724	14
Taneum-Manastash Creeks	54,485	19,038	35	0	0	20,183	37	4,092	8	11,173	20
Little Naches River	94,023	11,151	12	22,112	23	50,032	53	8,268	9	2,460	3
American River	50,838	212	1	39,708	78	1,548	3	7,038	14	2,332	5
Bumping River	71,529	148	0	53,743	75	9,964	14	6,805	10	869	1
Minor Naches River Tribs	74,413	8,353	11	0	0	52,046	70	11,957	16	2,057	3
Wenas Creek	11,109	3,010	27	0	0	7,208	65	890	8	1	0
Rattlesnake Creek	75,430	0	0	48,972	65	19,992	27	3,795	5	2,671	4
Upper Tieton River	122,346	6,150	5	52,937	43	42,379	35	10,876	9	10,004	8
Lower Tieton River	55,290	9,964	18	6,296	11	25,843	47	10,749	19	2,438	4

TABLE F-3

**ACRES AND PERCENTAGES OF LAND ALLOCATIONS BY WATERSHED
IN ALTERNATIVES C & I**

Watershed	Total Acres		Private Acres %		Wilderness Acres %		Intensive Harvest Acres %		Other Harvest Acres %		Non Harvest Acres %	
Stehekin River	91,097	0	0	91,097	100	0	0	0	0	0	0	0
Lake Chelan	285,079	7,462	3	110,517	39	40,747	14	52,258	18	74,095	26	
Entiat River	174,202	9,095	5	25,398	15	34,556	20	55,799	32	49,354	28	
Chiwawa River	119,188	4,918	4	37,652	32	20,861	18	21,264	18	34,493	29	
White, Little Wenatchee R	173,354	5,745	3	105,407	61	11,003	6	28,599	16	22,599	13	
Nason Creek	68,752	14,904	22	19,335	28	64	0	22,324	32	12,125	18	
Wenatchee River	160,676	45,771	28	30,337	19	23,129	14	48,315	30	13,122	8	
Mad River	61,035	5,851	10	0	0	29,214	48	12,084	20	13,886	23	
Ice Creek	135,236	16,939	13	100,701	74	0	0	6,551	5	11,045	8	
Cle Elum River	126,651	24,762	20	56,393	45	2,650	2	19,631	16	23,214	18	
Yakima River	128,282	51,962	41	14,056	11	8,671	7	34,493	27	19,102	15	
Teanaway River	78,420	14,840	19	0	0	2,862	4	10,982	14	49,672	63	
Peshastin Creek	78,992	14,459	18	23,129	29	8,798	11	24,995	32	7,631	10	
Mission Creek	40,959	3,201	8	0	0	11,088	27	15,964	39	10,706	26	
Columbia R Minor Tribs.	44,245	7,081	16	0	0	5,152	12	29,426	67	2,586	6	
Swauk-Naneum Creeks	81,748	8,183	10	0	0	13,568	17	40,810	50	19,186	23	
Taneum-Manastash Creeks	54,485	19,038	35	0	0	5,088	9	14,925	27	15,434	28	
Little Naches River	94,023	11,151	12	22,112	23	33,094	35	21,243	23	6,423	7	
American River	50,838	212	1	39,708	78	85	0	2,141	4	8,692	17	
Bumping River	71,529	148	0	53,743	75	636	1	14,395	20	2,607	4	
Minor Naches River Tribs	74,413	8,353	11	0	0	36,062	48	22,833	31	7,162	10	
Wenas Creek	11,109	3,010	27	0	0	6,190	56	1,378	12	530	5	
Rattlesnake Creek	75,430	0	0	48,972	65	13,950	18	9,370	12	3,138	4	
Upper Tieton River	122,346	6,150	5	52,937	43	18,571	15	30,825	25	13,865	11	
Lower Tieton River	55,290	9,964	18	6,296	11	10,006	18	27,306	49	1,717	3	

TABLE F-4

ACRES AND PERCENTAGES OF LAND ALLOCATIONS BY WATERSHED
IN ALTERNATIVE E

Watershed	Total Acres	Private		Wilderness		Intensive Harvest		Other Harvest		Non Harvest	
		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Stehekin River	91,097	0	0	91,097	100	0	0	0	0	0	0
Lake Chelan	285,079	7,462	3	110,517	39	14,713	5	47,722	17	104,765	37
Entriat River	174,202	9,095	5	25,398	15	5,152	3	53,573	31	80,984	46
Chiwawa River	119,188	4,918	4	37,652	32	0	0	25,949	22	50,669	42
White, Little Wenatchee R	173,354	5,745	3	105,407	61	0	0	24,147	14	38,055	22
Nason Creek	68,752	14,904	22	19,335	28	0	0	21,433	31	13,080	19
Wenatchee River	160,676	45,771	28	30,337	19	2,523	2	65,339	41	16,706	10
Mad River	61,035	5,851	10	0	0	8,332	14	17,978	29	28,874	47
Icicle Creek	135,236	16,939	13	100,701	74	0	0	6,763	5	10,833	8
Cle Elum River	126,651	24,762	20	56,393	45	2,120	2	21,031	17	22,345	18
Yakima River	128,282	51,962	41	14,056	11	2,459	2	37,524	29	22,281	17
Teanaway River	78,420	14,840	19	0	0	3,032	4	11,151	14	49,397	63
Peshastin Creek	78,992	14,459	18	23,129	29	2,459	3	26,924	34	12,021	15
Mission Creek	40,959	3,201	8	0	0	297	1	13,102	32	24,359	59
Columbia R Minor Tribs.	44,245	7,081	16	0	0	2,099	5	33,751	76	1,314	3
Swauk-Naneum Creeks	81,748	8,183	10	0	0	1,420	2	44,605	55	27,540	34
Taneum-Manastash Creeks	54,485	19,038	35	0	0	0	0	14,522	27	20,925	38
Little Naches River	94,023	11,151	12	22,112	23	11,745	12	25,440	27	23,575	25
American River	50,838	212	1	39,708	78	0	0	276	1	10,642	21
Bumping River	71,529	148	0	53,743	75	0	0	4,897	7	12,741	18
Minor Naches River Tribs	74,413	8,353	11	0	0	23,320	31	32,500	44	10,240	14
Wenas Creek	11,109	3,010	27	0	0	5,703	51	1,166	10	1,230	11
Rattlesnake Creek	75,430	0	0	48,972	65	1,738	2	18,402	24	6,318	8
Upper Tieton River	122,346	6,150	5	52,937	43	5,766	5	25,843	21	31,650	26
Lower Tieton River	55,290	9,964	18	6,296	11	170	0	30,719	56	8,141	15

TABLE F-5

**ACRES AND PERCENTAGES OF LAND ALLOCATIONS BY WATERSHED
IN ALTERNATIVE F**

Watershed	Total Acres	Private		Wilderness		Intensive Harvest		Other Harvest		Non Harvest	
		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Stehakin River	91,097	0	0	91,097	100	0	0	0	0	0	0
Lake Chelan	285,079	7,462	3	110,517	39	23,066	8	44,330	16	99,7056	35
Entiat River	174,202	9,095	5	25,398	15	13,081	8	48,124	28	78,504	45
Chiwawa River	119,188	4,918	4	37,652	32	0	0	27,263	23	49,354	41
White, Little Wenatchee R	173,354	5,745	3	105,407	61	106	0	25,928	15	36,168	21
Nason Creek	68,752	14,904	22	19,335	28	64	0	21,667	32	12,784	19
Wenatchee River	160,676	45,771	28	30,337	19	6,720	4	61,099	38	16,748	10
Mad River	61,035	5,851	10	0	0	15,815	26	13,399	22	25,970	43
Icicle Creek	135,236	16,939	13	100,701	74	0	0	6,678	5	10,918	8
Cle Elum River	126,651	24,762	20	56,393	45	2,565	2	20,564	16	22,366	18
Yakima River	128,282	51,962	41	14,056	11	2,841	2	37,206	29	22,218	17
Teanaway River	78,420	14,840	19	0	0	3,392	4	10,791	14	49,333	63
Peshastin Creek	78,992	14,459	18	23,129	29	3,519	4	27,581	35	10,324	13
Mission Creek	40,959	3,201	8	0	0	509	1	13,483	33	23,765	58
Columbia R Minor Tribs	44,245	7,081	16	0	0	2,120	5	33,730	76	1,314	3
Swauk-Naneum Creeks	81,748	8,183	10	0	0	2,120	3	45,517	56	25,928	32
Taneum-Manastash Creeks	54,485	19,038	35	0	0	0	0	14,946	27	20,500	38
Little Naches River	94,023	11,151	12	22,112	23	15,031	16	28,005	30	17,723	19
American River	50,838	212	1	39,708	78	0	0	1,929	4	8,988	18
Bumping River	71,529	148	0	53,743	75	0	0	9,858	14	7,780	11
Minor Naches River Tribs.	74,413	8,353	11	0	0	28,069	38	32,458	44	5,533	7
Wenas Creek	11,109	3,010	27	0	0	6,381	57	1,484	13	233	2
Rattlesnake Creek	75,430	0	0	48,972	65	5,194	7	18,465	24	2,798	4
Upper Tieton River	122,346	6,150	5	52,937	43	9,456	8	28,959	24	24,847	20
Lower Tieton River	55,290	9,964	18	6,296	11	170	0	34,281	62	4,579	8

TABLE F-6

ACRES AND PERCENTAGES OF LAND ALLOCATIONS BY WATERSHED
IN ALTERNATIVE G

Watershed	Total Acres	Private		Wilderness		Intensive Harvest		Other Harvest		Non Harvest	
		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Stehekin River	91,097	0	0	91,097	100	0	0	0	0	0	0
Lake Chelan	285,079	7,462	3	110,517	39	15,519	5	72,929	25	78,653	28
Entiat River	174,202	9,095	5	25,398	15	14,480	8	47,806	27	77,423	44
Chiwawa River	119,188	4,918	4	37,652	32	10,749	9	24,719	21	41,149	35
White, Little Wenatchee R.	173,354	5,745	3	105,407	61	3,116	2	34,811	20	24,274	14
Nason Creek	68,752	14,904	22	19,335	28	64	0	22,303	32	12,148	18
Wenatchee River	160,676	45,771	28	30,337	19	18,381	11	53,319	33	12,868	8
Mad River	61,035	5,851	10	0	0	11,851	19	17,829	29	25,504	42
Icicle Creek	135,236	16,939	13	100,701	74	0	0	6,551	5	11,045	8
Cle Elum River	126,651	24,762	20	56,393	45	2,650	2	19,631	16	23,214	18
Yakima River	128,282	51,962	41	14,056	11	8,586	7	34,832	27	18,847	15
Teanaway River	78,420	14,840	20	0	0	2,862	4	11,003	14	49,651	63
Peshastin Creek	78,992	14,459	18	23,129	29	4,473	6	27,179	34	19,971	25
Mission Creek	40,959	3,201	8	0	0	509	1	19,250	47	17,993	44
Columbia R. Minor Tribes.	44,245	7,081	16	0	0	2,459	5	33,094	75	1,611	4
Swauk-Naneum Creeks	81,748	8,183	10	0	0	2,332	3	56,414	69	14,819	18
Taneum-Manastash Creeks	54,485	19,038	35	0	0	3,901	7	16,960	31	14,586	27
Little Naches River	94,023	11,151	12	22,112	23	15,837	17	29,299	31	15,624	17
American River	50,838	212	1	39,708	78	0	0	6,508	13	4,409	19
Bumping River	71,529	148	0	53,743	75	0	0	15,561	22	2,077	3
Minor Naches River Tribes.	74,413	8,353	11	0	0	22,515	30	41,192	55	2,353	3
Wenas Creek	11,109	3,010	27	0	0	5,851	53	2,014	18	233	2
Rattlesnake Creek	75,430	0	0	48,972	65	4,282	6	19,017	25	3,159	4
Upper Tieton River	122,346	6,150	5	52,937	43	11,046	9	29,934	24	22,282	18
Lower Tieton River	55,290	9,964	18	6,296	11	148	1	35,383	64	3,498	6

TABLE F-7

**ACRES AND PERCENTAGES OF LAND ALLOCATIONS BY WATERSHED
IN ALTERNATIVE H**

Watershed	Total Acres	Private		Wilderness		Intensive Harvest		Other Harvest		Non Harvest	
		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Stehekin River	91,097	0		91,097	100	0	0	0	0	0	0
Lake Chelan	285,079	7,462	3	110,517	39	34,620	12	60,845	21	71,635	25
Entiat River	174,202	9,095	5	25,398	15	49,608	28	56,075	32	34,026	20
Chiwawa River	119,188	4,918	4	37,652	32	24,974	21	20,649	17	30,994	26
White, Little Wenatchee R	173,354	5,745	3	105,407	61	38,627	22	9,010	5	14,565	8
Nason Creek	68,752	14,904	22	19,335	28	64	0	22,451	33	11,999	17
Wenatchee River	160,676	45,771	28	30,337	19	30,825	19	40,980	26	12,762	8
Mad River	61,035	5,851	10	0	0	30,401	50	17,363	28	7,420	12
Icele Creek	135,236	16,939	13	100,701	74	0	0	6,975	5	10,621	8
Cle Elum River	126,651	24,762	20	56,393	45	2,629	2	20,013	16	22,854	18
Yakima River	128,282	51,962	41	14,056	11	7,038	5	37,630	29	17,597	14
Teanaway River	78,420	14,840	20	0	0	2,862	4	10,982	14	49,672	63
Peshastin Creek	78,992	14,459	18	23,129	29	8,650	11	24,656	31	8,119	10
Mission Creek	40,959	3,201	8	0	0	16,685	41	11,067	27	10,006	24
Columbia R Minor Tribs.	41,849	6,784	16	0	0	17,511	40	18,402	42	1,251	3
Swauk-Naneum Creeks	81,748	8,183	10	0	0	5,067	6	61,290	75	7,208	9
Taneum-Manastash Creeks	54,485	19,038	35	0	0	3,943	7	17,787	33	13,716	25
Little Naches River	94,023	11,151	12	22,112	23	30,019	32	28,684	31	2,056	2
American River	50,838	212	1	39,708	78	170	1	7,632	15	3,116	6
Bumping River	71,529	148	0	53,743	75	1,336	2	15,264	21	1,039	2
Minor Naches River Tribs	74,413	8,353	11	0	0	39,814	54	24,041	32	2,205	3
Wenas Creek	11,109	3,010	27	0	0	6,614	60	1,484	13	0	0
Rattlesnake Creek	75,430	0	0	48,972	65	8,183	11	15,031	20	3,244	4
Upper Tieton River	122,346	6,150	5	52,937	43	13,165	11	37,249	30	12,848	11
Lower Tieton River	55,290	9,964	18	6,296	11	12,127	22	25,631	46	1,272	2

TABLE F-8

**ACRES AND PERCENTAGES OF LAND ALLOCATIONS BY WATERSHED
IN ALTERNATIVE J**

Watershed	Total Acres	Private		Wilderness		Intensive Harvest		Other Harvest		Non Harvest	
		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Stehakin River	91,097	0		91,097	100	0	0	0	0	0	0
Lake Chelan	285,079	7,462	3	110,517	39	87,599	31	33,475	12	46,026	16
Entiat River	174,202	9,095	5	25,398	15	69,113	40	28,111	16	42,485	24
Chiwawa River	119,188	4,918	4	37,652	32	44,775	38	8,480	7	23,362	20
White, Little Wenatchee R	173,354	5,745	3	105,407	61	24,529	14	17,087	10	20,585	12
Nason Creek	68,752	14,904	22	19,335	28	594	1	21,942	32	11,978	17
Wenatchee River	160,676	45,771	28	30,337	19	33,687	21	38,118	24	12,762	8
Mad River	61,035	5,851	10	0	0	40,938	67	6,657	11	7,590	12
Icicle Creek	135,236	16,939	13	100,701	74	0	0	6,975	5	10,621	8
Cle Elum River	126,651	24,762	20	56,393	45	2,777	2	19,843	16	22,875	18
Yakima River	128,282	51,962	41	14,056	11	17,978	14	30,189	24	14,099	11
Teanaway River	78,420	14,840	20	0	0	2,883	4	10,961	14	49,672	63
Peshastin Creek	78,992	14,459	18	23,129	29	10,367	13	22,939	29	8,119	10
Mission Creek	40,959	3,201	8	0	0	21,327	52	14,289	35	2,141	5
Columbia R Minor Tribs.	44,245	7,081	16	0	0	6,593	15	28,959	65	1,611	4
Swauk-Naneum Creeks	81,748	8,183	10	0	0	25,822	32	36,019	44	11,724	14
Taneum-Manastash Creeks	54,485	19,038	35	0	0	23,426	43	5,279	10	6,741	12
Little Naches River	94,023	11,151	12	22,112	23	50,605	54	8,204	9	1,950	2
American River	50,838	212	1	39,708	78	1,548	3	7,038	14	2,332	5
Bumping River	71,529	148	0	53,743	75	9,773	14	6,996	10	869	1
Minor Naches River Tribs.	74,413	8,353	11	0	0	43,927	59	20,119	27	2,014	3
Wenas Creek	11,109	3,010	27	0	0	7,208	65	890	8	0	0
Rattlesnake Creek	75,430	0	0	48,972	65	17,087	23	6,699	9	2,671	3
Upper Tieton River	122,346	6,150	5	52,937	43	43,206	35	11,597	10	8,459	7
Lower Tieton River	55,290	9,964	18	6,296	11	20,034	36	17,003	31	1,993	4

APPENDIX G

TREATY WITH THE YAKIMA

INTRODUCTION

The Wenatchee National Forest is within the area ceded to the U.S. Government by the Treaty with the Yakima, 1855. This treaty reserved to the confederated tribes and bands of the Yakima Indian Nation certain rights and privileges to these ceded lands. Among the most important rights with respect to management of the Forest are those identified in Article 3: "...the right of taking fish at all usual and accustomed places in common with the citizens of the territory, and of erecting temporary buildings for curing them; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land..." This right includes consideration by the Forest Service of the environmental effects of their land management activities on the water quality and anadromous fish habitat of the Forest.

Certain additional uses of the Forest lands by the American Indians are authorized by P.L. 95-341, the Joint Resolution on American Indian Religious Freedom (AIRFA). This Act states that it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express and exercise their traditional religions. This includes, but is not limited to, access to sites, use and possession of sacred objects and the freedom to worship through ceremonials and traditional rites. This Act directs Federal Departments and Agencies to evaluate their policies and procedures *in consultation with Native traditional religious leaders in order to determine appropriate changes necessary to protect and preserve Native American religious rights and practices.*

The following are complete copies of the Treaty with the Yakima, 1855 and the American Indian Religious Freedom Act.

TREATY WITH THE YAKIMA, 1855

June 9, 1855
 12 Stat. 951
 Ratified Mar. 8, 1859
 Proclaimed Apr. 18,
 1859

Articles of agreement and convention made and concluded at the treaty-ground, Camp Stevens, Walla-Walla Valley, this ninth day of June, in the year one thousand eight hundred and fifty-five, by and between Isaac I. Stevens, governor and superintendent of Indian affairs for the Territory of Washington, on the part of the United States and the undersigned head chiefs, chiefs, head-men, and delegates of the Yakama, Palouse, Piquouse, Wenatshapam, Klkakat, Klinguit, Kow-was-say-ee, Li-ay-was, Skin-pah, Wish-ham, Shyrks, Oche-chotes, Kah milt-pah, and Se-ap-cat, confederated tribes and bands of Indians, occupying lands hereinafter bounded and described and lying in Washington Territory, who for the purposes of this treaty are to be considered as one nation, under the name of "Yakama," with Kamaiakun as its head chief, on behalf of and acting for said tribes and bands, and being duly authorized thereto by them.

Cession of lands to
 the United States

ARTICLE 1. The aforesaid confederated tribes and bands of Indians hereby cede, relinquish, and convey to the United States all their right, title, and interest in and to the lands and country occupied and claimed by them, and bounded and described as follows, to wit.

Boundaries

Commencing at Mount Ranier, thence northerly along the main ridge of the Cascade Mountains to the point where the northern tributaries of Lake Che-lan and the southern tributaries of the Methow River have their rise; thence southeasterly on the divide between the waters of Lake Che-lan and the Methow River to the Columbia River; thence, crossing the Columbia on a true east course, to a point whose longitude is one hundred and nineteen degrees and ten minutes, (119° 10',) which two latter lines separate the above confederated tribes and bands from the Oakinakane tribe of Indians, thence in a true south course to the forty-seventh (47°) parallel of latitude, thence east on said parallel to the main Palouse River, which two latter lines of boundary separate the above confederated tribes and bands from the Spokanes; thence down the Palouse River to its junction with the Moh-hah-ne-she, or southern tributary of the same; thence in a southeasterly direction, to the Snake River, at the mouth of the Tucannon River, separating the above confederated tribes from the Nez Percé tribe of Indians; thence down the Snake River to its junction with the Columbia River: thence up the Columbia River to the "White Banks" below the Priest's Rapids, thence westerly to a lake called "La Lac;" thence southerly to a point on the Yakama River called Toh-mah-luke; thence, in a southwesterly direction, to the Columbia River, at the western extremity of the "Big Island," between the mouths of the Umatilla River and Butler Creek; all which latter boundaries separate the

TREATY WITH THE YAKIMA, 1855.

above confederated tribes and bands from the Walla-Walla, Cayuse, and Umatilla tribes and bands of Indians; thence down the Columbia River to midway between the mouths of White Salmon and Wind Rivers: thence along the divide between said rivers to the main ridge of the Cascade Mountains; and thence along said ridge to the place of beginning.

ARTICLE 2. There is, however, reserved, from the lands above ceded for the use and occupation of the aforesaid confederated tribes and bands of Indians, the tract of land included within the following boundaries, to wit Commencing on the Yakama River, at the mouth of the Attah-nam River: thence westerly along said Attah-nam River to the forks; thence along the southern tributary to the Cascade Mountains: thence southerly along the main ridge of said mountains passing south and east of Mount Adams, to the spur whence flows the waters of the Klickitat and Pisco Rivers; thence down said spur to the divide between the waters of said rivers, thence along said divide to the divide separating the waters of the Satass River from those flowing into the Columbia River; thence along said divide to the main Yakama, eight miles below the mouth of the Satass River; and thence up the Yakama River to the place of beginning.

Reservation.

Boundaries

All which tract shall be set apart and, so far as necessary, surveyed and marked out, for the exclusive use and benefit of said confederated tribes and bands of Indians, as an Indian reservation; nor shall any white man, excepting those in the employment of the Indian Department, be permitted to reside upon the said reservation without permission of the tribe and the superintendent and agent. And the said confederated tribes and bands agree to remove to, and settle upon, the same, within one year after the ratification of this treaty. In the mean time it shall be lawful for them to reside upon any ground not in the actual claim and occupation of citizens of the United States; and upon any ground claimed or occupied, if with the permission of the owner or claimant.

Reservations to be set apart etc. and Indians to settle thereon
Whites not to reside thereon

Guaranteeing, however, the right to all citizens of the United States to enter upon and occupy as settlers any lands not actually occupied and cultivated by said Indians at this time, and not included in the reservation above named.

And provided, That any substantial improvements heretofore made by any Indian, such as fields enclosed and cultivated, and houses erected upon the lands hereby ceded, and which he may be compelled to abandon in consequence of this treaty, shall be valued, under the direction of the President of the United States, and payment made therefor in money; or improvements of an equal value made for said Indian upon the reservation. And no Indian will be required to abandon the improvements aforesaid, now occupied by him, until their value in money, or improvements of an equal value shall be furnished him as aforesaid.

Improvements on ceded lands

ARTICLE 3. *And provided,* That, if necessary for the public convenience, roads may be run through the said reservation; and on the other hand, the right of way, with free access from the same to the nearest public highway, is secured to them, as also the right, in common with citizens of the United States, to travel upon all public highways

Roads may be made.

The exclusive right of taking fish in all the streams, where running through or bordering said reservation, is further secured to said confederated tribes and bands of Indians, as also the right of taking fish at all usual and accustomed places, in common with the citizens of the Territory, and of erecting temporary buildings for curing them: together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.

Privileges secured to Indians

TREATY WITH THE YAKIMA, 1855

<p>Payments by the United States</p>	<p>ARTICLE 4 In consideration of the above cession, the United States agree to pay to the said confederated tribes and bands of Indians, in addition to the goods and provisions distributed to them at the time of signing this treaty, the sum of two hundred thousand dollars, in the following manner, that is to say: Sixty thousand dollars, to be expended under the direction of the President of the United States, the first year after the ratification of this treaty, in providing for their removal to the reservation, breaking up and fencing farms, building houses for them, supplying them with provisions and a suitable outfit, and for such other objects as he may deem necessary, and the remainder in annuities, as follows. For the first five years after the ratification of the treaty ten thousand dollars each year, commencing September first, 1856; for the next five years, eight thousand dollars each year, for the next five years, six thousand dollars per year; and for the next five years, four thousand dollars per year.</p>
<p>How to be applied</p>	<p>All which sums of money shall be applied to the use and benefit of said Indians, under the direction of the President of the United States, who may from time to time determine, at his discretion, upon what beneficial objects to expend the same for them. And the superintendent of Indian affairs, or other proper officer, shall each year inform the President of the wishes of the Indians in relation thereto.</p>
<p>United States to establish schools</p>	<p>ARTICLE 5. The United States further agree to establish at suitable points within said reservation, within one year after the ratification hereof, two schools, erecting the necessary buildings, keeping them in repair, and providing them with furniture, books, and stationery, one of which shall be an agricultural and industrial school, to be located at the agency, and to be free to the children of the said confederated tribes and bands of Indians, and to employ one superintendent of teaching and two teachers; to build two blacksmiths' shops, to one of which shall be attached a tin-shop, and to the other a gunsmith's shop: one carpenter's shop, one wagon and plough maker's shop, and to keep the same in repair and furnished with the necessary tools to employ one superintendent of farming and two farmers, two blacksmiths, one tinner, one gunsmith, one carpenter, one wagon and plough maker, for the instruction of the Indians in trades and to assist them in the same; to erect one saw-mill and one flouring-mill, keeping the same in repair and furnished with the necessary tools and fixtures, to erect a hospital, keeping the same in repair and provided with the necessary medicines and furniture, and to employ a physician, and to erect, keep in repair, and provided with the necessary furniture, the building required for the accommodation of the said employees. The said buildings and establishments to be maintained and kept in repair as aforesaid, and the employees to be kept in service for the period of twenty years.</p>
<p>Mechanics' shops</p>	<p>And in view of the fact that the head chief of the said confederated tribes and bands of Indians is expected, and will be called upon to perform many services of a public character, occupying much of his time, the United States further agree to pay to the said confederated tribes and bands of Indians five hundred dollars per year, for the term of twenty years after the ratification hereof, as a salary for such person as the said confederated tribes and bands of Indians may select to be their head chief, to build for him at a suitable point on the reservation a comfortable house, and properly furnish the same, and to plough and fence ten acres of land. The said salary to be paid to, and the said house to be occupied by, such head chief so long as he may continue to hold that office.</p>
<p>Sawmill and flouring mill Hospital.</p>	<p>And it is distinctly understood and agreed that at the time of the conclusion of this treaty Kamaiakun is the duly elected and authorized</p>
<p>Salary to head chief house etc</p>	<p></p>
<p>Kamaiakun is the head chief</p>	<p></p>

TREATY WITH THE YAKIMA, 1855.

head chief of the confederated tribes and bands aforesaid, styled the Yakama Nation, and is recognized as such by them and by the commissioners on the part of the United States holding this treaty, and all the expenditures and expenses contemplated in this article of this treaty shall be defrayed by the United States, and shall not be deducted from the annuities agreed to be paid to said confederated tribes and band of Indians. Nor shall the cost of transporting the goods for the annuity payments be a charge upon the annuities, but shall be defrayed by the United States.

ARTICLE 6. The President may, from time to time, at his discretion, cause the whole or such portions of such reservation as he may think proper, to be surveyed into lots, and assign the same to such individuals or families of the said confederated tribes and bands of Indians as are willing to avail themselves of the privilege, and will locate on the same as a permanent home, on the same terms and subject to the same regulations as are provided in the sixth article of the treaty with the Omahas, so far as the same may be applicable.

Reservation may be surveyed into lots and assigned to individuals or families

ARTICLE 7. The annuities of the aforesaid confederated tribes and bands of Indians shall not be taken to pay the debts of individuals

Annuities not to pay for debts of individuals

ARTICLE 8 The aforesaid confederated tribes and bands of Indians acknowledge their dependence upon the Government of the United States, and promise to be friendly with all citizens thereof, and pledge themselves to commit no depredations upon the property of such citizens.

Tribes to preserve friendly relations

And should any one or more of them violate this pledge, and the fact be satisfactorily proved before the agent, the property taken shall be returned, or in default thereof, or if injured or destroyed, compensation may be made by the Government out of the annuities.

To pay for depredations

Nor will they make war upon any other tribe, except in self-defence, but will submit all matters of difference between them and other Indians to the Government of the United States or its agent for decision, and abide thereby. And if any of the said Indians commit depredations on any other Indians within the Territory of Washington or Oregon, the same rule shall prevail as that provided in this article in case of depredations against citizens. And the said confederated tribes and bands of Indians agree not to shelter or conceal offenders against the laws of the United States, but to deliver them up to the authorities for trial.

Not to make war but in self-defence

To surrender offenders

ARTICLE 9. The said confederated tribes and bands of Indians desire to exclude from their reservation the use of ardent spirits, and to prevent their people from drinking the same, and, therefore, it is provided that any Indian belonging to said confederated tribes and bands of Indians, who is guilty of bringing liquor into said reservation, or who drinks liquor, may have his or her annuities withheld from him or her for such time as the President may determine.

Annuities may be withheld from those who drink ardent spirits

ARTICLE 10 *And provided,* That there is also reserved and set apart from the lands ceded by this treaty, for the use and benefit of the aforesaid confederated tribes and bands, a tract of land not exceeding in quantity one township of six miles square, situated at the forks of the Pisquouse or Wenatshapam River, and known as the "Wenatshapam Fishery," which said reservation shall be surveyed and marked out whenever the President may direct, and be subject to the same provisions and restrictions as other Indian reservations

Wenatshapam fishery reserved

ARTICLE 11. This treaty shall be obligatory upon the contracting parties as soon as the same shall be ratified by the President and Senate of the United States.

When treaty to take effect.

In testimony whereof, the said Isaac I. Stevens, governor and superintendent of Indian affairs for the Territory of Washington, and the undersigned head chief, chiefs, headmen, and delegates of the afore-

said confederated tribes and bands of Indians, have hereunto set their hands and seals, at the place and on the day and year hereinbefore written

ISAAC I. STEVENS,
Governor and Superintendent. [L. s.]

Kamaiakun, his x mark.	{ L s }	Wish-och-kmpits, his x mark.	{ L s }
Skloom, his x mark	{ L s }	Koo-lat-tooe, his x mark	{ L s }
Owhi, his x mark.	{ L s }	Shee-ah-cotte, his x mark	{ L s }
Te-cole-kun, his x mark	{ L s }	Tuck-quille, his x mark	{ L s }
La-boom, his x mark	{ L s }	Ka-loo-as, his x mark	{ L s }
Me-ni-nock, his x mark	{ L s }	Scha-noo-a, his x mark	{ L s }
Elit Palmer, his x mark	{ L s }	Sia-kish, his x mark	{ L s }

Signed and sealed in the presence of—

James Doty, secretary of treaties,
Mie des Pandosy, O M T,
Wm C McKay,
W. H Tappan, sub Indian agent, W T,
C Chirouse, O M T,
Patrick McKenzie, interpreter,
A. D Pamburn, interpreter,
Joel Palmer, superintendent Indian affairs, O T.,
W D Biglow,
A D Pamburn, interpreter.

American Indian Religious Freedom

- Act of August 11, 1978 (P.L. 95 341, 92 Stat. 469, 42 U.S.C. 1996(note))

Whereas the freedom of religion for all people is an innerent right, fundamental to the democratic structure of the United States and is guaranteed by the First Amencment of the United States Constitution;

Whereas the United States has traditionally rejected the concept of a government denying individuals the right to practice their religion and, as a result, has benefited from a rich variety of religious heritages in this country,

Whereas the religious practices of the American Indian (as well as Native Alaskan and Hawaiian) are an integral part of their culture, tradition and heritage, such practices forming the basis of Indian identity and value systems,

Whereas the traditional American Indian religions, as an integral part of Indian life, are indispensable and irreplaceable,

Whereas the lack of a clear, comprehensive, and consistent Federal policy has often resulted in the abridgment of religious freedom for traditional American Indians;

Whereas such religious infringements result from the lack of knowledge or the insensitive and inflexible enforcement of Federal policies and regulations premised on a variety of laws,

Whereas such laws were designed for such worthwhile purposes as conservation and preservation of natural species and resources but were never intended to relate to Indian religious practices and, therefore, were passed without consideration of their effect on traditional American Indian religions,

Whereas such laws and policies often deny American Indians access to sacred sites required in their religions, including cemeteries,

Whereas such laws at times prohibit the use and possession of sacred objects necessary to the exercise of religious rites and ceremonies,

Whereas traditional American Indian ceremonies have been intruded upon, interfered with, and in a few instances banned. Now, therefore, be it

Resolved by the Senate and House of Representatives
of the United States of America in Congress assembled,

That henceforth it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

Sec. 2. The President shall direct the various Federal departments, agencies, and other instrumentalities responsible for administering relevant laws to evaluate their policies and procedures in consultation with native traditional religious leaders in order to determine appropriate changes necessary to protect and preserve Native American religious cultural rights and practices. Twelve months after approval of this resolution, the President shall report back to the Congress the results of his evaluation, including any changes which were made in administrative policies and procedures, and any recommendations he may have for legislative action.

APPENDIX H

SELECTION OF HARVEST CUTTING METHOD

Silvicultural systems are used to manage forest stands. A silvicultural system is a planned sequence of treatments for controlling the species composition and structure of the vegetation during the life of a stand. A stand is a community of trees sufficiently uniform to be distinguishable as a silvicultural or management unit. Typically, stand sizes vary from about 5 acres to over 30 acres on National Forest lands.

Silvicultural systems are not just the creation of foresters; rather, they are adaptations of natural occurrences. Natural “regeneration” occurs by means of fire, insects, disease, wind, and other phenomena; by removing a single tree, a small group of trees, a stand, or sometimes a whole forest.

Harvest Cutting Methods

Harvest cutting methods include both even-aged and uneven-aged silvicultural systems.

Even-aged harvest cutting systems (silvicultural treatment methods) generally include clearcutting, shelterwood cutting, and seedtree cutting.

Uneven-aged harvest cutting systems generally include individual tree selection and group selection cutting when healthy, fully stocked, uneven-aged stands exist or can be created by identified treatments within a defined time period.

An intermediate type of management for special areas needing constant tree cover and live root masses is two-story extended rotation stand management. This type of management utilizing long rotation shelterwoods, combines some of the resource protection features of uneven-aged management with the features of even-aged management that optimizes economics, simplifies yield prediction, and improves disease control opportunities.

As shown in Chapter III, two-storied stands are the predominant or characteristic existing stand condition on dry ecotype sites.

The two-storied stand condition is less common in the wet area but still occupy 25 percent of this ecotype.

Two-storied stands rather than strictly even-aged or all age were selected as the proposed models to meet old-growth dependent species, key big game habitat, scenic travel, riparian, Scenic River, and Recreational River management emphasis allocations. Sketches of how such stands would look are shown in Chapter IV. Also refer to graphic “Timber Yield Table - Special” for predicted yields, tree sizes at 130 and 260 years, and number of trees left at shelterwood entry.

Calculated yields using the constant tree cover shelterwood system varies from a low of 73 percent of the general forest wet type for riparian areas to 89 percent for the partial retention visual prescription. (These are based on the percentage of GF-1 yield). This approximates the maximum potential yield.

These yields are approximately 10 percent above potential yield using an even-aged 260 year rotation system.

Detailed monitoring of the use of the two-story system is needed during the next 10 years to determine if this potential gain over single story even-aged management is being accomplished.

The biggest questions to be answered by monitoring are, (1) the effects of diseases especially mistletoe and root rots on growth of trees under an overstory and, (2) the suppressive effect of the overstory on growth of the new stand under managed conditions.

The intent here is to document the rationale for selection of the broad harvest cutting methods (even-aged or uneven-aged) to be applied on the Forest. The specific silvicultural system (such as clearcutting, seedtree cutting, or group selection) will be selected on a site specific basis as identified in environmental assessments or in silvicultural prescriptions written or approved by certified silviculturists.

The criteria used for selection of harvest cutting methods were developed using selection criteria identified in the Regional Guide for the Pacific Northwest Region (1984) as well as direction provided in 36 CFR 219.27(b) for management prescriptions that involve manipulation of tree cover.

Combined Criteria for Selection of Harvest Cutting Method

The criteria identified in the Regional Guide and in 36 CFR 219.27(b) have been combined to eliminate duplication of intent and simplify the rationale for selecting the harvest cutting methods used to implement the Forest Plan. These seven combined criteria are summarized as follows:

1. The selected harvest cutting method must permit the production of a volume of marketable trees sufficient to utilize all trees that meet utilization standards and are designated for harvest. (Regional Guide: Criteria 1)
2. The selected harvest cutting method must permit use of an available and acceptable logging method *which can remove designated trees without excessive damage to the identified desirable residual vegetation* while meeting other established land management objectives. Table 2-1 in the Regional Guide displays the compatibility of logging systems with common harvest cutting methods. Generally, ground based logging methods, helicopters, and cable methods using slack pulling carriages are appropriate for all harvest methods. Cable methods without slack pulling carriages and balloons are appropriate only for clearcuts. (Regional Guide: Criteria 2, 36 CFR 219.27(b): Criteria 4)
3. The selected harvest cutting method must be capable of providing special conditions, such as a continuous high density live root mats, that are required to meet resource management objectives. Table 2-2 in the Regional Guide displays commonly used harvest methods which achieve desired forest character. Generally, both even-aged and uneven-aged methods can meet desired forest character with the exception of the "mosaic of forest and openings," and "maximum wildlife species diversity" objectives. Here, uneven-aged methods are not applicable. (Regional Guide: Criteria 3 and 6, 36 CFR 219.27(b): Criteria 1 and 6)

The selected harvest cutting method must meet multiple-use biological, environmental, engineering, and economic management objectives identified in the Regional Guide and Forest Plan.

4. The selected harvest cutting method must permit control of vegetation to establish desired numbers and rates of growth of trees as well as other vegetation needed to achieve special management objectives. Tables 2-3 and 2-4 in the Regional Guide outline these harvest cutting methods. Generally, both even-aged and uneven-aged methods can be used in vegetation zones occurring on the Forest; however, uneven-aged methods are not applicable for wildlife forage production or optimum tree seedling and sapling growth. (Regional Guide: Criteria 4, 36 CFR 219.27(b): Criteria 4 and 6)

5. The selected harvest cutting method must promote a stand structure and species composition which minimizes serious risk from insects, disease, animal damage, and wildfire and will allow treatment of existing insect, disease, and fuel conditions. Table 2-5 in the Regional Guide displays harvest cutting methods favorable to the reduction and treatment of these agents. Generally, uneven-aged methods are not applicable where dwarf mistletoe and root disease present serious risks. (Regional Guide: Criteria 5)

6. The selected method must assure that lands can be adequately restocked, (36 CFR 219.27(b): Criteria 2)

7. The selected method must be practical and economical in terms of transportation, harvesting, preparation, and administration of timber sales. (36 CFR 219.27(b): Criteria 7)

In addition, no harvest cutting method was selected primarily because it resulted in the greatest dollar return or provided the highest output of timber, or which permanently reduced site productivity, or could not assure conservation of the water and soil resources. (36 CFR 219.27(b): Criteria 3 and 5)

Dry Forest (Ponderosa Pine - Douglas-Fir Climax Forest)

Past harvesting in this type was largely individual tree selection or overwood removals. Due to increased recognition of root rots, mistletoe, and western spruce budworm potential, clearcutting has increased in this type. Clearcutting allows for regeneration of ponderosa pine from select parent trees under the tree improvement program for the forest.

Clearcutting also allows for more complete removal of fire hazard through broadcast burning or utilization of logging residue. Clearcutting mature stands or two-storied stands on north slopes even in the dry zone is clearly optimal where mistletoe or root rots are problems and soils allow for successful planting. For mature ponderosa pine stands, Alexander (1986) recommends against partial cutting stands with a mistletoe rating of 3 or more using a 6 point rating system. Douglas-fir mistletoe is even more serious than ponderosa pine mistletoe. (Hadfield 1986)

Ponderosa pine is the preferred planting species, where adapted, because of the high demand for its lumber, and its relative resistance to many disease and insect problems.

One concern is marketing of second growth ponderosa pine. High moisture content and rapid taper make second growth ponderosa less desirable than old growth ponderosa and in many cases less desirable than associated species such as Douglas-fir and lodgepole pine. On the other hand, ponderosa pine grown on longer rotations, such as proposed for visual management areas, will return a premium value that may be underestimated using current values. Our proposed management on many of these sites will be to remove associated species during the commercial thinning and shelterwood harvest stages while retaining the best quality ponderosa pine for increased stumpage values and other resources, especially scenery.

The ponderosa is also favored in campground and high density recreation areas because of its deep tap root. This makes it less subject to windthrow hazard. Its thick bark protects it from fire and mechanical injuries. The cinnamon to yellow-colored bark is also desirable from a scenery standpoint as it adds color variety to the Forest.

McDonald (1976) found that the degree of stocking, rate of growth, and species of trees were all affected by cutting method.

Ponderosa pine, the most desired species on much of the dry forest area was found to grow best in clearcuts. Leaving four to eight seed trees per acre reduced growth by forty percent on ponderosa pine seedling. Growth was reduced by sixty-six percent when twelve shelterwood trees were left per acre.

The number of new seedlings established, however, is greater under shelterwood or seed tree methods. Therefore, on sites where this is the primary concern, these methods may be optimal for establishing a new stand. McDonald (1976) recommends removal of residual trees within two years after establishment, however, to decrease growth reductions.

Single tree or group selections decreased both the stocking and growth of ponderosa pine, but increased the stocking of shade tolerant white fir. White fir grew less than ponderosa pine in clearcuts, but was favored by shelterwood cutting where it grew slightly better than ponderosa pine. Establishment of new white fir seedlings was greatest under selection methods. However, growth was only thirty-five percent of what it was in clearcuts.

Dry or extremely rocky, south slopes on the other hand may need shelter trees or in extreme cases, may call for uneven-aged management. Stands on sites in between these extremes are common. Other factors including economics are included in the site specific analysis and prescription prepared by or reviewed by a certified silviculturist.

Wet Forest (True Firs, Hemlock, Cedar, and Spruce Climax Forest)

Even-aged management, usually by clearcutting, is the optimal silviculture method for most of this type. Shallow root systems in true firs, hemlocks, cedars, and spruce make windthrow a problem with heavy cutting in previously unmanaged stands. Although these species are the climax species in this ecotype, Douglas-fir and even ponderosa pine are very common seral species currently occupying the sites due to fire or other disturbances.

Some shelterwood is required to obtain successful regeneration on extremely rocky, wet or frost pocket areas. High elevation types composed of silver fir, alpine fir and mountain hemlock may be managed under uneven-aged management where heavy snow accumulations make planting difficult and early growth extremely slow.

Preserving the fastest growing trees at each harvest can maintain these stands in a fully stocked productive state. However, logging or slash disposal can damage the leave trees causing disease and poor stocking unless careful planning and administration is carried out.

Comparisons of silvicultural methods in the mixed conifer type in southwestern Oregon was completed by Minore (1977). He found ponderosa pine to reproduce best in large clearcuts. Douglas-fir and grand fir were more successful in small clearcuts. Growth of Douglas-fir seedlings was eighteen percent less in small clearcuts, and forty-six percent less in partial cuts compared to large clearcuts. Both reduced height growth and logging damage from removal of adjacent timber has been observed on small Wenatchee forest clearcuts. For these reasons, clearcutting in units larger than ten acres is optimal for maximum growth for average growing conditions in the moist ecotype on the Wenatchee forest.

Clearcutting favors shade intolerant species including ponderosa pine, Douglas-fir, noble fire, western white pine, and western larch. These are the preferred species where they can be successfully grown. Areas of excessive wet snow, extreme frost, or high water tables may require the use of shade tolerant species, such as pacific silver fir, alpine fir, and mountain hemlock, which are more adapted to uneven-aged management. These have lower economic value, slower growth rates, and are more easily damaged by fire. Therefore, these species are favored only where the preferred species are not ecologically well adapted.

Working Groups and Management Areas

Elevation, soil types, precipitation and aspect combine to create a wide variety of ecological vegetative types on the Forest. The two tentatively suitable vegetative types and condition class, and their applicable management emphasis combinations are summarized as follows:

Vegetative Types and Condition Class	Management Emphasis - The Following are Appropriate for Both Dry and Wet Forest Types
Dry Forest (Ponderosa pine and Douglas-fir Ecotypes)	
Mature	
Immature One-Story	
Immature Two-Story	
Seedlings and Saplings	
Bare Ground	
AND	
Wet Forest (All other ecotypes)	
Mature	
Immature One-Story	
Immature Two-Story	
Seedlings and Saplings	
Bare Ground	
	Critical Big Game Habitat (EW-1) 1/ Riparian-Aquatic Ecosystems (EW-2) 1/ Old-Growth Ecosystems (OG-2) 1/ Scenic Travel Corridors - Retention VQO (ST-1) 1/ Scenic Travel Corridors - Partial Retention VQO (ST-2) 1/ General Forest - Clearcut - Timber Emphasis (GF-1; GF-3; GF-4) General Forest - Shelterwood - Timber Emphasis (GF-5; GF-6) Scenic River (WS-1) 1/ Recreational River (WS-2) 1/ Intensive Range Management (RM-1)

1/ Two-story extended rotation stand management.

Ecotype	Site Conditions	Management Prescriptions	Usual Optimum Silvicultural System	Remarks
Dry	Uneven-aged, healthy, nearly pure ponderosa pine stands.	All allowing harvest.	Uneven-aged management.	Applies to less than 5 percent of suitable forest land.
	Even-aged, mature, diseased, or stands where Douglas-fir is the primary regenerating species.	General forest.	Even-aged management featuring clearcutting for most north slopes where adequate regeneration can be assured within five years, and shelterwood for many south slopes or extremely rocky areas where regeneration may require shelter trees for regeneration within ten years.	
		"Special" prescriptions for wildlife, scenic values, and riparian zones.	Intermediate longer rotation, extended shelterwood.	Clearcutting or seed tree may be necessary, especially where mistletoe or root diseases are serious problems.
	Uneven-aged, high elevation alpine fir, Pacific silver fir, and mountain hemlock stands on difficult reforestation sites.	All allowing harvest.	Uneven-aged management.	Clearcutting may be applied where conversion to lodgepole pine is desired and can be accomplished within ten years.

Ecotype	Site Conditions	Management Prescriptions	Usual Optimum Silvicultural System	Remarks
Wet	Even-aged, mature stands of mixed conifer and lodgepole pine types.	General forest.	Even-aged favor clearcutting for most areas where regeneration can be assured within five years. Seed trees are encouraged, especially where full crowned western larch or ponderosa pine are available. Shelterwoods are to be used for areas where regeneration needs protection from frost, extreme exposure to sun, wind, or increased water tables.	Clearcutting or seed tree methods will often be needed for root rot or heavy mistletoe areas.
		"Special" areas where prescriptions emphasize wildlife, scenic, or riparian values.	Intermediate longer rotation, or extended shelterwoods preferred.	

Literature Cited or Reviewed

The evaluation of harvest cutting methods is based on operational experience and research findings published in the following documents:

Alexander, Robert R. 1986. *Silvicultural Systems and Cutting Methods for Ponderosa Pine Forests in the Front Range*. USDA Forest Service Technical Report RM 128, Fort Collins, Colo. 80526.

Barrett, J.W. 1979. *Silviculture of ponderosa pine in the Pacific Northwest: the state of our knowledge*. USDA For. Serv. Gen. Tech. Rpt. PNW-92, PNW For. and Range Exp. Stn., Portland, OR. 106 p.

Burns, R.M., tech. comp. 1983. *Silvicultural systems for the major forest types of the United States*. Ag. Handb. 445, USDA, Washington, D.C. 191 P.

Eyre, F.H. ed. *Forest cover types of the United States and Canada*. Washington, DC: Society of American Foresters; 1980. 148p.

Fowells, H.A., tech. comp. 1965. *Silvics of forest trees of the United States*. Ag. Handb. 271, USDA, Washington, D.C. 762 p.

Hadfield, James S. et al 1986. *Root Diseases in Oregon and Washington Conifers*. USDA Forest Service R-6 FPM-250-86, Portland, Oregon.

McDonald, Philip M., 1976. *Forest regeneration and seedling growth from five major cutting methods in north central California*. USDA Forest Service Research paper PSW 115, PSW Forest and Range Experiment Station, Berkeley, CA. 10 p.

Minore, Don, 1977. "Comparison of Silvicultural Methods at Coyote Creek Watersheds," in *Watersheds in Southwestern Oregon -- A Case History*. USDA Forest Service Research Note PNW307, PNW Forest and Range Experiment Station, Portland, OR. 12 p.

APPENDIX I

ANALYSIS OF MANAGEMENT REQUIREMENTS

PURPOSE

This appendix presents information responding to decisions of the Chief of the Forest Service and the Deputy Assistant Secretary of Agriculture regarding Appeal Number 1770, brought by the Northwest Forest Resource Council on September 18, 1986. The appeal centered on direction from the Regional Forester to incorporate management requirements (MR's) into Forest Plan alternatives.

Appellants requested that the appropriateness of the MR's be examined through the environmental impact statement process. This analysis is intended to address the issue raised by the appellants. In the analysis, alternate ways of meeting the management requirements are examined and their opportunity costs (losses in economic efficiency and timber available for harvest) are compared.

BACKGROUND OF THE MANAGEMENT REQUIREMENTS

WHAT ARE MANAGEMENT REQUIREMENTS AND WHAT ROLE DO THEY PLAY IN FOREST PLANNING?

To assure consistency in applying the laws and regulations to planning, Forest Service National and Regional direction established those substantive requirements of the regulations which must be met in all Forest Plan alternatives.

Regulations for forest planning were derived from the National Forest Management Act of 1976 (NFMA) and are found in Section 36 of the Code of Federal Regulations, Part 219. These regulations specified the "minimum specific management requirements to be met in accomplishing the goals and objectives of the National Forest System" [36 CFR 219.27]. The term "management requirements" (MR's) is used throughout this document to refer to the regulations. In the Wenatchee Draft EIS and Plan, they were referred to as "minimum management requirements," or MMR's. This term is no longer used.

Some requirements are procedural and need not be dealt with here. Some were analyzed and subjected to public review in the Regional Guide Environmental Impact Statement (EIS) process; those too do not need to be dealt with here. The management requirements which have not been fully dealt with elsewhere, and require additional analysis, are those for timber harvest dispersion, viable populations of existing native vertebrate species, and water quality/riparian habitat. Each of these management requirements is described in later sections of this appendix.

LEGAL REQUIREMENTS VS. IMPLEMENTATION METHODS

The management requirements from NFMA and its implementing regulations are legal requirements. They represent "ends" which must be met during forest plan implementation. For example, the NFMA implementing regulations require that "fish and wildlife habitat shall be managed to maintain viable populations of existing and desired non-native vertebrate species in the planning area." It is mandatory that whatever implementation methods are chosen, the management requirement be met.

Specifications or standards for achievement for each management requirement are established at the national level or through analysis at the regional level for most of the management requirements. These are listed in the regulations or as standards and guidelines in the Regional Guide.

The specifications must be based on knowledge of the resources involved. For example, in meeting the management requirement for viable populations of vertebrate species it is necessary to define the type of habitat required by the species, the maximum distance between habitats which will still provide reasonable assurance of genetic interaction, and the size of habitat area needed to support a breeding pair.

Often, the pool of scientific knowledge is insufficient to provide the entire basis for defining the specific conditions or standards that will satisfy or meet a management requirement. When this happens it is necessary to rely on the field experience and the professional judgement of knowledgeable professionals and to establish monitoring and research that will provide better information for future planning efforts.

Implementation methods are the “means” or “ways” in which the management requirements will be met. Usually there is more than one way in which a management requirement can be met. Determining the most appropriate means of meeting the specifications for each management requirement involves careful analysis at the Forest level. Considering and analyzing different means or ways of meeting a specific management requirement are particularly important if there are potentially significant reductions in present net value (PNV) or allowable sale quantity (ASQ) involved.

ALTERNATIVE WAYS OF MEETING THE MANAGEMENT REQUIREMENTS

Usually there is more than one way in which a management requirement can be met, i.e., different means (or ways) can be analyzed for assuring the specifications that indicate ends are satisfied or met. The specifications involve choices as well as the means for achieving those specifications to meet the same end. Considering and analyzing different means (or ways) of meeting a specific management requirement are particularly important if there are potentially large opportunity costs involved.

HOW IMPLEMENTATION METHODS TO MEET THE MANAGEMENT REQUIREMENTS ARE DEVELOPED

The general process used in evaluating alternative ways of meeting the management requirements is as follows:

1. Identify the desired “end” for each management requirement.
2. Assemble existing information about the resources addressed by the management requirement.
3. Analyze the existing information to determine what conditions or specifications need to exist on-the-ground to assure meeting “ends” of the management requirement. See Table I-1.
4. Develop various ways or means to meet the management requirement. See Table I-2.
5. Evaluate the effectiveness of the alternative means in meeting the management requirements. Estimate the environmental effects of each set of means.
6. For each set of means, estimate the effects on economic efficiency (as measured by changes in present net value) and the effects on timber availability (as measured by allowable sale quantity).

7. Where opportunity costs of meeting a management requirement exceed two percent of PNV or ASQ of the maximum present net value benchmark, the analysis used to select the means is presented in this appendix. Two percent was used as a threshold because differences less than two percent would not be significant in terms of opportunity costs of alternative means. A higher threshold would preclude evaluation of many alternatives.

Table I-1 summarizes each of the management requirements (ends) subject to analysis of opportunity costs on the Wenatchee National Forest and summarizes the specifications or standards of achievement for those ends.

TABLE I-1

**SUMMARY OF MANAGEMENT REQUIREMENTS
AND ASSOCIATED SPECIFICATIONS**

MANAGEMENT REQUIREMENTS	SUMMARY OF SPECIFICATIONS
1. Openings created by timber harvest activities are dispersed and limited in size.	<ul style="list-style-type: none"> - maximum created opening size of 40 acres (with some exceptions). -created openings cannot be adjacent to, or corner on, another created opening within a given 10 year period or decade. -site must be adequately stocked with trees 4 1/2 feet tall before a harvest area is considered a closed stand and not an opening. -large private cutting areas will be compensated for or ignored for this modeling effort.
2.Habitat provided that maintains viable populations of existing native and desired non-native vertebrate species.	<ul style="list-style-type: none"> - Pileated woodpecker, pine marten Northern three-toed woodpecker -maintain old growth or mature conifer habitat (nesting habitat) and feeding areas of adequate size and distribution to permit interaction among breeding pairs of dependent species. (See Table I-6, I-7, I-8). - Spotted owl -maintain old growth or mature conifer habitat (nesting habitat and feeding areas) of adequate size and distribution to permit interaction among breeding pairs of dependent species. (See Table I-9).
3.Protect water quality and edges of all perennial streams, lakes, and other bodies of water require special attention:	-land approximately 100 feet from riparian habitat.
<ul style="list-style-type: none"> 1. to maintain streambank stability. 2. to maintain stream channel stability. 3 to avoid unacceptable erosion and sedimentation that would exceed State standards. 4. to meet Clean Water Act standards 5. to meet State water quality standards. 	

Table I-2 shows the alternative means considered for implementing each management requirement where the opportunity costs exceeded 2 percent of the present net value or the allowable sale quantity of the Maximum Present Net Value Benchmark.

TABLE I-2

SUMMARY OF ALTERNATIVE MEANS CONSIDERED FOR IMPLEMENTING EACH MANAGEMENT REQUIREMENT

MANAGEMENT REQUIREMENT	ALTERNATIVE MEANS
Harvest Dispersion	<ol style="list-style-type: none"> 1. 25% of any analysis unit (Created openings) harvested in one decade. 2. 20% of any analysis unit harvested in one decade; all adjacent private lands harvested in first decade. 3. 33% of any analysis unit harvested in one decade; 50% of adjacent private lands cut; created openings may corner on each other.
Provide for adequate old growth/mature habitat to maintain viable populations of wildlife (pileated woodpecker, marten/three-toed woodpecker)	<ol style="list-style-type: none"> 1. Dedicate old growth habitat with no timber management 2. Manage old growth habitat which provides for replacement habitat. 3. Manage mature habitat which provides for replacement habitat.
Provide for adequate old growth/mature populations of wildlife (spotted owls).	<ol style="list-style-type: none"> 1. Dedicate old growth/mature habitat to maintain viable habitat with no timber management. 2. Manage old growth habitat which provides for replacement habitat.
Protect water quality and riparian habitat.	<ol style="list-style-type: none"> 1. Manage riparian-aquatic zone on extended rotation. 2. Dedicate riparian-aquatic zone with no timber management.

In analyzing the effects of the alternative means of meeting the MR's on present net value (PNV) and allowable sale quantity (ASQ), FORPLAN runs were made with and without constraints designed to simulate meeting the management requirement. The Maximum PNV benchmark was used for this analysis. This benchmark is a FORPLAN run which identifies the mix of management activities which would result in the highest level of economic efficiency (i.e., the highest PNV) in managing the Wenatchee National Forest resources. It also identifies the ASQ associated with the most economically-efficient mix of management activities.

A benchmark was chosen to use in the with and without constraint comparison, rather than an issue-based Forest Plan alternative, because management practices necessary to meet other objectives of the issue-based alternatives may partially or fully meet the MR, thus clouding any analysis of opportunity costs induced by the management requirement. The true effect when measured against a fully developed alternative is significantly less because the objectives of that alternative may satisfy the management requirements to a large extent.

Table I-3 summarizes the findings of the analysis. It displays the PNV and the first-decade ASQ for the maximum PNV benchmark as shown in the DEIS and shows the reduction in PNV and ASQ resulting from application of the selected optimum means of meeting the management requirements. Also displayed is the percent change in ASQ and PNV.

TABLE I-3

**OPPORTUNITY COSTS OF MEETING THE MANAGEMENT REQUIREMENTS
WITH THE SELECTED IMPLEMENTATION METHODS (MEANS)**

	FIRST DECADE ALLOWABLE SALE QUANTITY	CHANGE IN ALLOWABLE SALE QUANTITY 1/	PRESENT NET VALUE MM\$	CHANGE IN PRESENT NET VALUE
Maximum PNV Benchmark Displayed in the FEIS	29.9 (163.0)		2132	
Opportunity Cost—Approximate Change				
Opportunity Cost of Selected Timber Harvest Dispersion Implementation Methods	4.3 (23.4)	13.4%	25	1.2%
Opportunity Cost of Selected Mature Conifer Implementation Methods	0.9 (4.9)	3.0%	5	0.2%
Opportunity Cost of Selected Spotted Owl Implementation Methods	1.8 (9.8)	6.0%	9	0.4%
Opportunity Cost of Selected Water Quality/ Riparian Implementation Methods	1.8 (9.8)	6.0%	9	0.4%

MMCF/YR = Millions of cubic feet per year

MMBF/YR = Millions of board feet per year

MM\$ = Millions of dollars

1/ Percent change calculated on cubic foot basis

Where the opportunity costs exceeded 2 percent, the analysis of the alternative means for meeting management requirements is presented in subsequent tables.

The following sections present for the management requirements requiring a discussion of the alternatives: (1) the source of the management requirement; (2) a description of the management requirement; (3) alternative ways considered for meeting the management requirement; (4) an opportunity cost analysis; (5) consequences of the different ways of meeting each management requirement; (6) rationale for the selected method; (7) implications for Forest Plan alternatives; and (8) a discussion of the role of monitoring and research.

TIMBER HARVEST DISPERSION

SOURCE OF THE MANAGEMENT REQUIREMENT

Direction for harvest dispersion comes from several sources. The National Forest Management Act (Section 6 (g)(3)(F)) sets broad direction that the Forest Service is to, among other things, identify maximum sizes for openings created by harvest activities (created openings). This is further defined in the NFMA implementing regulations (36 CFR 219.27(d)) and in the Regional Guide for the Pacific Northwest Region (pages 3-7 and 3-8).

DESCRIPTION OF THE MANAGEMENT REQUIREMENT

The specifications or standards for achievement of the harvest dispersion management requirement are:

1. A harvested area of commercial forest land will no longer be considered a created opening, for silvicultural purposes, when stocking surveys, carried out in accordance with Regional instructions, indicate prescribed tree stocking that is at least 4 1/2 feet high and free to grow.
2. The maximum size limit of harvest openings on the Wenatchee National Forest is 40 acres. Some exceptions are permitted in specific situations.
3. Harvest openings will be separated by blocks of land that generally are adequately stocked with trees that are at least 4 1/2 feet high and that contain one or more logical harvest units.
4. Created openings cannot be adjacent to, or corner on, another created opening within a given 10 year period or decade. However, they can be adjacent after 10 years.
5. Large private cutting areas will be compensated for or ignored for this modeling effort.
6. Harvest openings should not be created adjacent to any natural openings (regardless of size) unless adequate vegetation along the edge of the natural opening can be developed or retained in sufficient density to protect wildlife and meet visual management objectives.

ALTERNATIVE WAYS CONSIDERED FOR MEETING THE MANAGEMENT REQUIREMENT

The Wenatchee National Forest based its analysis of the dispersion MR on the time required to harvest an entire area. The schematic representation of the assumptions used in the draft Wenatchee Forest Plan (25% dispersion) is shown below (Figure I-1). The numbers in the boxes represent schematic 40 acre cutting areas. Areas numbered “1” would be cut in the first decade, “2” in the second decade, “3” in the third decade, and “4” would be cut in the fourth decade. If it takes 40 years to harvest the entire analysis area, then prorating this out would allow 25% to be harvested in each decade.

FIGURE I-1

	1	2	1	2
	3	4	3	4
DECADES	1	2	1	2
1990 = 1				
2000 = 2				
2010 = 3				
2020 = 4				

Dispersion Limitation: (Fig. I-1) This is the constraint used in the DEIS where no more than 25% of any analysis unit can be harvested in any one decade.

A second modeling assumption considered was that adjacent analysis areas were all harvested in the first decade, as could be the case with intermingled ownership patterns in mature timber areas.

Changing this one assumption from the previous example, where cutting adjacent to an analysis area was ignored or compensated for, could result in a 5 decade period to harvest an entire analysis area. This results in a 20% dispersion constraint (Figure I-2).

FIGURE I-2

DECADES

1990 = 1
2000 = 2
2010 = 3
2020 = 4
2030 = 5

3	2	3	2
4	1	4	5
3	2	3	2
4	5	4	5

Dispersion Limitation: (Fig. I-2) This is the worst case scenario where no more than 20% of any analysis area can be harvested in any one decade and all adjacent private lands are harvested in the first decade.

A less restrictive assumption would result if created openings can corner on, or be adjacent to each other, but not have a lot of area in common. In this third schematic, some adjacent harvest or created opening is recognized outside of the analysis area, but it is assumed this would not exceed 50% of the adjacent area. This would result in an approximately 33% dispersion constraint.

FIGURE I-3

DECADES

1990 = 1
2000 = 2
2010 = 3

3	2	3	2
2	1	2	1
1	2	1	2
2	3	2	3

Dispersion Limitation: (Fig. I-3) This is where no more than 33% of any analysis unit can be harvested in any one decade and where it is assumed that created openings on adjacent private lands would not exceed 50%.

OPPORTUNITY COST ANALYSIS

Table I-4 displays the opportunity costs associated with the two sets of alternative analysis assumptions considered in detail for meeting the timber harvest dispersion management requirement.

The reduction in PNV per unit loss of ASQ in meeting the harvest dispersion MR is disproportionately high as compared the effects of the other MR's on PNV. This occurs because the lower ASQ is not accompanied by a corresponding reduction in management costs. In fact, some management costs may actually increase with implementation of harvest dispersion requirements. For example, to meet the harvest dispersion management requirement, it may be necessary to accelerate development of roadless areas (resulting in additional road development costs), delay harvest of high-value timber on some lands, or use faster (and more expensive) reforestation methods to reduce the length of time that an area is considered a created opening.

TABLE I-4

**APPROXIMATE CHANGE (OPPORTUNITY COST)
ASSOCIATED WITH MEETING THE HARVEST DISPERSION
MANAGEMENT REQUIREMENT**

	FIRST DECADE ALLOWABLE SALE QUANTITY	CHANGE IN ALLOWABLE SALE QUANTITY 1/	PRESENT NET VALUE MM\$	CHANGE IN PRESENT NET VALUE
Maximum PNV Benchmark Displayed in the FEIS	29.9 (163.0)		2132	
Opportunity Cost--Approximate Change				
Opportunity Cost of the Selected Way for Meeting the Harvest Dispersion Management Requirement (25% dispersion)	4.3 (23.4)	13.4%	25	1.2%
Opportunity Cost of Meeting the Harvest Dispersion Management Requirement With All Adjacent Analysis Areas Harvested in First Decade (20% Dispersion)	4.9 (26.9)	16.4%	31	1.5%
Opportunity Cost of Meeting the Harvest Dispersion Management Requirement With Less Than 50% Adjacent Analysis Areas Harvested and Corners Touching (33% Dispersion)	3.8 (20.7)	12.7%	19	0.9%

MMCF/YR = Millions of cubic feet per year

MMBF/YR = Millions of board feet per year

MM\$ = Millions of dollars

1/ Percent change calculated on cubic foot basis

CONSEQUENCES OF THE ALTERNATIVE WAYS OF MEETING THE MR

In general, the risk to other resources is expected to be less when the dispersion factor is more constraining. More risk to other resources is expected when the dispersion factor is less constraining. Specifically, when the dispersion factor is relaxed (more of an area can be cut): the risk of having fewer animal species would slightly increase; there would be a slightly increased risk of unacceptable modification to the visual resource; and regeneration potential could be slightly less. When the dispersion factor is more constraining, the opposite (less risk) would be expected. Watershed conditions are unaffected.

RATIONALE FOR THE SELECTED IMPLEMENTATION MEANS

The 25% dispersion factor was selected as the maximum rate at which regeneration cutting could occur without cut areas touching. This is assuming a checkerboard harvesting model.

A check of plantations on the Forest found a range of 8 to 16 years for trees to reach 4.5 feet in height with an average period being 13.2 years. A diagram of the harvesting scheme that would meet the 25% dispersion constraint is shown in Figure I-1.

The rationale resulting in a 20% dispersion limitation would be the exceptional case and not applicable for a Forest average. It would create an unnecessarily large reduction in ASQ and PNV. The rationale allowing harvest areas to corner is contrary to our understanding of regional direction that says openings which touch or corner must be considered one opening.

IMPLICATIONS FOR FOREST PLAN ALTERNATIVES

The dispersion management requirement is most critical for those alternatives that have the highest ASQ. It also is a major factor in areas of heavy private cutting.

The opportunity costs from the dispersion management requirement would be less than the PNV benchmark because the objectives of most alternatives contribute to satisfying the MR. For example, allocations for wildlife habitat or scenery would be more restrictive on timber harvest than the dispersion MR.

Under the preferred alternative, some delay of harvest in checkerboard ownership areas will be required, especially on the Cle Elum and Naches Ranger Districts. This will necessitate additional harvest in areas which require more road construction which will reduce the PNV.

ROLE OF MONITORING AND RESEARCH

Monitoring and research are needed to assess where dispersion of harvest is actually benefitting water and wildlife, and where concentrations of cutting may be desirable. Some research people propose that fewer large openings might have less impact on ecosystems than the dispersal of many small openings over a wider area.

VIALE POPULATIONS OF EXISTING NATIVE VERTEBRATE SPECIES

Source of the Management Requirement

The NFMA regulations require that:

“Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired nonnative vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure continued existence in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.” (36 CFR 219.19).

Vertebrate species in Region 6 were assessed with regard to population numbers and/or distribution that could result in either Forest or Regional extinction during the next five decades. Management requirements were developed for species whose viability would be at risk if no management actions were taken to protect their habitats.

The focus was on habitats that were likely to be limiting in the future (in short supply either in total acreage or in distribution). There was also an identification of particular species that could be used to represent all species dependent on those habitats. This identification was done on a subregional basis, recognizing the variability of situations within the Region. Once these species were identified, the Region defined their habitat requirements and biological characteristics. The species are included in the list of Management Indicator Species that the Forests address in forest planning and subsequent monitoring.

Table I-5 displays current Regional management requirement direction regarding limited habitats and wildlife species by sub-regional zones. The Wenatchee National Forest is in Zone 3, East Cascades.

Northern spotted owl, pileated woodpecker, three-toed woodpecker, and marten are the only species for which alternative ways of meeting management requirements are evaluated. Management requirements for mountain goat, primary cavity excavators, threatened and endangered species, sensitive species (except spotted owl), and special habitats are not addressed in this analysis because opportunity costs associated with providing sufficient habitat to maintain viable populations are less than two percent. The management requirements for riparian wildlife and fish are met with the same management practices which provide the requirements for water quality and riparian area management, therefore, further analysis is not provided.

TABLE I-5

**SPECIES MATRIX FOR ADDRESSING MANAGEMENT REQUIREMENTS
FOR WILDLIFE AND THREATENED AND ENDANGERED SPECIES**

HABITAT	Zone 1 NORTH COASTAL	Zone 2 WESTSIDE CASCADES	Zone 3 EASTSIDE CASCADES	Zone 4 BLUE MOUNTAINS
Old Growth/ Mature	*Northern Spotted Owl Marten	*Northern Spotted Owl Marten	*Northern Spotted Owl, Barred Owl Marten Pileated Woodpecker	Marten Pileated Woodpecker
(Serai stages V & VI	Pileated Wood-pecker	Pileated Wood-pecker	Northern 3-toed Woodpecker	Northern 3-toed Woodpecker
*The current effort to develop a supplemental environmental impact statement will result in direction for planning the management of spotted owls in Region 6.				
Dead and Defective	Primary Cavity Excavator's	Primary Cavity Excavators	Primary Cavity Excavators	Primary Cavity Excavators
Riparian	The Forest determined and documented as part of the planning records, whether it needed to address wildlife in addition to fish, and if so, which wildlife species would represent the riparian habitat. Coordination of this process with adjacent Forests was necessary to determine consistency.			
Big Game	Mountain Goat		Mule Deer (Okanogan, Colville) Mountain Goat (Wenatchee)	
T & E Species	Bald Eagle Peregrine Falcon Brown Pelican Aleutian Canada Goose	Bald Eagle Peregrine Falcon	Bald Eagle Peregrine Falcon Grizzly Bear Woodland Caribou (Colville)	Bald Eagle Peregrine Falcon

HABITAT NEEDS

Once the species needing management requirements were identified, the Region defined habitat requirements and biological characteristics. These are the basis for providing habitat and also for deciding how best to represent the species' needs in the planning process and in the FORPLAN Model.

Habitat needs were defined using information from existing research whenever possible (see bibliography). This information was used to define the habitat conditions, habitat dispersal, and habitat size necessary to meet the management requirement. When information was available, but did not fit exactly the management requirement context, professional judgement was used to apply the information in estimating habitat needs. When information was not available, habitat needs were developed using professional judgment of a number of the more knowledgeable biologists on the subject. Information from existing research was used whenever possible. (Note: Habitat needs of spotted owls are described in the Final Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide).

Specific information on habitat needs, specifications for meeting habitat requirements, and alternative ways of meeting the management requirements for marten, pileated woodpecker, and spotted owls are presented in the following sections. For each species, information is provided for these three habitat factors:

(1) Principal Habitats Used - Information about the seral stages and Kuchler vegetation types which are used by the various species is documented in many research papers for individual species. Information as to which Kuchler type and/or seral stage are primary or secondary habitat, and the amount of dependency upon each habitat, is based mostly on professional judgment. (Guenther and Kucera 1978, Phillips et al., 1981)

(2) Dispersal Distance Between Habitats - The guideline on distribution of habitat areas is intended to establish a network that allows individuals of a species to successfully disperse to adjacent habitat areas. This provides interactions among individuals and prevents isolation of sub-populations. This guideline is called the dispersal distance. Research information alone is generally not adequate to establish reasonable dispersal distances between habitats. As a result, dispersal distance is often determined on the basis of observations, experience, and professional judgement. In establishing the network of habitat areas for each species, consideration is given to habitats in reserved areas and to habitat areas being established for other species.

(3) Size of Area to which Wildlife Prescriptions Apply - The size of individual habitat areas provided for each wildlife species is based on the habitat acreage needed to support the basic social or reproductive unit of the species, i.e., breeding pairs. Both home range and species density information are used to estimate the needed size of habitat area. This was supplemented with professional judgement where no data were available for the specific habitat types being managed.

The specific Regional direction for the three identified indicator species and the scientific source of that direction are discussed in the following sections. This direction is summarized from "A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service" (USDA Forest Service, June 1986). In developing the report, various habitat sizes and dispersal distances were considered. Based on that analysis minimum habitat sizes and maximum dispersal distances were identified for each species. Since those minimums are based on the best available data, and there are no data specific to the Wenatchee area which would indicate different habitat needs, alternate minimums were not further considered in developing the Forest Plan for the Wenatchee National Forest.

SPECIFICATIONS FOR MEETING HABITAT REQUIREMENTS FOR PILEATED WOODPECKER, NORTHERN THREE-TOED WOODPECKER, AND PINE MARTEN

Approximately 40-50 wildlife species are known to depend on or prefer mature conifer habitat during some part of their life cycle on the Wenatchee National Forest. By providing a dispersion of mature conifer habitats sites for the pileated woodpecker, northern three-toed woodpecker and pine marten, we are assuming that the other species preferring mature conifer habitats will have adequate habitat to maintain viable populations throughout the planning period.

Regional specifications for pileated woodpecker, northern three-toed woodpecker and pine marten are discussed in the following sections. The specifications are summarized from "A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service" (USDA Forest Service, June 1986). In developing the report, various habitat sizes and dispersal distances were considered. Based on that analysis, minimum habitat sizes and maximum dispersal distances were identified for each species.

Pileated Woodpecker

Principal Habitats Used - Pileated woodpeckers need mature and old growth stands of timber for nesting and feeding. Habitats listed were identified in Bull and Meslow (1977), Guenther et al. (1978), and Thomas (1979).

Dispersal Distance Between Habitats - An initial five-mile maximum dispersal distance between habitats resulted from professional judgement documented in Phillips and Roberts (1985). In June 1986, the distance between habitats was modified to one habitat areas for every 12,000 to 13,000 acres (about five miles apart) to allow greater flexibility in application. Irwin (1987) suggested that this distance could be greater, but also noted that dispersal distances of juvenile pileated woodpeckers are poorly known. He offered no concrete alternative to the five-mile distance. Bull (1987) noted that the distance moved by eight juveniles from the nest where they were raised to the territory that they later occupied ranged from 0.4 to 5.4 miles and averaged 2.1 miles.

Size of Area to Which Wildlife Prescriptions Apply - The size of areas used by pairs of pileated woodpeckers during the nesting season has been observed to range from 320 acres in eastern Oregon to 1,357 acres in western Oregon (Irwin, 1987). The management requirement established for pileated woodpeckers both east and west of the Cascades called for 300 acres of old growth or mature timber, containing at least 45 snags greater than 20 inches, plus 300 acres of feeding area. The requirement for 300 acres containing at least 45 large snags was taken from Thomas (1979). The additional requirement for 300 acres of small snags for foraging areas was established because of the evidence from the literature that pairs of pileated woodpeckers used areas larger than 300 acres. Acreage figures from Bull (1975), and Bull and Meslow (1977) were used. As more data specific to westside and eastside habitats (eastside may be further subdivided) become available, the size of the nesting area may be adjusted.

**TABLE I-6
WILDLIFE SPECIES HABITAT REQUIREMENTS**

SPECIES PILEATED WOODPECKER

<u>Principal Habitats Used</u>	<u>Dispersal Distance Between Habitats</u>	<u>Size of Area to which Wildlife Prescriptions Apply</u>	<u>Habitat Requirements to be Used In Analyses</u>
Zone III (East Cascades)	All Zones	600 acres/pair	Within a 1,000 acre unit.
A.Reproducing			
Seral stages V and VI of Kuchler types K1, K2, K3, K5, K7, K10, K11, K12, K13, K14 and riparian	One habitat area for every 12,000 to 13,000 acres'		- Maintain 300 acres of conifers in seral stages VI and/or V, per pair for reproducing.
B.Feeding			
All seral stages of Kuchler types listed for reproducing habitat, provided snags are present.			- Maintain a minimum average of 2 hard snags per acre greater than or equal to 12 inches DBH, within the 300 acre reproductive area. Forty-two of these 600 snags should be greater than or equal to 20 inches DBH. -When possible, maintain reproductive area in 300 contiguous acres. If not possible, habitat may be arranged in blocks no less than 50 acres and no more than 1/4 mile apart - Maintain a minimum average of 2 hard snags per acre greater than or equal to 10 inches DBH on an additional 300 acres for feeding.

Northern Three-Toed Woodpecker

Principal Habitats Used - The three-toed woodpecker represents mature and old growth seral stages.

Dispersal Distance Between Habitats - The 2 mile dispersal distance between habitats was the result of professional judgment documented in Phillips and Roberts (1985). In June 1986, this direction was modified to allow one habitat for every 2,000 to 2,500 acres (the area of a circle whose diameter is 2 miles), to allow greater flexibility in application.

Size of Area to Which Wildlife Prescriptions Apply - The size of the area is 75 acres per pair and was taken from Thomas (1979).

TABLE I-7
WILDLIFE SPECIES HABITAT REQUIREMENTS

SPECIES NORTHERN THREE-TOED WOODPECKER

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to which Wildlife Prescriptions Apply	Habitat Requirements to be Used in Analyses
A. Reproducing Seral stage V and VI of Kuchler types K4, K15, and lodgepole pine.	One habitat area for every 2,000 to 2,500 acres.	75 acres per pair	Maintain 75 acres of conifers in seral stages VI and/or V, per pair for reproducing
B. Feeding All seral stages of Kuchler types K4, K15, and lodgepole pine, provided snags are present.			Maintain a minimum average of two hard snags per acre greater than or equal to 10 inches DBH, within 75 acre reproductive areas. Forty-five of these 150 snags should be greater than or equal to 12 inches DBH.

Pine Marten

Principal Habitats Used - The marten uses seral stages III-VI--closed sapling-pole, large mature, and old growth (Thomas, 1979; Guenther and Kucera, 1978; Phillips and others, 1981). The Kuchler types used are from Guenther and Kucera (1978). The principal habitat for the marten is seral stages V and VI (mature and growth).

Dispersal Distance Between Habitats - Burke (1982) recommends that the dispersal distance between habitat areas for marten should be two miles. This change was made because it was felt where than one adjacent habitat is available for dispersal, the dispersal distance can be extended to three miles for pine marten. This change has been reviewed by a number of biologists within and outside the Forest Service and most agree that it would appear not to create a population viability problem for represented species. In June of 1986, the dispersal distance specification for marten habitat was changed to one habitat for every 4,000 to 5,000 acres (about 3 miles apart), to allow greater flexibility in application.

Juvenile marten dispersal up to 25 miles has been observed (Hawley and Newby, 1957), and average juvenile dispersal distances greater than 6 miles were observed in these studies and Burnett (1981). Based on this information, Irwin (1987) concluded that "the dispersal distance used in the MMR standards might be increased without reducing probabilities for interactions among adults or dispersing young". However, he did not provide a specific alternative, and concluded that there was little empirical insight into the probability of maintaining a viable marten population using the MR guidelines. As Burke (1982) noted, the distance covered by dispersing individuals is not an absolute guide to appropriate spacing between habitat areas. The probability of dispersing individuals location habitat areas and other individuals decreases rapidly as habitat areas are spaced further apart. Burke suggested that the observed range of population densities might be a better guide to spacing of habitat areas. He noted that the three mile spacing would result in a marten density 1/9 to 1/27 of normal densities reported in the literature.

Size of Area to Which Wildlife Prescriptions Apply--In the professional judgement of the biologists listed in Phillips and Roberts (1985), a breeding female pine marten can be supported on 160 acres of quality habitat. Research is variable as to the size of area needed, but the female pine marten home range is estimated to be 160 acres (Campbell, 1978). The biologists listed in Phillips and Roberts (1985) judged that this area should be contiguous to ensure that there would be enough habitat within the home range of the female. They also judged that crown closure should equal or exceed fifty percent. Research papers indicate that areas with a low percent crown closure receive little or no use by pine marten. Therefore, to ensure and adequate crown closure, a minimum requirement of 50 percent closure was selected.

Research shows that pine marten require dead and down material for foraging, cover, and denning,. Six down logs/acre (Burke, 1982) was selected as the minimum down material requirement. The number and size of snags required was selected to ensure that the amount of down material was achieved. The specifications for pine marten habitat are summarized in Table I-8.

Irwin (1987) noted that the MR guidelines contained an implied hypothesis that 160-acre areas would meet reproductive and winter range needs, and that marten would use broader areas containing a mix of less suitable habitat types at other times. He concluded that monitoring and research could provide appropriate tests of this hypothesis.

TABLE I-8

WILDLIFE SPECIES HABITAT REQUIREMENTS

SPECIES MARTEN

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to which Wildlife Prescriptions Apply	Habitat Requirements to be Used in Analyses
Zones III and IV			
A. Reproducing			
Seral stages V and VI of Kuchler Types K4, K12, K13, K14, K15 and lodgepole climax.	One habitat area for every 4,000 to 5,000 acres.	160 acres per habitat area. (This figure represents the territory of one female and part of the territory for a male.)	Maintain 160 contiguous acres of conifers in seral state V or VI with a crown closure of 50% or greater.
B. Feeding			
Seral stages III-VI of Kuchler Types K4, K11, K12, K13, K14, K15 and lodgepole climax.			Maintain an average of 2 hard snags per acre greater than or equal to 12 inches DBH. Twenty-four of these 320 snags should be greater than or equal to 20.

ALTERNATIVE WAYS CONSIDERED FOR MEETING THE MANAGEMENT REQUIREMENT

Application of the Regional direction for size and dispersal of habitats to the Wenatchee National Forest requires that a minimum of 52,000 acres of mature/old-growth forest, outside of wilderness or other lands not suitable for timber production, be retained as wildlife habitat for the indicator species and other species occupying the same habitat. In this analysis, habitat requirements for the three species are not considered separately since all species require the same type of habitat, though in differing amounts. In order to reduce the total amount of old growth/mature forest necessary to provide for viable populations, every opportunity was taken to overlap areas managed for the indicator species, i.e., a habitat area for a pileated woodpecker is also suitable for a marten and for a northern three-toed woodpecker. Areas for marten and three-toed woodpecker have been combined into one instead of having a separate area for each species. Consequently, opportunity costs for one species cannot reasonably be considered separately from the other two.

In the DEIS, the Wenatchee elected to provide old-growth habitat by managing for old-growth conditions on a long rotation (260 years). For the pileated woodpecker, this meant maintaining 600 acres in 130-260 year old stands with 600 acres in 1-130 year old stands. The marten/northern three-toed woodpecker had stands of 160 acres with trees 1-260 years old and a select number of trees 130-260 years old. Either of these two prescriptions could be used for the pileated woodpecker and marten/northern three-toed woodpecker.

An alternative way of providing the habitat would be to dedicate the old growth. Under a dedicated old growth strategy, each acre of old growth is withdrawn from timber production. Dedication of existing old-growth stands assures that desired structural characteristics will be available for wildlife. It risks the loss of individual stands through catastrophic events or natural decay of the system. Recent literature on old growth however, suggests that such risk is much less than once thought. Indeed, management of old growth on a harvest basis and replacing it removes structural characteristics important to old growth and may hasten the decline of the residual stand (Franklin 1981).

In the managed strategy for the pileated woodpecker, the direction was to provide replacement stands through time. The old growth component of the habitat area would remain unlogged until a replacement stand achieved mature habitat conditions. Then the old growth stand would be logged while the mature stand developed into an old growth condition. This strategy requires twice as many acres as the dedicated strategy but reduces the risk from catastrophic events by having a larger area. It also reduces the stand replacement time; if natural systems of decay removed the old growth, the mature stand would already be developing into old-growth habitat.

For the marten/northern three-toed woodpecker areas, only one stand was maintained. This stand would be logged frequently to remove defective trees and keep the stand healthy. Maintaining a healthy stand of trees with little defect does not allow dead standing or dead down trees to occur in the abundance desired without additional costs and management. Frequent logging of a stand requires removal of dead trees that are in the later stages of decay to maintain safe conditions for loggers. As a result, the limiting factor for the marten/three-toed woodpecker may be the dead and defective tree structure. The cumulative effect of multiple entries into the stand for logging may mean the loss of the area from the old growth network with no further cutting until the area recovered to satisfactory conditions.

ANALYSIS OF OPPORTUNITY COSTS

Table I-9 displays the opportunity costs associated with the three ways of meeting the viable wildlife populations management requirement. Present net value for the managed old growth methods is not displayed since opportunity costs were calculated by means other than the FORPLAN model.

CONSEQUENCES OF THE DIFFERENT WAYS OF MEETING THE MANAGEMENT REQUIREMENTS

The Wenatchee National Forest is providing a minimum number of sites, with a minimum acreage per site, in the areas where timber harvest may occur. If problems occur in “key” sites or in a number of adjacent sites, there is a risk of dividing the existing network into two or more populations. There is a high likelihood of this fragmentation of the old growth network occurring. This is due to:

1. Minimum acreage per site;
2. Minimum distribution (number of sites);
3. High risk management prescription;
4. High rate of catastrophic events (fire);
5. Low knowledge on the requirements of wildlife species;
6. Lack of good field information on habitat sites; and
7. Lack of indicator species inventories.

This document only discusses the prescription to be applied. A change in the prescription will increase or decrease the risk of maintaining one population, but the risk is changed only a small amount.

TABLE I-9
APPROXIMATE CHANGE (OPPORTUNITY COST)
ASSOCIATED WITH MEETING THE VERTEBRATE SPECIES
MANAGEMENT REQUIREMENT

	FIRST DECADE ALLOWABLE SALE QUANTITY	CHANGE IN ALLOWABLE SALE QUANTITY 1/	PRESENT NET VALUE MM\$	CHANGE IN PRESENT NET VALUE
Maximum PNV Benchmark as Displayed in the FEIS	29.9 (163.0)		2132	
Opportunity Cost--Approximate Change				
Opportunity Cost of the Selected Way of Meeting the Management Requirement for Viable Populations: Managed Old Growth/Mature Timber	0.9 (4.9)	3.0%	5	0.2%
Opportunity Cost of Meeting the Management Requirement for Viable Populations: Dedicated Old Growth/Mature Timber	1.5 (18.1)	5.0%	8	0.4%

MMCF/YR = Millions of cubic feet per year
MMBF/YR = Millions of board feet per year
MM\$ = Millions of dollars
1/ Percent change calculated on cubic foot basis

RATIONALE FOR THE SELECTED METHOD

Based on the preceding analysis, it was determined that for the Wenatchee situation having 40% of the pileated woodpecker and marten/three-toed woodpecker in Wilderness with low risks for maintaining habitat would balance the high risk in timber harvest areas. The populations in Wilderness are related to habitat on the Gifford Pinchot, Mt. Baker-Snoqualmie and Okanogan National Forests, and Mt. Rainier and North Cascades National Parks. This additional habitat represents a large number of individuals. Therefore, the total risk to the populations of these species is low. The goal is to maintain sufficient mature habitat and distribution which can be replaced quickly with minimal effects on timber harvest. Different management prescriptions were selected for each species to have the least effect on timber harvest. Fragmentation of the populations was not part of the considerations for selection of the prescription.

IMPLICATIONS FOR FOREST PLAN ALTERNATIVES

Plan alternatives were designed to address public issues. Therefore, alternatives incorporate retention of mature and old growth habitat for a variety of objectives such as wildlife, visual, riparian, recreation, and wilderness. Where marten/northern 3-toed woodpecker and pileated woodpecker areas overlap these other allocations, they would be managed for other resource objectives whose constraints on vegetation management are more binding than the mature habitat management requirements. The opportunity costs for this situation are thus a result of the allocations, rather than the management requirements of the marten/northern 3-toed woodpeckers and pileated woodpeckers. Since each Forest Plan alternative has different allocations of resources, the costs of the MR are different. How much of the mature/old growth component is in managed or dedicated strategies will also change by alternative.

ROLE OF MONITORING AND RESEARCH

The Forest Monitoring Plan (Forest Plan Chapter 5) calls for monitoring populations and habitats of pileated woodpeckers and marten/northern 3-toed woodpeckers. In future planning efforts this data will be considered in determining the suitability and effectiveness of the selected way for meeting the management requirement for viable populations. This is important in testing the appropriateness of the selected modeling assumptions.

NORTHERN SPOTTED OWL

Specific Regional direction for the northern spotted owl is found in the Final Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide released in August, 1988. The Supplement was prepared, in response to an appeal of the R-6 Regional Guide, to address planning direction for spotted owl habitat management. Standards and guidelines adopted as a result of the Supplement will be used by National Forests in the Region to meet the management requirement to maintain viable populations of spotted owls.

The Final Supplement was prepared after a series of public meetings and study of the nearly 42,000 comments received on the Draft Supplement issued in the summer of 1986. A summary of the analysis of public comments, substantive comments, and copies of letters received from government agencies and elected officials can be found in Appendix G of the Final Supplement.

The Forest Service selected alternative designates SOHA's to contain a variable amount of suitable habitat by physiographic province based on location of owl pairs and location of habitat in lands unsuitable for timber production. Current distribution of habitat on lands unsuitable for timber production is evaluated for adequacy of distribution. Areas are then designated on lands suitable for timber production if they are needed to meet distribution standards.

Standards and guidelines for the selected alternative are briefly summarized in the following discussion. Chapter 2 of the Final Supplement should be reviewed for a detailed description of the direction. These Regional standards and guidelines will provide specifications or standards for achievement of management requirements for northern spotted owls.

1. **Amount of suitable habitat in designated habitat areas:** Designated habitat areas shall contain the following amount of suitable habitat in the Washington Cascades physiographic province: 2200 acres, 2.1 miles from nest. Habitat shall occur as one contiguous stand if possible or, as a 300-acre stand containing the known or suspected nest site with the remaining habitat as contiguous as possible. Each stand shall be larger than 60 acres.
2. **Spacing of Designated Habitat Areas:** Designate habitat areas where: greater than 6 miles separates areas which occur in reserved lands or in lands unsuited for timber production, and which are capable of supporting less than three breeding pairs of spotted owls; or where greater than 12 miles separates such areas capable of supporting a cluster of three or more habitat areas.
3. **Location of Designated Habitat Areas:** Lands suitable for timber production will be used in designated habitat areas only when needed to meet spacing standards.
4. **Priority for Locating Designated Areas:** Priority for locating designated areas follows status of occupancy by spotted owls: highest priority to locations with verified occupancy by breeding spotted owl pairs within the last 5 years; next highest priority to locations with verified occupancy by breeding pairs more than 5 years ago; next priority to locations with verified occupancy by pairs, either verified non-breeding or breeding status or success unknown; next highest to locations with confirmed sightings of owls; lowest priority to locations where only the suitability or potential suitability of habitat is known.
5. **Management of Habitat:** Habitat can be managed through prescriptions for no scheduled timber harvest or through prescriptions for uneven or even-aged harvest under an extended rotation to meet the standard for amount of suitable habitat within the area. Prescriptions to be used and where they will apply shall be specified in the Forest Plans.
6. **Identification of Suitable Habitat:** Suitable habitat shall be identified in Forest Plans according to the general definition in the spotted owl Final Supplement and with concurrence by the Regional Forester.

ALTERNATIVE WAYS OF MEETING THE MANAGEMENT REQUIREMENT

The Forest considered two ways or means for providing spotted owl habitat. One was to dedicate the required number of acres of suitable habitat in each site. These areas would not be managed for timber production and would be expected to remain in suitable habitat over time. The second method is to manage the habitat on a long rotation such that there is always enough suitable spotted owl habitat at any given time.

- ALTERNATIVE 1: DEDICATED SITES

Under a dedicated habitat strategy, each acre of spotted owl habitat is withdrawn from timber production. Dedication of existing stands assures that desired structural characteristics will be available, but may risk loss of individual stands through catastrophic events or natural decay processes. Recent literature on old growth suggests this risk is much less than once thought. Each spotted owl habitat area is 2,200 acres dedicated under this alternative.

- ALTERNATIVE 2: MANAGED SITES

Management of sites assumes that existing old growth stands can be harvested as other stands grow into an old growth condition to replace them. Delay in harvesting the existing old growth stands would occur if replacement stands fail to develop desired structural characteristics on schedule. Management of old growth on a harvest basis removes structural characteristics important to old growth and may hasten the decline of the residual stand (Franklin 1981). Each spotted owl habitat area is 4,100 acres managed under this alternative.

ANALYSIS OF OPPORTUNITY COSTS

The Final Supplemental Environmental Impact Statement to the Regional Guide (SEIS) for spotted owl habitat management guidelines does not include the number of designated habitat areas as part of any alternative because that will be a consequence of applying standards and guidelines in Forest Plans, rather than being a specification in the Regional Guide.

In preparation of the FEIS for the Wenatchee Forest Plan, the two alternative ways of providing spotted owl habitat were evaluated. With adjustments for overlap on unsuitable lands, 60,000 acres of spotted owl habitat were needed to meet the management requirements discussed in the FEIS.

Table I-10 displays the opportunity costs associated with managing or dedicating spotted owl habitat.

TABLE I-10

OPPORTUNITY COSTS OF ALTERNATIVE WAYS OF MEETING THE SPOTTED OWL MANAGEMENT REQUIREMENT

	FIRST DECADE ALLOWABLE SALE QUANTITY	CHANGE IN ALLOWABLE SALE QUANTITY 1/	PRESENT NET VALUE MM\$	CHANGE IN PRESENT NET VALUE
PNV Benchmark	29.9 (163.0)		2132	
Opportunity Cost--Approximate Change				
Opportunity Cost of Meeting Viable Populations for Spotted Owl by Dedicating Habitat	1.8 (9.8)	6.0%	9	0.4%
Opportunity Cost of Meeting Viable Populations for Spotted Owls by Managing Habitat	1.7 (9.3)	5.7%	9	0.4%

MMCF/YR = Millions of cubic feet per year
MMBF/YR = Millions of board feet per year
MM\$ = Millions of dollars
1/ Percent change calculated on cubic foot basis.

CONSEQUENCES OF THE ALTERNATIVE WAYS OF MEETING THE MANAGEMENT REQUIREMENT

Populations of spotted owls would not be expected to differ significantly under any of the different ways considered to meet the management requirement. There are, however, differences in the opportunity costs (see Table I-10).

RATIONALE FOR THE SELECTED METHOD

In the DEIS, the Wenatchee National Forest chose to provide spotted owl habitat by dedicating 2,200 acre habitat sites.

The dedicated habitat approach has the advantage that the location of the 2,200 acre habitat site does not change over time, making implementation less complicated.

IMPLICATIONS FOR FOREST PLAN ALTERNATIVES

Plan alternatives were designed to address public issues. As a result most alternatives, including the preferred alternative, incorporate objectives for retention of old growth and mature timber for a variety of reasons, including wildlife, visual, and recreational purposes. To the extent possible, spotted owl habitat areas will be overlapped with areas selected for other purposes (such as unroaded recreation areas, special interest areas and other lands determined as not appropriate or unsuited for timber production) wherever these meet habitat suitability and distribution requirements. The analysis of opportunity costs of selected means of spotted owl protection displayed are gross PNV and ASQ effects caused by the selected implementation methods. The costs do not take into account any overlap that may occur among implementation methods where lands selected for spotted owl habitat may also meet other wildlife, scenery or recreation objectives on lands suitable for timber harvest.

ROLE OF MONITORING AND RESEARCH

The Forest Monitoring Plan (Forest Plan Chapter 5) calls for monitoring populations and habitats of spotted owls.

The Final Supplemental Environmental Impact Statement to the Regional Guide (Appendix D) identifies specific monitoring and research needs and describes how the information will be obtained. Intensive inventory, monitoring, and research being conducted by the Spotted Owl Research, Development, and Application Program will provide new information. This should allow an opportunity to re-evaluate and possibly adjust management direction within five years.

WATER QUALITY, RIPARIAN AND FISH MR's

SOURCE OF MANAGEMENT REQUIREMENT

Management requirements for water quality are based on NFMA which states:

Forest planning shall provide for compliance with requirements of the Clean Water Act, the Safe Drinking Water Act, and all substantive and procedural requirements of Federal, State, and local governmental bodies with respect to the provision of public water systems and the disposal of waste water [36 CFR 219.23(d)].

Special attention shall be given to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes and other bodies of water. This area shall correspond to at least the recognizable area dominated by the riparian vegetation. No management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment shall be permitted within these areas which seriously and adversely affect water conditions or fish habitat [36 CFR 219.27 (e)].

The Clean Water Act seeks to control nonpoint sources of water pollution. To comply with Section 208 of the Act, Forest Service Region Six, the states of Oregon and Washington (which manage implementation of the Act in the respective states), and the Environmental Protection Agency agreed on a process whereby each state reviews Forest Service management practices to determine if they meet or exceed state water quality standards. Practices that are judged to meet or exceed the standards are certified as Best Management Practices (BMPs) which the Forest Service then agrees to continue.

DESCRIPTION OF THE MANAGEMENT REQUIREMENT

General water use and criteria classes are defined by Washington State regulations (WAC 173-201-045). The following criteria shall apply to Class AA (extraordinary) surface waters in the State of Washington. (NOTE: this is a summary of the major items that may be affected by timber harvest activities):

- 1) Freshwater - dissolved oxygen shall exceed 9.5 milligrams/liter.
- 2) Freshwater - temperature shall not exceed 16.0 degrees Celsius due to human activities. When natural conditions exceed 16.0°C., no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C. Temperature increases shall not, at any time, exceed $t=23/(T+5)$. For purposes hereof, "t" represents the permissive temperature change across the dilution zone, and "T" represents the highest existing temperature in this water classification outside of any dilution zone. This is provided that temperature increase resulting from nonpoint source activities shall not exceed 2.8°C., and the maximum water temperature shall not exceed 15.3°C.
- 3) Freshwater - pH shall be within the range of 6.5 to 8.5 with man-caused variation within a range of less than 0.2 units.
- 4) Turbidity shall not exceed 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU.

The primary approach to maintaining water quality on Forest lands is to limit or prohibit timber harvest activities on certain unstable land types. The objectives are to minimize sedimentation, blockages and scour in stream channels; to prevent increases in water temperature; to provide a source of large woody debris; and to protect human life.

In the DEIS, the specifications established by the Forest are called standards and guidelines. The Wenatchee National Forest has two kinds of standards and guidelines. The first are Forest-wide standards and guidelines that describe the desired condition to be achieved throughout the Forest in every prescription. Secondly, are those that were written specifically for each prescription. The ones included in the Riparian-Aquatic Habitat Protection Zone (EW-2) prescription are designed to provide additional protection features for the riparian zone that are not covered by the Forest-wide standards and guidelines, as well as provide for some other resource needs (e.g. large woody debris, wildlife cover, etc.).

ALTERNATIVE WAYS CONSIDERED FOR MEETING THE MANAGEMENT REQUIREMENT

The following alternatives were considered:

Alternative 1 - Managed Riparian Zone

This alternative would allow some management of the timber resource through the use of extended shelterwood rotations (approximately 260 years). Leave trees would be concentrated next to the streams which should assure that natural tree mortality will provide the necessary woody debris in the streams. Management practices would require an adequate amount of streamside vegetation for shading to be left so that stream temperatures would remain within acceptable limits.

The EW-2 Riparian-Aquatic Habitat Protection Zone for this alternative would be of variable width. The width would be determined by a combination of potential erosion hazard and the percent slope adjacent to the stream (Forest Plan, p.IV-97). It would also apply to all Class I and II streams along with portions of some Class III streams.

Additional modeling for this alternative included constraints limiting harvest to no more than 25% of any analysis area in a decade as well as allowing harvest in no more than 10% of a riparian zone within any given sub-basin. Class IV streams were also not considered for this prescription.

After a joint meeting with members of the Wenatchee and Okanogan National Forest Interdisciplinary Teams on June 4, 1987, it was decided there was a certain amount of imprecision in determining appropriate inventories and modeling for riparian zones. This imprecision was tested through FORPLAN analysis. The analysis showed that there was not a significant change in the amount of delivered sediment or the amount of runoff produced. Therefore, water quality was not affected.

There was also one other assumption made which is that other management prescriptions would provide adequate protection of the riparian-aquatic zone and therefore did not need a special EW-2 prescription. These other prescriptions include old growth, dispersed unroaded recreation, research natural areas, special interest areas, scenic retention, wilderness, and Wild, Scenic, or Recreational River designations. These allocations overlap riparian zones in a lot of places. Thus the acreage figures for the riparian zone may not reflect the actual total on the forest.

The variable width riparian-aquatic habitat protection zone was developed with the intention of maintaining water quality by keeping sediment out of the streams. It was not designed to meet the needs of wildlife. Generally, the narrowest protection zones are located along the Class I and II streams. In these areas the protection zone may not be wide enough to provide suitable habitat for some species of wildlife.

Alternative 2 - Dedicated Riparian Zones

This alternative would require full protection for the lands within one hundred feet from either side of all Class I, II, and portions of some Class III streams. There would be no timber harvest activities allowed within this zone except for sold sales that have yet to be harvested. Stream temperatures would be adequately protected because none of the streamside vegetation would be removed.

The variable width protection zone, which may go out beyond the designated one hundred foot protection zone, will also require that consideration be given to practices that will prevent unacceptable soil erosion.

This alternative would require that the EW-2 prescription (riparian-aquatic habitat protection zone) be applied to all riparian lands, with the prescription standing on its own. No other prescription would have precedence over EW-2.

OPPORTUNITY COST ANALYSIS

Table I-11 displays the opportunity costs associated with the two sets of alternative analysis means considered in detail for the water quality/riparian management requirement.

TABLE I-11

OPPORTUNITY COSTS OF ALTERNATIVE WAYS OF MEETING THE WATER QUALITY/RIPARIAN MANAGEMENT REQUIREMENT

	FIRST DECADE ALLOWABLE SALE QUANTITY	CHANGE IN ALLOWABLE SALE QUANTITY	PRESENT NET VALUE MM\$ 1/	CHANGE IN PRESENT NET VALUE
Maximum PNV Benchmark as Displayed in the FEIS	29.9 (163.0)		2132	
Opportunity Cost--Approximate Change				
Opportunity Cost of Meeting Management Requirements for Water Quality/Riparian (Managed)	1.8 (9.8)	6.0%	9	0.4%
Opportunity Cost of Meeting Management Requirements for Water Quality/Riparian (Dedicated)	3.0 (16.3)	10.0%	15	0.4%

MMCF/YR = Millions of cubic feet per year

MMBF/YR = Millions of board feet per year

MM\$ = Millions of dollars

1/ Percent change calculated on cubic foot basis.

CONSEQUENCES OF ALTERNATIVE WAYS OF MEETING WATER QUALITY

Implementation of either alternative would meet water quality standards. Alternative 1 was designed specifically to keep delivered sediment at acceptable levels, while still allowing some timber harvest activities to occur within the riparian-aquatic habitat protection zone. Alternative 2 would provide additional protection, so would be more effective in keeping the soils in place and minimizing the amount of delivered sediment that would get into the lakes, streams, and rivers on the Wenatchee National Forest. Alternative 2 would also provide for more large woody debris in and adjacent to the stream channels, as well as providing more habitat for wildlife (e.g. hiding cover, forage, etc.).

RATIONALE FOR THE SELECTED IMPLEMENTATION MEANS

Implementation methods (means) for meeting the management requirements for water quality are based on practices that were developed prior to the needs developed to provide additional protection for wildlife and fish in the riparian-aquatic habitat protection zone. Originally, the emphasis was on reducing the amount of delivered sediment that would enter a stream, river, or lake, and also on shade to prevent wide changes in water temperature.

Alternative 1 represents current practices that have been developed through cooperation between the Forest soil scientist, hydrologists, foresters, biologists, and other professionals. Compliance with the Forest-wide standards and guidelines and the special standards and guidelines included in the EW-2 prescription will result in meeting the Washington State Class AA water quality standards. It will also have less of an impact on the ASQ and PNV than Alternative 2.

IMPLICATIONS FOR FOREST PLAN ALTERNATIVES

The DEIS Chapter II, Appendix B part VIII, and Appendix F, discuss the effects on DEIS alternatives. The analysis of opportunity costs of selected means of water quality protection is displayed in Appendix B part IV (economic efficiency analysis). The costs do not account for overlap among implementation methods where other prescriptions (OG-1, RE-2A, RE-2B, RN-1, SI-1, ST-1, WI-1, WS-1, WS-2, & WS-3) provide equal or better protection for the Riparian-Aquatic Habitat Protection Zone.

ROLE OF MONITORING AND RESEARCH

Determining the width of the variable-width protection zone needed to prevent unacceptable soil erosion and delivered sediment production was based on local knowledge of soils, storm intensities, precipitation zones, plant communities, and stream hydrology (Forest Soil Scientist and Forest Hydrologist). Determining the amount, kind, and size of vegetation and down woody debris needed to maintain stable hydrologic balance in this zone is subject to controversy.

Because the Riparian-Aquatic Habitat Protection Zone extends through several very different climatic zones, many different kinds of geologic materials, and a very wide range of different soil types, there is a need to develop some site specific studies so that the protection needs for the "average situation" can be validated and supported.

Site specific studies could also provide information on the true effect of the variable-width protection zones, and determine their contribution towards the desired results.

BIBLIOGRAPHY

- Bull, Evelyn L. and E. Charles Meslow. 1977. Habitat Requirements of the Pileated Woodpecker in Northeastern Oregon. *Journal of Forestry* 1975 (6). p. 334-337.
- Bull, Evelyn L. 1975. Habitat Utilization of the Pileated Woodpecker, Blue Mountains, Or. M.S. Thesis. OSU, Corvallis. 58 pp.
- Bull, Evelyn L. 1987. Ecology of the pileated woodpecker in northeastern Oregon. *J. Wildl. Manage.* 51:472-481.
- Burke, T.E. 1982. Marten (unpublished). Colville National Forest, Washington.
- Burnett, B.W. 1981. Movements and Habitat Use of American Marten in Glacier National Park, Montana. M.S. Thesis. Univ. of Montana. Missoula, MT.
- Campbell, T.M. 1979. Short-term Effects of Timber Harvest on Pine Marten Ecology. M.S. Thesis. Colorado State University. Ft. Collins, Colorado. 71 pp.

- Franklin, Jerry F. and others 1981. Ecological Characteristics of Old-Growth Douglas-fir Forests. Gen. Tech. Rep. PNW-118. USDA Forest Service. Pacific Northwest Forest and Range Experiment Station.
- Guenther, K. and T. Kucera. October 1978. Wildlife of the Pacific Northwest. USDA Forest Service, Pacific Northwest Region.
- Hawley, V.D. and F.E. Newby. 1957. Marten home ranges and population fluctuations in Montana. *J. Mammal.* 38:174-184.
- Irwin, L.L. 1987. Review of minimum management requirements for indicator species: pine marten and pileated woodpecker. National Council of the Paper Industry for Air and Stream Improvement Tech. Bull. No. 522. New York 24p.
- Jackman, Siri M. and Dr. J. Michael Scott. 1975. Literature Review of Twenty-three Selected Forest Birds of the Pacific Northwest. USDA Forest Service, Pacific Northwest Region. 382 pp.
- Johnson, K. September 21, 1983. Westside Coordination Meeting Notes. USDA Forest Service Memo.
- Jonkel, C.J. 1959. Ecological and Physiological Study of the Pine Marten. M.S. Thesis. Montana State University. Missoula, MT.
- Mannan, R. W. 1982. Territory Size and Habitat Preferences of Pileated Woodpeckers in Western Oregon. OSU Corvallis Ag. Exp. Stat. Tech. Paper 000.
- Phillips, C. A. and R. Roberts. June 4, 1985. Documentation of Wildlife MMR's. USDA Forest Service Memo.
- Phillips, et al. January 1981. Wildlife Habitats and Species Management Relationship Program.
- Thomas, J.W. Edited 1979. Wildlife Habitats in Managed Forests: The Blue Mountains of Oregon and Washington. USDA Agric. Handbook No. 553. Washington, D. C.
- USDA Forest Service. June 1986. A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service.

APPENDIX J

BEST MANAGEMENT PRACTICES

DEFINITIONS

Nonpoint sources or nonpoint source pollution refers to pollution that enters any waters of the State from any dispersed [or unconfined] land based or water based activities, including, but not limited to atmospheric deposition, surface water runoff from agricultural lands, urban areas, or forest lands, sub-surface or underground sources, or discharges from boats or marine vessels (Washington Administrative Code 412-200). For example, silvicultural sources, such as surface erosion from a harvest unit or erosion from a haul road, are considered nonpoint sources.

Best Management Practices (BMPs) are defined as “methods, measures, or practices selected by an agency to meet its nonpoint source control needs. BMPs include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters” (40 CFR 130.2, EPA Water Quality Standards Regulation).

Usually BMPs are applied as a **system** of practices rather than as a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility (EPA Interagency Nonpoint Task Force, 1985).

BMPs are basically a preventive rather than an enforcement system. BMPs are a whole management and planning system in relation to sound water quality goals, including both broad policy and site-specific prescriptions.

INTRODUCTION

Best Management Practices are the primary mechanism to enable the achievement of water quality standards (Environmental Protection Agency, 1987). BMPs will be selected and tailored for site-specific conditions to arrive at the project-level BMPs for the protection of water quality.

The process for determining appropriate BMPs, and for ensuring their implementation, at both the Forest Plan and Project level, is described in this appendix. This Forest Service Nonpoint Source Management System is aimed at protection of water quality, as reflected in the following text. However, the critical role of BMPs in the integrated management of soil, fish habitat and related resources must also be recognized.

Following is a description of the methods and procedures that will be used to control or prevent non-point sources of pollution from resource management activities. This system is designed to ensure compliance with the following laws and related agreements:

Clean Water Act of 1972, as amended (1977 and 1987). Section 319 of the Clean Water Act Amendments of 1987 requires that the States determine those waters that will not meet the goals of the Act, to determine those nonpoint source activities that are contributing pollution, and to develop a process of determining BMPs to reduce such pollution to the “maximum extent practicable”. This Appendix is designed to fulfill the intent of the requirements of Section 319.

Washington Administrative Code (Chapters 173-201 and 202). Department of Ecology (DOE). Washington’s Administrative Code contains water requirements for protection of various classes of surface waters.

Memorandum of Understanding: The Washington Department of Ecology and U.S. Department of Agriculture Forest Service (7/79), and “Attachment A” referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest Lands in the Pacific Northwest 12/78).

The EPA has certified the Washington Forest Practices Rules and Regulations as BMPs. The State of Washington compared Forest Service practices with these State practices and concluded that Forest Service practices meet or exceed State requirements. As State practices change, comparisons are made to ascertain that Forest Service practices meet or exceed these changes. Monitoring and evaluation will also determine the need for changes in BMPs and/or State standards.

Forest Services management practices will meet, as a minimum, the substantive State BMP requirements, and other considerations required by the National Forest Management Act (NFMA), and other authorities, for the protection of soil, water and related resources.

The general BMPs described herein are action-initiating mechanisms which call for the development of detailed, site-specific BMP prescriptions to meet water quality objectives and protect beneficial uses. These prescriptions are developed as part of the NEPA process, with interdisciplinary involvement by a team of individuals that represent several areas of professional knowledge, learning, and/or skill appropriate for the issues and concerns identified. BMPs also include such requirements as Forest Service manual direction, contract provisions, environmental documents, and Forest Plan Standards and Guidelines. Inherent in prescribing project-level management requirements is recognition of specific water quality objectives which BMPs are designed to achieve.

BMP IMPLEMENTATION PROCESS

In cooperation with the State, the primary strategy for the prevention and control of nonpoint sources is based on the implementation of BMPs determined necessary for the protection of the identified beneficial uses.

The objective is to identify the most practical means of attaining water quality objectives. Water quality objectives include water quality measures that adequately reflect the needs of identified beneficial uses.

The Forest Service Nonpoint Source Management System consists of:

1. Selection and design of BMPs based on site-specific conditions, technical, economic and institutional feasibility, and the water quality standards of those waters potentially impacted.
2. Implementation and enforcement of BMPs.
3. Monitoring to ensure that practices are correctly applied as designed.
4. Monitoring to determine the effectiveness of practices in meeting design expectations and in attaining water quality standards.
5. Evaluation of monitoring results and mitigation where necessary to minimize impacts from activities where BMPs do not perform as expected.
6. Adjustment of BMP design standards and application when it is found that beneficial uses are not being protected and water quality standards are not being achieved to the desired level. Evaluation of the appropriateness of water quality criteria to reasonably assure protection of beneficial uses. Consideration of recommending adjustment of water quality standards.

BMP Selection and Design - Step 1

Scoping: Potential concerns are identified, e.g., water quality, as part of the NEPA process for environmental analysis. Public notices are dispersed inviting comment and participation in the process. Alternatives are developed to address potential problems and to accomplish project objectives.

Environmental Analysis: Each alternative is evaluated for its potential effect on different resources, including water. From this analysis, a preferred alternative is identified, along with the measures (BMPs) needed to reduce risk and increase the potential for success.

Documentation: An Environmental Assessment (EA) or Environmental Impact Statement (EIS) is developed with a decision notice and includes required measures (BMPs).

Water quality standards are used as objectives towards which practices are designed to protect beneficial uses.

Appropriate BMPs are selected for each project by an interdisciplinary team. BMP selection and design are dictated by water quality objectives, soils, topography, geology, vegetation, climate, economics, institutional constraints, etc. Environmental effects and water quality protection options are evaluated and a range of practices is considered. A final set of practices are selected that not only protect beneficial uses, but meet other resource needs. These final selected practices constitute the BMPs.

The selected BMPs, an estimate of their effectiveness, and a plan for monitoring them is included in the project EA or EIS. The site-specific BMP prescriptions are normally included in project implementation plans, but may also be included in the body or appendix of a project environmental document.

BMP Implementation and Enforcement - Steps 2 and 3

The site-specific BMP prescriptions are taken from plan-to-ground by a combination of project layout and resource specialists (hydrology, fisheries, soil, geology, etc.). Final adjustments to fit the BMP prescriptions to the site are made before implementing the resource activity.

When the resource activity (e.g., timber harvest or road construction) begins, timber sale administrators, engineering representatives, resource specialists, and others ensure that the BMPs are implemented according to plan. A similar implementation process is used for other resource activities (range management, mining, etc.) on National Forests.

BMP implementation monitoring is done before, during, and after resource activity implementation. This monitoring answers the question: Did we do what we said we were going to do? Some examples of implementation monitoring for a Riparian Management Area BMP prescription may be:

- 1. Before project:** checking Riparian Management Areas along streams to see if layout meets the objectives of the BMP prescription, or if the road crossing of a stream is properly located and designed per estimates made during the environmental analysis.
- 2. During project:** during timber felling, the timber sale administrator checks to see if the timber fallers understand marking prescription for timber to be felled in the SMU. The timber sale administrator also observes on-going harvest operations to see if the activity meets the objectives defined in the project plan.
- 3. After project:** measuring canopy stream shading to see if the amount specified in the BMP prescription was retained, or monitoring a beneficial use of the water to determine a change or trend in use.

Enforcement is carried out primarily through internal project reviews and contractual enforcement e.g., timber sale contract, grazing or special use permit, etc.

Contract enforcement is a more formal method used to achieve desired results. Normally, each project is assigned a person as a contracting officer. For timber sales, that person is called a timber sale administrator. The project is routinely monitored to ensure that practices are being carried out in the manner and method prescribed in the contract, permit, etc. When a contractor or permittee is not in compliance, they can be held in breach with penalties (e.g., bond forfeiture) until remedies are implemented.

Often during the course of an activity, adjustments are made if it is determined that unsatisfactory results are currently resulting or may occur. This can often mean that a contract modification may be necessary (as in the case of a timber sale).

BMP Monitoring - Step 4

Once BMPs have been implemented, further monitoring is done to evaluate their effectiveness. BMP "effectiveness monitoring" answers the question: Are BMPs effectively meeting management objectives for protection of water quality?

Water quality standards are the "yardstick" against which the effectiveness is tested. If, through objective monitoring, BMPs do not meet prescribed objectives, then information is available to modify either the BMPs for future management, or the objectives, or both.

The natural variability of water quality under unmanaged conditions is an important factor that will be considered during the monitoring and evaluation. Additionally, effectiveness monitoring will include measurement against land management objectives as well as water quality objectives.

Some examples of the types of BMP effectiveness monitoring to be conducted are:

1. Measuring stream temperatures to see if the riparian prescriptions in a watershed are maintaining water temperature.
2. Storm period surveillance monitoring of a road system to see if road rocking is effectively preventing road surface erosion.

The monitoring and evaluation section of the Forest Plan, (Chapter 5), provides that monitoring of BMPs will be accomplished on an appropriate sample basis.

Once a specific project is designed, a site-specific monitoring plan may be developed.

Results of monitoring should be shared with State and local agencies as well as available to the public. Monitoring design, sampling, and laboratory analyses will be coordinated.

BMP Evaluation and Adjustment - Step 5 and 6

The technical evaluation/monitoring described above will determine how effectively BMPs protect and/or improve water quality. If the evaluation indicates that water quality objectives are not being met and/or beneficial uses do not appear to be receiving adequate protection, corrective action will consider the following three components:

1. **The BMP:** Is it technically sound? Is it really best, or is there a better practice which is technically sound and feasible to implement?
2. **The implementation program or processes:** Was the BMP applied entirely as designed? Was it only partially implemented? Were personnel, equipment, funds, or training lacking which resulted in inadequate or incomplete implementation?
3. **The water quality standards:** The water quality standards are established to protect the beneficial uses of water. They include numeric and narrative criteria that, when exceeded, are assumed to indicate detrimental impacts on beneficial uses. They are intended to provide a benchmark for evaluating harm to beneficial uses.

Assessing the applicability of the standards is a responsibility of the State. The Forest Service will provide information to the State to address the following types of questions.

Do the standards describe the conditions necessary for protecting beneficial uses?

Are standards higher or lower than that necessary for protecting beneficial uses?

Do the standards reflect the natural variability occurring within the natural and human-affected ecosystem?

Do the parameters and criteria that constitute water quality standards adequately reflect (are they sensitive enough) human-induced changes to water quality and beneficial uses?

“Validation” monitoring may be needed to make this assessment. The purpose of validation monitoring is to answer the question whether standards, coefficients, requirements, and guidelines are appropriate to meet objectives, e.g., protect beneficial uses.

- Examples: (1) Did the change in water temperature impact the fish population?
(2) Did the soil compaction effect tree growth?

Validation Monitoring will need to be closely coordinated with or, in some cases, conducted by research. It may require the establishment of permanent plots or administrative studies. This kind of monitoring will be very limited and will require coordination to select projects with broad application and to prevent duplication. Only those coefficients and standards that are not reasonably validated by existing research or documentation should be candidates for this monitoring.

Corrective action may be initiated once the reason for failing to achieve the management objectives is determined. The management practice may have to be changed, the water quality objectives modified, or both.

TRAINING

National Forest personnel involved with project location, design, layout, administration, and maintenance activities will receive BMP training. The training will consist of BMP awareness, as well as on the more technical aspects such as planning, implementation, monitoring, and evaluation.

GENERAL BEST MANAGEMENT PRACTICES AND EXAMPLES

Individual, general Best Management Practices are described in General Water Quality Best Management Practices, Pacific Northwest Region, 11/88. This provides guidance, but is not a direction document. Also included in this document is a description of the process, and limitations and use of these BMPs. Each BMP listed includes the Title, Objectives, Explanation, Implementation and Responsibility, and Monitoring. Evaluations of ability to implement and estimated effectiveness are made at the project level.

Not all of the general BMPs listed will normally apply to a given project, and there may be specific BMPs which are not represented by a general BMP in this document.

The sensitivity of the project determines whether the site-specific BMP prescriptions are included in the EA/EIS or in the sale/project plan, or in the analysis files.

Following is an example of a general BMP, as described in this document, along with an example of a site-specific BMP which is developed at the project level.

Examples:

General BMP

T-5. Title: Limiting the Operating Period of Timber Sale Activities

Objective: To ensure that the Purchaser conducts operations in a timely manner, within the time period specified in the Timber Sale Contract (TSC).

Explanation: The TSC specifies a Normal Operating Season, during which, operations may generally proceed without resource damage. Operations are permitted outside the Normal Operating Season only when they can be conducted without damage to soil, water, and other resources. Where determined to be necessary through the environmental analysis, the TSC will limit operations to specific periods or weather conditions. Operations are not permitted to continue if damage will occur. This is a timber sale C clause.

Implementation & Responsibility: Limited operating periods are identified and recommended during the Timber Sale Planning Process by the interdisciplinary team and followed through the life of the timber sale primarily by the Sale Administrator.

Ability to implement: Add at project level.

Effectiveness: Add at project level.

Monitoring: During implementation of timber sale activities by the Sale Administrator, Forest Service Representative (FSR), engineers, watershed and fish habitat specialists. Also see Forest Plan monitoring plan for Soil, Water and Fish Habitat Resources.

Specific BMP

PT-5. Title: Limiting the Operating Period of Timber Sale Activities

Objective: To ensure that the Purchaser conducts operations in a timely manner, within the time period specified in the Timber Sale Contract (TSC).

Explanation: The Ship Mountain Timber sale contains sensitive soils that are subject to soil compaction during tractor skidding, and a non-surfaced road that is not suitable for wet weather haul.

The normal operating season for the Forest will be enforced for the Ship Mountain Timber sale. All operations off road FR 10 (non-surfaced) will be halted at the onset of wet weather to prevent erosion and damage to the road. Tractor skidding on units 1-5 will be restricted if soil moisture is above the level established by the soil scientist. Other operations can continue outside the normal operating season if they can be conducted without damage to soil, water, and other resources.

Implementation and responsibility: For the Ship Mountain Timber sale the normal operating season for the Forest will be enforced. All operations off road FR 10 (non-surfaced) will be halted at the onset of wet weather to prevent erosion and damage to the road. Other operations can continue outside the normal operating season if they can be conducted without damage to soil, water, and other resources. The Forest watershed specialists will work with the timber sale administrators to evaluate the potential for resource damage if operating outside the normal operating season.

Ability to implement: High

Effectiveness: High

Monitoring: During implementation of timber sale activities by the Sale Administrator, Forest Service Representative (FSR), engineers, and watershed specialists. Also see Forest Plan monitoring plan for Soil, Water and Fish Habitat Resources.

REFERENCES

1988, USDA Forest Service, Pacific Northwest Region, General Water Quality Best Management Practices, November, 1988.

1987, US Environmental Protection Agency. Nonpoint Source Controls and Water Quality Standards. Water Quality Standards Handbook, Chapter 2, General Program Guidance, Page 2-25, August 19, 1987.

1985, US Environmental Protection Agency. Final Report on the Federal/State/Local Nonpoint Source Task Force and Recommended National Nonpoint Source Policy. Office of Water, Washington, D.C. Page 17.

United States
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Agriculture

Forest Service

Pacific
Northwest
Region

1990



Appendix K

Final Environmental Impact Statement

Land and Resource
Management Plan

Wenatchee National Forest



APPENDIX K
PUBLIC INVOLVEMENT, COMMENTS AND THE
FOREST SERVICE RESPONSES

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APPENDIX K

FOREST SERVICE RESPONSE TO COMMENTS

INTRODUCTION

This Appendix describes the efforts made by the Wenatchee National Forest to involve and consult the public during the review of its Proposed Forest Plan, Draft Environmental Impact Statements (Draft EIS) and Supplement to the Draft Environmental Impact Statement (Supplement EIS). Included in this Appendix are representative comments received and the Forest Serviceresponses. This document adds to Appendix A, which includes issues, concerns, and opportunities identified by the public during the formal 120-day public review period for the DEIS and the 90-day formal review period for the Supplement to the DEIS.

Presented first is a description of the public participation activities, followed by a summary of the types of comments received on the Proposed Forest Plan, Draft EIS and Supplement EIS. This summary includes a breakdown of comments by resource or issue.

Next is a list of people, agencies, and organizations who commented on the Draft EIS and Supplement EIS. A summary of the Final Environmental Impact Statement (Final EIS) or a complete Final EIS document package has been sent to those listed.

The fourth section contains summarized comments from the general public, organized by resource or subject area, along with the Forest Serviceresponse to each.

The last section contains copies of letters from elected officials and public agencies.

DRAFT ENVIRONMENTAL IMPACT STATEMENT AND FOREST PLAN

DISTRIBUTION OF DOCUMENTS

The Draft Planning documents for the Wenatchee National Forest were available for public comment beginning in early June, 1986, with mailings to the Forest's mailing list of approximately 2,600 individuals beginning on June 9, 1986. A Federal Register Notice was published on June 20, 1986 with a ninety day review period ending on October 1, 1986. Planning documents were also available at Forest Service offices and local libraries and were distributed at a series of public meetings.

The planning documents consisted of the Draft EIS, Forest Plan, Appendices to the Draft EIS, and a Reviewer's Guide Summary of the Draft EIS. All those on the Forest Plan mailing list received the Reviewer's Guide, and the entire planning documents were mailed to those who had requested them. Through mailings and personal contacts, over 4,500 copies of the Reviewer's Guide and 850 sets of the complete documents were distributed to the public.

PUBLIC ANNOUNCEMENTS-NEWS RELEASES

Fifteen news releases and 16 Forest Plan Reports were distributed throughout the planning process, beginning May 23 1979.

In January, 1982, an informational letter was sent to 2,400 individuals and organizations on the general forest mailing list as well as to about 400 Wenatchee National Forest employees. Its purpose was to gather information on whether an adequate variety of alternatives were included in the Forest plan.

A special effort was made to locate individuals who own land within or adjacent to the Wenatchee National Forest. In a joint effort with the Mt. Baker-Snoqualmie National Forest, a paid advertisement was placed in 16 newspapers to notify these individuals about the forest planning.

News conferences regarding the Draft Plan were held in Wenatchee, Yakima & Seattle, June 9-10, 1986.

PUBLIC MEETINGS AND PRESENTATIONS

Between June 18-23, 1979, four public workshops were held in Wenatchee, Yakima, Seattle and Tacoma to explain the Forest planning process and receive ideas on issues which needed to be addressed in the Forest Plan.

Eleven public meetings were held to give information and receive public input on the Draft Planning documents. These meetings were held at the following locations:

Wenatchee	July 14, 1986	70 attendees
Chelan	July 15, 1986	30 attendees
Ellensburg	July 16, 1986	70 attendees
Entiat	July 17, 1986	38 attendees
Leavenworth	July 21, 1986	33 attendees
Seattle	July 22, 1986	53 attendees
Tacoma	July 23, 1986	25 attendees
Cle Elum	July 28, 1986	55 attendees
Yakima	July 29, 1986	90 attendees
Richland	July 30, 1986	30 attendees
Plain	July 31, 1986	25 attendees

Presentations of the Proposed Plan were made to a total of 164 people, members of eight organizations. These included:

Manson Kiwanis	June 11, 1986	35 Attendees
Environmental Protection Agency	June 17, 1986	6 Attendees
Yakima Indian Nation	July 29, 1986	10 Attendees
NCW Trail Riders Assoc.	Aug. 7, 1986	14 Attendees
Rock Club - Wenatchee	Aug. 8, 1986	11 Attendees
North Central WA Sports Council	Aug. 21, 1986	8 Attendees
Timber Industry - Ellensburg	Sept. 16, 1986	35 Attendees
Tacoma Motorcycle Club	Sept. 17, 1986	45 Attendees

Wenatchee National Forest Staff members also met with the following groups regarding the Proposed Plan: Timber and Wood Products Group, Governor's Office, Peninsular Wilderness Club, Washington State Economic Development Board, Liberty Mountain Ownership Association, Leavenworth City Council - Icicle Design Review Committee, and the Wenatchee Timber Committee.

SUPPLEMENT TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

DISTRIBUTION OF DOCUMENTS

On October 1, 1988, the Wenatchee National Forest released a Supplement to the 1986 Draft Environmental Impact Statement, for public review and comment. The Supplement contained a discussion of a "No Change Alternative," an analysis of the opportunity costs of changes in management requirements used in developing the alternatives in the DEIS and an analysis of rivers on the Forest for recommendation for classification in the Wild and Scenic Rivers System. All three topics were selected for further analysis as a result of public comment on the DEIS and Forest Plan.

The 260-page Supplement was mailed to approximately 600 people and organizations who requested it. A 60-page Summary was mailed to this same mailing list as well as to approximately 6,000 people on the Forest Plan mailing list. A Federal Register Notice was published on October 21, 1988 with a 90 day review period ending on January 20, 1989. Copies of both documents were also available on request from the Ranger District offices.

PUBLIC ANNOUNCEMENTS-NEWS RELEASES

Two new releases and two Forest Plan Reports were released in support of the public review process for the Supplement.

PUBLIC MEETINGS AND PRESENTATIONS

Eight Public Meetings were held at the following locations:

Entiat	November 28, 1988	28 attendees
Lake Wenatchee	November 29, 1988	57 attendees
Wenatchee	November 30, 1988	32 attendees
Seattle	December 1, 1988	13 attendees
Cle Elum	December 5, 1988	12 attendees
Ellensburg	December 6, 1988	11 attendees
Leavenworth	December 7, 1988	50 attendees
Yakima	December 8, 1988	16 attendees

In addition, Forest Service staff also made presentations to the following organizations: Chelan County Farm Forestry Association, Yakima Nation Tribal Council, Chelan, Yakima and Kittitas County Commissioners, Governor's Office and also a second public meeting in Wenatchee sponsored by the Friends of Wild Rivers.

OVERVIEW OF PUBLIC COMMENTS

The Wenatchee National Forest received 4,665 responses to the Draft EIS and Forest Plan, and 2,650 responses to the Supplement to the Draft EIS. Comments from these respondents were coded, cross-referenced and analyzed. Original letters are filed and accessible to anyone wishing to review them at the Forest Supervisor's Office in Wenatchee, Washington.

SOURCE OF RESPONSES TO THE DRAFT EIS

Origin of Responses

The majority of comments came from respondents living in Washington State (4,351 or 92%); however, there were also responses from Oregon, Idaho, California, and one from American Samoa. The following is a more detailed breakdown of response origin.

Washington State

Eastern Washington 2,637 or 56% of total response	Western Washington 1,714 or 36% of total response
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Outside Washington

Oregon - 169 Idaho - 23	California - 27 Other - 95
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Of the major cities represented in the response from the public in eastern Washington, Yakima led in number of responses with 807. The western Washington city from which the most responses were received was Seattle with 1,071.

WHO RESPONDED

In this statistical category, signatures were tallied rather than responses. This means that the total in this category exceeds the 4,665 figure, but the breakdowns still provide for relevant comparisons. The following is a detailed breakdown of who responded.

Who	Number of Signatures
Individuals	4,846
Business Groups	59
Conservation/Environmental Groups	42
Motorized Recreation Interests	24
Associations/Unions	14
Federal Agencies	13
Hunting/Sporting Groups	12
Timber Industry	11
City Municipal Government	9
Riding Groups	9
Civic Groups	7
County Elected Officials	5
City Elected Officials	5
Irrigation Districts	5
Yakima Indian Nation/Inter-Tribal Commission, etc.	5
State Elected Officials	3
Mining Interests	3
State Agencies	3
Hiking Interests	3
Federal Elected Officials	2
County Agencies	1
Professional Societies	1

METHOD OF RESPONSE

The form of response was divided fairly equally between individual letters and post cards and the “Essential Alternative Ballot.” The ballot was developed by the Wenatchee Timber Purchasers Association and 6,000 were printed for distribution within the Pacific Northwest. The Forest received 2,061 of the ballots (44% of response) as input to the Forest Planning Process. A total of 1,996 individual letters and cards (43% of response) were received.

Additionally, 396 Forest Service Response Forms (8% of response) were returned to the agency. Five petitions, one resolution, and two oral comments were also received.

The remainder of the almost 300 responses were primarily form letters. The following details this breakdown.

Form Letters

Mining Rights - 125	General Form Letters - 111
Friends of Holden Village - 20	Friends of Lake Wenatchee - 10
Modified Form Letters - 8	Stormy Mountain Ski Area - 3

SOURCE OF RESPONSES TO THE SUPPLEMENT

Origin of Responses

A total of 2,650 responses to the Supplement were received. Most responses came from Washington State with roughly half from eastern Washington and half from western Washington. About half of the responses received were “ballots” in support of the timber industry and form letters in support of off-road vehicle recreation. The majority of “ballots” were from eastern Washington (64%) and the majority of form letters were from western Washington (66%).

Who Responded

Comments on the Supplement were directed to the three issues covered by the Supplement: Wild and Scenic Rivers Analysis, the No Change Alternative and the Management Requirements Analysis. The breakdown of the responses is shown below.

Individual comments on Wild and Scenic Rivers	400
Landowner comments on Wild and Scenic Rivers	95
Timber industry letters	48
Timber Industry ballots	1,183
Off-Road Vehicle recreation letters	665
Elected Officials, U.S., State and Local Agencies	13
Individual comments concerning other issues	146

SUMMARY OF COMMENTS BY SUBJECT ON THE DRAFT EIS AND FOREST PLAN

Recreation (in General) (412 comments) - Most comments suggested that the emphasis on the Wenatchee should shift from timber and commodity orientation to a recreation/amenity emphasis. Industry comments were concerned that the Forest is already providing dispersed and developed recreation in excess of projected demand. Another concern from the public was that demand projections should also take into account population growth on the west side of the state.

Developed Recreation/User Fees (86/73 comments) - Some comments were received supporting improved campgrounds. Comments on user fees generally supported them.

Downhill Skiing (124 comments) - The majority of these comments were by proponents of a Stormy Mountain Ski Area near Lake Chelan. These people wanted the area included in an allocation that did not preclude the possibility of future development. Others expressed concern that expanded facilities at Mission Ridge near Wenatchee would adversely affect wildlife.

Trails (1287 comments)- This subject received one of the larger volumes of comments. The major message: Don't reduce the trail mileage! Also a substantial number of comments were related to hiker/ORV conflicts and a strong dislike of hiking through clearcuts.

ORV use (2929 comments) - Not counting the timber industry ballot, this subject received the most comments of any issue. The majority of comments were against ORV use in general, but especially against any expansion of ORV use. We also received many comments opposing ORV use on trails leading into wilderness. Several substantive comments contended the Forest Service has violated federal Executive Orders relating to ORV's. The overall issue is very emotional.

Hiking Areas - This subject was the object of a campaign generated by the Washington Trails Association. We received 301 comments in support of designating the four proposed areas as "hiking only" areas. An additional 135 comments supported specific areas, and 26 were against them.

Rockhounding (195 comments) - We received very site specific comments on this subject. A large percentage of comments were from older people who desired better access.

Scenery (771 comments) - The comments showed strong public support for a natural appearing forest, especially along major travel routes such as Snoqualmie and Blewett Pass. Industry comments contended that scenic travel allocations were too strict.

Wild & Scenic Rivers (852 comments) - Nearly all comments supported classification of the Chiwawa, Entiat, North Fork Entiat, Mad, Wenatchee, White, and Yakima Rivers. Many also included the Icicle and Little Wenatchee Rivers. This was part of the environmental coalition Alt. F campaign list. Several substantive comments were received in favor of classification, and also expressed concern over the adequacy of the standards and guidelines for protecting river corridors.

Special Interest/Botanical Areas (258 comments) - Most comments received were in support of Alt. F allocations. A small campaign generated comments for several site specific botanical areas.

Alpine Lakes Mgmt. Area (42 comments) - Industry felt strongly that the Alpine Lakes Plan should be looked at again because they felt the inclusion of Minimum Management Requirements (MR's) constitutes a change in the plan. Other public comments generally supported leaving the Alpine Lakes plan intact.

Mather Memorial Parkway (232 comments) - We received a large number of comments supporting preservation. A number of comments recommended transfer of the Parkway to the National Park Service.

Wilderness (1109 comments) - Most comments were concerned about the consistency of management adjacent to the wilderness. Many of comments opposed ORV use on trails leading into wilderness. Some support was received for buffer zones, particularly along the Alpine Lakes. Party size in wilderness was also a concern, especially for commercial outfitters.

Roadless Areas (2550 comments) - This subject was another of the major issues. Most comments supported preservation of all of them. Devil's Gulch and Entiat/Mad River received most of the site specific comments. Roadless comments were often tied together with old-growth comments. ORV users also supported roadless area preservation, mentioning the Manastash the most frequently.

Old Growth (1429 comments) - Another major issue. Most comments wanted preservation of the existing old growth. Comments were generally more emotional than on other issues. This issue was often tied in with roadless area preservation.

Multiple Use Commodity/Amenity (1150 comments) - A large number of comments were received here. Most fell into list of amenity items. Several comments on the commodity end asked "whatever happened to multiple use?"

Wildlife (1202 comments) - Most of the comments were general in nature favoring the preservation of wildlife and the increasing of their numbers. Often the comments included lists of amenity concerns. Concerns were also expressed about inadequate wildlife data, a perceived timber bias in the plan, and weak standards and guidelines. General comments about habitat, especially for big game species, was also a big concern with 520 comments received. These comments covered topics such as inadequate range, impacts of roads and timber management, and conflicts with grazing and private lands.

Wildlife-MR's (161 comments) - Most comments were process related issues from the timber industry. They felt the Minimum Management Requirements (MMR's) were too restrictive, and objected to the development of MMR's without public involvement. Other public comments noted the MMR's were inadequate, especially for old growth dependent species.

Spotted Owls (2302 comments) - A large number of comments were received with most being from the timber industry ballot opposing the acreage set aside for Spotted Owl Habitat Areas (SOHA's). This issue tied in strongly with the old growth management issue. Comments on both sides of the issue noted that the data was inadequate.

Fish (1211 comments) - This was another major issue. Most of the general public comments were in favor of preserving and increasing the numbers of fish. The comments were often intermixed with timber harvest effects, sedimentation, and water quality. This issue received the most comments from state, federal and tribal agencies. There also was consistent support expressed for more research, and concern for continued management without sufficient data.

Riparian Habitat (272 comments) - Most comments were related to preserving water quality and fisheries. This issue received the most input concerning the adequacy of the standards and guidelines.

Threatened and Endangered (461 comments) - Several substantive comments asked that T&E species be addressed in more detail throughout the documents. The public also proposed specific sites for botanical areas. In addition, this subject received many general comments from the Alt. F campaign. Most comments stated the discussion was inadequate, disagreed with the effects of management activities, and felt more data was needed.

Range and Vegetation (918 comments) - A large number of general comments opposed increased grazing. There was also concern expressed over grazing impacts on native plants, conflicts with big game, and perceived subsidy of allotment holders.

Research Natural Areas (179 comments) - This was not a big issue although it was mentioned by some supporters of Alternative F and native plant society members.

Timber Resource (995 comments) - Timber management and logging were among subjects receiving the largest number of comments. Related comments are broken down further in the next four subject areas.

Harvest Levels (3048 comments) - This one subject received more comments than any other. Nearly 2000 of these comments were from the industry ballot expressing support for increased harvest levels. The majority of the remaining comments requested reduced harvest levels. Many of these comments tied harvest levels to impacts on soil, water, fish and wildlife.

Below Cost Sales (345 comments) - A considerable number of comments were received with nearly all in opposition. This issue was often tied in with road building, road costs, and roadless areas.

Land Suitability, Yield Tables, Utilization Standards (312 comments) - These issues all received substantive comment from timber industry questioning the approach used by the Forest Service. Other public comments felt that more land was unsuitable for harvest, notably in roadless areas.

Harvest Methods, Even/Uneven-aged Management, Harvest Effects (1452 comments) A major portion of the comments were opposed to clearcutting. Water quality, sedimentation, and fisheries issues were also tied in. Industry, as well as general public input, called for a more detailed discussion of harvest methods.

Water (1408 comments) - Most of the comments expressed concern over water quality, watersheds in general, timing of runoff, and irrigation. These comments related to harvest effects, grazing, sedimentation and fisheries. Substantive comments on water were received from government agencies, tribal groups, and county commissioners. A number of comments were concerned with municipal watersheds, especially the Roslyn and the Icicle River. Those who commented thought private lands should be acquired within the watersheds, and the drainage protected to preserve water quality.

Soil (412 comments) - Soil was included on a broad list of environmental concerns but also received specific comments in relation to water quality, harvest effects, erosion, the Devil's Gulch area, and ORV use.

Land Status (215 comments) - Most of the comments were related to the impacts of clearcutting on intermingled private lands and cumulative effects.

Minerals (539 comments) - Many comments received came in a mining form letter which focused on the use of the term "highly restricted" in the DEIS discussion of mineral resources.

Roads (1386 comments) - The majority of comments received opposed increased road construction, and many citing road costs. This issue was also related to below cost sales, timber sales, and roadless area allocations. Many comments were received in favor of increased road closures.

Naches Pass Road (274 comments) - Nearly all of the comments received were in opposition to construction of the road. This is a big issue for both the Wenatchee and the Mt. Baker-Snoqualmie National Forests.

Economics (992 comments) - Topics under this general heading received some of the largest volumes of input. Substantive input was received from both industry and environmental groups. There was major disagreement with our economic assumptions, modeling procedures, and projected outputs. Comments on this subject area are broken down in the following four paragraphs.

Receipts to Counties (2154 comments) - Substantive input was received from both county officials and school district personnel opposed to any reduction in funds. The majority of these comments came from the industry ballot.

Employment and Job Security (554 comments) - Most of the comments opposed any reduction in jobs caused by a reduction in timber harvest levels. This issue was also related to comments stressing the need to change from a timber based economy to a recreation/tourism based economy.

Short-term/Long-term Economic Benefits (195 comments) - Most comments contended that the DEIS didn't consider the long-term, especially from an amenity standpoint.

Timber/Tourism Based Economy (895 comments) - A considerable number of people felt the DEIS was too biased towards timber and did not take into account the number of jobs recreation and tourism provided. The opposing viewpoint was the Forest Service didn't take into account how important the timber industry was to our economy.

Social Considerations (746 comments) - Most of the comments stressed the need for more of an amenity emphasis in the management of the Forest. There was also a strong viewpoint expressed for preservation of the natural beauty of the forest for future generations.

Forest Coordination Efforts (72 comments) - A few substantive comments were received especially from other government agencies, stressing the need for better interagency coordination.

Indian Rights (30 comments) - This issue received substantive comments from both the Yakima Nation and the Intertribal Fish Commission mainly relating to water quality, and fishing and hunting rights.

Planning in General (1334 comments) - The many comments concerning the planning process cited a perceived lack of good inventories, inadequate monitoring plans, failure to meet NFMA and NEPA regulations for public input into the plan, flaws in the modeling process, and seemingly arbitrary adjustments of economic values. Many of the planning process comments appeared to be in preparation for appeal of the plan. Several substantive comments contended the standards and guidelines were inadequate and not restrictive enough. This was especially true in relation to the DEIS discussion of riparian areas, fish, water, and wildlife.

Cumulative Effects (266 comments) - Most of these comments dealt with the cumulative effects of forest management activities on soil and water. This issue also tied in with management on intermingled private land, timber harvest effects, fisheries, sedimentation, and water quality.

SUMMARY OF COMMENTS BY SUBJECT ON THE SUPPLEMENT TO THE DRAFT EIS

Wild and Scenic Rivers Proposal Support (80 comments) - The comments in support of the proposal were both general in nature and specific references to the values of the rivers considered in the Supplement.

Wild and Scenic Rivers Proposal Opposition (80 comments) - General opposition comments listed specific concerns as the reason for opposition. The concerns cited were: potential for condemnation, defacto designation of wilderness, restricted individual rights, preference for local control, more analysis needed, restrictions on property owners, limitation of multiple use, loss of control over timber management and restrictions on development.

Additional Rivers Should be Included (340 comments) - Most of the comments supported the proposed rivers but felt more rivers should be proposed for inclusion in the Wild and Scenic Rivers System. Some of the rivers mentioned were: Little Wenatchee, North Fork Entiat, Mad, Cooper, Silver, Teanaway, Waptus, Little Naches, Bumping, Naches, Rattlesnake and Tieton.

Landowner Opposition to Specific River Proposals (95 comments) - Most of the comments from landowners contended that existing regulation were adequate to protect the rivers and that designation would result in the loss of local control. The specific rivers mentioned were: Wenatchee, Entiat, Nap-equa, Icicle and Chiwawa.

Landowners Support of Wild and Scenic Proposal (6 comments) - The comments by landowners expressed some level of support for the proposal and a few indicated additional rivers should be included.

Support of the No Change Alternative (85 Comments) - Some of the comments supported the No Change Alternative without specific reasons, while others mentioned concerns for the stability of the economy. Other comments stated the current management of the forest is adequate and present recreation opportunities, such as off-road vehicle trail allocations, should not be changed.

Opposition to the No Change Alternative (79 comments) - Most of the comments opposed the No Change Alternative because of the detrimental effects on the forest environment and the amount of timber harvest allowed. A few comments mentioned that the alternative did not meet legal requirements.

Support of Management Requirements (30 comments) - The majority of the comments cited support for preservation of amenity values as the reason for support of the Management Requirements.

Opposition to Management Requirements (30 comments) - Many comments said the information on Management Requirements was difficult to comprehend. Concern for the effects was also cited, including loss of jobs and community stability.

Timber Industry "Ballots" (1,183 comments) - The Timber industry provided "ballots" which allowed individuals to check their preferred harvest level, ranging from 118 to 211 million board feet. The majority checked the two highest harvest levels, 211 and 180 million board feet. The form included a section concerning analysis of the Wild and Scenic River designations. The majority checked a box asking the Forest Service to complete further analysis of the impacts on other resources before recommending rivers for designation.

Off-Road Vehicle Form Letters (665 comments) - Two similar form letters were received concerning off-road vehicle use. Both form letters expressed support for the No Change Alternative because off-road vehicle recreational opportunities could continue unchanged. They also expressed concern over the effects of Wild and Scenic River designation on motorized trails.

NAMES OF RESPONDEES

A total of 4,665 responses were received on the D.E.I.S documents and 2,650 responses on the Supplement. This section contains the names of all respondents and the number assigned to their comments. Respondees to the D.E.I.S. are listed first. The respondees to the Supplement follow, and are distinguished by the letter "S" following the number.

DEIS RESPONDEES

AAGAARD, ANN
3700
BOTHELL, WA 98011

ABEL, TOM
0541
ARLINGTON, WA 98223

ABLY, TERRY
9016
MANSON, WA 98831

ACKLEY, SPRAGUE
2952
SEATTLE, WA 98103

ADAMS, BILL
2829
ELLENSBURG, WA 98926

ADAMS, DON
1417
BORING, OR 97009

ADAMS, HARVEY E
4486
TOPPENISH, WA 98948

ADAMS, JOY
4344
BOISE, ID 83704

ADAMSON, CAROL B
0244
LEAVENWORTH, WA 98826

ADAMSON, JIM
0056
LEAVENWORTH, WA 98826

ADAMSON, KAREN
4177
ELLENSBURG, WA 98926

ADAMSON, RICH
0245
FEDERAL WAY, WA 98023

ADDINGTON, MARGE
4372
HOQUIAM, WA 98550

ADKINS, FRANKLIN L
0216
ENTIAT, WA 98822

ADKINS, HARRIS & OLIVE
9053
TACOMA, WA 98446

ADKINS, VENETA
0192
ENTIAT, WA 98822

ADLER, HERBERT
1427
TIGARD, OR 97223

AHLF, DON
0715
EASTON, WA 98925

AINSWORTH, JOHN
2888
YAKIMA, WA 98902

AINSWORTH, MURIEL L
4241
YAKIMA, WA 98902

AKIN, KUSTINE
1881
PROSSER, WA 98350

ALBRIGHT, CHARLOTTE F
0428
SEATTLE, WA 98115

ALDERMAN, LOUIS K.
1568
YAKIMA, WA 98908

ALDRICH, ROBERT B
3280
MOUNTLAKE TERR, WA 98043

ALEMAN, CHERYL
3948
SPOKANE, WA 99223

ALEXANDER, JOHN
1342
CHEHALIS, WA 98532

ALEXANDER, MALCOLM D
3050
ELLENSBURG, WA 98926

ALEXANDER, VIRL E
0784
PESHASTIN, WA 98847

ALEXANDRA RN, KATHRYN A.
3625
ANACORTES, WA 98221

ALEXANDRA, KATHRYN
2792
ANACORTES, WA 98221

ALISEO, JANET G
2031
ROSLYN, WA 98941

ALLEN, CHERYL
0411
E WENATCHEE, WA 98802

ALLEN, LES
0825
SEATTLE, WA 98115

ALLEN, MARY
2458
YAKIMA, WA 98902

ALLEN, PAUL C
4223
S CLE ELUM, WA 98941

ALLEN, RICHARD
1348
YAKIMA, WA 98902

ALLEN, ROBERT S.
2136
CLE ELUM, WA 98922

ALLEN, ROBERT S
3546
CLE ELUM, WA 98922

ALLEN, VIKI
1813
EUGENE, OR 97404

ALLENBAUGH, WILLIAM J
0883
ELLENSBURG, WA 98926

ALLIN, ROGER W
9027
OAK HARBOR, WA 98277

ALLMENDINGER, DONALD
2539
YAKIMA, WA 98902

ALMACK, JON
4475
SEDRO WOOLLEY, WA 98284

ALPLUND M D, CICI B
3808
KIRKLAND, WA 98033

ALPLUND, RANDY L.
3815
KIRKLAND, WA 98033

ALTDORFER, CATHRYN A.
1328
YAKIMA, WA 98902

AMBROSE, LAURA C
0027
OKANOGAN, WA 98840

AMERICAN MOTORCYCLE
ASSOC
3326
WESTERVILLE, OH 43081

AMES, BEN
1745
TACOMA, WA 98466

AMES, JACK
1405
YAKIMA, WA 98902

AMEZOLA, SALVADOR
2504
YAKIMA, WA 98901

ANCICH, ANDY
4380
ABERDEEN, WA 98520

ANDERSEN, GLENN A.
0305
E WENATCHEE, WA 98802

ANDERSEN, PATTI & WAYNE
0378
MOUNTLAKE TER, WA 98043

ANDERSON, CLAUDE D
2644
PORTLAND, OR 97206

ANDERSON, CYNTHIA R
2088
SEATTLE, WA 98107

ANDERSON, DR. RICHARD V
0494
CAMBRIDGE, MN 55008

ANDERSON, ED
1400
YAKIMA, WA 98901

ANDERSON, HEIDI A.
4163
YAKIMA, WA 98903

ANDERSON, LORINDA A.
0578
TUMWATER, 98504

ANDERSON, MAXINE
4164
WENATCHEE, WA 98801

ANDERSON, NEIL
0574
TACOMA, WA 98407

ANDERSON, NORMAN E.
3887
NACHES, WA 98937

ANDERSON, ROD
0081
SPOKANE, WA 99212

ANDERSON, T L
3883
SEATTLE, WA 98195

ANDERSON, THEODORE L
0866
SEATTLE, WA 98195

ANDERSON, THOMAS N
4140
ISSAQUAH, WA 98027

ANDERTON, CHARLES W
3283
LAKE STEVENS, WA 98258

ANDERTON, MIKE
0023
MARYSVILLE, WA 98270

ANDREWS, FRANK
0444
DRYDEN, WA 98821

ANGEL M D, RONALD
0393
OAK HARBOR, WA 98277

ANSON, COL. & MRS PAUL A.
0671
SEATTLE, WA 98199

ANTHIS, GREG
0190
ENTIAT, WA 98822

ANTHIS, JERRY
0191
ENTIAT, WA 98822

ANTHIS, MICHAEL
0212
ENTIAT, WA 98822

ANTIEAU, CLAYTON J
4481
SEATTLE, WA 98103

ANTRON, ERIS P
2065
FEDERAL, WA 98003

ARBUCKLE, AUDREY
2444
YAKIMA, WA 98902

ARCH, ANASTO M
2923
RENTON, WA 98956

ARLESON, LAEN J
4077
LAKE STEVENS, WA 98258

ARLINGTON, ALBERT E
2778
SEATTLE, WA 98178

ARMSTRONG, GERALD D
0594
OLYMPIA, WA 98506

ARMSTRONG, JUDI
2401
YAKIMA, WA 98901

ARMSTRONG, S
0702
WENATCHEE, WA 98801

ARNESON, ARNIE
3849
WENATCHEE, WA 98801

ARNETT, BOBBIE J
1749
YAKIMA, WA 98902

ARNOLD, BILL
1628
ELLENSBURG, WA 98826

ARNOLD, BOB
1627
ELLENSBURG, WA 98926

ARNOLD, E W
0059
WENATCHEE, WA 98801

ARNOLD, NANCY & ALISON
4081
GREENBANK, WA 98253

ARNOLD, RAYMOND M
4412
YAKIMA, WA 98902

ARNTUFFUS, DAVID J
4091
SEATTLE, WA 98117

ARON, HARRY F
3417
ISSAQUAH, WA 98027

ARR, ARTHUR H
2848
SKAMANIA, WA 98648

ARRE, WALLACE D
1310
COLVILLE, WA 98114

ARTHUR, BILL
3136
SEATTLE, WA 98133

ASHBROOK, ALEXIS
1206
YAKIMA, WA 98907

ASHMAN, RICH & BARBARA
2948
BELLEVUE, WA 98007

ASPLIN, WENDY M
2988
SEATTLE, WA 98105

ASPLUND, BILL
2138
WENATCHEE, WA 98801

ASTLEY, MIKE
4283
PASCO, WA 99301

ASTON JR, EMMET R
3658
CHELAN, WA 98816

ASTON, EMMIT & BONNIE
4002
CHELAN, WA 98816

ATKINSON, EDWARD
2083
CHELAN, WA 98816

ATKINSON, MR & MRS C E
2058
CHELAN, WA 98816

ATNEOSEN, RICHARD A
4170
BELLINGHAM, WA 98226

AUHR, JOHN
1483
STOCKTON, CA 95205

AUST, SALLY
1751
YAKIMA, WA 98908

AUSTIN, DOROTHY
0368
CASHMERE, WA 98815

AUSTIN, GENE
0583
NO ADDRESS

AUSTIN, GILBERT & ALICE
3752
SNOQUALMIE, WA 98065

AUSTIN, ROBIN
0365
CASHMERE, WA 98815

AUVE, ALBERT
2526
YAKIMA, WA 98901

AVERY, ALLAN F
4087
KIRKLAND, WA 98033

AVERY, NYAL
0482
LEAVENWORTH, WA 98826

AYDEN, GARY
1736
YAKIMA, WA 98902

AYERS, RON
1794
CASHMERE, WA 98815

AYERS, SANDY
0330
CASHMERE, WA 98815

BABCOCK, THOMAS N
1002
YAKIMA, WA 98901

BACHHUBER, STEPHEN R
1977
PORTLAND, OR 97266

BACKSTROM, RALPH V
0584
SEATTLE, WA 98155

BACKUS, DENNIS
1504
PORTLAND, OR 97203

BACON, JEAN
2800
BELLEVUE, WA 98006

BAER, DON
1943
RICHLAND, WA 99352

BAGLEY JR M D , CHARLES M
2159
SEATTLE, WA 98133

BAILES, FLOYD E
1130
ELLENSBURG, WA 98926

BAILES, LARRY
1129
ELLENSBURG, WA 98926

BAILEY, BARRY D
1398
YAKIMA, WA 98901

BAILEY, RICK
2212
ALOHA, OR 97006

BAILOR, RICHARD
4015
WENATCHEE, WA 98801

BAIN, MARK E.
2043
SEATTLE, WA 98125

BAINARD JR, GEORGE
1806
WENATCHEE, WA 98801

BAINARD, TOM
1777
E WENATCHEE, WA 98802

BAIR, HOWARD L
0460
WENATCHEE, WA 98801

BAIR, STEWART W
1786
PESHASTIN, WA 98847

BAIRD, DEE ANN
0200
ENTIAT, WA 98822

BAIRD, JOHN M
1551
LEAVENWORTH, WA 98826

BAIRD, LINDA
0681
YAKIMA, WA 98901

BAIRD, RON
0195
ENTIAT, WA 98822

BAKER, FRED
0218
ENTIAT, WA 98822

BAKER, MARK
1046
YAKIMA, WA 98902

BAKER, PAM
3788
WENATCHEE, WA 98801

BAKER, RAY E
2287
COLVILLE, WA 99114

BALDRIDGE, DUANE E.
2564
YAKIMA, WA 98902

BALDRIDGE, TERRY
0802
YAKIMA, WA 98903

BALDWIN, BRUCE
0107
ROCHESTER, WA 98579

BALDWIN, MICHAEL
0004
SEATTLE, WA 98119

BALDYGA, PAUL V
3941
CHELAN, WA 98816

BALL, JERROLD L.
1484
STOCKTON, CA 95205

BALL, ROBERT M
2963
LYNNWOOD, WA 98037

BALLARD, JOHN
9109
YAKIMA, WA 98903

BALLARD, JUDY
9108
YAKIMA, WA 98903

BALLARD, PATSY
1452
EUGENE, OR 97401

BALLER, MRS IDA L.
2035
GREENBANK, WA 98253

BALLINGER, NORMA
0253
CASHMERE, WA 98815

BALTHAZER, CINDY J
2103
ANACORTES, WA 98221

BANISTER, D'ARCY P
0596
SEATTLE, WA 99202

BANNISTER, JIM
4428
ELLENSBURG, WA 98926

BANNISTER, PHYLLIS
9059
SEATTLE, WA 98101

BARBER, JANIE
3977
NO ADDRESS

BARBER, R B
2507
TOPPENISH, WA 98948

BARDSLEY, MARC
2826
SNOHOMISH, WA 98290

BARDY M D , GUST H
4019
SEATTLE, WA 98199

BAREELO, GLORIA L.
2093
BELLEVUE, WA 98004

BARICH, WILLIAM M
3681
SEATTLE, WA 98106

BARIS, DANIEL M
2781
TOPPENISH, WA 98948

BARKER, BONNIE
2933
FALL CITY, WA 98024

BARKER, DEBRA
4273
WENATCHEE, WA 98801

BARKHOFF, E W
4408
E WENATCHEE, WA 98802

BARKHOFF, EMMA L.
2080
E. WENATCHEE, WA 98802

BARNES, FERN E. SHANK
0217
ENTIAT, WA 98822

BARNES, GEORGE
1437
ALOHA, OR 98007

BARNES, JOHN A.
4467
ENTIAT, WA 98822

BARNES, MARK & TEENA
2229
RANDLE, WA 98377

BARNETT, BILL
0616
WENATCHEE, WA 98801

BARNETT, DIANA G
0946
SELAH, WA 98942

BARNETT, GREGORY C
0968
SELAH, WA 98942

BARNOWE MEYER, STEVE
2596
OLYMPIA, WA 98503

BARRETT, GEOFFREY F
4161
MILL VALLEY, CA 94941

BARRETT, JAMES
1045
YAKIMA, WA 98902

BARRETT, PAT & MARTY
9085
CHELAN, WA

BARRICK, MICHAEL D
1889
ZILLA, WA 98953

BARTH III, PHIL F
0737
BOTHHELL, WA 98102

BARTLEY, DAVID
0519
SEATTLE, WA 98125

BARTON, KENNETH R.
2193
BREMERTON, WA 98310

BASE, LARRY D
0997
SELAH, WA 98942

BATCHELDER, DAVID
3055
SEATTLE, WA 98102

BATEMAN, SCOTT
2503
YAKIMA, WA 98902

BATEMAN, STEVE
2502
YAKIMA, WA 98902

BATES, ELSIE A.
0035
POULSBO, WA 98370

BAUER, CONNIE & GREG
0833
SNOHOMISH, WA 98290

BAUER, LINDA
1589
YAKIMA, WA 98902

BAUERMEISTER, JIM
0815
CASHMERE, WA 98815

BAUERMEISTER, JIM
4466
CASHMERE, WA 98815

BAUGH, RUTH M
4147
ISSAQUAH, WA 98027

BAUGHMAN, DOROTHY
2244
TIETON, WA 98947

BAUGHMAN, HOLLIS
2245
TIETON, WA 98947

BAUGHMAN, T J
1180
YAKIMA, WA 98908

BAUMANN, CLARENCE
1543
LEAVENWORTH, WA 98826

BAUMILLER, NANCY L.
1238
YAKIMA, WA 98908

BAXTER, DARLENE
3720
SEATTLE, WA 98107

BAXTER, ED
2628
YAKIMA, WA 98902

BAXTER, LARRY J
3492
SEATTLE, WA 98107

BAYNE, DELORIS
0372
LEAVENWORTH, WA 98826

BAYNE, JOHN D
0373
WENATCHEE, WA 98801

BAYNE, JOHN F
1910
CASHMERE, WA 98815

BAYNE, MARY
0268
E. WENATCHEE, WA 98802

BAYNE, RON
0281
E WENATCHEE, WA 98802

BEAN, DAVID
3834
LYNNWOOD, WA 98037

BEAN, JAMES R
4400
LYNNWOOD, WA 98037

BEASON, HOYAT
1834
TACOMA, WA 98466

BEASON, ORVAN
0949
YAKIMA, WA 98908

BEATTIE, JEAN S
2481
YAKIMA, WA 98908

BEATTIGER, ALBERT D
3371
WENATCHEE, WA 98801

BEATTY, ROBERT
0904
SELAH, WA 98942

BEATY, JAMES D
4082
FEDERAL WAY, WA 98003

BEATY, MADELEINE
4080
FEDERAL WAY, WA 98003

BEAUCHAMP, HENRY
(MAYOR)
3684
YAKIMA, WA 98901

BEAUPAIN, JEFFREY
4167
WENATCHEE, WA 98801

BEAVER, FRED
3073
TACOMA, WA 98444

BEAYDOIN, TIM
0799
OREGON CITY, OR 97045

BEBIE, MARK
2094
SEATTLE, WA 98115

BECHARD, BARBARA
2517
YAKIMA, WA 98901

BECHARD, DARRELL M
1101
YAKIMA, WA 98902

BECK, RONALD J
2186
PUYALLUP, WA 98373

BECKER, ART
0473
DRYDEN, WA 98821

BECKETT, JAMES D
1573
YAKIMA, WA 98908

BECKETT, WM G
4149
BREMERTON, WA 98310

BECKLEY, RANDY
1774
DRYDEN, WA 98821

BEDARD, VAL
0151
YAKIMA, WA 98902

BEDDINGFIELD, ELMER R
1097
SELAH, WA 98942

BEDDINGFIELD, JOANNE
2450
SELAH, WA 98942

BEDNAR, TIM
1279
S CLE ELUM, WA 98943

BEDROCK PROSPECTORS
4533
PUYALLUP, WA 98371

BEE, DAMON & DEBBIE
3512
BOTHHELL, WA 98011

BEEDEE, VANCE
1277
CLE ELUM, WA 98922

BEEMAN, MICHAEL
4066
SNOHOMISH, WA 98290

BEEMER, TOM
3880
LEAVENWORTH, WA 98826

BEERS, CAROL
0731
SEATTLE, WA 98107

BEKEMEIER, CHRIS
0648
CHELAN, WA 98816

BEKKEDAHL, LARRY
2435
NACHES, WA 98937

BELCHER, KATHLEEN A.
2677
YAKIMA, WA 98901

BELL, MR & MRS RICH E
3883
WENATCHEE, WA 98801

BELL, WAYNE
0791
KENNEWICK, WA 98337

BELLAMA, LIVIA
0525
SEATTLE, WA 98115

BELLAMY JR, GLADWIN
2068
CHELAN, WA 98816

BELSHAW, FERN I
2388
WENATCHEE, WA 98801

BELSHAW, MYRON
2387
WENATCHEE, WA 98801

BEHAVIDES, LYDIA
1892
MABTON, WA 98835

BENDA, LEE
3710
SEATTLE, WA 98103

BENDER, BARBARA & EUGENE
3217
SEQUIM, WA 98382

BENDER, KAREN
3250
YAKIMA, WA 98901

BENDER, LAURIE
3010
NO ADDRESS

BENDER, RUSS
2233
ELLENSBURG, WA 98926

BENDICKSON, BRUCE
2091
WENATCHEE, WA 98801

BENE, C
3762
SEATTLE, WA 98198

BENEFIELD, MIKE
0696
ENTIAT, WA 98822

BENINTENDI, RON
1065
YAKIMA, WA 98901

BENJAMIN, RAYMOND
0184
LEAVENWORTH, WA 98826

BENNETT, CYNTHIA K.
2072
ELLENSBURG, WA 98926

BENNETT, DAVE
4284
NO ADDRESS

BENNETT, GAIL
3951
E WENATCHEE, WA 98802

BENNETT, JACK & MABEL
2824
SNOHOMISH, WA 98290

BENNETT, MALINDA
4254
NO ADDRESS

BENNETT, MIKE
4255
NO ADDRESS

BENNETT, PATTY
4252
NO ADDRESS

BENNETT, W
2112
SEATTLE, WA 98105

BENNETT, W
3447
SEATTLE, WA 98105

BENNION, MOLLY MCLELLAN
0628
CHELAN, WA 98816

BENTLEY, J D
3281
LOPEZ, WA 98261

BENTO, JIM C
0909
SELAH, WA 98942

BENZ, ROBERT H
2434
YAKIMA, WA 98908

BEPPLE, HELEN
1859
QUINCY, WA 98848

BEREND, DEBRA A.
2448
SEATTLE, WA 98101

BERGEN, JOYCE
3069
SEATTLE, WA 98119

BERGER, ANTON
2254
E WENATCHEE, WA 98802

BERGER, HARLEY M
1087
YAKIMA, WA 98902

BERGER, RALPH
1102
SELAH, WA 98942

BERGESON, MICHAEL
3731
SEATTLE, WA 98115

BERGESON, RULON C
0251
ZILLAH, WA 98953

BERGMAN, FLOYD R & MARGARET
9008
SEATTLE, WA 98118

BERGMAN, ROBERT J
1840
TACOMA, WA 98408

BERGREN, ALFRED C.
0810
LEAVENWORTH, WA 98826

BERGSETH, RENE
2984
SEATTLE, WA 98138

BERKOWITZ, CARL
0557
RICHLAND, WA 98352

BERNARD, RICHARD
1029
YAKIMA, WA 98901

BERNDT, STAN
4040
YAKIMA, WA 98903

BERNER, RICHARD C
3955
SEATTLE, WA 98122

BERNSTEIN, JOE
3408
BOTHELL, WA 98011

BERNTHAL, TIM
3723
SEATTLE, WA 98107

BERRRENS, BOB
3593
ELLENSBURG, WA 98926

BERRY M D, CAROL
9093
SEATTLE, WA 98115

BERTHELOTE DDS PS, THEODORE
2173
BELLEVUE, WA 98008

BERTHELOTE, GUY
3811
REDMOND, WA 98052

BERTLIN, PAUL
4121
CLE ELUM, WA 98922

BERTRAM, RICHARD L.
2128
TUMWATER, WA 98501

BEST, DR LYNN & MALCOLM J
9062
SEATTLE, WA 98115

BEST, JACK
1074
SELAH, WA 98942

BETHAY, WILLIE E
2541
YAKIMA, WA 98902

BETTISWORTH, AMY
1599
TACOMA, WA 98416

BEVIS, KENNETH R
9092
FT COLLINS, CO 80524

BICCHIERI, BARBARA
3603
ELLENSBURG, WA 98926

BICKNELL, MARY
4213
SEATTLE, WA 98105

BIDDULPH, JOHN
2853
SEATTLE, WA 98178

BIEGER, JACK
3093
BREMERTON, WA 98312

BIEWER, BRIAN R
1494
ST CLAIR, MI 48079

BIGAS, JOHN C
0901
SEATTLE, WA 98115

BIGBY, ALLENE
1202
YAKIMA, WA 98908

BIGBY, DAVE
2670
NACHES, WA 98937

BIGBY, DORRAINE
2669
NACHES, WA 98937

BIGBY, SAM
1239
YAKIMA, WA 98908

BIGGER, C MOLLIE
3184
SEATTLE, WA 98107

BIGGS, BEVERLY
3740
SPOKANE, WA 99204

BILES, LAEL
3633
E WENATCHEE, WA 98802

BILES, MRS LAEL
3635
E WENATCHEE, WA 98802

BIRCHER, HAROLD
2284
RICE, WA 99167

BIRKER, DAVID
0396
SEATTLE, WA 98189

BIROCHAK JR, MD
0376
ISSAQUAH, WA 98027

BISHOP, FAYE
2492
YAKIMA, WA 98907

BISHOP, HOWARD
2594
PROSPECT, OR 97536

BLACK, DAVE
0250
BOTHELL, WA 98134

BLACK, FRANK J
0703
LEAVENWORTH, WA 98826

BLACK, JAMES J
3182
ISSAQUAH, WA 98027

BLACK, LARRY
2452
ELLENSBURG, WA 98926

BLAINE, ELISABETH
0643
SEATTLE, WA 98118

BLAIR, BECKY
3080
YAKIMA, WA 98908

BLAIR, GARY
1828
TACOMA, WA 98406

BLAKE, PHILIP
3290
SEATTLE, WA 98103

BLANCHARD, DON R.
2418
SELAH, WA 98942

BLANCHARD, JOHN E
2456
NACHES, WA 98937

BLANCHARD, LONNIE J
1035
YAKIMA, WA 98902

BLANK, RICK
1248
YAKIMA, WA 98902

BLEAN, H P
0788
E WENATCHEE, WA 98802

BLIJIE, JAMES W
2996
SEATTLE, WA 98118

BLODGETT, J
0183
LEAVENWORTH, WA 98826

BLOOR, WILLIAM E.
8096
WATTSBURG, WA 99361

BLOSSOM, ALICE
3491
SEATTLE, WA 98115

BLOWERS, DOUGLAS
1016
YAKIMA, WA 98902

BLUM, JUDY
1886
CLE ELUM, WA 98922

BLUM, PAUL
0417
MT VERNON, WA 98273

BLUME, CAROL
2700
CLE ELUM, WA 98922

BOARDMAN, BRENDA
3485
SEATTLE, WA 98119

BOCK, RICHARD
2954
SEATTLE, WA 98115

BOCK, THAIS
3278
FEDERAL WAY, WA 98003

BOECK, MICHAEL D
4355
SANDPOINT, ID 83864

BOHLIN, SUE
3450
CHELAN, WA 98816

BOLLIS, HILARY
0090
SEATTLE, WA 98103

BOLYARD, TOM
2859
CASHMERE, WA 98815

BOND, ALICE
3096
TACOMA, WA 98403

BONNET, ANNE
2941
KIRKLAND, WA 98033

BONNETT, EDNA J
1661
YAKIMA, WA 98908

BONURA, A.
2426
WHEATLEY HGHTS, NY 11798

BONWELL, JULIE P
3295
RENTON, WA 98056

BOOTH, BEATRICE C
3947
SEATTLE, WA 98105

BOOTH, DONALD E
1815
LEAVENWORTH, WA 98826

BOOTH, MARGUERITE M
9042
SEATTLE, WA 98105

BOOTH, NANCY P
3772
YAKIMA, WA 98908

BOOTHROYD, DAVE
3744
RICHLAND, WA 99352

BORES, JOHN
3712
KENNEWICK, WA 99336

BORGENSEN, MEL
0834
SEATTLE, WA 98111

BORING, LANDIN
3903
SEATTLE, WA 98198

BORROZ, MICKEY
0254
CASHMERE, WA 98815

BORROZ, TINA MARIE
1930
CASHMERE, WA 98815

BOSS, EDSON
2349
GOLDENDALE, WA 98620

BOSSERT, LARRY
0984
YAKIMA, WA 98903

BOSSERT, RAY T
0914
YAKIMA, WA 98902

BOTTS, CASSANDRA
0154
JOSEPH, OR 97846

BOUNDS, ANN
1862
YAKIMA, WA 98902

BOUNDS, GERALD
1584
YAKIMA, WA 98902

BOURG, NADINE
1302
SPANAWAY, WA 98367

BOURTON, BILL
3285
WENATCHEE, WA 98801

BOUSQUET, DENIS
2739
SEATTLE, WA 98102

BOWDEN, DAN
1226
YAKIMA, WA 98908

BOWDEN, DAN
9060
YAKIMA, WA 98908

BOWDEN, PAUL
9020
YAKIMA, WA 98901

BOWEN, EARL
2890
ROCHESTER, WA 98579

BOWEN, LEE
0380
BELLEVUE, WA 98008

BOWEN, PRISCILLA
3302
NO ADDRESS

BOWERS, DAVE
2713
OLYMPIA, WA 98501

BOWEY, MR & MRS R E
3275
KENNEWICK, WA 99336

BOWLEN, DALE
0308
VANCOUVER, WA 98661

BOWLES JR, RICK
3944
CHELAN, WA 98816

BOWLES, TOM
2062
MOSES LAKE, WA 98837

BOWLIN, LARRY & SHIRLEY
0558
ANACORTES, WA 98221

BOWLIN, MRS DALE
0309
VANCOUVER, WA 98661

BOWYER, DAVID
0194
ENTIAT, WA 98822

BOWYER, KAY
0199
ENTIAT, WA 98822

BOYCE, CHARLES
1923
LEAVENWORTH, WA 98826

BOYCE, GREG C
0855
PESHASTIN, WA 98847

BOYD M D, MICHAEL E.
0845
MERCER ISLAND, WA 98940

BOYD, LAYMAN B
4463
LEAVENWORTH, WA 98826

BOYD, SARA DOWNING
4234
OAKLAND, CA 94110

BOYES, ANN
1184
NACHES, WA 98937

BOYES, GORDON K.
1183
NACHES, WA 98937

BOYLE, BARBARA E
3235
SEATTLE, WA 98103

BOYLE, DALE
4409
BREMERTON, WA 98310

BOYLEN, RICH
1440
PRAIRIE DU CHIE, WI 53821

BRACKEN, EDWARD
2715
ELLENBURG, WA 98926

BRADLEY, CYNTHIA M
2981
SEATTLE, WA 98115

BRADLEY, DELORES
2376
GOLDENDALE, WA 98620

BRAID, JAMES
1487
LAGRANGE, IN 46761

BRAND, JIM
4038
ELLENBURG, WA 98926

BRANDSTOETTNER, EDWARD
P
0240
SPOKANE, WA 99208

BRANDSTOETTNER, LOR-
RAINE C.
0239
SPOKANE, WA 99208

BRANDT, NEIL
3759
YAKIMA, WA 98902

BRATHOVDE
1650
YAKIMA, WA 98902

BRATHOVDE, SUE
4381
YAKIMA, WA 98902

BRAUN SR, ROBERT
2154
OMAHA, NE 68114

BRAUN, DICK
0053
CASHMERE, WA 98815

BRAUN, JOAN K.
0052
CASHMERE, WA 98815

BRAUN, LISA
0054
CASHMERE, WA 98815

BRAUNER, KALMAN
3519
SEATTLE, WA 98109

BREITENFELDT, DON
0786
YAKIMA, WA 98902

BREITSPRECHER, ARTHUR A.
3212
SEATTLE, WA 98144

BREWER, CHARLES C
1079
YAKIMA, WA 98902

BREWER, CHARLES E.
3087
BREMERTON, WA 98312

BRICKERT, MIKE
2648
LEAVENWORTH, WA 98826

BRIEN, STEVE
0013
SEATTLE, WA 98133

BRIGGS, PAMELA
1430
TIGARD, OR 97224

BRISCOE, HARLEN T
0981
SELAH, WA 98942

BRITTON, GEORGE C
1394
YAKIMA, WA 98901

BROADSWORD, MIKE
0593
E WENATCHEE, WA 98802

BROCKHAUS, ROBERT D
0828
RICHLAND, WA 99352

BRODERIUS, ROBERT D
1125
ELLENBURG, WA 98926

BRODIE, BENJAMIN
2005
EDMONDS, WA 99020

BRODINE, RUSSELL
0878
ROSLYN, WA 98941

BRODY, GORDON
1555
LEAVENWORTH, WA 98826

BROKAW, PETER B
2360
GOLDENDALE, WA 98620

BROKER, LEESA
0227
LEAVENWORTH, WA 98826

BRONKHORST, ALLAN K.
2367
GOLDENDALE, WA 98620

BRONSON, CHARLES
2570
TACOMA, WA 98498

BROOK, HURLEY
4346
SELAH, WA 98942

BROOK, JACKIE
4348
SELAH, WA 98942

BROOK, KILE
4333
SELAH, WA 98942

BROOKS, JAMES
0205
ENTIAT, WA 98822

BROOKS, MRS R.J
2179
SEATTLE, WA 98112

BROOKS, PETER
4459
WENATCHEE, WA 98801

BROUETTE, LEONARD
2445
SEATTLE, WA 98102

BROWITT, D JEAN
4286
ROSLYN, WA 98941

BROWITT, D JEAN
4430
ROSLYN, WA 98941

BROWITT, DAVID J
4431
ROSLYN, WA 98941

BROWITT, JAMES E.
4429
ROSLYN, WA 98841

BROWITT, ROBERT A.
1266
CLE ELUM, WA 98922

BROWN, B L.
0317
EVERETT, WA 98204

BROWN, BERT E.
2076
TACOMA, WA 98406

BROWN, BOB
1459
SPRINGFIELD, OR 97476

BROWN, BRIAN
1550
E. WENATCHEE, WA 98802

BROWN, BRUCE
2845
SPOKANE, WA 99207

BROWN, DAVE
4540
MAPLE VALLEY, WA 98038

BROWN, DAVID L.
3451
DES MOINES, WA 98198

BROWN, DAVID L.
4539
DES MOINES, WA 98198

BROWN, DEBORAH S
4178
MOXEE, WA 98936

BROWN, DERYL
0157
LEAVENWORTH, WA 98826

BROWN, DUANE
4324
CASHMERE, WA 98815

BROWN, ELLEN M
3164
YAKIMA, WA 98902

BROWN, ELVETT H
0304
LEAVENWORTH, WA 98826

BROWN, HAROLD
2803
TACOMA, WA 98498

BROWN, JULIE
0973
YAKIMA, WA 98903

BROWN, KEITH
0972
YAKIMA, WA 98903

BROWN, LAURA E
4033
WENATCHEE, WA 98801

BROWN, LYETTE
3489
ARLINGTON, WA 98223

BROWN, MARIEDELLE
3932
OLYMPIA, WA 98506

BROWN, PATSY J
1554
WENATCHEE, WA 98801

BROWN, RICH & LOIS
4538
SEATTLE, WA 98125

BROWN, RICHARD
3317
SEATTLE, WA 98117

BROWN, ROBERT
0691
WENATCHEE, WA 98826

BROWN, ROBERT N
4388
SELAH, WA 98942

BROWN, STEPHANIE
2689
YAKIMA, WA 98902

BROWN, WILLIAM R
0316
SEATTLE, WA 98168

BROWNING, BETTY
2488
YAKIMA, WA 98908

BROWNING, KEITH
2489
YAKIMA, WA 98908

BROWNING, LYLE V
0282
ENTIAT, WA 98822

BROWNING, ROBIN KIM
9095
CARLOTTA, CA 95528

BROWNING, ZELPHA
0283
ENTIAT, WA 98822

BROYLES, MARCIA
0226
BELLEVUE, WA 98007

BROZOVICH, GERALD A.
1267
CLE ELUM, WA 98922

BROZOVICH, GIGRID
1268
CLE ELUM, WA 98922

BRUHN, STEVE
1466
VANCOUVER, WA 98663

BRUMMETT, JAMES D
1370
SELAH, WA 98942

BRUNE, CARY BRENT
1081
NACHES, WA 98937

BRUNK, BERNARD M
4055
ELLENSBURG, WA 98926

BRUNK, MICHAEL
4292
CLE ELUM, WA 98922

BRUNO, PAULINE
0822
SPOKANE, WA 99204

BRYANT, BRENDA M
1164
YAKIMA, WA 98903

BRYANT, GARY A.
1147
SELAH, WA 98942

BRYANT, M
0688
LEAVENWORTH, WA 98826

BRYANT, RANDY
1237
NACHES, WA 98937

BRYANT, ROGER
0231
WENATCHEE, WA 98801

BRYANT, RONALD J
1367
YAKIMA, WA 98902

BRYANT, TINA
1148
SELAH, WA 98942

BRZOSKA, MICHAEL A.
0632
CHENEY, WA 99004

BUCHAMAM, DAVID
4160
MALAGA, WA 98828

BUCHANAN, JUDY
0672
YAKIMA, WA 98902

BUCK, AGNES
2528
YAKIMA, WA 98901

BUCK, TAMARA E
2951
BELLEVUE, WA 98005

BUCKER, ANN
3934
SEATTLE, WA 98122

BUCKES, MRS. SUSAN
3906
SEATTLE, WA 98125

BUCKINGHAM, RICHARD D
2085
E WENATCHEE, WA 98802

BUCKINGHAM, STEVEN B
4401
YAKIMA, WA 98902

BUCKINGHAM, SUSAN L.
4398
YAKIMA, WA 98901

BUCKLEY, CARROLL
2332
YAKIMA, WA 98202

BUCKLEY, JAN & RAULER-
SON, ROB
2037
LANGLEY, WA 98260

BUDDEN, VI
1720
YAKIMA, WA 98902

BUDESILCH, JOHN
1020
YAKIMA, WA 98902

BUDGE, JOSEPH & ALICE
3532
LEAVENWORTH, WA 98828

BUECHLER, SUSAN E
2851
SNONOMISH, WA 98290

BUFORD, E M
3006
WENATCHEE, WA 98801

BUHRMAN, CLYDE
2415
YAKIMA, WA 98908

BUNCH, MAXINE
3310
SEATTLE, WA 98105

BUNKER, BOB & HELENA
3318
DUVALL, WA 98109

BUNKER, DELBERT R.
0988
YAKIMA, WA 98903

BURBANK, KEITH
3922
SEATTLE, WA 98117

BURD, ROBERT S
4495
SEATTLE, WA 98101

BURDYSHAW, GARY R
0518
POULSBO, WA 98370

BURGE, MARIAN L.
1686
NACHES, WA 98937

BURGER, HENRY
0708
PESHASTIN, WA 98847

BURGERS, BRIAN D
1581
TRAIL, OR 97541

BURGESS, JEAN J
0235
LEAVENWORTH, WA 98826

BURGESS, MARK
1974
KIRKLAND, WA 98033

BURGESS, MELVIN & LOIS
3788
WENATCHEE, WA 98801

BURGESS, W T
2253
LEAVENWORTH, WA 98826

BURGESS, WILLIAM E
2398
LEAVENWORTH, WA 98826

BURKE, EDWARD J
2427
RIVERHEAD, NY 11901

BURKE, PATTY
1112
ELLENSBURG, WA 98926

BURKE, ROBERT J
1115
ELLENSBURG, WA 98926

BURKE, WILLIAM
3405
WOODINVILLE, WA 98072

BURKLAND, KRIS
0068
SPOKANE, WA 99211

BURKS III, JOHN E.
4411
TACOMA, WA 98406

BURLINGAME, HARRY
3851
SEATTLE, WA 98166

BURNA, SID
2883
CHELAN, WA 98816

BURNETT, ELROY
4104
SULTAN, WA 98294

BURNETT, FRED R.
1682
WENATCHEE, WA 98801

BURNETT, JOHN S
0072
REDMOND, WA 98052

BURNETT, VIRGINIA L.
1592
WENATCHEE, WA 98801

BURNS, HERMAN
2513
MOXEE, WA 98936

BURNS, JAMES A.
1361
YAKIMA, WA 98904

BURNS, LESLYE
1418
WILSONVILLE, OR 97070

BURNS, ROBERT
0300
NACHES, WA 98937

BURNS, SHERON L.
2925
YAKIMA, WA 98901

BURR, ERIC
3207
MAZAMA, WA 98833

BURRILL, DAVE L.
1359
YAKIMA, WA 98908

BURT, DAVID
3268
ELLENSBURG, WA 98926

BURTON, ANGIE
2277
SELAH, WA 98942

BURTON, CHERYL
2275
SELAH, WA 98942

BURTON, DARLENE
2278
SELAH, WA 98942

BURTON, JOAN
3689
SEATTLE, WA 98133

BUSH, CALEB F
4544
DES MOINES, WA 98188

BUSH, LEONA
3477
DES MOINES, WA 98198

BUTLER, DAVE
3894
WENATCHEE, WA 98801

BYERS, HAROLD
4113
YAKIMA, WA 98903

BYERS, WILLIAM N
0427
SEATTLE, WA 98115

BYHRE, HELGA
1965
EDMONDS, WA 98020

BYRD, GREG
0732
WENATCHEE, WA 98801

BYRD, LAWRENCE
0965
MOXEE, WA 98936

CABA, PAUL
1445
BOISE, ID 83704

CADD, POLLY B
4312
RICHLAND, WA 99352

CADIGAN, MARY E
4152
BELLEVUE, WA 98006

CADOTTE, CONNIE C
2150
PLATTSMOUTH, NE 68048

CADWALLADER, PATRICK S
4060
ROSLYN, WA 98941

CADWALLADER, PAUL
4030
ROSLYN, WA 98941

CAHILL, BRENT
2316
YAKIMA, WA 98908

CAHILL, TODD
2313
GOLDENDALE, WA 98620

CAIN, ALAN B
4379
MONTESANO, WA 98563

CALCOE FED C U
2451
YAKIMA, WA 98907

CALHOON, RICHARD
1685
TIETON, WA 98947

CALHOUN, JULIE
2014
SEATTLE, WA 98195

CALLAHAN, JOHN
2206
MERCER ISLAND, WA 98040

CALLAHAN, JOHN
2737
BELLEVUE, WA 98006

CALLAN, IDA M
2096
VIENNA, OH 44473

CALLISON, DENNIS (& FAMILY)
0039
AUBURN, WA 98001

CALVERT, CONSTANCE
2910
ROSLYN, WA 98941

CAMARATA, JIM
2266
E WENATCHEE, WA 98802

CAMERON, CHUCK
4185
ELLENSBURG, WA 98926

CAMERON, HELEN
3614
SEATTLE, WA 98155

CAMPBELL, PAUL L.
2908
YAKIMA, WA 98907

CAMPBELL, TOM
3937
SEATTLE, WA 98115

CAMPBELL, VICTORIA H
3823
SEATTLE, WA 98102

CANDRA, C
4420
CLE ELUM, WA 98922

CANNON, BONNIE
9076
CHELAN, WA 98816

CANNON, SUSIE & DARLTON
3046
CHELAN, WA 98816

CANON, TOM
2970
CHELAN FALLS, WA 98817

CAP, EVERETT L.
4057
ROSLYN, WA 98941

CAPPS, RON
1648
YAKIMA, WA 98902

CARDENAS, ERNESTO F
1008
YAKIMA, WA 98901

CARDENAS, JAMES E.
1051
YAKIMA, WA 98901

CARECTOR, WILLIE
1656
YAKIMA, WA 98901

CARIMER, DAVE
0466
WENATCHEE, WA 98801

CARL, JOE
0382
WENATCHEE, WA 98801

CARL, MARY
0383
E. WENATCHEE, WA 98802

CARL, ROD
1086
YAKIMA, WA 98902

CARLILE, ROBERT
0513
FORKS, WA 98331

CARLILE, THOMAS
4363
BOISE, ID 83704

CARLISLE JR, JAMES
0867
SEATTLE, WA 98134

CARLQUIST, BRAD
9046
SEATTLE, WA 98177

CARLSON M D , DUANE G
0488
RENTON, WA 98058

CARLSON, AMY D
3923
SEATTLE, WA 98109

CARLSON, CRAIG
1142
ELLENSBURG, WA 98926

CARLSON, DAVID G
1602
TACOMA, WA 98406

CARLSON, FRANK K.
3967
PORT ORCHARD, WA 98366

CARLSON, MARILYNN C
0871
RENTON, WA 98058

CARLSON, MRS. RUTH E.
3999
PORT ORCHARD, WA 98366

CARLSON, PAT
4184
ELLENSBURG, WA 98928

CARLSON, PATRICIA A.
1143
ELLENSBURG, WA 98928

CARLTON, DON H.
3678
YAKIMA, WA 98908

CARNES, KATHY
4274
YAKIMA, WA 98902

CAROLLO, DON
1124
ELLENSBURG, WA 98928

CARPENTER, CHARLOTTE &
DALE
4073
YAKIMA, WA 98901

CARR, JOHN D.
0794
VANCOUVER, WA 98662

CARR, JUDITH A.
2628
E. WENATCHEE, WA 98902

CARRELL, MAY M.
2029
TACOMA, WA 98444

CARRIKER, ROY I.
0547
KENNEWICK, WA 98336

CARROLL, BARBARA J.
4357
E. WENATCHEE, WA 98902

CARROLL, BARBARA J.
4358
E. WENATCHEE, WA 98902

CARRY, WILLIAM A.
2890
BELLEVUE, WA 98004

CARSTENS, JOHN W.
0286
SELAH, WA 98942

CARSTENS, STEVEN D.
0455
YAKIMA, WA 98908

CARTER, CECIL-PLACHTA
4434
ELLENSBURG, WA 98928

CARTER, CLIFTON
4520
LYNNWOOD, WA 98036

CARTER, FRED
1030
NACHES, WA 98937

CARTER, STEVE
2227
ROSEBURG, OR 97470

CARTMEL, BRUCE D.
2224
LA GRANDE, OR 97878

CASCADE FIELD AND STREAM
4510
CLE ELUM, WA 98922

CASCADE SURVEYORS
3852
CHELAN, WA 98816

CASCADIANS
3877
YAKIMA, WA 98907

CASEY JR, RONALD W.
0900
YAKIMA, WA 98902

CASEY SHIRLEY
0849
YAKIMA, WA 98908

CASEY, RON
0850
YAKIMA, WA 98908

CASEY, SUSAN
0890
SEATTLE, WA 98119

CASEY, THELMA
0803
YAKIMA, WA 98902

CASH, ROY
0878
ELLENSBURG, WA 98928

CASH, VIVIEN F.
0890
ELLENSBURG, WA 98928

CASTLEMAN, J.
2785
TACOMA, WA 98446

CAUSEY, ALICE
4385
YAKIMA, WA 98902

CAUSEY, CHESTER
4384
YAKIMA, WA 98902

CAUSEY, DAVID R.
4380
YAKIMA, WA 98902

CAUSEY, ELIZABETH
4387
YAKIMA, WA 98902

CAUSEY, RICK
0899
YAKIMA, WA 98902

CAUSEY, TORI
4382
YAKIMA, WA 98902

CAVNAK, CLAUDE C.
1912
PESHASTIN, WA 98847

CEIS, VIRGINIA
2207
LYNNWOOD, WA 98037

CELLARIUS, RALPH
0454
HILLSBORO, WA 97123

CHAMBERLAIN, LORRAINE
3398
WHITE SALMON, WA 98672

CHAMBERLAND, JAMES W.
1458
KLAMATH FALLS, WA 97601

CHAMBERLIN, CLAUDE L.
3874
YAKIMA, WA 98901

CHAMBERS, C.M.
3489
LACEY, WA 98503

CHAMPOUX, ERNIE
1312
WAPATO, WA 98951

CHAMPOUX, JOE
2872
TOPPENISH, WA 98948

CHAMPOUX, MARVIN
1890
NACHES, WA 98937

CHANDLER, GILBERT
2408
YAKIMA, WA 98901

CHANDLER, GINA
2329
YAKIMA, WA 98902

CHANDLER, REP. FOO
2139
WASHINGTON D.C. 20515

CHANEY, FREDDIE
1857
YAKIMA, WA 98901

CHANEY, HERMAN
1881
YAKIMA, WA 98902

CHAPLIN, CAREY
4207
SEATTLE, WA 98107

CHAPMAN, JAMES L.
2735
EDMONDS, WA 98020

CHAPMAN, LINDA B.
3718
TACOMA, WA 98446

CHAPMAN, PAT M.
3714
TACOMA, WA 98446

CHARD, THOMAS DAVID
1184
YAKIMA, WA 98901

CHARRON, EDGAR
2519
MOXEE, WA 98938

CHASE, CHARLES E.
2838
RENTON, WA 98058

CHASE, RONALD D.
3334
REDMOND, WA 98052

CHEELY, WALTER H.
1480
NAPERVILLE, IL 60566

CHEESMAN, W.A.
3880
YAKIMA, WA 98902

CHELAN COUNTY, PORT OF
4296
WENATCHEE, WA 98901

CHENEY, MARJORIE E.
4174
SEATTLE, WA 98108

CHESNUTT, BARBARA M.
9083
SEATTLE, WA 98103

CHESSMAN, DOROTHY
1303
YAKIMA, WA 98902

CHICONINE, RALPH
3294
BELLEVUE, WA 98004

CHILDRESS, DON A.
2131
ELLENSBURG, WA 98928

CHIONIZ, MARY B.
3724
REDMOND, WA 98052

CHITTIM JR, CHARLES L.
0472
CASHMERE, WA 98815

CHITTIM, PATRICIA J.
0471
CASHMERE, WA 98815

CHOTT, JEAN
3849
YAKIMA, WA 98908

CHRIST, PETE
2185
SEDO-WOOLLEY, WA 98284

CHRISTENSEN, ANNABELLE
2155
ELLENSBURG, WA 98928

CHRISTENSEN, THOMAS A.
3891
E. WENATCHEE, WA 98902

CHRISTIAN, MARK S.
9088
SEATTLE, WA 98104

CHRISTIAN, WILLIAM
1905
LEAVENWORTH, WA 98828

CHRISTIANSEN, D. &
KRETZMANN, J.
3287
CHICAGO, IL 60613

CHRISTIANSON, KATHY
0018
RENTON, WA 98058

CHRISTIANSON, SLYVIANE
2520
WEST LINN, OR 97068

CHRISTOPHER, EDITH I.
0350
LEAVENWORTH, WA 98828

CHRISTOPHER, SEAN
2326
YAKIMA, WA 98908

CISKE, DANIEL L.
2778
SEATTLE, WA 98103

CISKE, SANDRA J.
3826
SEATTLE, WA 98103

CLARK, ANNE C.
0437
BAINBRIDGE ISL, WA 98110

CLARK, BENNETT G.
8037
SEATTLE, WA 98177

CLARK, CLYDE R.
1518
SEATTLE, WA 98168

CLARK, DAVID P.
1731
SELAH, WA 98942

CLARK, GARY
0880
ZILLAH, WA 98953

CLARK, JOANN
1533
SEATTLE, WA 98168

CLARK, P.J.
0979
ZILLAH, WA 98953

CLARK, VINCE D.
1211
YAKIMA, WA 98908

CLARKE, COLIN A.
2282
WENATCHEE, WA 98901

CLARKE, DOUGLAS C.
3125
PESHASTIN, WA 98847

CLARKE, EDWARD G.
2822
PESHASTIN, WA 98847

CLARKE, MICHAEL D.
3472
REDMOND, WA 98052

CLARKE, RICHARD
1388
YAKIMA, WA 98902

CLAYSON, VIC
0122
WENATCHEE, WA 98901

CLAYTON, PHILIP M.
1824
LEAVENWORTH, WA 98828

CLE ELUM CHAMBER OF
COMM.
3844
CLE ELUM, WA 98922

CLEAVER, ROYCE
2412
YAKIMA, WA 98902

CLEGG, COLIN
0407
BELLEVUE, WA 98004

CLEMENTS, KENNETH D.
0283
YAKIMA, WA 98908

CLEMENTS, RICHARD E.
2808
NACHES, WA 98937

CLINE, LLOYD H.
2784
UNION GAP, WA 98903

CLINE, MARY
2856
SEATTLE, WA 98168

CLINE, ROBERT D.
4329
LEAVENWORTH, WA 98828

CLOSE, G.L.
1059
SELAH, WA 98942

CLOSE, MARTHA
3915
NACHES, WA 98937

COATES, JIM
4228
KITTTAS, WA 98934

COBLE, LARRY J.
0459
ENTIAT, WA 98822

COBLEIGH, P.E., KENNETH A.
0508
RENTON, WA 98058

COCHEBA, DR. & MRS. DON
3605
ELLENSBURG, WA 98928

COCHRANE, BETTY A.
1579
NACHES, WA 98937

COFFIN, MIKE
1773
LEAVENWORTH, WA 98828

COHEN, MATTHEW
2024
SEATTLE, WA 98144

COHRS, V.W.
2788
SEATTLE, WA 98125

COHRS, VERN R.
3807
SEATTLE, WA 98125

COKER, PHILLIP R.
3099
SEATTLE, WA 98119

COLBY, MAUREEN
0360
YAKIMA, WA 98902

COLE, ALAN L
1419
PORTLAND, OR 97209

COLE, DOROTHY
3425
ELLENSBURG, WA 98926

COLE, LIN
4188
CLE ELUM, WA 98922

COLE, MARK A.
1971
ELLENSBURG, WA 98926

COLE, MONTE
0105
WENATCHEE, WA 98801

COLE, PHILIP V
1997
SEATTLE, WA 98103

COLE, RUSSELL
1421
ALOHA, OR 97006

COLEMAN, T L
0017
COWICHE, WA 98923

COLGAN, MICHAEL D
1447
CHEYENNE, WY 82001

COLLIER JR M D, J TOM
3107
WOODINVILLE, WA 98072

COLLIER, JOHN
4141
EVERETT, WA 98204

COLLIER, PAT
3938
VASHON, WA 98070

COLLINS, CLARK L
0830
POCATELLO, ID 83202

COLLINS, JAMES R
0041
CHELAN, WA 98816

COLLINS, LARRY D
1018
YAKIMA, WA 98901

COLTON, KEITH
2599
MORTON, WA 98356

COLWELL, DUANE F
2273
WENATCHEE, WA 98801

COMSTOCK, WESLEY W
0564
SPOKANE, WA 99205

CONGDON JR, GORDON
3338
WENATCHEE, WA 98801

CONLEY, NANCY JEANNE
3810
SEATTLE, WA 98112

CONN, ANNE & WILLIAM
3228
SEATTLE, WA 98177

CONNER, DOUGLAS A.
3672
PASCO, WA 99301

CONNER, KELLY
3771
PASCO, WA 99301

CONRAD, ROYCE
3785
SEATTLE, WA 98155

CONTOR, ROGER
0886
ELLENSBURG, WA 98926

COOK, GLEN
2717
ELLENSBURG, WA 98926

COOK, MARK & KIM
3629
TUMWATER, WA 98532

COOK, ROBERT
3964
BREMERTON, WA 98312

COOK, STEVE
2796
WENATCHEE, WA 98801

COOK, TOM H
0117
FOREST GROVE, OR 97116

COOKE, KIM
2339
GOLDENDALE, WA 98620

COOKE, LYNN
4341
S CLE ELUM, WA 98943

COOKE, STEVE E
1294
CLE ELUM, WA 98922

COOMER, NANCY
4087
SEATTLE, WA 98103

COOPER, DEAN W
2208
SEATTLE, WA 98109

COOPER, DENNIS
1397
SELAH, WA 98942

COOPER, DON
2841
PASCO, WA 98301

COOPER, HAROLD
1411
MORTON, WA 98356

COOPER, JONATHAN A.
0435
SEATTLE, WA 98122

COOPER, JOYCE
1178
YAKIMA, WA 98902

COOPER, RICHARD J
1853
TACOMA, WA 98408

COOPER, WILLIAM
1179
YAKIMA, WA 98902

COPELAND, MARY JANE
3515
YAKIMA, WA 98901

COPP, DEBORAH
4031
CLE ELUM, WA 98922

CORBACH, MARION VAN
1741
YAKIMA, WA 98902

CORBALEY, RAY
1548
CASHMERE, WA 98815

CORBALEY, RAY
4313
CASHMERE, WA 98815

CORBOY, JOE & ANN
3348
SEATTLE, WA 98115

CORCORAN, TOM
2886
CHELAN FALLS, WA 98817

CORELY, SCOTT D
0830
SEATTLE, WA 98125

COREY, BARBARA
3162
YAKIMA, WA 98908

CORNEIL, MIKE
3452
AUBURN, WA 98002

CORNEJO, CARLOS
2407
YAKIMA, WA 98901

CORNELIUS, GEORGE R
1883
YAKIMA, WA 98908

CORNETT, HARVEY J
3516
SEATTLE, WA 98155

CORNING, LEANN
2903
YAKIMA, WA 98908

CORROONE, R MICHAEL
3426
WOODINVILLE, WA 98072

COSKI, WILLIAM D
0548
MERCER ISLAND, WA 98040

COSTELLO, RONALD J
0043
SUNNYSIDE, WA 98944

COTTON, M C
1037
YAKIMA, WA 98903

COULES, DENNIS
0063
EL SOBRANT, WA 94803

COULTER, KAREN
8052
SEATTLE, WA 98103

COUNSELLOR, RON
0504
BOTHELL, WA 98012

COUNTRYMAN, MRS KAREN
1607
YAKIMA, WA 98908

COURTNEY, DAVID
0148
SONDRA, CA 95370

COURTNEY-BARNHART, JUNE
2746
WENATCHEE, WA 98801

COVERT, DAVID S
2939
SEATTLE, WA 98115

COVERT, THOMAS GARY
0704
LEAVENWORTH, WA 98826

COWAN, STEPHEN T
3708
LEAVENWORTH, WA 98826

COWAN, TED
2604
NACHES, WA 98937

COWGILL, SARAH
0341
WEST LINN, OR 97068

COX, CHARLES & CHESNUTT,
BARB
2891
SEATTLE, WA 98107

COX, DENNIS K
2875
LEAVENWORTH, WA 98826

COX, GALE & WALTRAUT
2197
SEATTLE, WA 98115

COX, JERRY
2588
CASHMERE, WA 98815

COX, LLOYD J
4457
KENT, WA 98032

COYLE, DWIGHT N
2818
YAKIMA, WA 98908

CRAIG JR, BILL J
1235
YAKIMA, WA 98908

CRAIG, CHARLES S
3418
SEATTLE, WA 98125

CRAIG, GINGER
1238
YAKIMA, WA 98908

CRAIG, JOHN SCOTT
2042
SEATTLE, WA 98125

CRAIG, KAREN
1764
YAKIMA, WA 98908

CRAIG, MARILEE K.
3419
SEATTLE, WA 98125

CRAIG, PAUL
1190
NACHES, WA 98937

CRAIG, ROSE M
1152
NACHES, WA 98937

CRAM, RICHARD L
1825
LEAVENWORTH, WA 98826

CRANKOVICH, ALAN A
2710
CLE ELUM, WA 98922

CRANKOVICH, ALBERT
2703
ROSLYN, WA 98941

CRANKOVICH, CYNTHIA A.
2704
CLE ELUM, WA 98922

CRATT, TOMMY
1288
ELLENSBURG, WA 98926

CRAWFORD SR, BARTIS W
1062
YAKIMA, WA 98908

CRAWFORD, CATHERINE
1223
NACHES, WA 98937

CRAWFORD, JOHN
1220
NACHES, WA 98937

CRIDER, CHARLES
3706
ELLENSBURG, WA 98926

CRIST, RUSTY
3787
KIRKLAND, WA 98083

CRONKHITE, CLARY
1758
YAKIMA, WA 98902

CROOK, TERRY M
0864
KIRKLAND, WA 98033

CROTHERS, ROGER
1578
NACHES, WA 98937

CROWDER, BETSY
2036
PORTOLA VALLEY, CA 94025

CROWELL, BOB
2537
YAKIMA, WA

CROWL, DOROTHY F
0367
STANDWOOD, WA 98292

CROWLEY, CAROLE
3384
SEATTLE, WA 98125

CRUM, JAMES B
2123
WENATCHEE, WA 98801

CRUTIS, ROSS R
1469
COTTAGE GROVE, OR 97424

CULVER, SAMUEL E
1346
TIETON, WA 98947

CUMMISK, GARY
2816
ELLENSBURG, WA 98926

CUNNINGHAM, KATHEEN M
3924
LYNNWOOD, WA 98037

CURILL, MADELYN
3674
SEATTLE, WA 98115

CURTIS, ANNE T
3901
SEATTLE, WA 98105

CURTIS, BOB
0104
E WENATCHEE, WA 98802

CURTIS, JANET
9073
BOISE, ID 83706

CURTISS, KEITH
4289
CLE ELUM, WA 98922

CURTSINGER, ARCHIE
0954
YAKIMA, WA 98908

CURTSINGER, JACK
1073
NACHES, WA 98937

CURTSINGER, JIM
0259
NACHES, WA 98937

CURTSINGER, TIM
2321
YAKIMA, WA 98902

CUSACK, GARY
4190
CLE ELUM, WA 98922

CUSHMAN, HAL
4240
CLE ELUM, WA 98922

CUSHMAN, JOHN
4238
CLE ELUM, WA 98922

CYR, WALTER
0991
YAKIMA, WA 98901

D" STAKE MILL INC
2160
MCMINNVILLE, OR 97128

D'ASARO, ERIC A.
0101
SEATTLE, WA 98115

DAFOE, VERA L.
3249
PORTLAND, OR 97219

DAHLEN, SANDRA
0313
LYNNWOOD, WA 98038

DAHLGREN, SCOTT
1914
WENATCHEE, WA 98801

DAHLIN, RON A.
1858
BAYPORT, MN 55003

DAIGNEAULT, FRED J
0529
CLE ELUM, WA 98922

DAILY, ROBERT T
3535
BELLINGHAM, WA 98226

DALE, MARK
2023
SEATTLE, WA 98136

DALEY, DIANE
2213
UNION, OR 97863

DALLMAN, GLENN
4029
CLE ELUM, WA 98922

DALLMAN, GORDON L.
4221
GLENOMA, WA 98338

DALROSKI, DAVID & PYN-
CHON, BARBARA
3047
SEATTLE, WA 98144

DALY, PATRICK K.
1598
TACOMA, WA 98402

DAMON, PATRICK J
1457
BEND, OR 97701

DANIELS, M KEITH
1565
YAKIMA, WA 98908

DANIELS, C JEANNIE
3845
BRIER, WA 98038

DANNAHAUER M D , ALLAN R.
2917
SEATTLE, WA 98122

DANNAHAUER, LILA
3168
SEATTLE, WA 98115

DAPPEN, ANDY
9079
BRIER, WA 98038

DARK, THOMAS A.
1999
SEATTLE, WA 98155

DARLINGTON, DOUG
1538
LEAVENWORTH, WA 98828

DART, MICHAEL F
3124
CASHMERE, WA 98815

DARVILL JR, M D , FRED T
0484
MT VERNON, WA 98273

DAVENPORT, MICHAEL J
4328
PESHASTIN, WA 98847

DAVENPORT, MICHAEL S
1519
SUMNER, WA 98390

DAVENPORT, ORVILLE
0461
LEAVENWORTH, WA 98828

DAVES, RONALD B.
4217
RENTON, WA 98055

DAVES, SANDRA A.
3990
RENTON, WA 98055

DAVID, ELMER D
0967
YAKIMA, WA 98908

DAVIDSON, HARRY A.
0097
BELLEVUE, WA 98004

DAVIDSON, LINDA
3420
KIRKLAND, WA 98034

DAVIS, ANDREA
1122
ELLENSBURG, WA 98926

DAVIES, DAVE
0860
SEATTLE, WA 98122

DAVIES, JEROME G
1123
ELLENSBURG, WA 98926

DAVIS, C HUNTER
3178
VASHON, WA 98070

DAVIS, DON
0964
YAKIMA, WA 98908

DAVIS, EUGENE
1203
MOXEE, WA 98936

DAVIS, JEFF W
3390
WINTHROP, WA 98882

DAVIS, JERRY
9030
SELAH, WA 98942

DAVIS, JOHN
4307
TUCSON, AZ 85703

DAVIS, LINDA
2315
YAKIMA, WA 98903

DAVIS, MARY A.
3350
EDMONDS, WA 98020

DAVIS, MINOT
2183
SEATTLE, WA 98105

DAVIS, RICHARD
0975
YAKIMA, WA 98901

DAVIS, ROSALIE
1204
MOXEE, WA 98936

DAVIS, TOM
1549
CASHMERE, WA 98815

DAWKINS, DONNA
3385
REDMOND, WA 98053

DAWN, RON
3984
SILVERDALE, WA 98383

DAY, DABUEK A.
1875
YAKIMA, WA 98901

DAY, FRANCIS T
1791
WENATCHEE, WA 98801

DAY, HOLLIS
0111
TACOMA, WA 98401

DAY, LEROY C
0802
KITITAS, WA 98934

DE CAMP, BARBARA
3537
NO ADDRESS

DE CAMP, G C
0009
QUINCY, WA 98848

DE CAMP, LARRY
2116
NO ADDRESS

DE CHENNE, WANDA MARTIN
2632
WENATCHEE, WA 98801

DE GARIS A.S.C T , W A.
0084
BURNABY, BC

DE JONG, DAVE
4460
WENATCHEE, WA 98801

DE LANCY, RAY
1908
CASHMERE, WA 98815

DE LUCCHI, MILO C
3637
SEATTLE, WA 98138

DE WEESE, BILL
1145
YAKIMA, WA 98902

DE WEESE, CAREY
1156
YAKIMA, WA 98902

DE WEESE, JIMMY
1155
YAKIMA, WA 98902

DE WEESE, TIM
1144
YAKIMA, WA 98902

DEAN CPA, STEPHEN M
3842
STANWOOD, WA 98292

DEAN, ALICE I
2297
YAKIMA, WA 98908

DEAN, LARRY E.
2198
YAKIMA, WA 98902

DEAN, NANCY L.
3843
SEATTLE, WA 98133

DEARING, JOHN
4291
S CLE ELUM, WA 98943

DEARRINGER, E A.
4521
LYNNWOOD, WA 98036

DECAMP, BARBARA
2102
NO ADDRESS

DECARP, LARRY
3527
NO ADDRESS

DECOTA, W A.
3588
YAKIMA, WA 98903

DEEBACH, MICHELLE
2732
EVERETT, WA 98204

DEFORREST, SYLVIA
2235
SEATTLE, WA 98177

DEGRANDPRE, MIKE
3433
SEATTLE, WA 98115

DEHOLLANDER, BELINDA
0344
ELLENSBURG, WA 98926

DEHOLLANDER, BELINDA
4500
ELLENSBURG, WA 98926

DELCOUR, JOLENE L.
1601
TACOMA, WA 98407

DELCOUR, ROBERT E.
1595
TACOMA, WA 98466

DELLINGER, DIANE L.
3531
SEATTLE, WA 98112

DELONG, JAMES B.
0832
SEATTLE, WA 98103

DELONG, RUTH WINE
3928
LEAVENWORTH, WA 98826

DERP, GENE
1092
YAKIMA, WA 98902

DEMADE, HARRY
0712
E. WENATCHEE, WA 98802

DEMARTIN, GERALD H
3312
CHELAN, WA 98816

DENDRON, R
0434
CORVALLIS, OR 97333

DENNING, JACK
3391
ROSLYN, WA 98941

DENSON, RENDER D
3017
SEATTLE, WA 98115

DENT, ORRIS
3033
SEATTLE, WA 98103

DENTON, SANDY
3597
LYNWOOD, WA 98037

DENZEL, WILLIAM T
3115
SEATTLE, WA 98177

DENZLER, JOHN
1851
SUMNER, WA 98390

DEPUE, ANNE E
4125
SEATTLE, WA 98105

DESGROSELLIER, ROBERT J
1032
YAKIMA, WA 98902

DESMARAI, TOM
0485
YAKIMA, WA 98902

DESSER, DONNA M
0888
SEATTLE, WA 98125

DETILLION, NEAL
0269
PESHASTIN, WA 98847

DEVIETTI, DR. TER & REB
SMITH
3589
ELLENSBURG, WA 98926

DEVIN, DOUG
0022
WINTHROP, WA 98862

DEWEESE, EVELYN
2684
NACHES, WA 98937

DEWELL, ALICE & JULIAN
2164
EVERETT, WA 98201

DEWELL, B J
1937
E. WENATCHEE, WA 98802

DEWEY, WM & BARBARA
4123
RENTON, WA 98058

DEWITT, PAT
2175
E WENATCHEE, WA 98802

DICE, STEVEN F
4448
FEDERAL WAY, WA 98023

DICKEY, HEATHER
2687
YAKIMA, WA 98901

DICKEY, M A
2688
YAKIMA, WA 98901

DICKINSON, JEFF T
3556
CHELAN, WA 98816

DICKSON, DON
2189
RENTON, WA 98057

DICKSON, DON
3071
RENTON, WA 98057

DICKSON, DON & MAURA
3072
SEATTLE, WA 98148

DIETRICH, CHARLES E.
2389
NACHES, WA 98937

DIETRICH, CONNIE
2388
NACHES, WA 98937

DIETRICH, JOHN
2972
CHELAN FALLS, WA 98817

DIETRICK, SCOTT A.
3023
NO ADDRESS

DILLY, CLAUDE
4301
SEATTLE, WA 98107

DILLY, LES
2725
CASHMERE, WA 98815

DITTMAR, STANLEY P
2789
SEATTLE, WA 98112

DOCTOR, PAMELA G
3481
RICHLAND, WA 99352

DOCTOR, STEVEN R.
3482
RICHLAND, WA 99352

DODGE, NICK
3202
PORTLAND, OR 97201

DODRILL, RICHARD E.
0692
LEAVENWORTH, WA 98826

DOHERTY, JAMES A.
3544
PAGO PAGO, AS 96799

DOINAN, MALCOLM
0771
WARD COVE, AK 99901

DOLBY, DOROTHY J
9100
BELLINGHAM, WA 98226

DOLE, MICHAEL N
4156
SEATTLE, WA 98103

DOLES, DIANE
0442
SEATTLE, WA 98122

DOLL, MARK A.
1023
YAKIMA, WA 98901

DOLMAN, EMMA
3503
CASHMERE, WA 98815

DOLPH, PHYLLIS & DON
3031
WAPATO, WA 98951

DOLPH, PHYLLIS & IVAR
3079
WAPATO, WA 98951

DOLQUIST, CHUCK
1632
YAKIMA, WA 98902

DONAHUE, MICHAEL
3559
SEATTLE, WA 98102

DONALDSON, J W
0320
UNION GAP, WA 98903

DONALDSON, JIM & JAN
3580
ROSLYN, WA 98941

DONBAR, DAVID A.
0959
YAKIMA, WA 98902

DONIVAN, TIMOTHY L.
2219
LA GRANDE, OR 97850

DOOLEY, WENDELL
1528
E WENATCHEE, WA 98802

DORAN, J C
4441
RICHLAND, WA 99352

DORAN, JOHN
2603
KENNEWICK, WA 99336

DORN, JIM
0903
MOXEE, WA 98936

DORNS, ROBERT
2190
BREMERTON, WA 98310

DOROUGH, DAVID
9090
SEATTLE, WA 98126

DOROUGH, SCOTT & LORI
3683
EVERETT, WA 98204

DOSSETT, DARRYL
3943
MANSON, WA 98831

DOTY, JACK & YOUNG, BOB
3120
CHELAN, WA 98816

DOTY, SHIRLEY
2122
OLYMPIA, WA 98504

DOUD, DANIEL
1157
SELAH, WA 98942

DOUGLAS, LAWRENCE J
1181
YAKIMA, WA 98902

DOUGLAS, SHARLOSE
1240
YAKIMA, WA 98903

DOURS, DAVID & GRETCHEN
3189
BOTHELL, WA 98021

DOVE, BILL
2358
CENTERVILLE, WA 98613

DOVER, BEN
0785
YAKIMA, WA 98907

DOVER, SHARI
0778
YAKIMA, WA 98908

DOW, CONSTANCE D
0841
ISSAQUAH, WA 98027

DOWE, MINA
2530
YAKIMA, WA 98907

DOWELL, JERI
3355
CHELAN, WA 98816

DOWNS, L V
2743
EPHRATA, WA 98823

DRAFS, A G
0721
BELLINGHAM, WA 98226

DRAFS, JONENE
0625
SEATTLE, WA 98105

DRAFS, KAREN
0727
BELLINGHAM, WA 98826

DRAFS, SCOTT
0739
BELLINGHAM, WA 98226

DRAGSETH, STEFFEN
4445
PACIFIC, WA 98043

DRAPER, F M
0069
SEATTLE, WA 98105

DREISBACH, ROBERT H
2165
SEATTLE, WA 98155

DROLLINGER, BILL & RUTH
3370
PORT ORCHARD, WA 98366

DRURY, CHRISTY
1522
YAKIMA, WA 98903

DRYDEN, ROBERT G
0098
KENT, WA 98032

DRYDEN, ROBERT G
4074
KIRKLAND, WA 98034

DUCHESNE, CHRISTINA
3103
YAKIMA, WA 98902

DUERES, CURTIS
1082
NO ADDRESS

DUFF, ALAN GREGORY
1633
MOXEE, WA 98936

DUFFIELD, DENNIS
2531
MOXEE, WA 98936

DUKE, MARJORIE B
4027
YAKIMA, WA 98908

DUNCAN, MAX
3153
SEATTLE, WA 98112

DUNCAN, SUSAN
3045
LEAVENWORTH, WA 98826

DUNN, SUE
2484
NACHES, WA 98937

DUNNAGAN, BOB
2140
ASHFORD, WA 98330

DUNNELL, C W
0025
WENATCHEE, WA 98801

DUNNING, BUD
1626
ELLENSBURG, WA 98926

DUNNING, JEANNE
1625
ELLENSBURG, WA 98926

DUNSETH, FRANK
0730
SULTAN, WA 98294

DURALL, RICHARD L.
1574
YAKIMA, WA 98902

DURAN, CATHY
2300
YAKIMA, WA 98902

DURAND, BETTY
1876
YAKIMA, WA 98908

DURAND, DUNCAN
1089
YAKIMA, WA 98901

DURKAN, BEATRICE
3267
CURLEW, WA 99116

DURSCH, ANN
4308
ANACORTES, WA 98221

DURUZ, HATTIE
2852
SEATTLE, WA 98117

DYCHES, DAVID W
2626
LEAVENWORTH, WA 98826

DYCHES, NITA L.
2630
LEAVENWORTH, WA 98826

DYE, DAVID L.
2820
BELLEVUE, WA 98006

DYER, BOB
3286
OLYMPIA, WA 98503

DYER, JOHN
3978
OLYMPIA, WA 98502

EADON, RICK
0441
SEQUIM, WA 98382

EAGER, BETTY JO
4036
ZILLA, WA 98953

EARLY, RAYMOND W
9047
SEATTLE, WA 98155

EASTERN WA DIRT RIDERS
3650
KENNEWICK, WA 99336

EASTERWOOD, CHERYL
2833
SEATTLE, WA 98105

EASTMAN, DONALD ARBY
0741
SEATTLE, WA 98103

EASTON, EDITH L.
2012
WOODINVILLE, WA 98072

EATON, AL
4410
BURLE, WA 98322

EBEL, FRED
0142
LA GRANDE, OR 97850

EBEL, FREDERICK W
2222
COLBERT, WA 99005

EBERHARDY, CHARLES F
4009
KENT, WA 98042

EBERLE, DAN
1078
YAKIMA, WA 98908

ECALBARGER, R.W
1903
E WENATCHEE, WA 98802

ECHOLS, CRAIG
3565
SEATTLE, WA 98103

ECK, BRIAN D
1514
SEATTLE, WA 98188

ECKERT, THOMAS L.
1941
SEATTLE, WA 98102

ECKHART, JOHN J
0887
SEATTLE, WA 98134

ECKIS, DON
2770
PASCO, WA 99301

ECOB, TRUDY
3266
MERCER ISLAND, WA 98040

EDDINGS, LYLE K.
2285
KETTLE FALLS, WA 99141

EDDY, JAMES M
1658
SELAH, WA 98942

EDERTON, DAVID
2556
YAKIMA, WA 98908

EDGE, MICHAEL
2870
CASHMERE, WA 98815

EDINGER, JAMES
1671
YAKIMA, WA 98901

EDISON, JOHN
3699
SEATTLE, WA 98115

EDRICH, VANESSA B
3399
MULKITEO, WA 98275

EDWARDS, NOREEN & TOM
1962
SEATTLE, WA 98125

EDWARDS, ROBERT A
3269
KENNEWICK, WA 99336

EDWARDS, WILLIAM A.
3463
REDMOND, WA 98052

EGG, DOROTHY
2817
YAKIMA, WA 98902

EHLERS, E. GEORGE
2982
SEATTLE, WA 98115

EHLIS, LEO R
1009
YAKIMA, WA 98902

EISENBERG, HELEN G
3040
SEATTLE, WA 98109

EISENMAN, INGIRD
3518
MERCER ISLAND, WA 98040

EKDAHL, BRIAN
0431
AUBURN, WA 98002

EKENBARGER, RAYMOND,
2540
YAKIMA, WA 98908

ELAMER, RICHARD
4543
NO ADDRESS

ELANDER, FREDDIE D
1196
YAKIMA, WA 98908

ELDRIGE, JACK
0160
E WENATCHEE, WA 98801

ELF, JENNIFER
3768
ELLENSBURG, WA 98926

ELLENBARGER, LEE
1257
EASTON, WA 98925

ELLENSBURG CHAMBER OF
COMMERCE
3582
ELLENSBURG, WA 98926

ELLIOT, LESTER
2624
WENATCHEE, WA 98801

ELLIOT, NANCY R
2249
NACHES, WA 98937

ELLIOTT, HAL J
2238
NACHES, WA 98937

ELLIS, JOHN W E
0706
ENTHAT, WA 98811

ELLIS, KAREN
1242
SELAH, WA 98942

ELLIS, LARRY
1167
YAKIMA, WA 98903

ELLIS, MARJORIE J
3827
ARLINGTON, WA 98223

ELLIS, MARY MARIE
2441
YAKIMA, WA 98903

ELLIS, TERRY
1169
SELAH, WA 98942

ELLIS, WALLACE C
3536
ARLINGTON, WA 98223

ELLS, BARRY
1913
CASHMERE, WA 98815

ELMER, MRS GWEN
4201
NO ADDRESS

ELMER, RICHARD
4249
NO ADDRESS

ELMO, JERRY
1381
YAKIMA, WA 98901

ELOFSON, HOWARD
3587
YAKIMA, WA 98901

ELSTON, RUSSELL K
1364
YAKIMA, WA 98901

EMANUEL, ROGER
1444
MERRILL, WI 54452

EMHOFF, STEVE
2457
YAKIMA, WA 98902

EMMONS, CLYDE
3919
CLE ELUM, WA 98922

EMMONS, RICHARD W
4316
LEAVENWORTH, WA 98826

ENBOM, KATHLEEN
1826
TACOMA, WA 98949

ENDERBY, JESS P
2371
GOLDENDALE, WA 98820

ENDERLEIN, CHRISTOPH
4132
SEATTLE, WA 98125

ENDERLEIN, CHRISTOPH
4450
SEATTLE, WA 98125

ENDERLEIN, MARGARET
0812
SEATTLE, WA 98125

ENGEL, DAVID
3429
SEATTLE, WA 98155

ENGEL, PEG
3140
SEATTLE, WA 98155

ENGELS, HERB
1264
CLE ELUM, WA 98922

ENGELS, MARTIN K.
1260
CLE ELUM, WA 98922

ENGELS, ROB
1259
CLE ELUM, WA 98922

ENGELS, WAYNE A.
1262
CLE ELUM, WA 98922

ENGLEBRIGHT, E G
2825
ANACORTES, WA 98221

ENGLISH JR, CHARLES J
3858
RICHLAND, WA 99352

ENGLISH, HOMER
3506
WENATCHEE, WA 98801

ENGSTROM, K.R
0404
PASCO, WA 99301

ENNIS, EARL W
0302
NACHES, WA 98937

ENNIS, ROD
0926
NACHES, WA 98937

ENSEY, DOYLE E
2373
GOLDENDALE, WA 98820

ENSIGN, DIANE
3620
PORTLAND, OR 97219

EONS, SUSAN
3423
WENATCHEE, WA 98801

EPHRATA SPORTSMENS AS-
SOC
3873
EPHRATA, WA 98823

ERB, GENE L.
1819
E WENATCHEE, WA 98801

ERDMANN, DR KIMBALL S
2779
SLIPPERY ROCK, PA 16127

ERICKSON PH D MBA, G A.
3949
SEATTLE, WA 98125

ERICKSON, STEVE & EDAIN,
MARIANNE
4142
LANGLEY, WA 98260

ERVIN, CLIFFORD E
1678
YAKIMA, WA 98902

ERWAY, JOHN
3272
RENTON, WA 98056

ERWOOD, RICHARD G
2791
SEATTLE, WA 98168

ERWOOD, STEVEN G
2010
TUMWATER, WA 98502

ESCH, SANDRA
1439
MILWAUKIE, OR 97222

ESCHRICH, ROBERT W
3638
MERCER ISLAND, WA 98040

ESTERHOLDT, GORDON
0359
CLE ELUM, WA 98922

ESTES, BRIAN
1084
YAKIMA, WA 98908

ETHEY, MICHAEL
4212
ROSLYN, WA 98941

ETNYRE M S W, WILLIAM S
3669
SEATTLE, WA 98119

EUSTIS, JEFFREY M
3393
SEATTLE, WA 98104

EVANS, ALMA FAYE
2461
SELAH, WA 98942

EVANS, DALE R
0718
PORTLAND, OR 97232

EVANS, DENNIS
0614
CHELAN, WA 98816

EVANS, GORD T
3058
OLYMPIA, WA 98506

EVANS, JAMES
3352
FREELAND, WA 98249

EVANS, JO ANN
3764
SEATTLE, WA 98105

EVANS, L.J
1212
YAKIMA, WA 98908

EVANS, LEE R.
2455
SELAH, WA 98941

EVANS, MARGARET
1213
YAKIMA, WA 98908

EVANS, S S
0296
NO ADDRESS

EVANS, W E
1768
LEAVENWORTH, WA 98826

EWAN, JOE M
2280
COLVILLE, WA 99114

EWART, JOANNA V
4350
SELAH, WA 98942

EWART, KIRK
2705
BOISE, ID 83728

EWING, ARNOLD
1810
PLEASANT HILL, OR 97455

EYAN, ROBERT E.
0848
COWICHE, WA 98923

FACKLER, RALPH
2764
NO ADDRESS

FAGER, CRAIG
2071
SPOKANE, WA 99203

FAGER, DON
2026
E WENATCHEE, WA 98802

FAGER, DON & THEA
0493
E WENATCHEE, WA 98802

FAGER, THEA
2016
E WENATCHEE, WA 98802

FAHLENKAMP, WALT
2350
GOLDENDALE, WA 98820

FAHNESTOCK, AUBREY D
2549
YAKIMA, WA 98902

FAIR, MARCIA
0399
SEATTLE, WA 98199

FAIRCHILD, EUGENE D
3465
WENATCHEE, WA 98801

FAIRHART, E M
1604
MORTON, WA 98356

FAIRMAN, WILLIAM
3774
YAKIMA, WA 98908

FAITH AICP, RICHARD R
4294
YAKIMA, WA 98902

FALCO, AL
2058
SEATTLE, WA 98146

FALING, JUDY
3758
ELLENSBURG, WA 98926

FALTEISEK, DEAN & NAN
2069
CASHMERE, WA 98815

FANT, KAREN M
4511
SEATTLE, WA 98145

FARDELL, KIM
3062
RICHLAND, WA 99352

FARMER, THOMAS
2428
MCDOLE ISLAND, NY 11953

FARNSWORTH, CARL E
1818
YAKIMA, WA 98908

FARNSWORTH, GERALD
1863
YAKIMA, WA 98908

FARRIMOND, MARTY
3054
SEATTLE, WA 98155

FARRIS, SALLY
1830
TACOMA, WA 98403

FAULKNER, BARBARA
1571
SELAH, WA 98941

FAULKNER, MERRITT W
3505
LYNNWOOD, WA 98036

FAUST, EDWARD
0026
E WENATCHEE, WA 98802

FAY, DARLENE
2887
YAKIMA, WA 98903

FAY, GERALD H
1358
YAKIMA, WA 98903

FEBBER, J M
0271
LEAVENWORTH WA 98826

FEIGL, ERIC
0840
SEATTLE, WA 98122

FEIL, MELVIN H
1803
WENATCHEE, WA 98801

FEIN, ALBERT H
0733
EDMONDS, WA 98020

FELDHaus III, JOSEPH
0874
KENNEWICK, WA 99336

FELDHaus, DEBRA D
0875
KENNEWICK, WA 99336

FELL, DON
4369
LEAVENWORTH, WA 98826

FENLIN, JAMES T
0817
EVERETT, WA 98204

FENSKE, DOUGLAS H
3042
ELLENSBURG, WA 98926

FENSNER, JOHN D
1885
SELAH, WA 98942

FERBER, MRS ROBERT H
0061
SEATTLE, WA 98136

FERINGER, JO ANNE & DICK
3443
BELLINGHAM, WA 98226

FERKOVICH JR, ALEX
3610
SEATTLE, WA 98115

FERM, MARGARET H
0624
MONROE, WA 98272

FERRARI, PAUL
4021
EDMONDS, WA 98020

FERREN, SHERRY
2639
DRYDEN, WA 98821

FERRIS, B M
1951
SEATTLE, WA 98115

FICK, ARTHUR R
1964
BREMERTON, WA 98310

FIDDLER, RICHARD
3159
SEATTLE, WA 98177

FIDDLER, RICHARD
3992
SEATTLE, WA 98177

FIELD, SHELDON
2467
ELLENSBURG, WA 98926

FIELDER, JIM
2567
YAKIMA, WA 98907

FIELDS, LEROY
2359
GOLDENDALE, WA 98620

FIKE, NANCY
1412
NACHES, WA 98937

FINCHUM, RANDEL
2620
LEAVENWORTH, WA 98828

FINK, ANN
3927
LEAVENWORTH, WA 98826

FINK, ANN
4464
LEAVENWORTH, WA 98826

FINK, WANDA
3032
VASHON, WA 98070

FINLEY, CURT
3126
E. WENATCHEE, WA 98802

FINLEY, TOM
1716
YAKIMA, WA 98901

FISCHER, DICK
0110
ELLENBURG, WA 98826

FISCHER, GEORGINA M
4365
RANDLE, WA 98377

FISCHER, ROBERT
2782
NO ADDRESS

FISH AND WILDLIFE SERVICE
9066
OLYMPIA, WA 98502

FISHBURN, STAN
3016
LEAVENWORTH, WA 98826

FISHER, PAULYNE M
4480
NO ADDRESS

FISHER, RICHARD H
2547
YAKIMA, WA 98901

FISK, BARBARA
1252
TIETON, WA 98947

FISK, MARION W
1588
TIETON, WA 98947

FITZPATRICK, MICHAEL LEE
0918
YAKIMA, WA 98902

FITZPATRICK, TAMARA
2988
SEATTLE, WA 98116

FITZPATRICK, WILLIE
1763
E WENATCHEE, WA 98802

FLANAGAN, KATHLEEN M
1603
TACOMA, WA 98466

FLEENER, GORDON E
2992
SEATTLE, WA 98107

FLEMING, CHERYL A.
2101
KIRKLAND, WA 98034

FLEMING, CHERYL A.
3613
KIRKLAND, WA 98034

FLEMING, DOUGLAS
3612
KIRKLAND, WA 98005

FLEMING, DOUGLAS E.
2113
KIRKLAND, WA 98034

FLEMING, JIM L.
2107
KIRKLAND, WA 98034

FLEMING, MICHAEL S
2098
KIRKLAND, WA 98034

FLEMING, MICHAEL S
3618
KIRKLAND, WA 98034

FLEMING, SUSAN J
4455
SEATTLE, WA 98105

FLEMING, TIM L.
3526
KIRKLAND, WA 98034

FLESCHER, RUSTY
0623
BELLINGHAM, WA 98226

FLEWELLEN, LORENE
4358
TACOMA, WA 98466

FLICK, MARY
3003
SEATTLE, WA 98109

FLORAKIS, SHARON
3311
SEATTLE, WA 98109

FLORTH, MARY
4012
MANSON, WA 98831

FLOWERS, GLEN E.
1170
YAKIMA, WA 98904

FLUHARTY, DAVID
4507
SEATTLE, WA 98117

FOEHRING, BOB & DEB
4454
SEATTLE, WA 98199

FOEHRING, R C
0091
SEATTLE, WA 98199

FOLAND, L.E.
1804
WENATCHEE, WA 98801

FORBES, JEFF
3137
SEATTLE, WA 98115

FORD, PAUL W
3366
SEATTLE, WA 98177

FORDERHASE, BARBARA
0785
SEATTLE, WA 98125

FOREMAN, DEBBIE
0333
CASHMERE, 98915

FOREMAN, STEVE
0332
CASHMERE, WA 98915

FORESYTH, JANICE
1042
NACHES, WA 98937

FORSCHMIEDT, RACHMIEL
3335
REDMOND, WA 98052

FORTIER JR, HENRY
2305
YAKIMA, WA 98902

FORTIER, BRAD
1404
YAKIMA, WA 98901

FORTIER, LARRY
1382
YAKIMA, WA 98901

FORTIFIBER CORP, MEYER
AND SMART
0121
CLACKAMAS, OR 97015

FOSS, NANCY
3983
POULSBORO, WA 98370

FOSS, TIMOTHY
3345
CLE ELUM, WA 98922

FOSTER, G J
3835
EPHRATA, WA 98823

FOSTER, JEFFREY R
3553
LARAMIE, WY 82070

FOSTER, SYD
1391
YAKIMA, WA 98903

FOUNTAIN, PETER
3611
TWISP, WA 98956

FOY, GERALD L.
1525
YAKIMA, WA 98908

FRACK, LARRY
3344
WENATCHEE, WA 98801

FRALEY, ANN
1570
YAKIMA, WA 98902

FRANCE, ARDEN
2588
WENATCHEE, WA 98801

FRANCIS, LINDA
1838
GIG HARBOR, WA 98335

FRANCY, ANN
3400
MARYSVILLE, WA 98270

FRANK, GEORGE D
1842
KENNEWICK, WA 98336

FRANK, K.W
0546
SHELTON, WA 98584

FRANKLIN, COLETTE
2928
YAKIMA, WA 98901

FRANSEY, R C
3794
ENTIAT, WA 98822

FRANZ, CARL
3284
EVERETT, WA 98205

FRASER, JUDITH
3776
S CLE ELUM, WA 98943

FRAZER, HENRY
3024
ROSLYN, WA 98941

FRAZER, RONALD L.
2413
UNION GAP, WA 98903

FREDERICKSON, BEA
4150
TACOMA, WA 98424

FREDRICK, JACK
1707
YAKIMA, WA 98902

FREDRICK, MARGE
3958
NO ADDRESS

FREDSALL, R M
3551
PORTLAND, OR 97204

FREEDMAN, ERNEST & BART
2936
SEATTLE, WA 98122

FREEDMAN, MITCH
0575
SEATTLE, WA 98145

FREEMAN M D, LARRY S
0428
SPOKANE, WA 99204

FREER, RICHARD
2366
GOLDENDALE, WA 98620

FREIMARK, ROBERT M
4493
SEATTLE, WA 98101

FREUND M D, FELIX G
0351
SEATTLE, WA 98115

FRICKE, LAVARA
4171
MUKILTEO, WA 98275

FRIEDMAN, NEAL
4235
SEATTLE, WA 98103

FRIENDS OF WHITEWATER
3878
SEATTLE, WA 98111

FRIES, CHARLES
4026
CASHMERE, WA 98815

FRIES, MARY A.
3085
TACOMA, WA 98403

FRIESTMAN, MATT
0136
PASCO, WA 99301

FRISK, CLARENCE
0202
ENTIAT, WA 98822

FRISK, CLARENCE G
1183
YAKIMA, WA 98901

FRISK, EMMA JEAN
1185
YAKIMA, WA 98901

FRISK, TAMI
0201
ENTIAT, WA 98822

FRISK, TERRY E
1150
YAKIMA, WA 98902

FRISQUE, BOB & JO
3368
NACHES, WA 98937

FRISQUE, JAMES F
3663
YAKIMA, WA 98902

FRISQUE, JO ANNE
0603
NACHES, WA 98937

FROST, PETER J
0659
EVERETT, WA 98204

FRYE, RAY
4075
ISSAQUAH, WA 98027

FRYOR, BRIAN
0921
YAKIMA, WA 98901

FUDAZ, LARRY T
3009
CLE ELUM, WA 98922

FUENTES, RENE
3383
BOTHELL, WA 98011

FUENTES-WILLIAMS, L
0152
COEUR D' ALENE, ID 86814

FUJIMAN, DALE
3258
PT ORCHARD, WA 98366

FULCHER, KATHY
1645
YAKIMA, WA 98908

FULLER, KATHRYN
1638
YAKIMA, WA 98908

FUNKHOUSER, WAYNE
0322
SELAH, WA 98942

FUTRELL, MAXINE
0220
LEAVENWORTH, WA 98828

FYRE, ROBERT C
1945
EATONVILLE, WA 98328

GABBARD, DANA R
0994
NACHES, WA 98937

GABBARD, EMMA
1210
SELAH, WA 98942

GABBARD, JACK
1182
SELAH, WA 98942

GABBARD, JERRY D
1031
YAKIMA, WA 98902

GAGNAT-DURAN, C V
3247
SEATTLE, WA 98136

GALBRAITH, BILL
1692
YAKIMA, WA 98901

GALBREATH, DONALD S
4263
EPHRATA, WA 98823

GALLAGHER, PAT & BARB
4014
CASHMERE, WA 98815

GALLAND, DAVE
2291
YAKIMA, WA 98901

GALLINATTI, DEBBIE
1835
TACOMA, WA 98403

GALLOWAY, EUGENE & KAYE
0572
TACOMA, WA 98407

GALPIN, GREG
9056
RICHLAND, WA 99352

GALPIN, GREG
9063
RICHLAND, WA 99352

GALPIN, HAROLD
0827
RICHLAND, WA 99352

GALPIN, RONALD H
3484
KENNEWICK, WA 98336

GAMACHE, DAN
2420
GRANGER, WA 98932

GAMACHE, LAWRENCE
1691
YAKIMA, WA 98902

GAMBLE, HAROLD
3313
BOTHHELL, WA 98021

GANN, DAVID L.
0500
BELLINGHAM, WA 98226

GARBE, HAROLD E
1384
UNION GAP, WA 98903

GARCIA, CARMEN
2584
YAKIMA, WA 98908

GARCIA, DAMEN
2610
YAKIMA, WA 98908

GARCIA, MERCED
2608
YAKIMA, WA 98908

GARCIA, RENE
2585
YAKIMA, WA 98908

GARCIA, SYLVIA
3252
BELLEVUE, WA 98007

GARDINER, DENNIS
1454
EUGENE, OR 97401

GARDNER, LEAH
2718
SEATTLE, WA 98103

GARDNER, LEN
4298
SEATTLE, WA 98117

GARDNER, RAYMOND F
1617
S CLE ELUM, WA 98943

GARKA, ARNOLD
0331
MARYSVILLE, WA 98270

GARLING, MS KATHLEEN
4079
SEATTLE, WA 98178

GARNER, FRANCES M
1620
S CLE ELUM, WA 98943

GARNER, JAMES E
1683
YAKIMA, WA 98901

GARNS, ELMER H
1352
YAKIMA, WA 989

GARRARD, THOMAS A.
3303
SEATTLE, WA 98115

GARRETSON, JOEL B
4354
YAKIMA, WA 98908

GARRETT, ROGER C
3606
TIGARD, OR 97223

GARRIC, RICHARD
0656
AUBURN, WA 98002

GARRISON, BILL
0207
ENTIAT, WA 98822

GARRISON, CHARLENE
0208
ENTIAT, WA 98822

GARZA, ABDON
0919
TOPPENISH, WA 98948

GARZA, AMELIA M
1893
GRANDVIEW, WA 98930

GASTFIELD, NORMAN A.
0308
ENTIAT, WA 98822

GATES, ROYCE R.
1490
BRONSON, MI 49028

GAUDETTE, GERALD A.
1640
YAKIMA, WA 98901

GAUDETTE, JACK E.
1380
YAKIMA, WA 98902

GAVIN, PAT
1689
TIETON, WA 98947

GAYLE, DEBORAH L.
2989
SEATTLE, WA 98107

GEBBARD, HAROLD
0290
LEAVENWORTH, WA 98826

GEBHARD, VIRGINIA
0270
LEAVENWORTH, WA 98826

GEEGH, WILSON
4246
SEATTLE, WA 98103

GEFRE, TONY
1379
YAKIMA, WA 98901

GEISINGER, JIM
1517
PORTLAND, OR 97266

GELLENBECK, GERI & DE-
WAYNE
4276
TACOMA, WA 98445

GELLERT, ERIC N
2053
BOTHHELL, WA 98011

GELLERT, GEORGE O
3690
MERCER ISLAND, WA 98040

GENEVAUX, RAYMOND P
2793
WILMINGTON, DE 19807

GENEVAUX, RAYMOND P
3607
WILMINGTON, DE 19807

GENTRY, JAMES R.
1609
WENATCHEE, WA 98801

GENTRY, REX
4304
SEATTLE, WA 98144

GEORGESON, STANLEY T
4103
ROSLYN, WA 98941

GERBER, LANE A.
0413
SEATTLE, WA 98115

GERDES, JOHN
2472
YAKIMA, WA 98902

GERISH, GRETCHEN C
2752
LEAVENWORTH, WA 98826

GERMAN, MELFORD A.
2405
YAKIMA, WA 98901

GERSTUNG, ERIC
2894
CITICUS HEIGHTS, CA 95610

GESE, LEO J
0592
LYNNWOOD, WA 98046

GETTELMAN, MEL, GAEL &
SANDRA
2047
KENNEWICK, WA 98336

GIBBONS MD, GERALD E.
2050
WENATCHEE, WA 98801

GIBBS, CHRISTINE
0257
LEAVENWORTH, WA 98826

GIBBS, GRANT
1924
LEAVENWORTH, WA 98826

GIBBS, STEVEN P
2192
SHELTON, WA 98584

GIERLASINSKI, ELLA
0488
ELLENSBURG, WA 98926

GILBERT, ALLEN
2195
LAKE OSWEGO, OR 97034

GILBERT, JOHN P
0851
PORTLAND, WA 97219

GILBERTSON, JOHN R
2003
PORTLAND, OR 97204

GILL, RON
2483
YAKIMA, WA 98902

GILLIE, JIM
2462
NACHES, WA 98937

GILLIES, GEORGE & MILDRED
3523
OROVILLE, WA 98844

GILLIN, SCOTT
0288
E WENATCHEE, WA 98802

GILLY, DELBERT D
2535
YAKIMA, WA 98901

GIVEN, CARY & WENDY
4157
KIRKLAND, WA 98034

GIVON, CURT L.
3805
BOTHHELL, WA 98021

GJERTSON, JOE
0128
WENATCHEE, WA 98801

GLAESSNER, TINA
4282
OLGA, WA 98279

GLANGER, GENEVA
1859
COWICHE, WA 98923

GLASCOCK, SCOTT
3231
SEATTLE, WA 98112

GLASS, STEVE
1508
SEATTLE, WA 98166

GLAZIER, JACK
2551
YAKIMA, WA 98903

GLECKNER, ROGER
2374
GOLDENDALE, WA 98620

GLICK, JAN & HAZEL
0634
KIRKLAND, WA 98033

GLIDEWELL, SHIRLEY
1349
SELAH, WA 98942

GLOSSBRENNER, N
1306
YAKIMA, WA 98901

GLOVER, JACK R
1704
YAKIMA, WA 98902

GLOVER, MARIE
2247
NACHES, WA 98937

GLOVER, ROBERT J
2246
NACHES, WA 98937

GODFREY, RICHARD D
1647
YAKIMA, WA 98907

GOEHNER, DENNIS A.
1527
CASHMERE, WA 98815

GOEHNER, LISA
0168
DRYDEN, WA 98821

GOERSS M D, JEAN B.
3396
TACOMA, WA 98407

GOES, JAMES BRADLEY
0485
EUGENE, OR 97403

GOFF, CHARLES R
4503
ENTIAT, WA 98822

GOFF, ROGER
0908
YAKIMA, WA 98902

GOHEEN, DAVE
2794
EATONVILLE, WA 98328

GOHEEN, JOSEPH W
3801
SEATTLE, WA 98126

GOHMAN, MR & MRS C W
1814
YAKIMA, WA 98902

GOLDE, MARCY
0085
NO ADDRESS

GOLDETHORPE, JEANETTE
3444
WENATCHEE, WA 98801

GOLDSBERG, JENNIE S
3205
SEATTLE, WA 98125

GOLDSTEIN, DANIEL
3673
SAN FRANCISCO, CA 94103

GOMBISKI, TED
3640
CARNATION, WA 98014

GOMEZ, MIKE
2307
YAKIMA, WA 98902

GONZALES, LUIS
2545
YAKIMA, WA 98901

GONZALES, RUBEN
1005
YAKIMA, WA 98902

GOODALL, THOMAS K.
9089
SWEET, ID 83670

GOODFREY, JOHN
1766
NACHES, WA 98937

GOODHUE, KATHERINE
4278
NORDLAND, WA 98358

GOODING, BETTE
0177
LEAVENWORTH, WA 98826

GOODING, JERRY
0170
LEAVENWORTH, WA 98826

GOODING, KARI
0185
LEAVENWORTH, WA 98826

GOODKIND, EILEEN D
2119
WENATCHEE, WA 98801

GOODMAN, DONALD J
4046
SEATTLE, WA 98102

GOODWIN, CHARLES V
4402
YAKIMA, WA 98902

GOODWIN, DOROTHY G
3574
TACOMA, WA 98408

GOODWIN, KEN
0511
KIRKLAND, WA 98033

GOODWIN, LELA J
4399
YAKIMA, WA 98902

GOOLD, R S
0034
YAKIMA, WA 98902

GORDON, FREDRICK J
4129
ISSAQUAH, WA 98027

GORDON, LINDA
0319
YAKIMA, WA 98908

GORDON, MARIANNE
3912
THORP, WA 98946

GORDON, MERLE
0576
THORP, WA 98946

GORDON, STEVE
1743
YAKIMA, WA 98902

GORMAN, MICHAEL S
3324
STANWOOD, WA 98292

GORS, MERLE D
3493
SEATTLE, WA 98111

GORSLINE, JEREMIAH
4278
PORT TOWNSEND, WA 98388

GOSSETT, REV RICHARD L
1884
LA CONNER, WA 98257

GOUGH, DANIEL
4318
LEAVENWORTH, WA 98828

GOULD, D A.
4034
SEATTLE, WA 98136

GOWRYLOW, MIKE
3471
SEATTLE, WA 98119

GRAF, DAVID J
3727
YAKIMA, WA 98902

GRAF, SUSAN
3283
YAKIMA, WA 98902

GRAGE, DENNIS
3634
LYNNWOOD, WA 98037

GRAHAM, BARBARA
0856
EASTON, WA 98925

GRAHAM, CHARLES E
4522
KIRKLAND, WA 98033

GRAHAM, GARY D
1138
ELLENSBURG, WA 98928

GRAHAM, GLENN A.
1275
EASTON, WA 98925

GRAHAM, GREGG
1272
S CLE ELUM, WA 98943

GRAHAM, JOEY
1274
S CLE ELUM, WA 98943

GRAHAM, JUDY
2702
S CLE ELUM, WA 98943

GRAHAM, KERRY
4320
PESHASTIN, WA 98847

GRAHAM, LORRAINE
3143
RENTON, WA 98056

GRAHAM, PATRICIA L.
1283
CLE ELUM, WA 98922

GRAHAM, PAUL
1273
CLE ELUM, WA 98922

GRAHAM, RON
4041
YAKIMA, WA 98903

GRAHAM, SCOTT R
1278
EASTON, WA 98925

GRAHAM, CECIL
1288
CLE ELUM, WA 98922

GRANARD, RON & SUE
2017
SNOHOMISH, WA 98290

GRANGER, ROBERT E
0765
LEAVENWORTH, WA 98828

GRANSTRAND, DENNIS C
3109
YAKIMA, WA 98902

GRANT, MR & MRS CURTIS
2772
OTHELLO, WA 99344

GRANT, SAM
0325
OTHELLO, WA 99344

GRANUM, JORDAN L.
2380
GOLDENDALE, WA 98620

GRAY, RON
0845
RENTON, WA 98058

GRAZZINI, DONALD W
0135
KENNEWICK, WA 99337

GREEN, DENIS
0848
SEATTLE, WA 98105

GREEN, DOUG
2358
GOLDENDALE, WA 98620

GREEN, FRED D
2621
PESHASTIN, WA 98847

GREEN, GERALD
0505
VANCOUVER, WA 98685

GREEN, LEROY J
1530
WENATCHEE, WA 98801

GREENE M D, MARTIN L.
0665
SEATTLE, WA 98105

GREENE, SARAH E.(PAC NW
RESEARCH)
4550
CORVALLIS, OR 97331

GREENHAGEN L.
3245
SEATTLE, WA 98109

GREENWALT, JANET
0385
NACHES, WA 98937

GREENWOOD, STELLA
4194
KENT, WA 98032

GREER, ROBERT E
0985
NACHES, WA 98937

GREGORICH, AL
4225
YAKIMA, WA 98902

GREIN, RANDY
3815
SEATTLE, WA 98105

GRESHAM, MARLIN
2238
BOTHELL, WA 98012

GRIESON, ROBERT T
1511
PORTLAND, OR 97230

GRIFFITH, DORIS M
0418
ISSAQUAH, WA 98027

GRIFFITH, GWEN
3850
CHELAN, WA 98818

GRIFFITH, JACK E
8013
PASCO, WA 99302

GRIFFITH, ROBERT
3711
ISSAQUAH, WA 98027

GRIFFITH, STEVE W
3851
CHELAN, WA 98818

GRIFFITH, ZANA
9014
PASCO, WA 99302

GRIGG, WALTER J
1759
YAKIMA, WA 98907

GRIGGS, HELEN F
0743
BOTHELL, WA 98021

GRIGGS, TAMAN
0028
TACOMA, WA 98438

GRIGSBY, RAYMOND F
3431
KENNEWICK, WA 99338

GRIMES, DORIS E.
0334
CASHMERE, WA 98815

GRIMM, RICHARD
1711
NACHES, WA 98937

GRINDELAND, HARVEY A.
1747
SELAH, WA 98942

GROENIG, SANDRA M
2460
YAKIMA, WA 98902

GROH, JAMES
2804
POULSBO, WA 98370

GROVES, RICHARD O
4158
BOTHELL, WA 98021

GROW, GALE
3865
NACHES, WA 98937

GRUBB, JOE S
1227
SELAH, WA 98942

GRUBB, SUZANNE
1225
SELAN, WA 98942

GRUBER, LARRY
0600
PORT ORCHARD, WA 98368

GRUBER, MATT
4138
SEATTLE, WA 98178

GRUNEWALD, REX
0483
YAKIMA, WA 98826

GRUNWALD, GARY K.
4224
SEATTLE, WA 98102

GUERRERO, GREGORY A
3111
RENTON, WA 98058

GULL R N, A C S W, OLGA
3298
SEATTLE, WA 98144

GULLICKSON, GERALD P
0019
MOUNTLAKE TERR, WA 98043

GULTSCHER, LEE M
4044
LYNNWOOD, WA 98036

GUNNER, RON
1247
YAKIMA, WA 98902

GUNNYON, E L.
2345
GOLDENDALE, WA 98620

GUNTER, BYRON
1241
YAKIMA, WA 98903

GURNSEY, STEVE
2590
MEDFORD, OR 97504

GUSSMAN, JOHN
9057
MEDINA, WA 98039

GUSTAFSON, CHARLES
2177
SEATTLE, WA 98125

GUSTAFSON, JANE
2781
YAKIMA, WA 98901

GUTCHECK, ROBERT A
0390
BOTHELL, WA 98041

GUTHERLDGE, JOHNETHY H
1049
YAKIMA, WA 98902

GUTIERREZ, RICHARD
1061
YAKIMA, WA 98902

GWINN, ERNEST S
0811
SEATTLE, WA 98104

HAALAND, SHERILEE K
1702
YAKIMA, WA 98902

HAALAND, THEODORE
1297
YAKIMA, WA 98902

HABURCHAK, JOHN S
0352
SEATTLE, WA 98155

HACK, DONALD W
0540
LONGVIEW, WA 98632

HACKETT, DEAN
9061
PACKWOOD, WA 98361

HADDOCK, PHILIP G
0066
VANCOUVER, BC

HADDOX, VALLI D.
2580
SUNNYSIDE, WA 98944

HADFIELD, JEFF
4102
ROSLYN, WA 98941

HAGAMAN, BILL
0370
QUINCY, WA 98848

HAGAN, ELLIS & SHIRLEY
4062
MARYSVILLE, WA 98270

HAGELGANS, SUSAN
1488
BURR OAK, MI 49030

HAGEN, DAVID
4094
WAPATO, WA 98951

HAGEN, HARRY W
3701
SEATTLE, WA 98105

HAGEN, MAXINE
3648
SEATTLE, WA 98105

HAGERMAN, CHARLES L.
1513
KIRKLAND, WA 98033

HAGUE, DEAN
1441
EUGENE, OR 97405

HAGUE, ROBERT A.
3780
YAKIMA, WA 98907

HAHN, IRIS ROSE
0014
NO ADDRESS

HAHN, RICHARD
0015
NO ADDRESS

HAIGHT, CHARLES R.
3760
ELLENSBURG, WA 98926

HALE, HARRY H
3778
CLE ELUM, WA 98922

HALEKAS, GEORGE
3083
WAUCONDA, WA 98859

HALL, GREG L.
1867
CLE ELUM, WA 98922

HALL, JOHN A.
0045
PULLMAN, WA 99164

HALL, LINNEA
1408
LEAVENWORTH, WA 98828

HALL, MICHAEL
0012
OLYMPIA, WA 98503

HALL, PATRICIA L.
1885
CLE ELUM, WA 98922

HALL, RAY
1324
YAKIMA, WA 98908

HALL, TERRY
0693
LEAVENWORTH, WA 98828

HALLAUER, DEAN S
9021
SEATTLE, WA 98117

HALLETT, DARRELL D
3449
SEATTLE, WA 98104

HALLSTROM, STEVE
3019
CARNATION, WA 98014

HALVERSON, MARK
3803
WEST RICHLAND, WA 99352

HALVORSON, KRISTI
3037
MARYSVILLE, WA 98270

HAM M D, JAY
3504
ANACORTES, WA 98221

HAMANN, MARY BETH
0821
SEATTLE, WA 98116

HAMBELTON, MIKE & KATHY
4469
WENATCHEE, WA 98801

HAMBERG, MICHELLE
2646
PORTLAND, OR 97206

HAMEL, DAVE
1347
YAKIMA, WA 98901

HAMERLY, RUSSELL
3149
SEATTLE, WA 98115

HAMERLY, RUSSELL P
0070
SEATTLE, WA 98115

HAMILTON, BONNIE
1108
YAKIMA, WA 98901

HAMILTON, DAVID
3129
REDMOND, WA 98052

HAMILTON, GERRI
2722
SPOKANE, WA 99204

HAMLICK, ALFORD W
2357
GOLDENDALE, WA 98620

HAMMERLY, RAMONA
3832
SEATTLE, WA 98116

HAMMERSTROM, PATSY &
DAVID
4260
FEDERAL WAY, WA 98023

HANDRICH, DONOVAN
3782
KIRKLAND, WA 98034

HANEY, MICHAEL
1705
SELAH, WA 98942

HANGERS, ALAN
0870
SEATTLE, WA 98125

HANNA, MICHAEL
0514
BREMERTON, WA 98418

HANSEN, BOB
1783
WENATCHEE, WA 98801

HANSEN, JEFF A.
0701
LEAVENWORTH, WA 98826

HANSON, FRED
3199
LONGVIEW, WA 98632

HANSON, HENRY
1473
WEST LINN, OR 97068

HANSON, JIM
0008
ELLENSBURG, WA 98926

HANSON, LAURA
3577
SEATTLE, WA 98199

HANSON, LAUREN M
4183
ELLENSBURG, WA 98926

HANSON, LINDA
3534
SEATTLE, WA 98199

HANSON, WAYNE
1139
ELLENSBURG, WA 98926

HANSTEAD, SANDRA
3187
BELLINGHAM, WA 98225

HANTMAN, KAREN
2871
CASHMERE, WA 98815

HARBEND, JAMES W
2280
KETTLE FALLS, WA 99141

HARCHARIK, STEPHEN H
4436
BREMERTON, WA 98312

HARDERS, LAURA A.
0388
RENTON, WA 98055

HARDING, BRUCE
4218
BELLEVUE, WA 98008

HARDING, JACK H
0886
YAKIMA, WA 98942

HARDISON, CATHY
0639
YAKIMA, WA 98902

HARL, BRAD
0658
CHELAN, WA 98816

HARLAN, JOHN
3691
NACHES, WA 98937

HARLEY, JOHN D
2074
SEATTLE, WA 98105

HARLOW, PAMELA
3116
SEATTLE, WA 98103

HARM PH D, WALTER & HELGA
3282
EASTSOUND, WA 98245

HARN P E, ROBERT E
0748
SEATTLE, WA 98116

HARPER JR, JOHN E.
4056
CLE ELUM, WA 98922

HARPER, DONNA
2664
WENATCHEE, WA 98826

HARPER, LYNN
1521
MEDFORD, OR 97504

HARPER, TED
2649
WENATCHEE, WA 98801

HARRELL, EDGAR
4118
ELLENSBURG, WA 98926

HARRELL, ROSEMARY
3836
ELLENSBURG, WA 98926

HARRER, BARBARA (MAYOR)
3804
HARRAH, WA 98933

HARRINGTON, MARIE J
3385
SEATTLE, WA 98115

HARRIS, BARBARA B
2678
ENTIAT, WA 98822

HARRIS, BARBARA J
3106
SEATTLE, WA 98119

HARRIS, BILL
0920
YAKIMA, WA 98908

HARRIS, BONNIE
1014
YAKIMA, WA 98902

HARRIS, CURTIS
1703
YAKIMA, WA 98901

HARRIS, DENNIS R
1354
ZILLA, WA 98953

HARRIS, DONALD W
0089
VANCOUVER, WA 98864

HARRIS, HERTIS
1669
YAKIMA, WA 98901

HARRIS, JAMES
1668
YAKIMA, WA 98902

HARRIS, KILBOURNE J
2690
ENTIAT, WA 98822

HARRIS, LORIE
2438
YAKIMA, WA 98907

HARRIS, MARGARET
2691
E. WENATCHEE, WA 98802

HARRIS, RODNEY
0918
YAKIMA, WA 98902

HARRIS, SUE & HOWARD
3078
BRIER, WA 98036

HARRIS-GREGORICH, ELSIE
3101
YAKIMA, WA 98902

HARRISON, BRUCE
0657
SEATTLE, WA 98155

HARRISON, DONALD J
1508
RENTON, WA 98056

HARRISON, JOHN G
0910
YAKIMA, WA 98902

HART JR, PAUL
3742
E WENATCHEE, WA 98802

HART SR, PAUL R.
1301
YAKIMA, WA 98908

HART, CHARLOTTE A.
2318
YAKIMA, WA 98902

HART, DAVID E
2777
EVERETT, WA 98204

HART, MELBA J
2468
ELLENSBURG, WA 98926

HART, RANDALL, & COLLETTE
3076
SUMNER, WA 98390

HARTWIG, JOHN M
1881
BELLEVUE, WA 98006

HARTY, SIDNEY
0291
VALLEYFORD, WA 99036

HARVARD, IVAN L.
9035
BELLINGHAM, WA 98226

HATMAKER, JOHN
1542
LEAVENWORTH, WA 98826

HATTEN, GREG
2479
NACHES, WA 98937

HATZENBELER, RALPH
0989
YAKIMA, WA 98902

HAUBER, RUSTY
4334
NACHES, WA 98937

HAUBER, TRACI
4340
NACHES, WA 98937

HAUBRICK, JOYCE
0399
YAKIMA, WA 98903

HAUCK, MIKE
1113
ELLENSBURG, WA 98926

HAUFF, BILL
1899
E WENATCHEE, WA 98802

HAUFF, HELEN
2272
PESHASTIN, WA 98847

HAUGE ED D, LAWRENCE J
2015
WENATCHEE, WA 98801

HAUPTMAN, TED
0498
PASADENA, CA 91106

HAVENS, LORENA
2202
EVERETT, WA 98205

HAVERFIELD, JAMES E
4078
GRANITE FALLS, WA 98252

HAVLIN, DONALD M
3584
YAKIMA, WA 98902

HAWKINS, CHARLES H
3265
ELLENSBURG, WA 98926

HAWKINS, JUANITA
0898
YAKIMA, WA 98902

HAYES, GARY
1446
BOISE, ID 83703

HAYES, MARY F
2459
YAKIMA, WA 98901

HAYFORD, RALPH M
4244
OLYMPIA, WA 98502

HAYS, ALYSON
3077
SEATTLE, WA 98103

HAYWARD, B R.
2032
PROSSER, WA 99350

HAYWARD, DENNIS
1811
EUGENE, OR 97405

HAYWARD, ELEANOR PAINE
2059
YAKIMA, WA 98902

HAZARD, GREG
0617
LAKE ELSINORE, CA 92330

HAZARD, LARRY
0099
NO ADDRESS

HAZEL, ANNE
3841
SEATTLE, WA 98109

HEATH, RON
1816
LEAVENWORTH, WA 98826

HEATH, TERRY
1215
YAKIMA, WA 98908

HEAVYRUNNER, EDWARD J F
4396
WAPATO, WA 98951

HEDGES, NEAL A.
3868
WENATCHEE, WA 98801

HEDGLIN, THOMAS D
0768
TACOMA, WA 98407

HEFFNER, GEORGE
2025
SEATTLE, WA 98155

HEILMAN, GERALD E
9019
YAKIMA, WA 98902

HEILMAN, JOHN
1034
YAKIMA, WA 98902

HEILMAN, PHIL
1371
YAKIMA, WA 98902

HEILMAN, RICK
1044
YAKIMA, WA 98902

HEIMBIGNER, MRS ANONA M
2729
ODESSA, WA 99159

HEIN, COLLEEN H
1872
YAKIMA, WA 98908

HEIN, VINCE
4315
PESHASTIN, WA 98847

HEIRMAN, BOB
3226
SNOHOMISH, WA 98290

HEISER, ROLLAND A.
1321
YAKIMA, WA 98908

HELLING, K.G
3968
ROY, WA 98580

HELMICK, W J
0951
NACHES, WA 98937

HELMS, LISA
2309
YAKIMA, WA 98902

HEMPHILL, JEANNE
2011
SEATTLE, WA 98103

HENDERSON, DOROTHY
4048
WALDRON, WA 98297

HENDERSON, DWIGHT
4047
WALDRON, WA 98297

HENDREN, MELBA
1200
YAKIMA, WA 98903

HENDREN, TOM
1189
YAKIMA, WA 98903

HENDRICKSON, GORDON
1802
E WENATCHEE, WA 98802

HENDRY, JACK & MARTINA
3541
BREMERTON, WA 98312

HENEGHEN, DARREL F
1288
YAKIMA, WA 98902

HENEGHEN, DAVID
2325
YAKIMA, WA 98902

HENEGHEN, MIKE
1357
YAKIMA, WA 98901

HENEGHEN, SHIRLEY
0682
YAKIMA, WA 98902

HENEGHEN, TOM
1380
MOXEE CITY, WA 98936

HENGHEN, DANIEL D
2402
YAKIMA, WA 98901

HENNING, NANCY
3769
SANTA ANA, CA 92704

HENRUKSON, LEE A.
0787
DOUGLAS, AK 99824

HENSLEY, HARVEY
0707
CASHMERE, WA 98815

HENSON, BONNIE
1684
COWICHE, WA 98923

HENSON, KEITH
0502
FT STEILACOOM, WA 98494

HEPP, HELEN
4311
MONTESANO, WA 98563

HERDRICH, JOHN
1834
SELAH, WA 98842

HERLYCK, TERRI
0303
LEAVENWORTH, WA 98826

HERMAN, JON R
4418
ELLENSBURG, WA 98928

HERON, JOHN
1757
YAKIMA, WA 98901

HERRERA, JAMES
1231
UNION GAP, WA 98903

HERRERA, JOE
1015
UNION GAP, WA 98903

HERRERA, RUTH
1399
UNION GAP, WA 98903

HERRING, STEVE
0647
HOOD RIVER, OR 97031

HERRUP, ROBERT
3004
ORCAS, WA 98280

HERSEE, JACK R
4018
CASHMERE, WA 98815

HERSEL, LILLIAN B
3790
CASHMERE, WA 98815

HESS, DR & MRS GEORGE
3195
TACOMA, WA 98468

HESS, JIM
2167
BREMERTON, WA 98310

HESS, JIM
3094
BREMERTON, WA 98310

HESS, MICHAEL J
3728
KIRKLAND, WA 98034

HESS, PHIL
4011
SELAH, WA 98942

HESS, PHIL
9082
SELAH, WA 98942

HESS, RENEE
4098
SELAH, WA 98942

HESSE, JOHN
9069
NORWOOD, OHIO 45212

HESSEY, MARION
4178
NACHES, WA 98937

HETTICK, STEVEN L
9102
LEAVENWORTH, WA 98828

HETZER, ROBERT E.
9113
CHELAN, WA 98816

HIATT, DAVID E
0100
EVERETT, WA 98204

HIBBERT, DENNIS M
4242
SEATTLE, WA 98103

HIBLAR, GEORGE S
0619
TACOMA, WA 98445

HICKENBOTTOM, CHARLES
3408
SEATTLE, WA 98108

HICKER, SHERILL L
3828
EVERETT, WA 98201

HICKER, WARD E
3831
SEATTLE, WA 98177

HICKMAN, ROBERT D
1503
PORTLAND, OR 97230

HICKS, MARTIN E
3123
WENATCHEE, WA 98801

HICKS, MICHAEL S
1817
CENTRAL POINT, OR 97502

HIGGINBOTHAM, AVIS
1932
PESHASTIN, WA 98847

HIGGINBOTHAM, DALE
0477
PESHASTIN, WA 98847

HIGGINBOTHAM, DAN
0279
CASHMERE, WA 98815

HIGGINBOTHAM, DAWN
0248
CASHMERE, WA 98815

HIGGINBOTHAM, OWEN
1934
DRYDEN, WA 98821

HIGGINS, ANNA C
2334
YAKIMA, WA 98902

HIKES, BILL
1939
MARYSVILLE, WA 98270

HIKES, GLORY A.
1940
MARYSVILLE, WA 98270

HILEMAN, SUSAN M
0432
SEATTLE, WA 98103

HILER, MIKE & KRISTIN
0577
YAKIMA, WA 98908

HILL, DAVID
1230
NACHES, WA 98937

HILL, FRANCES
1224
NACHES, WA 98937

HILL, GEORGE N
2573
OLYMPIA, WA 98506

HILLEARY, VERA P
2583
SEATTLE, WA 98188

HILLIARD, T M
3524
BELLINGHAM, WA 98225

HILTON, DEVON
0321
YAKIMA, WA 98908

HIMMELSPACK, MELVIN
1355
YAKIMA, WA 98902

HINES, BRUCE F
9001
YAKIMA, WA 98902

HINTON, SUZANNE
4045
YAKIMA, WA 98902

HINTZE, BOB
4337
YAKIMA, WA 98902

HIPNER, JAMES E
1358
YAKIMA, WA 98902

HIRE, MIRIAM J
2902
NACHES, WA 98937

HIRSCH, ROSEMARIE
2383
YAKIMA, WA 98908

HIRST, ERIC
0418
BELLEVUE, WA 98007

HITCHECK, KATHLEEN
0838
WHITE SWAN, WA 98952

HIXON, CHARLES
0982
YAKIMA, WA 98901

HIXON, DONNA
1340
YAKIMA, WA 98908

HOBBS, KELLY
0768
LEAVENWORTH, WA 98826

HODGSON, DON
0403
YAKIMA, WA 98908

HODKINSON JR, JOHN P
3427
UNION GAP, WA 98903

HOEFNER, LYLE
0729
MONITOR, WA 98836

HOEFNER, TONIA
0722
MONITOR, WA 98836

HOEL, GEORGE O
1857
HUDSON, WI 54016

HOFFERT, DAVID
1717
SELAH, WA 98942

HOFFMAN, FRANK
3480
WALLA WALLA, WA 99362

HOFFMAN, MARI
0118
KELSO, WA 98826

HOFFMAN, MICHAEL
4416
ELLENSBURG, WA 98926

HOFFMAN, RONALD R.
1548
CASHMERE, WA 98815

HOFFMANN NELSON, MARI
2728
KELSO, WA 98826

HOFMANN, CAROL
4470
WENATCHEE, WA 98601

HOFMANN, JIM
4189
WENATCHEE, WA 98801

HOFSTRAND, DEBORAH A.
1132
ELLENSBURG, WA 98926

HOFSTRAND, MRS MARVIN
0479
ELLENSBURG, WA 98926

HOFSTRAND, REG
1131
ELLENSBURG, WA 98926

HOFSTRAND, SUSAN
2054
ELLENSBURG, WA 98926

HOGAN, JAMES T
3994
KENT, WA 98031

HOGAN, JOHN
2957
SEATTLE, WA 98102

HOHISEL, NEIL S
3343
WENATCHEE, WA 98801

HOHN, TIMOTHY C
3500
SEATTLE, WA 98195

HOLBROOK, DONALD
1232
YAKIMA, WA 98902

HOLBROOK, GENE
1299
YAKIMA, WA 98908

HOLBROOK, RALPH L
0044
YAKIMA, WA 98902

HOLBROOK, ROSE
1177
YAKIMA, WA 98902

HOLDEN, ROY N
4196
SEATTLE, WA 98117

HOLDHNSEN, CHRIS
3434
SEATTLE, WA 98105

HOLLING, H
3666
CHELAN, WA 98816

HOLLINGER, CHRISTINE
0001
SEATTLE, WA 98119

HOLLINGSWORTH, KATHRYN
M
3732
ISSAQUAH, WA 98027

HOLLINGSWORTH, S WILLIAM
3538
ISSAQUAH, WA 98027

HOLM, CARL & VANJA
1948
SEATTLE, WA 98155

HOLMAN, DOUG
1423
PORTLAND, OR 97229

HOLMAN, JOSEPH D
2569
RANDLE, WA 98377

HOLMES, DAN
0682
PASCO, WA 99301

HOLMES, JENNIFER
2935
SEATTLE, WA 98195

HOLSCHER, GARY
2242
SELAH, WA 98942

HOLT, SHERILL L
4541
EVERETT, WA 98201

HOLT, TIM M
2221
SUMMERVILLE, OR 98776

HOLTHAUS, LOREN
3364
YAKIMA, WA 98901

HOLTHAUS, NORMA J
3278
YAKIMA, WA 98901

HONE, IRENE
3014
ZILLA, WA 98953

HONEY, GEORGE P
3545
ENTIAT, WA 98822

HOOK, CRAIG & VINEY,
CAROLE
3709
MONROE, WA 98272

HOON, JANICE
3232
SEATTLE, WA 98102

HOOPER, COREY
0774
WENATCHEE, WA 98801

HOOPER, ROY
0268
E WENATCHEE, WA 98802

HOOTS, MOLLY
1957
MANSON, WA 98831

HOOVER, DEBBIE
1134
ELLENSBURG, WA 98926

HOOVER, MARVIN D
3871
E. WENATCHEE, WA 98802

HOOVER, SUE
3872
E WENATCHEE, WA 98802

HOOVER, TOM
1133
ELLENSBURG, WA 98926

HOPKINS JR, JOE
9045
SEATTLE, WA 98112

HOPKINS, DAN
2379
GOLDENDALE, WA 98620

HORNER, EUGENE R.
4098
SELAH, WA 98942

HORNGREN, SCOTT
0083
PORTLAND, OR 97205

HORNGREN, SCOTT
4483
PORTLAND, OR 97205

HORNING, TRACIE
0728
FRIDAY HARBOR, WA 98250

HORSWILL, EMILY J
3192
SEATTLE, WA 98107

HOSKINS, HOWARD W
0005
KIRKLAND, WA 98033

HOST, HELEN M
2033
SOUTH HOLLAND, IL 60473

HOTCHKISS, JOHN
2268
E WENATCHEE, WA 98802

HOUGH, NAN
3102
SELAH, WA 98942

HOUGLAND, JAMES L
1173
ENTIAT, WA 98822

HOUPLIN, J E
0613
ELLENSBURG, WA 98926

HOUSER, BRIAN
3248
SEATTLE, WA 98112

HOVIS, ROSIE
2521
NACHES, WA 98937

HOWARD, ALLENE
1880
COWICHE, WA 98923

HOWARD, ARCHER H
0606
TACOMA, WA 98498

HOWARD, BILL
3487
COWICHE, WA 98923

HOWARD, BOB
1874
YAKIMA, WA 98908

HOWARD, CURTISS E
3127
STANWOOD, WA 98292

HOWARD, JENNY
1878
COWICHE, WA 98923

HOWARD, JUDITH A.
0820
ELLENSBURG, WA 98926

HOWARD, KAFL
1879
COWICHE, WA 98923

HOWELL, AUDREY
0764
LEAVENWORTH, WA 98826

HOWELL, DONALD E
0763
LEAVENWORTH, WA 98826

HOWELL, ED
0381
TACOMA, WA 98466

HOWELL, TERRY
0761
LEAVENWORTH, WA 98826

HOWEY, DAVID
2682
YAKIMA, WA 98902

HOWLAND, GLEN
4247
YAKIMA, WA 98908

HOYT, ANN
0879
LEAVENWORTH, WA 98826

HOYT, DIANA M
0953
UNION GAP, WA 98903

HOYT, EDDIE H
0974
WAPATO, WA 98951

HOYT, JIMMIE A.
0942
UNION GAP, WA 98903

HOYTE, ERIC W
3354
SEATTLE, WA 98115

HUARD, RICHARD
0324
YAKIMA, WA 98908

HUBBARD, THOMAS P
3573
SEATTLE, WA 98112

HUBEADAN, JACK
2522
MOXEE, WA 98936

HUBER, CORA
0166
LEAVENWORTH, WA 98826

HUBER, ROBERT D
2089
WENATCHEE, WA 98801

HUCK, GARY R
1875
YAKIMA, WA 98908

HUCK, GARY R.
1829
1678
YAKIMA, WA 98908

HUCKLEBERRY, ROBERT W
2475
RICHLAND, WA 99352

HUDSON, K.L
1328
YAKIMA, WA 98903

HUDSON, LOIS
3713
REDMOND, WA 98052

HUDSON, TIM & DONNA
4474
ISSAQUAH, WA 98027

HUFF, ORWIL
2633
LEAVENWORTH, WA 98826

HUFFMAN, DAVID & VAL
4111
SEATTLE, WA 98148

HUGHES, KIM
3825
EVERETT, WA 98204

HUGHES, MARY
1424
TUALATIN, OR 97062

HUGHES, MIKE
3848
EVERETT, WA 98204

HUGHES, PAM
2320
YAKIMA, WA 98902

HUGHES, ROBERT C
2382
YAKIMA, WA 98902

HUGHES, RONALD J
1729
YAKIMA, WA 98901

HUIZAR, CATARINO L
1019
TOPPENISH, WA 98948

HULL, BARRY
1442
EUGENE, OR 97401

HULL, GARY S
1052
YAKIMA, WA 98902

HUMANN, STANLEY D
2004
EATONVILLE, WA 98328

HUMPAL, JUNE
0738
LYNNWOOD, WA 98037

HUMPHREY, ED
4265
EPHRATA, WA 98923

HUMPHREY, RICHARD
1425
PORTLAND, OR 97223

HUNT, GREGORY
3734
BOTHELL, WA 98011

HUNT, HEIDI
2730
GRAND RAPIDS, MI 49506

HUNT, ROBERT R.
0077
SEATTLE, WA 98115

HUNTER, HAROLD
0941
YAKIMA, WA 98902

HUNTER, LARRY
1996
SEATTLE, WA 98178

HUNTER, ROSS
3719
SEATTLE, WA 98102

HUNTER, SARAH
0940
YAKIMA, WA 98902

HURST, GREG
2317
YAKIMA, WA 98902

HURT, SCOTT
2130
CHELAN, WA 98816

HUSBAND, KATHLEEN R
2020
SEATTLE, WA 98117

HUSHT, J
4107
RENTON, WA 98056

HUSKEY, DAN
1075
NACHES, WA 98947

HUSTED, JERROLD F
2378
GOLDENDALE, WA 98620

HUSTING, MRS H W
0660
BELLEVUE, WA 98008

HUTCHINS, CHARLES
2716
WENATCHEE, WA 98801

HUTCHINSON, RETA
2466
ELLENSBURG, WA 98926

HUTTON, ERNEST D
2340
GOLDENDALE, WA 98620

HYNES, JOHN R.
1100
YAKIMA, WA 98908

IMBURGIA, DAVID V
4089
BELLINGHAM, WA 98225

INCHAUSPE, DAVID A.
4189
WENATCHEE, WA 98801

INDERMUHLE, MARTHA
4421
KITTTAS, WA 98934

INNES, DAVID
3704
SEATTLE, WA 98112

INT-HOUT, PAT
0040
WENATCHEE, WA 98801

IRELAND, LORRAINE
2695
S CLE ELUM, WA 98943

IRISH, MARGARET
4120
ELLENSBURG, WA 98926

IRVIN, CAROLINE
9007
SEATTLE, WA 98106

IRVIN, MICHAEL J
9011
SEATTLE, WA 98106

IRWIN, LOIS
3208
MERCER ISLAND, WA 98040

IRWIN, WARD
3020
MERCER ISLAND, WA 98040

ISENBERG, LARRY
1537
POST FALLS, ID 83854

ISLEY, STAN A.
3163
YAKIMA, WA 98902

ITTNER, RUTH
3725
SEATTLE, WA 98119

IWING, PEGGY
3781
ELLENSBURG, WA 98926

J SR, JERRY
3454
SEATTLE, WA 98155

JABLONSKI, DAIN
2546
COTTAGE GROVE, OR 97424

JACKSON, ALEC
0847
KENMORE, WA 98028

JACKSON, DELMER
1375
YAKIMA, WA 98902

JACKSON, DIANE
1725
YAKIMA, WA 98902

JACKSON, HOWARD
1708
YAKIMA, WA 98908

JACKSON, JUDY
3237
EASTSOUND, WA 87245

JACKSON, ROGER W
4084
RENTON, WA 98056

JACOB, JULIE
0522
SEATTLE, WA 98122

JACOBS, JUDY
2580
YAKIMA, WA 98901

JACOBSEN, JANIS
3432
RENTON, WA 98056

JACOBSON, BRAD
1683
YAKIMA, WA 98902

JACOBSON, DENNIS
0670
RENTON, WA 98056

JACOBSON, KATHY & STEVE
1944
WENATCHEE, WA 98801

JACOBSON, LAWRENCE M
3497
OLYMPIA, WA 98502

JACOBUCCI, MICHAEL C
1778
WENATCHEE, WA 98801

JAECKS, DAVID
0792
WENATCHEE, WA 98801

JAECKS, K.L.
9077
WENATCHEE, WA 98801

JAEGER, DAN E
1690
YAKIMA, WA 98908

JAFFE, DANIEL A. 0076 FAIRBANKS, AK 99775	JENKINS, MORRIS 3588 CLE ELUM, WA 98922	JOHNSON, BRIAN C 3897 SILVERDALE, WA 98383	JOHNSON, RICH 4151 TACOMA, WA 98422	JONES, K.C & DOROTHEA 3175 COUPEVILLE, WA 98239
JAKUBAL, MIKE 0736 WENATCHEE, WA 98801	JENKINS, NICKY 0537 TUALATIN, OR 97062	JOHNSON, BRYAN 4008 TACOMA, WA 98422	JOHNSON, RICHARD E 0451 GOLDENDALE, WA 98820	JONES, KAREN 4010 SUMNER, WA 98390
JALI, RICK 2168 MUKILTEO, WA 98275	JENKINS, PETER T 3238 SEATTLE, WA 98121	JOHNSON, CARL G 1846 SHELTON, WA 98584	JOHNSON, RICHARD L. 1691 SELAH, WA 98942	JONES, LEON 2030 ROSLYN, WA 98941
JAMESON, DONALD L. 2760 YAKIMA, WA 98902	JENNERJOHN, BOBBY D 0932 YAKIMA, WA 98908	JOHNSON, CARRIE 2529 YAKIMA, WA 98901	JOHNSON, ROEKNE L. 0346 BOTHELL, WA 98012	JONES, LORING M 1961 MOSCOW, ID 83843
JAMISON, FRED C 9025 RICHLAND, WA 99352	JENNERJOHN, ROBERT J 0633 YAKIMA, WA 98908	JOHNSON, DANNY L. 0857 YAKIMA, WA 98902	JOHNSON, RONALD E 4024 TACOMA, WA 98022	JONES, LORNE 3905 SUMNER, WA 98390
JAQUES, FREDY 3730 RENTON, WA 98056	JENNINGS, BEVERLY & HUGH 3181 BELLEVUE, WA 98008	JOHNSON, DELBERT 4070 YAKIMA, WA 98903	JOHNSON, RUSSELL L. 0315 SEATTLE, WA 98125	JONES, LOUIS R 0480 OLYMPIA, WA 98507
JARRIS, JOHN C 4130 GOLDBAR, WA 98251	JENNINGS, DORCIE A. 3378 YAKIMA, WA 98901	JOHNSON, DENNIS R 2571 GIG HARBOR, WA 98335	JOHNSON, STEPHEN P 0928 NACHES, WA 98937	JONES, ROD 3631 ISSAQUAH, WA 98027
JAUKEN, JILL D 3959 LACEY, WA 98503	JENSEN PH D, MARY 3359 TWISP, WA 98856	JOHNSON, DEROSS 4188 ROSLYN, WA 98941	JOHNSON, STEVEN R. 1987 SEATTLE, WA 98103	JONES, WALTON H 3388 ISSAQUAH, WA 98027
JAUSSAUD JR, VICTOR J 1559 YAKIMA, WA 98902	JENSEN, DAVID 3564 SEATTLE, WA 98125	JOHNSON, DUANE 0450 GOLDENDALE, WA 98620	JOHNSON, SUE 4179 SELAH, WA 98942	JONES, WILLIAM A. 0664 SEATTLE, WA 98125
JAUSSAUD, MARY ANN 1524 YAKIMA, WA 98902	JENSEN, EDWARD W 2203 SEATTLE, WA 98117	JOHNSON, ELMER W 3688 TWISP, WA 98856	JOHNSON, SUE E 1988 SHELTON, WA 98584	JORDAN, FRANK C 1585 YAKIMA, WA 98902
JAUSSAUD, MARY MARIE 1168 YAKIMA, WA 98902	JENSEN, ERIC R 3134 WALLA WALLA, WA 99362	JOHNSON, ERVIN H 1050 YAKIMA, WA 98901	JOHNSON, TED B 3013 ELLENSBURG, WA 98926	JORDAN, LARRY 0607 SEATTLE, WA 98148
JEFFERSON JR, GEORGE J 2429 NACHES, WA 98937	JENSSEN, EDWARD W 3248 SEATTLE, WA 98117	JOHNSON, FORREST D 1322 ELLENSBURG, WA 98926	JOHNSON, ZANE 2553 YAKIMA, WA 98903	JORDAN, MRS SHARON 1587 YAKIMA, WA 98902
JEFFERSON JR, GEORGE J 3801 NO ADDRESS	JERLES, EDWARD L. 0689 CASHMERE, WA 98815	JOHNSON, GEORGE W 0650 SEATTLE, WA 98188	JOHNSTON, CLAUDE 4406 E. WENATCHEE, WA 98802	JORDIN, C B 4285 CLE ELUM, WA 98922
JEFFERSON, LORIE 2576 NACHES, WA 98937	JESMER, TOM, 0318 MONROE, WA 98272	JOHNSON, GREG S 2597 ASHLAND, OR 97520	JOHNSTON, GREG 3950 KIRKLAND, WA 98034	JORDIN, MABLE 4192 BEVERLY, WA 98321
JEFFERSON, LOUELLE 0931 NACHES, WA 98937	JEWETT, DONALD S 4231 RENTON, WA 98058	JOHNSON, HOWARD 1300 ENUMCLAW, WA 98022	JOLLEY, RUSS 4451 PORTLAND, OR 97203	JORGENSEN, BERNIE & CANDI 4046 RICHLAND, WA
JEFFERSON, SHERRY L 2430 NACHES, WA 98937	JOHANSON, JEAN L. & PERRY 2021 MERCER ISLAND, WA 98040	JOHNSON, JACK & SHARP, DEVERA 2960 PESHASTIN, WA 98847	JONAS, DON C 2618 NACHES, WA 98937	JORGENSON, BARBARA 3609 ABERDEEN, WA 98520
JEFFERSON, TIM G 0930 NACHES, WA 98937	JOHN JR, DAVID W 1033 YAKIMA, WA 98901	JOHNSON, JAY 1894 SELAH, WA 98942	JONES, G T 2007 KIRKLAND, WA 98034	JOSENDAL, VICTOR 4162 SEATTLE, WA 98118
JEFFREY, BOBBY J 1701 SELAH, WA 98942	JOHN, NORB 3462 SELAH, WA 98942	JOHNSON, LANDI 0927 NACHES, WA 98937	JONES, GARY E. 2156 ARLINGTON, WA 98223	JOSEY, WESLEY 0530 YAKIMA, WA 98908
JEFFREY, MRS BOBBY J 2453 SELAH, WA 98942	JOHN, STEVEN 4100 ELLENSBURG, WA 98926	JOHNSON, LAURIE 0755 DRYDEN, WA 98821	JONES, GINGER 4003 SEATTLE, WA 98105	JOY, STEVE 2270 E WENATCHEE, WA 98802
JEFFRIS, JERRY 2748 PESHASTIN, WA 98847	JOHNS, ROBERT H 1465 PORTLAND, OR 97233	JOHNSON, LEROY E 9114 BUCKLY, WA 98321	JONES, JAMES E. 0905 YAKIMA, WA 98901	JOYNT, D T 1740 YAKIMA, WA 98908
JEFFRIS, KIM 0409 CASHMERE, WA 98815	JOHNSEN, LAURINDA 2959 RENTON, WA 98057	JOHNSON, LINDSAY & MARK 3002 KENNEWICK, WA 98337	JONES, JEFFREY R 1265 CLE ELUM, WA 98922	JUDKINS, FRANK 0358 WENATCHEE, WA 98801
JEFFRIS, KIM 1801 CASHMERE, WA 98815	JOHNSON II, REX V 0387 SEATTLE, WA 98117	JOHNSON, NORMAN 3892 SELAH, WA 98942	JONES, JEFFREY R 3596 CLE ELUM, WA 98922	JUDSON, PHIL 0503 SALEM, OR 97308
JENKE, MONICA B 4472 LEAVENWORTH, WA 98826	JOHNSON, A. SCOTT 0888 E. WENATCHEE, WA 98802	JOHNSON, OWEN 3979 NO ADDRESS	JONES, JIM 3963 TACOMA, WA 98405	JUHRE, SUE 3177 REDMOND, WA 98052
JENKEL, HEATHER C 1596 TACOMA, WA 98407	JOHNSON, ALAN J 1327 YAKIMA, WA 98908	JOHNSON, PAULA 3707 ELLENSBURG, WA 98926	JONES, JOHN O 0776 YAKIMA, WA 98908	JUMP, TERRI 1752 SELAH, WA 98942

JUST, RICHARD
9072
EMMETT, IDAHO 83617

KAATZ, CARLA H
4071
ELLENSBURG, WA 98926

KAATZ, MARTIN R.
3439
ELLENSBURG, WA 98926

KADING, STEVEN
0642
GREELEY, CO 80634

KADING, SUE
0651
GREELEY, CO 80634

KADY, DAN
1832
GRAHAM, WA 98338

KAISER, BILL
2898
VANCOUVER, WA 98665

KALVIK, ORAL P
2600
SEATTLE, WA 98146

KAMMERER, DARLENE &
ROGER
3588
MERCER ISLAND, WA 98040

KAMMERZELL, DON L
1243
YAKIMA, WA 98907

KAMMERZELL, SHIRLEY
1189
YAKIMA, WA 98902

KANDLE, GENE A.
0598
TACOMA, WA 98443

KANE, KEVIN
2120
WENATCHEE, WA 98801

KANTZER, BULA
3598
ALDERWOOD MANOR, WA
98036

KANTZER, BULA B
4547
ALDERWOOD MANOR, WA
98036

KANTZER, M G
3826
ALDERWOOD MANOR, WA
98036

KANZLER, GARY F
1176
YAKIMA, WA 98908

KANZLER, MRS GARY
1175
YAKIMA, WA 98908

KAPLAN, NANCY & JOSEPH P
PARR
3319
CASHMERE, WA 98815

KAPLE, JO ANN
1861
YAKIMA, WA 98903

KAPPELMAN M D , MICHAEL P
4023
SEATTLE, WA 98112

KARL, RANDY & SARA
3025
NICEVILLE, FL 32578

KARR, KEN
1734
YAKIMA, WA 98903

KAUFFMAN, HELEN E
0462
PESHASTIN, WA 98847

KAUFFMAN, LYLE R
0463
PESHASTIN, WA 98847

KAUPER, DEB
3193
PORTLAND, OR 97230

KAUZLARICH, PAUL
2619
NACHES, WA 98937

KAVANAUGH, KATHLEEN L.
3209
SEATTLE, WA 98102

KAWADA, KIM Y
1866
ELLENSBURG, WA 98926

KAY, SANDRA
1496
EUGENE, OR 97402

KEATING, JIM
1915
LEAVENWORTH, WA 98826

KEEBLER, JOHN
0523
MALAGA, WA 98826

KEEFER, ROBERT R
1368
YAKIMA, WA 98902

KEEZER, CAROL J
3279
LYNNWOOD, WA 98036

KEEZER, RICHARD
2171
EVERETT, WA 98204

KEIHN, TAMI
3694
SEATTLE, WA 98103

KEIHN, WILLIAM
3726
SEATTLE, WA 98103

KEISTER, WAYNE
2658
SELAH, WA 98942

KEITH, JOYCE
3970
TACOMA, WA 98444

KEITH, MARVIN D
3972
TACOMA, WA 98444

KELLER, EDWARD
2404
YAKIMA, WA 98902

KELLER, JOHN E
0275
CASHMERE, WA 98815

KELLER, LAWRENCE W
1883
WENATCHEE, WA 98801

KELLER, MICHAEL H
0364
STANDWOOD, WA 98292

KELLER, RON
1672
YAKIMA, WA 98902

KELLER, ZACH E
3414
E WENATCHEE, WA 98802

KELLEY JR, LLOYD D
1884
YAKIMA, WA 98908

KELLOUGH, THOMAS
1572
YAKIMA, WA 98908

KELLS M D , FRANKLIN
0713
E. WENATCHEE, WA 98802

KELLS, LAYMAN
3779
SEATTLE, WA 98166

KELLY, LYDIA G
3910
SEATTLE, WA 98144

KELLY, MAIA
3862
SAN MATEO, CA 94403

KEMP, JAMES
1687
COWICHE, WA 98923

KENDALL MTN INC, HELL-
ROEGER D W
0006
SEATTLE, WA 98816

KENDALL, STEPHEN A.
0793
TACOMA, WA 98424

KENNETT, THEODORE D
2474
NACHES, WA 98937

KENNY, LORNA,
4085
ISSAQUAH, WA 98027

KEOUGH, ROBERT
9075
RICHLAND, WA 99352

KEPLEY, MICHAEL C
2178
EVERETT, WA 98203

KERBLER, CHARLES I
2255
MALAGA, WA 98826

KERLEE, DANIEL
2914
SEATTLE, WA 98103

KERN, PHIL
2762
ELLENSBURG, WA 98926

KERR JR, JOHN H
4209
YAKIMA, WA 98902

KERR, CHRISTOPHER J
3448
SEATTLE, WA 98115

KERR, MARY A
2073
E WENATCHEE, WA 98802

KERSHAW KAY, LYNN ISA-
BELLE
0605
GOOSE PRAIRIE, WA 98929

KERSLAKE, ELIZABETH
3662
YAKIMA, WA 98902

KESSINGER, JIM
4332
UNION GAP, WA 98903

KESSLER, ANNE G
3579
YAKIMA, WA 98902

KESSLER, STEVEN
3509
YAKIMA, WA 98902

KEY, FRANK
3340
BARING, WA 98224

KIDRICK, E FRANK
3570
BREMERTON, WA 98310

KILBURY, CHARLES D
2780
PASCO, WA 99302

KILDAHL, MR & MRS FRANK
1975
EATONVILLE, WA 98328

KILE, L & LORRAINE
3882
CASHMERE, WA 98815

KILLEN M D , RON
2172
TACOMA, WA 98488

KILLIEN, JUDGE PHILIP Y
0439
SEATTLE, WA 98115

KILNER, DUNCAN
1455
KLAMATH FALLS, OR 97603

KILPATRICK, CALVIN
2674
SELAH, WA 98942

KILPATRICK, CHARLES
1174
NACHES, WA 98937

KILPATRICK, DON
2815
NACHES, WA 98937

KILPATRICK, RICK
2675
SELAH, WA 98942

KIME, NORMAN L
2263
E WENATCHEE, WA 98802

KINDT, LEON M
1845
YELM, WA 98597

KING, COLLEEN
4137
ISSAQUAH, WA 98027

KING, ELIZABETH
3435
RENTON, WA 98056

KING, FRANCES V
2477
NACHES, WA 98937

KING, GREG
2627
MONITOR, WA 98836

KING, JENNIFER
1827
TACOMA, WA 98403

KING, ORREN
0917
YAKIMA, WA 98908

KING, SUSAN
1947
RICHLAND, WA 99352

KING, W WAYNE
1635
YAKIMA, WA 98901

KING, W WAYNE
4484
YAKIMA, WA 98907

KINGSBURY, DWIGHT
0813
SEATTLE, WA 98195

KINGSTON, ELIZABETH
0430
SEATTLE, WA 98102

KINGSTON, JOHN H
0911
YAKIMA, WA 98908

KINN, CHRIS
0123
SEATTLE, WA 98102

KINMAN, BILL
3135
S CLE ELUM, WA 98943

KINNEAR, CAL & GEORGE
3130
SEATTLE, WA 98106

KINNEAR, PATRICIA A.
2878
LEAVENWORTH, WA 98826

KINNEY JR, J DANIEL
4501
YAKIMA, WA 98901

KINNEY, ESTHER
0750
ISSAQUAH, WA 98027

KINNEY, ESTHER
4198
ISSAQUAH, WA 98027

KINSEL, AMY J & WM A
3410
SEATTLE, WA 98122

KIOSSNER, DAN
4325
LEAVENWORTH, WA 98826

KIRBY, CHUCK
1850
GIG HARBOR, WA 98335

KIRCHHOFF, RICHARD T
3783
SEATTLE, WA 98109

KIRKMAN, MR & MRS J C
3721
RENTON, WA 98056

KIRKMIRE, JAMES D
0238
PORTLAND, OR 97223

KIRKPATRICK, G
0057
LEAVENWORTH, WA 98826

KIRKPATRICK, KERRY LYNN
3814
SEATTLE, WA 98109

KIRN, THOMAS J
0507
SEATTLE, WA 98133

KIRSCH, JACOB J
0829
CLE ELUM, WA 98922

KIRSCHT, DWIGHT
4345
BOISE, ID 83706

KIRSHNER, MIKE AND KAREN
3467
BOTHELL, WA 98011

KISH, REX M
2744
CASHMERE, WA 98815

KITSON, HAROLD
3367
SEATTLE, WA 98146

KITTELSON, DEAN
0678
RONALD, WA 98940

KITTELSON, MILTON C
1294
CLE ELUM, WA 98922

KITTITAS CO COMMISSION-
ERS
3254
ELLENSBURG, WA 98926

KITTITAS CO FRIENDS OF
FOREST
3255
ELLENSBURG, WA 98926

KITTLE, AMELIA L
2001
DES MOINES, WA 98189

KITTLESON, ALBERTA H
3933
TACOMA, WA 98445

KITTLESON, DEAN
4058
RONALD, WA 98940

KLEIN, PETE
2117
SEATTLE, WA 98155

KLEIN, PETER
3664
SEATTLE, WA 98155

KLINE, MICHAEL A.
2152
NO CITY

KLINE, MICHAEL A.
3665
NO ADDRESS

KLINGER, DAVID M
3520
LEAVENWORTH, WA 98826

KLINGMAN, KURT
3361
CLINTON, WA 98236

KLOCK PH D, GLEN (W RE-
SOU ANAL)
4551
WENATCHEE, WA 98801

KLUNZ P E, JAMES R.
0550
SEATTLE, WA 98105

KLYSER, JO ANN
0366
QUINCY, WA 98848

KNAPPE, BRADFORD
0663
WINSLOW, WA 98110

KNIGHT, BRADLEY
0649
BREMERTON, WA 98312

KNIGHT, J
1478
HARRISBURG, OR 97446

KNIGHT, KELTON W
0637
ELLENSBURG, WA 98928

KNIGHT, REX
0700
WENATCHEE, WA 98801

KNOBEL, EDWARD
1344
YAKIMA, WA 98908

KNOLL, TAMMY
1833
TACOMA, WA 98404

KNOTT, SHERMAN
0678
MABTON, WA 98935

KNOX, LORI ANN
2955
SEATTLE, WA 98117

KNOX, RANDY & JEAN
4415
YAKIMA, WA 98902

KNOX, WALTER R.
3148
SEATTLE, WA 98117

KNUDSON JR, E L
0804
ELLENSBURG, WA 98926

KNUTSON, MARVIN H
1512
EUGENE, OR 97401

KOBES, KEN
2478
NACHES, WA 98937

KOCH, MIKE & SHARON
3216
BREMERTON, WA 98312

KOEHLER, ERICH
3075
TACOMA, WA 98409

KOENIG, JOHN FRANKLIN
3059
SEATTLE, WA 98112

KOENIG, MIKE
0048
NO ADDRESS

KOENIG, NORMAN D
4017
YAKIMA, WA 98908

KOEPPS, KEITH
2589
E WENATCHEE, WA 98802

KOLIN, LEROY C
2009
BELLEVUE, WA 98008

KOMINSKI, ROBERT
0534
LEAVENWORTH, WA 98828

KOMRO, GEORGE H
4364
E WENATCHEE, WA 98802

KONSHAK, DENNIS J
0819
YAKIMA, WA 98903

KOON, P D
2148
SEATTLE, WA 98103

KOOPAL, ROBERTA
3836
OUTLOOK, WA 98938

KOPLAN, LOUIS
2629
LEAVENWORTH, WA 98826

KOPLU, KAREN
2635
LEAVENWORTH, WA 98826

KOPTONAK, SUSAN
3048
TWISP, WA 98858

KOREVAAR, DOUG
0164
LEAVENWORTH, WA 98826

KORYBA, STEVE
1492
ST CLAIR, MI 48079

KOSTKA, STANLEY
4134
WOODINVILLE, WA 98072

KRAFT, DANIEL E
2422
YAKIMA, WA 98902

KRAHENBUHL, SAM M
0675
CLE ELUM, WA 98922

KRAKOWKA, GEORGE
0116
WENATCHEE, WA 98801

KRAL, HENRY J
3173
EVERETT, WA 98204

KRAMER, MEL
0425
WAVERLY, IA 50877

KRASNEY, FERN
2182
SEATTLE, WA 98103

KRAUSE, TIMOTHY
4444
SEATTLE, WA 98115

KREIGEL, PAUL
2211
STANDWOOD, WA 98292

KRIETE, BEN M
2745
EPHRATA, WA 98823

KRIETE, MARGE
4462
EPHRATA, WA 98823

KROENING, NANCY
3632
SEATTLE, WA 98199

KROLL, DAVE
3568
ONALASKA, WA 98570

KROLL, HEATHER R & RUD-
DELL, KEVEN
3409
SEATTLE, WA 98115

KRONENBERG, PHYLLIS
4081
EVERSON, WA 98247

KROPSTADT, HAROLD
1363
YAKIMA, WA 98901

KRUCKEBERG, A.R.
2738
SEATTLE, WA 98195

KRUNG, JOE
1021
YAKIMA, WA 98902

KRUPIN, PAUL J
3270
KENNEWICK, WA 98336

KRUSOW, FRED
2353
GOLDENDALE, WA 98620

KRZAK, JOAN
0307
W GERMANY

KUBIAK, ARNIE
2163
BAINBRIDGE IS, WA 98110

KUBOTH, H ERIC
0662
SEATTLE, WA 98125

KUCIEJ, WALTER A.
3112
SEATTLE, WA 98199

KUEHN, DENNIS
0478
NACHES, WA 98937

KUEHNE, M J "GUS"
1697
TACOMA, WA 98466

KUHN, DEBORAH
0622
SEATTLE, WA 98119

KUMMER, CARL
3682
E WENATCHEE, WA 98802

KUMMER, KEVIN A.
3067
WATERVILLE, WA 98858

KURATH, DEAN A.
4275
RICHLAND, WA 99352

KURATLI, RUBEN M
1510
BELLEVUE, WA 98004

KURMAN, RUTH
2999
SEATTLE, WA 98112

KURSOW, RICH
2370
GOLDENDALE, WA 98620

KUTNER, KEN
0610
SEATTLE, WA 98107

KUTSCHER, SUSAN HELSELL
3018
VASION, WA 98070

LA MOTTE, BEULAH & VERNON
3809
CARLTON, WA 98814

LA PALM, JAN
0189
ENTIAT, WA 98822

LA PRE, VIRGINIA
2041
SEATTLE, WA 98102

LACERQUIST, MARLYS
1696
RANDLE, WA 98377

LACY, HAROLD
1205
NO ADDRESS

LACY, TIM
1154
YAKIMA, WA 98903

LADIGES, YVONNE
1109
YAKIMA, WA 98903

LADOUX, TED
1689
EATONVILLE, WA 98382

LAGERSEN, MRS HENRY
3800
YAKIMA, WA 98908

LAGO, RICK
2766
YAKIMA, WA 98902

LAKE CHELAN CHAM OF
COMM
0881
CHELAN, WA 98816

LAKE CHELAN SNOWMOBILE
CLUB
4297
CHELAN, WA 98816

LAKE, LOUIS
4366
PESHASTIN, WA 98847

LAMBERT, DANIEL A
2783
S CLE ELUM, WA 98943

LAMMERS, DOROTHY
2303
YAKIMA, WA 98901

LAMOTHER, DIANA
1858
TIGARD, OR 97223

LAMPHERE, DEBBIE
2708
S CLE ELUM, WA 98922

LANCASTER, MIKE B
1799
MONITOR, WA 98836

LANCASTER, STEVE
2962
E WENATCHEE, WA 98802

LANDAHL, BARBARA
2299
YAKIMA, WA 98902

LANDIN'S DIRTYFOOT RANCH
2750
LEAVENWORTH, WA 98826

LANE, JOAN
3847
SEATTLE, WA 98117

LANE, JOHN R
0079
SPOKANE, WA 99206

LANE, LAURA
0288
PHILADELPHIA, PA 19103

LANE, MARK D
0552
BELLINGHAM, WA 98226

LANGDON, JIM
4264
KENNEWICK, WA 98337

LANGER, WILLIAM D
4245
SEATTLE, WA 98112

LANGSTON, MARVIN
1025
NACHES, WA 98937

LANPHERE, ROBERT
2692
S CLE ELUM, WA 98943

LANPHERE, SENA LEONE
2693
S CLE ELUM, WA 98943

LANPHERE, TERESA R
2701
ROSLYN, WA 98941

LANSDON, CLIFF
4303
GRANTS PASS, OR 97526

LANSER, CHESTER A
4481
GRANITE FALLS, WA 98252

LANSER, DAVE
4479
GRANITE FALLS, WA 98252

LANTZ, STERLING
2018
MERCER ISLAND, WA 98040

LAPIERRE, LEO L.
1666
ZILLA, WA 98953

LAPORTE, L RICHARD
2189
BREMERTON, WA 98310

LAPORTE, ROLAND
3461
CHELAN FALLS, WA 98817

LAQUETA, KAMALLA
0496
VASHON ISLAND, WA 98070

LAQUETA, KAMALLA
4488
VASHON ISLAND, WA 98070

LARGENT, CHUCK
3945
WENATCHEE, WA 98801

LARIMER, ELLIN
0478
KENNEWICK, WA 98338

LARIMER, J R
1461
KENNEWICK, WA 98338

LARKIN, MICHAEL
2846
EUGENE, OR 97402

LARSEN, DANE
1263
CLE ELLUM, WA 98922

LARSON M D DC, MICHAEL
4299
WENATCHEE, WA 98801

LARSON, DENA
2108
ANACORTES, WA 98221

LARSON, HOWARD M
0345
WENATCHEE, WA 98801

LARSON, LANOL W
1488
COTTAGE GROVE, OR 97424

LARSON, LLOYD
4387
YAKIMA, WA 98908

LARSON, MR. & MRS. DAN
4097
SELAH, WA 98942

LARSON, OWEN F
2115
ANACORTES, WA 98221

LARUE, TERRENCE W
4506
ELLENSBURG, WA 98926

LASZLO, THOMAS
2602
EUGENE, OR 97401

LATHROP, ELIZABETH
3998
GIG HARBOR, WA 98335

LATIMER, J W
2617
WENATCHEE, WA 98801

LATVALA, ELEANOR
2106
ANACORTES, WA 98221

LATVALA, ERIC
2118
ANACORTES, WA 98221

LAUB, GEORGE
2727
WENATCHEE, WA 98801

LAUGHERY, OLIN
0281
NACHES, WA 98937

LAURENT, JAN
1330
YAKIMA, WA 98902

LAVIGNE, A.B
4093
SEATTLE, WA 98115

LAVIGNE, DUANE
0457
CASHMERE, WA 98815

LAVIGNE, JANE
0456
CASHMERE, WA 98815

LAWLER, MARK
4498
SEATTLE, WA 98102

LAWRENCE, STEVE
1433
BEAVERTON, OR 97005

LAWRENCE, SUSANNAH C
2932
SEATTLE, WA 98119

LAWRENCE, TARA
0653
WHITE SWAN, WA 98952

LAWSON, M D, E HAROLD
3680
NORTH BEND, WA 98045

LAWSON, MARILOU K.
4452
NORTH BEND, WA 98045

LAWSON, KATHY & CHRIS
2919
KIRKLAND, WA 98034

LAWSON, KEN
1068
NACHES, WA 98937

LAY, ELIZABETH
3095
GIG HARBOR, WA 98335

LAYMAN M A., WILLIAM D
0555
WENATCHEE, WA 98801

LAYMAN, JAMES G
0947
YAKIMA, WA 98908

LAYMAN, LOIS C
1072
YAKIMA, WA 98908

LAZLO, SARAH
1809
EUGENE, OR 97401

LEACH, CHARLES E.
4438
BENTON CITY, WA 98920

LEACH, KATHLEEN A.
3626
BENTON CITY, WA 98920

LEACH, RAYMOND
2419
PARKER, WA 98939

LEARN, MIKE
0485
NACHES, WA 98937

LEASE, DONNA M
1121
ELLENSBURG, WA 98926

LEASE, JOHN L.
1120
ELLENSBURG, WA 98926

LEATHERS, ANNE W
3661
SEATTLE, WA 98112

LEAUMONT, RICHARD J
3382
PASCO, WA 99301

LEBER, WILLIAM A.
3204
MERCER ISLAND, WA 98040

LEDBETTER, JAMES M
1071
SELAH, WA 98942

LEE, CHRISTIE A.
4227
ROSLYN, WA 98941

LEE, RONALD
1011
YAKIMA, WA 98901

LEE, TAMPA
1010
YAKIMA, WA 98901

LEE-HAIGHT, CATHY
3131
SEATTLE, WA 98117

LEEBERG, SHERRI
0996
NACHES, WA 98937

LEEDY, HELEN
2105
RENTON, WA 98058

LEEDY, HELEN
3525
RENTON, WA 98958

LEEDY, WESLEY & HELEN
2109
RENTON, WA 98058

LEEDY, WESLEY B
3494
RENTON, WA 98058

LEFF M D, MICHAEL A.
1888
BELLEVUE, WA 98004

LEHMAN, GREGORY D
4193
MANSON, WA 98831

LEHMAN, SHANNON
2974
MANSON, WA 98831

LEHMANN, CONNIE
1873
YAKIMA, WA 98908

LEIBSOHN, RONALD
0744
MERCER ISLAND, WA 98040

LEIDER M D, ALLAN R.
1970
SEATTLE, WA 98102

LEIENDECKER, KARIN
2385
MEDFORD, OR 97504

LEINGANG, AL
2423
YAKIMA, WA 98902

LEINGANG, GENE
2400
YAKIMA, WA 98902

LEISTER, KATHERINE
3595
SEATTLE, WA 98115

LEMKE, STEWART
0628
HAWKINS, WI 54530

LENNOTZ, DON
1036
SELAH, WA 98942

LENSEIGNE, AGNES
2510
MOXEE, WA 98936

LENSEIGNE, ARCHIE
2496
MOXEE, WA 98936

LENSEIGNE, CHRISTINE
2495
MOXEE, WA 98936

LENSEIGNE, CONNIE
2505
MOXEE, WA 98936

LENSEIGNE, DEAN
2506
MOXEE, WA 98936

LENSEIGNE, GINA
2512
MOXEE, WA 98936

LENSEIGNE, LARRY
2509
MOXEE, WA 98936

LENSEIGNE, LEROY
2494
MOXEE, WA 98936

LENSEIGNE, RICKI A.
2508
MOXEE, WA 98936

LENSEIGNE, SUZETTE
2516
OTIS, OR 97368

LENSEIGNE, TODD
2501
MOXEE, WA 98936

LENSEIGNE, TREVOR
2499
MOXEE, WA 98936

LENSEIGNE, WALLY
2500
MOXEE, WA 98936

LEONARD, DAVE
0171
LEAVENWORTH, WA 98828

LESLIE, LOLA FAYE
0779
YAKIMA, WA 98902

LESLIE, OTTO
0958
YAKIMA, WA 98902

LESLIE, STEVE
1387
YAKIMA, WA 98901

LESTER, CARMEN
3797
YAKIMA, WA 98901

LESTOR, ALBERT
1963
ROCK ISLAND, IL 61201

LETZENBERGER, DALE M
4013
PASCO, WA 99301

LEUNYAL, RAYMON
4396
ZILLA, WA 98953

LEWINSKI, DANIEL F
3988
SEATTLE, WA 98112

LEWIS, BERNADETTE
2482
NACHES, WA 98937

LEWIS, BRUCE
3957
TACOMA, WA 98409

LEWIS, DEAN
3761
GRANDVIEW, WA 98930

LEWIS, EVELYN R
3630
SEATTLE, WA 98118

LEWIS, GENNIE
1041
YAKIMA, WA 98902

LEWIS, GEORGE T
0620
SEATTLE, WA 98115

LEWIS, HADLEY M
2169
BELLINGHAM, WA 98226

LEWIS, JIM
2330
YAKIMA, WA 98907

LEWIS, KATHYRN
2176
BELLINGHAM, WA 98225

LEWIS, R
1611
YAKIMA, WA 98908

LEWIS, TILLIE
2548
YAKIMA, WA 98901

LEWIS, TOM
4505
REDMOND, WA 98073

LIDDANE, MARK
4114
ROSLYN, WA 98941

LIGHTFOOT, JULIE & ARTHUR
3791
BAINBRIDGE IS, WA 98110

LILLIS, DENNIS
2657
PESHASTIN, WA 98847

LILLQUIST, KARL D
2835
PORTLAND, OR 97214

LIND, REBECCA A.
1597
OLYMPIA, WA 98502

LINDBLOM, SUSAN
0844
WENATCHEE, WA 98801

LINDHOLDT, MRS. A.E.
4051
TACOMA, WA 98408

LINDSAY, DOUGLAS
3379
TACOMA, WA 98405

LINDSEY, EMMA I
3218
PUYALLUP, WA 98371

LINDSEY, ROB
3167
PUYALLUP, WA 98371

LINDSEY, ROBERT J
3104
PUYALLUP, WA 98371

LINDSTROM, HAL
2719
ELLENSBURG, WA 98926

LINGO, KATHY
2256
WENATCHEE, WA 98801

LINK, ELWOOD M
2271
LEAVENWORTH, WA 98826

LINNETT, BARRY JAMES
4088
SEATTLE, WA 98103

LINSTAD, DIANA M
2561
YAKIMA, WA 98901

LIPINSKI, DAVID B
3660
CENTRALIA, WA 98531

LIPP, BRAIN
3986
FIFE, WA 98424

LITTLE, DOROTHY C.
4208
SEATTLE, WA 98103

LITTOOY, J. A.
3339
OLYMPIA, WA 98502

LIVELY, CURTIS
2181
PORT ORCHARD, WA 98366

LIVELY, LEE
3300
PORT ORCHARD, WA 98366

LIVINGSTON, LEONARD
1095
YAKIMA, WA 98902

LIVINGSTON, WAYNE
1374
YAKIMA, WA 98901

LLOYD, CALVIN C
2234
GRANTS PASS, OR 97526

LLOYD, DEBBIE
2298
TOPPENISH, WA 98948

LLOYD, KENNETH E
3468
ELLENSBURG, WA 98926

LLOYD, RICHARD P
2478
NACHES, WA 98937

LOCHTE, ELIZABETH
4232
LYNNWOOD, WA 98048

LOCKMAN, KAREN
0492
GREELEY, CO 80631

LODATO, JACK D
4025
MALAGA, WA 98828

LODATO, KATHLEEN S.
3151
MALAGA, WA 98828

LOE, PHIL
2854
SEATTLE, WA 98109

LOEWEN, MARK
3327
YAKIMA, WA 98908

LOEWEN, PAM
3262
MOSES LAKE, WA 98837

LOFTUS, GREGG
4144
CLE ELUM, WA 98922

LOGAN JR, VICTOR
4321
LEAVENWORTH, WA 98826

LOGAN, SCOTT M
3920
S. CLE ELUM, WA 98943

LOGSDON, LARRY A.
3289
BREMERTON, WA 98310

LOHR, WILLIAM
2647
DRYDEN, WA 98821

LOMBARDO, MIKE
0852
LEAVENWORTH, WA 98826

LONG, ALBERT
0213
ENTIAT, WA 98822

LONG, BRIAN
0408
SEATTLE, WA 98115

LONG, CURTIS
3474
KENT, WA 98042

LONG, IDA
2184
SEATTLE, WA 98102

LONG, J. K.
1502
PORTLAND, OR 97210

LONG, WILLIAM H
2688
MONITOR, WA 98836

LONGWORTH, POLLY
3624
BAINBRIDGE IS , WA 98110

LORD, DARREN
3829
ISSAQUAH, WA 98027

LORD, JOHN D
3830
ISSAQUAH, WA 98027

LORD, LINDA
3594
ISSAQUAH, WA 98027

LORMIS, RAY A.
1221
SELAH, WA 98942

LORMIS, SHANNON
1222
SELAH, WA 98942

LORZ, THOMAS C
1541
LEAVENWORTH, WA 98826

LOSEY, JOHN L.
3916
CLE ELUM, WA 98922

LOTH, HUGH "SPUD"
9084
MONROE, WA 98272

LOTSPEICH, JOHN
1146
SELAH, WA 98942

LOUDERBACK, DAVID L.
2390
PUYALLUP, WA 98371

LOUDERBACK, DOROTHY
2391
PUYALLUP, WA 98371

LOUDERBACK, LARRY
1841
PUYALLUP, WA 98372

LOUNSBURY, STANLEY
1593
YAKIMA, WA 98908

LOVE, BRUCE
4353
YAKIMA, WA 98902

LOVE, C P
0814
SEATTLE, WA 98166

LOVEDAY, ABIE A.
1557
PESHASTIN, WA 98847

LOVINOSSE, MARY A.
9029
SEATTLE, WA 98107

LOWE, GORDON
9040
REDMOND, WA 98053

LOWRIE, JIM
3814
YAKIMA, WA 98903

LUCAS, DAVID
0724
NACHES, WA 98937

LUCAS, JOAN
3186
EVERETT, WA 98201

LUCAS, RICHARD A.
4168
E. WENATCHEE, WA 98802

LUCAS, SHARON
1313
YAKIMA, WA 98902

LUCAS, THOMAS J
2040
SEATTLE, WA 98104

LUCE, HAROLD O
0243
SEATTLE, WA 98103

LUDEMAN, WAYNE W
4490
SPOKANE, WA 99201

LUDWIG, ROD
0384
PORT ORCHARD, WA 98366

LUENN, NANCY
0604
SEATTLE, WA 98103

LUHMAN, R. DALE
2832
ENUMCLAW, WA 98022

LUISI, JERRY
1393
SELAH, WA 98942

LUMAGUIP, TRACY
4119
YAKIMA, WA 98902

LUMBLEY, M. ZANE
3558
SNOHOMISH, WA 98290

LUNDQUIST, PAUL
2515
MOXEE, WA 98936

LUNDSTROM, JIM
3812
EDMONDS, WA 98020

LUNSFORD, TAMI
2487
YAKIMA, WA 98901

LUPINSKI, NANCY
2881
LEAVENWORTH, WA 98826

LURAAS, JARIS
4211
YAKIMA, WA 98901

LUSCAS, KATHLEEN M
1228
NACHES, WA 98937

LUSE, KEN
1453
EUGENE, OR 97401

LUTZ, MARK P
3733
BELLEVUE, WA 98006

LUTZENHISER, GWEN
2006
SEATTLE, WA 98117

LYATES, RONALD
1171
NACHES, WA 98937

LYCAN, DOUGLAS A.
0246
WENATCHEE, WA 98601

LYDIG, DEAN A.
0343
SPOKANE, WA 99208

LYKKE, DAVID
2051
BELLINGHAM, WA 98227

LYKKE, GREGORY H
1982
BELLINGHAM, WA 98227

LYKKE, MARJI D
0668
BELLINGHAM, WA 98227

LYKKE, SARAH
2052
BELLINGHAM, WA 98227

LYLES, LIZABETH KELLY
2092
SEATTLE, WA 98119

LYNETTE, SUSAN B
3479
REDMOND, WA 98053

LYON, RUTH
2523
WAPATO, WA 98951

LYONS, DOYLE
0262
NACHES, WA 98937

LYTLE, FARREL
3993
SEATTLE, WA 98168

MAC LACHLAN, LAURIE
4122
ELLENSBURG, WA 98926

MACBARRON, ELIZABETH
9058
HADLOCK, WA 98339

MACDONALD, GREGG C
9103
ISSAQUAH, WA 98027

MACDONALD, STUART
9110
PRINEVILLE, OR 97754

MACDONALD, TOM
9112
PRINEVILLE, OR 97754

MACHNO, PETER
1407
SEATTLE, WA 98117

MACINKO, GEORGE
3026
ELLENSBURG, WA 98926

MACK, RICHARD & VIRG
2060
ELLENSBURG, WA 98926

MACKELWICH, BILL
4373
ABERDEEN, WA 98520

MACKAY, TERRY R
3453
AUBURN, WA 98001

MACLEAN, E. FRASER
2019
LEAVENWORTH, WA 98826

MACMILLER, ANTHONY
2973
CHELAN, WA 98816

MACY, GAYLE L.
1769
LEAVENWORTH, WA 98826

MADDEN, CHARLES
3234
RENTON, WA 87056

MADDEN, PHYLLIS
3308
WENATCHEE, WA 98801

MADELEY, TIM
1829
TACOMA, WA 98406

MADSEN, MAXINE
2699
CLE ELUM, WA 98922

MAEKAWA, HENRY
2720
E. WENATCHEE, WA 98802

MAGER, T. RUSSELL
0078
TACOMA, WA 98467

MAGLIETTI, CINDY
1254
CLE ELUM, WA 98922

MAGLIETTI, PAUL
1255
CLE ELUM, WA 98922

MAGNUSON, ALYCE
3082
SEATTLE, WA 98117

MAGNUSON, JILL
1767
TACOMA, WA 98409

MAGRUDER, GEORGEANNE
0148
ELLENSBURG, WA 98926

MAGRUDER, GEORGEANNE
1141
ELLENSBURG, WA 98926

MAGRUDER, ROBERT J
4068
ELLENSBURG, WA 98926

MAIN, BOB
2469
ELLENSBURG, WA 98926

MAIN, ROBIN
2470
ELLENSBURG, WA 98926

MAINER, MR. & MRS DAVID
3117
SEATTLE, WA 98115

MALANY, HERB
9080
BOISE, ID 83709

MALCEVSKI, IGOR & DONNA
0655
SNOHOMISH, WA 98290

MALINOFF, ROBERT
3259
MERCER ISLAND, WA 98040

MALLOY, JAMES B
0897
E. WENATCHEE, WA 98802

MALPASS, CHUCK
1450
EUGENE, OR 97401

MALTBIE, ROBERT
1677
SELAH, WA 98942

MANDEL, ERIC J
3211
SEATTLE, WA 98103

MANDRA, LORETTA
2013
SEATTLE, WA 98126

MANGAN, JOHN J
2837
SEATTLE, WA 98112

MANGAN, LEO J
0666
CLE ELUM, WA 98922

MANGOLD, ROGER F
2823
WENATCHEE, WA 98901

MANJARREZ, JANET
2403
YAKIMA, WA 98903

MANN, EDWARD
4497
SEATTLE, WA 98105

MANNIN, MARLENE
1401
YAKIMA, WA 98901

MANNING, HARVEY
4219
BELLEVUE, WA 98006

MANRING, H ALVIN
2857
SEATTLE, WA 98103

MAPES, BRIAN
3608
SEATTLE, WA 98195

MARBLE, EXEC V P , KEN
0807
YAKIMA, WA 98907

MARBLE, R A.
0798
YAKIMA, WA 98908

MARCELLUS, EARL
4368
LEAVENWORTH, WA 98826

MARCELLUS, LINDA
3145
LEAVENWORTH, WA 98826

MARKHAM, C R.
1471
COTTAGE GROVE, OR 97424

MARKHAM, ED
0835
KENT, WA 98032

MARKMANN, MS TERRY
2895
SEATTLE, WA 98115

MARKOV, GREGORY
0377
SEATTLE, WA 98115

MARLER, CHESTER
3820
LEAVENWORTH, WA 98826

MARLIN, LLOYD,
1556
WENATCHEE, WA 98801

MARLIN, MARGARET E
0339
CHELAN, WA 98816

MARLIN, RAYBURN
0340
CHELAN, WA 98816

MARLOW, STAN
0446
GOLDENDALE, WA 98820

MARR, JUDITH S
2601
BELLINGHAM, WA 98228

MARSH, SUSAN
0587
JACKSON, WY 83001

MARSHALL, EUGENE E
4389
YAKIMA, WA 98901

MARSHALL, VEDA
1343
CENTRAL POINT, OR 97502

MARTENSEN, DOUGLAS M
3581
ELLENSBURG, WA 98926

MARTIN, A.
0102
WENATCHEE, WA 98901

MARTIN, BILLY
3999
SILVERDALE, WA 98383

MARTIN, CHARLES H
1438
PORTLAND, OR 97201

MARTIN, CHARLES LYNN
1104
YAKIMA, WA 98901

MARTIN, CHRISTINE
0559
SEATTLE, WA 98103

MARTIN, DIANE & JIM
3021
CHELAN FALLS, WA 98817

MARTIN, ETHEL B
0636
ALDERWOOD MANOR WA,
98036

MARTIN, MEREDITH F
1438
PORTLAND, OR 97201

MARTIN, PAT L.
1399
GOLDENDALE, WA 98820

MARTIN, PAUL
4492
TACOMA, WA 98405

MARTIN, VERNA J
4006
SILVERDALE, WA 98383

MARTINEZ, MARIA
1865
YAKIMA, WA 98901

MARTINEZ, REYES
1706
YAKIMA, WA 98902

MARTINEZ, ROSIE
1674
YAKIMA, WA 98901

MARTINEZ, SIMN
1876
MOXEE, WA 98936

MARTING, SIMM J
3921
MOXEE, WA 98936

MARTINKAS, DR GARY
1320
YAKIMA, WA 98901

MARTZ, LINDA
0326
E. WENATCHEE, WA 98802

MARTZ, MICHAEL E
0327
E WENATCHEE, WA 98802

MARUSA, ANNE
2707
ROSLYN, WA 98941

MARUSA, CHERI
1271
S CLE ELUM, WA 98943

MARUSA, ROBERT
1270
S CLE ELUM, WA 98943

MARUSA, TONY
2696
ROSLYN, WA 98941

MARVIN, ANGELINE R.
3176
PORT ORCHARD, WA 98366

MARVIN, BRUCE
0646
SEATTLE, WA 98122

MARVIN, MARLA
3244
SEATTLE, WA 98111

MASSENA, RUTH
0048
SEATTLE, WA 98116

MASSUCCO, LOUIS
2763
CLE ELUM, WA 98922

MASTEN, MARY
1890
SELAH, WA 98942

MASTERMAN, GERALD L.
1329
SELAH, WA 98942

MASTIN, ETHEL
0272
CASHMERE, WA 98815

MASTIN, ROBERT
0273
CASHMERE, WA 98815

MATHASON, JAMES A.
0566
BELLINGHAM, WA 98226

MATHEWS, DONNA
3157
E WENATCHEE, WA 98802

MATHEWS, JAMES C
2534
ELLENSBURG, WA 98926

MATSONS, IVARS
4378
ABERDEEN, WA 98520

MATTSON, KENNETH R
1006
YAKIMA, WA 98902

MAX WEST INC
1605
RANDLE, WA 98377

MAXEY, BEN
1378
UNION GAP, WA 98903

MAXWELL, J ALEX
2086
YAKIMA, WA 98908

MAXWELL, WILLIAM
1305
BELLEVUE, WA 98004

MAYER, REV DONALD E
9006
WENATCHEE, WA 98806

MAYER, RUEBEN
0355
CHELAN, WA 98816

MAYFIELD, BETTY
3685
RAINIER, OR 97048

MAYHUE, AUBREY
1069
YAKIMA, WA 98908

MAYS, THEO H
1724
YAKIMA, WA 98908

MAYS, W E.
0638
ELLENSBURG, WA 98826

MAZAMAS
0150
PORTLAND, OR 97209

MC CALL, DON
1737
MOXEE, WA 98936

MC CANDLESS, E. GENE
0696
DRYDEN, WA 98821

MC CANDLESS, KEN
1909
DRYDEN, WA 98821

MC CANDLESS, RICHARD M
1778
DRYDEN, WA 98821

MC CASLIN, CONNIE
3966
YELM, WA 98597

MC CLELLAND, BRUCE
3261
RENTON, WA 98056

MC COLLEY, PHILLIP
2876
WENATCHEE, WA 98801

MC CONKEY, DIANA
3027
CAMAS, WA 98607

MC CONNELL, DAVID
4335
YAKIMA, WA 98908

MC CULLOUGH, JACK
0873
ROSLYN, WA 98941

MC CULLOUGH, WILLIAMS
3961
BELFAIR, WA 98528

MC DERMOTT, TOM
1318
WAPATO, WA 98951

MC DOWELL, MIKE
2424
SEATTLE, WA 98155

MC ELROY, GARY
2840
WENATCHEE, WA 98801

MC EVOY, JOHN
3682
GRAND COULEE, WA 99133

MC EVOY, MIKE
2574
SEATTLE, WA 98102

MC FEELEY, JUDITH A.
1558
YAKIMA, WA 98903

MC GILL, MELVIN
2336
LANGLEY, WA 98260

MC GINNIS, JIM & EARL
1908
E. WENATCHEE, WA 98802

MC GOWAN, THOMAS J
0249
PESHASTIN, WA 98847

MC KELLER, JOHN
2562
MOXEE, WA 98936

MC KENDRICK, CICELY M
3238
SOUTHWORTH WA 98386

MC LAUGHLIN, WILLIAM K.
3489
OXFOLD, MS 38655

MC LEAN, JACK
0801
LAKE OSWEGO, OR 97034

MC NEAL, CECEUA
0225
SPOKANE, WA 98205

MCALVEY, JAN
2133
CHELAN, WA 98816

MCBRIDE, DONALD E
2558
SELAH, WA 98942

MCBRIDE, GEORGE
2900
GIG HARBOR, WA 87335

MCBRIDE, JOYCE
2579
SELAH, WA 98942

MCCAFFERTY, E R
0024
NACHES, WA 98937

MCCAFFERTY, TANYA M
1333
YAKIMA, WA 98901

MCCARDELL, JOHN W
0445
GOLDENDALE, WA 98820

MCCLELLAN, TOM
1331
YAKIMA, WA 98908

MCCLINTON, LEON
2295
YAKIMA, WA 98901

MCCLOSKEY, STEPHEN V
4512
CHELAN, WA 98816

MCCOLLEY, MARIANNE
2873
WENATCHEE, WA 98801

MCCOLLUM, ROBERT M
3641
SEATTLE, WA 98105

MCCONAGLE, FRANCES
0573
SEATTLE, WA 98136

MCCONNELL, JAMES R
1043
YAKIMA, WA 98902

MCCONNELL, LARRY
1351
YAKIMA, WA 98901

MCCONNELL, MARVIN
0915
YAKIMA, WA 98902

MCCOWN MS MT, LINDA J
3105
YAKIMA, WA 98902

MCCOY, MIKE
1292
ROSLYN, WA 98941

MCCRORY, JULIE
1153
YAKIMA, WA 98908

MCCRORY, MORGAN
1160
YAKIMA, WA 98908

MCCULLOUGH, DAVID
0488
E WENATCHEE, WA 98802

MCDANIEL, HENRY E.
1718
YAKIMA, WA 98908

MCDANIEL, REX P
1659
YAKIMA, WA 98901

MCDONALD, JOHN
0510
HOQUIAM, WA 98550

MCDONALD, JOHN P
0545
RICHLAND, WA 99352

MCDONNELL, BEANINE
4339
YAKIMA, WA 98908

MCDONNELL, MR. & MRS
DAVID
4293
YAKIMA, WA 98908

MCDOWELL, WILLIAM G
2463
NACHES, WA 98937

MCELROY, DONNA JEAN
2665
WENATCHEE, WA 98801

MCELROY, MARCIA
2666
WENATCHEE, WA 98801

MCFARLAND, PAUL W
1163
WAPATO, WA 98951

MCFEELEY, MICHAEL D
1520
YAKIMA, WA 98903

MCGONIGLE, CAROL
0667
RENTON, WA 98058

MCGOWAN, J D
4230
MAPLE VALLEY, WA 98038

MCGOWAN, KYM
3987
MAPLE VALLEY, WA 98038

MCGREEVY, M
2266
KETTLE FALLS, WA 99141

MCGUIRE, CARLA A.
3904
OLYMPIA, WA 98507

MCGUIRE, GREG
1639
YAKIMA, WA 98908

MCGUIRE, RICHARD J
2978
EVERETT, WA 98204

MCINTURFF, NORMAN C
0047
KENNEWICK, WA 99336

MCKEE, ROBERT S
0420
RICHLAND, WA 99352

MCKEE, SANDRA
3982
FEDERAL WAY, WA 98023

MCKEEVER, DOUG
3132
BELLINGHAM, WA 98226

MCKELLAR, DONALD H
2384
PESHASTIN, WA 98847

MCKELLAR, LARUE
2385
PESHASTIN, WA 98847

MCKENZIE, RICHARD
2908
REDDING, CA 96099

MCKENZIE, ROBERT L.
4001
EDMONDS, WA 98020

MCKINLEY, RUSS
2592
MEDFORD, OR 97504

MCKINNEY, CHARLES
4427
ELLENSBURG, WA 98926

MCLAUGHLIN, ROY
0588
SEATTLE, WA 98146

MCLEAN, CLIFFORD E.
2259
E WENATCHEE, WA 98802

MCLEAN, DOUGLAS
3165
SEATTLE, WA 98107

MCLEAN, KIRK & BURNETT,
JUDITH
3183
SEATTLE, WA 98105

MCMILLAN, ANDREW
3287
OLYMPIA, WA 98506

MCNAMARA, DORIS
2314
YAKIMA, WA 98908

MCNEIGHT, JENAN
2232
ELLENSBURG, WA 98926

MCNEIGHT, TODD
2230
ELLENSBURG, WA 98926

MCNICHOL, SHANNON
2296
YAKIMA, WA 98908

MCQUIRE, GREG
2975
YAKIMA, WA 98908

MCRAE, NOEL
4128
KELSO, WA 98628

MEECH JR, DENNIS L.
2341
GOLDENDALE, WA 98620

MEECH, DENNIS
2355
GOLDENDALE, WA 98620

MEEK, J
3160
WAUNA, WA 98421

MEEKER, EUGENIE
3330
YAKIMA, WA 98902

MEEKS, KEVIN
2611
YAKIMA, WA 98902

MEGERT, HEFFMUT
4314
LEAVENWORTH, WA 98826

MEHLBRECH, NICOLE
2465
ELLENSBURG, WA 98926

MEIER, PAUL
0521
PASCO, WA 99301

MEIER, WALTER
1013
YAKIMA, WA 98901

MELGARD, CHRISTIAN
3645
SEATTLE, WA 98112

MELGARYZK, DENNIS
1493
ST CLAIR, MI 48079

MELLEM, ROGER D
3930
SEATTLE, WA 98101

MELLER, DELBERT R.
2619
REDMOND, WA 98053

MELLON, A.R.
2672
LEAVENWORTH, WA 98826

MELTON, DON
3092
BREMERTON, WA 98312

MELTON, JAMES F
0562
PATEROS, WA 98846

MERKER, CHRISTOPHER
3592
SELAH, WA 98942

MERLUCH, MAX
0265
SANDY, OR 97055

MERRITT, CAROLYN
1289
CLE ELUM, WA 98922

MERRITT, MARIE
1287
CLE ELUM, WA 98922

MERRITT, MIKE
1291
CLE ELUM, WA 98922

MERRITT, PAT
1290
CLE ELUM, WA 98922

MERRITT, SYLVAN
1282
CLE ELUM, WA 98922

MERVOS, KATHY
2694
CLE ELUM, WA 98922

MERWOOD, DENNIS L.
4007
TACOMA, WA 98401

MESA, YAIRE
2324
YAKIMA, WA 98902

MESSINGER, ROBERT
2223
SUMMERVILLE, OR 97876

MESSUBGER, BOB
0143
SUMMERVILLE, OR 97876

METZELER MOTORCYCLE
TIRE, AGENT
1966
EVERETT, WA 98204

MEYER M D, EDGAR A.
3475
CASHMERE, WA 98815

MEYER, CLARENCE
4043
BOTHELL, WA 98011

MEYER, G RALPH
0087
VANCOUVER, WA 98664

MEYER, GEORGE R.
2831
TACOMA, WA 98444

MEYERDING, ESTER
3571
SEATTLE, WA 98103

MEYERS P E., STANLEY K.
1561
KLAMATH FALLS, OR 97601

MEYERS, DAVID
2953
SEATTLE, WA 98105

MEYERS, MYRON
1583
YAKIMA, WA 98908

MICCICHE, MICHAEL L.
3043
NO ADDRESS

MICHAEL, BARB
0458
CASHMERE, WA 98815

MICHAEL, CHAD
1578
YAKIMA, WA 98901

MICHALUK, JAN
0695
E WENATCHEE, WA 98802

MICHALOFSKI, O VON
4004
BELLEVUE, WA 98007

MICHEL, DOLORES
1641
YAKIMA, WA 98908

MICKLE, EUGENE
0361
BELLEVUE, WA 98006

MIDDLETON JR, RICHARD W
1341
ABERDEEN, WA 98520

MIDDLETON, R W
0683
SEATTLE, WA 98104

MILBRANDT, LEONARD J
0899
RENTON, WA 98056

MILEAN, JEROLD SCOTT
0398
TIETON, WA 98947

MILER, MR & MRS ROBT
3291
YAKIMA, WA 98902

MILER, ROBERT T
4248
YAKIMA, WA 98902

MILES, JOE E
2858
DES MOINES, WA 98198

MILES, ROY
2593
CENTRAL POINT, OR 97502

MILINE, SHIRLEY I
3488
E WENATCHEE, WA 98802

MILLER, BESSIE ELAINE
0756
LEAVENWORTH, WA 98826

MILLER, BONNIE
0155
ENTERPRISE, OR 97826

MILLER, CARTER
1730
YAKIMA, WA 98908

MILLER, CLARK
1458
REDMOND, OR 97756

MILLER, DAVID
0697
DRYDEN, WA 98821

MILLER, DONALD G
3773
BELLEVUE, WA 98066

MILLER, DONALD ROBERT
0487
SUNNYSIDE, WA 98944

MILLER, JAY
0753
LEAVENWORTH, WA 98826

MILLER, JENNIFER
3215
BREMERTON, WA 98312

MILLER, JIM
2821
METHOW, WA 98834

MILLER, JIM
4549
ROSLYN, WA 98941

MILLER, KARRIE
4063
CLE ELUM, WA 98922

MILLER, MARGARET M
0863
BELLEVUE, WA 98007

MILLER, MONTY
3902
CLE ELUM, WA 98922

MILLER, REX
2342
CENTERVILLE, WA 98613

MILLER, RUSSELL
9055
PASCO, WA 99302

MILLS, ARCHIE & AILEEN
1955
WENATCHEE, WA 98801

MILLS, JAMES
0129
WENATCHEE, WA 98801

MILLS, LIBBY
4065
MT VERNON, WA 98273

MILNE, DAVID H
3008
OLYMPIA, WA 98505

MILTON, JIM
0388
YAKIMA, WA 98908

MINALIA, STEVEN
9099
RENTON, WA 98058

MINAMORRA, CHUCK
1844
TACOMA, WA 98405

MINER, LARRY
1389
YAKIMA, WA 98902

MITZEL, FRANK
2421
YAKIMA, WA 98902

MOBERLY, ROGER
3896
YAKIMA, WA 98902

MOBLEY, RALPH S
1385
YAKIMA, WA 98908

MOBURG, BRUCE
3273
SEATTLE, WA 98105

MOBURG, MARSHA L
3088
SEATTLE, WA 98112

MOEN, DON
0889
YAKIMA, WA 98902

MOFFAT, JOHN G
3861
WENATCHEE, WA 98801

MOHAGEN, R.N
1523
YAKIMA, WA 98902

MOLINE, PAUL H
3578
E. WENATCHEE, WA 98802

MOLLER, J CHRISTIAN
4109
SEATTLE, WA 98109

MOLLIICK, DON R
0720
BELLEVUE, WA 98005

MOLLINES, PAUL H
4535
E WENATCHEE, WA 98802

MOLVER, ANKER & ARLEAN
3470
SEATTLE, WA 98133

MONAHAN, G L
3380
TACOMA, WA 98424

MONAHAN, G.L
3381
TACOMA, WA 98424

MONDOR, ARCHIE W
0882
YAKIMA, WA 98908

MONROE, RICHARD E
4108
SEATTLE, WA 98144

MONSON, COLBY
1093
YAKIMA, WA 98901

MONTEITH, GRETCHEN
4338
CLE ELUM, WA 98922

MONTEITH, JOHN
4095
CLE ELUM, WA 98922

MONTGOMERY, GARY
0777
E WENATCHEE, WA 98802

MONTGOMERY, JAMES
3098
ROSLYN, WA 98941

MONTGOMERY, RONALD
1253
CLE ELUM, WA 98922

MOON, GLORIA
1390
YAKIMA, WA 98903

MOONE, DUNCAN
9015
NO ADDRESS

MOONEY, COLLEEN
0937
SELAH, WA 98942

MOONEY, JOHN E
2431
YAKIMA, WA 98908

MOONEY, LUNDA K
0944
YAKIMA, WA 98908

MOONEY, RANDY
0938
SELAH, WA 98902

MOONEY, WILLIAM G
0952
YAKIMA, WA 98908

MOORE II, ALBIN TROY
0181
LEAVENWORTH, WA 98826

MOORE, AARON
4039
SEATTLE, WA 98103

MOORE, ALICE
0178
LEAVENWORTH, WA 98826

MOORE, ERIN
3057
SEATTLE, WA 98122

MOORE, JEAN
1933
LEAVENWORTH, WA 98826

MOORE, MICHAEL
0228
SANDY, OR 97055

MOORE, TROY J
1931
LEAVENWORTH, WA 98826

MOORE, WILLIAM R.
1739
MOXEE, WA 98936

MOREHEAD, ETHEL S
0221
JOSEPH, OR 97846

MOREHEAD, PAUL B.
0178
JOSEPH, OR 97846

MOREY, MAE
3011
ELLENSBURG, WA 98926

MORFORD, LEROY A.
1667
YAKIMA, WA 98903

MORGAN SKYE, AZURE
2993
SEATTLE, WA 98115

MORGAN, CLARICE
3991
E. WENATCHEE, WA 98801

MORGAN, DANIEL F
1838
EDMONDS, WA 98020

MORGAN, DONALD W
4377
ELMA, WA 98541

MORGAN, GLEN & ALMA
1988
BREMERTON, WA 98312

MORGAN, HELEN G
2943
ELLENSBURG, WA 98926

MORGAN, J P
1140
ELLENSBURG, WA 98926

MORGAN, RANDY
0224
OHIO, CO 81237

MORGAN, REX & LAUREL
3022
QUINCY, WA 98848

MORGAN, WILLARD
9000
KITITAS, WA 98934

MORLEY, MIKE
0131
RICHLAND, WA 99352

MORO, GERALD R.
2861
WENATCHEE, WA 98801

MORRELL, ANTHONY R.
4509
PORTLAND, OR 97208

MORRILL, ROY H
0032
RICHLAND, WA 99352

MORRIS, CHESTER L.
1377
YAKIMA, WA 98902

MORRIS, DAVID
0890
GIG HARBOR, WA 98335

MORRIS, ELIZABETH M
2078
WENATCHEE, WA 98801

MORRIS, KEN
0945
NACHES, WA 98937

MORRIS, RICHARD S
0709
NO ADDRESS

MORRISON, RONALD G
1995
SPOKANE, WA 99204

MORROW, HENRY
0544
LEAVENWORTH, WA 98826

MORSE, JOHN
2057
SEATTLE, WA 98103

MORSER, JULI GOETZ
2205
SEATTLE, WA 98103

MORTON, BEVERLY
1760
SELAH, WA 98942

MORTON, LARRY
1758
SELAH, WA 98942

MORTON, STEPHEN L.
3879
LEAVENWORTH, WA 98826

MORTON, STEVE
3548
LEAVENWORTH, WA 98826

MOSEBAN, DENNIS
4053
CLE ELUM, WA 98922

MOSER, ROBERT
0924
YAKIMA, WA 98901

MOSES, LOIS C
1600
TACOMA, WA 98407

MOSMAN, MIKE
4374
MONTESANO, WA 98563

MOSS, SANDRA J
0113
SEATTLE, WA 98117

MOSS, SANDRA J
4233
SEATTLE, WA 98117

MOTE, KARL W
2129
SPOKANE, WA 99201

MOTTNER, PETER
0141
REDMOND, WA 98052

MOUNTER, HANK
0839
WENATCHEE, WA 98801

MOURA, GUY F
2612
YAKIMA, WA 98902

MOURAD, PIERRE
9018
SEATTLE, WA 98195

MOWERY, PERRY D
0196
ENTIAT, WA 98822

MRACHEK, LOREN F
2084
WENATCHEE, WA 98801

MROWKA, ROB
0900
CLE ELUM, WA 98922

MUDD, JAMES N
1315
YAKIMA, WA 98903

MUELLER, PAT & ROBERT
9097
STAUNTON, VA 24401

MUENSTER, MARK W
9017
SEATTLE, WA 98107

MULER, CHARLES S
2274
E WENATCHEE, WA 98802

MULHOLLAND, TONY
3456
NO ADDRESS

MULLEN PH D, A J
0395
NO ADDRESS

MULLEN, PETER
4306
SEATTLE, WA 98115

MULLIGAN, BRIAN AND HELEN
3795
KIRKLAND, WA 98034

MUMFORD, MIKE
3407
BELLEVUE, WA 98008

MUNSON, RICHARD
1862
YAKIMA, WA 98902

MUNSON, RUTH
3233
LYNNWOOD, WA 98036

MURANTE, LARRY
0862
SEATTLE, WA 98105

MURPHY, HEATHER A.W
2879
LEAVENWORTH, WA 98826

MURPHY, JAMES F
1569
YAKIMA, WA 98901

MURPHY, JIM
4476
PORT ORCHARD, WA 98366

MURPHY, MARTY
0424
BRISBANE, CA 94005

MURPHY, RENA R
2525
YAKIMA, WA 98901

MURPHY, WILLIE
0962
UNION GAP, WA 98908

MURRAY, BETSY
2204
BELLEVUE, WA 98007

MURRAY, KATHLEEN
0719
SEATTLE, WA 98136

MURRAY, PAT
3416
SEATTLE, WA 98108

MURREN, QUENTIN
2821
WENATCHEE, WA 98801

MURRI, NELDA
3808
SEATTLE, WA 98115

MURRI, OTHELLA,
1395
YAKIMA, WA 98903

MUSTOE, GEORGE
0536
BELLINGHAM, WA 98225

MUTCHLER, MICHAEL G
1849
TACOMA, WA 98409

MYCEK, LINDA
4216
WAUCONDA, WA 98859

MYCOCK, DEBORAH I
0474
CASHMERE, WA 98815

MYCOCK, STARKY
1800
CASHMERE, WA 98815

MYERS, DICK
3496
SEATTLE, WA 98103

MYERS, GENE
0585
SEATTLE, WA 98115

MYERS, KATHY & DICK
3264
YAKIMA, WA 98908

MYERS, MONA
2100
ANACORTES, WA 98221

MYERS, RICHARD W
1742
YAKIMA, WA 98908

MYERS, TERRY
2110
ANACORTES, WA 98221

MYERS, TERRY
3881
ANACORTES, WA 98221

MYERSON, M D PH D, DAVID
0865
MERCER ISLAND, WA 98040

MYHOWICH, EDWARD
1054
YAKIMA, WA 98901

NAGLE, JUSTINE F
2863
VASHON, WA 98070

NAKATA, LESLIE A.
3885
BELLEVUE, WA 98005

NALL, DAN R.
1728
SELAH, WA 98842

NANCE, JOHN
1001
YAKIMA, WA 98902

NASH, DOUGLAS O
1586
YAKIMA, WA 98902

NAUGHT, RICHARD
3743
YAKIMA, WA 98902

NAUGHTON, VINCE
2217
LA GRANDE, OR 97850

NAVARRE, MICHAEL T
2258
WENATCHEE, WA 98801

NEAL, ALICE A.
1618
SEATTLE, WA 98148

NEAL, JAMES R.
1616
SEATTLE, WA 98146

NEAL, LAURIE
2121
WENATCHEE, WA 98801

NEARING, M B
9084
CORVALLIS, OR 97333

NEFF, BERYL
3156
LAKE STEVENS, WA 98258

NEFF, HAROLD A.
3174
LAKE STEVENS, WA 98258

NEGRI, LEWIS
1027
YAKIMA, WA 98902

NEIL DC, FRED
3402
LYNNWOOD, WA 98036

NELLIS, ALLAN L.
1884
YAKIMA, WA 98908

NELSON, BETTY K.
0433
SEATTLE, WA 98125

NELSON, CATHY
0060
SNOHOMISH, WA 98290

NELSON, CINDY
3321
ISSAQUAH, WA 98027

NELSON, CLIFF
1535
LEAVENWORTH, WA 98826

NELSON, EVA B
0772
LEAVENWORTH, WA 98826

NELSON, JIM
1919
LEAVENWORTH, WA 98826

NELSON, JOHN K.
1117
KITITITAS, WA 98934

NELSON, LOIS A.
2333
YAKIMA, WA 98901

NELSON, MIKE
1414
KITITITAS, WA 98934

NELSON, PAT A.
0751
LEAVENWORTH, WA 98816

NELSON, ROBERT D
0770
LEAVENWORTH, WA 98826

NELSON, ROBERT T
0773
LEAVENWORTH, WA 98826

NELSON, ROGER
0553
SEATTLE, WA 98155

NELSON, SHERRY J
0767
LEAVENWORTH, WA 98826

NELSON, VICKI
1413
KITITITAS, WA 98934

NELSON, WILLIE
2565
YAKIMA, WA 98902

NERDRUM, CALVIN W
0853
SEATTLE, WA 98107

NERENBERG, ROBERT &
KATHLEEN
3543
REDMOND, WA 98052

NESSMAN, ALLAN
3227
SEATTLE, WA 98115

NETZ, GLEN
0149
SPOKANE, WA 99202

NEUMANN, WERNER
2145
LYNNWOOD, WA 98031

NEUZIL, DENNIS
3206
BELLEVUE, WA 98004

NEVERS, TOM
3495
SEATTLE, WA 98116

NEVEU, T
1610
YAKIMA, WA 98908

NEWBURY, GEORGE
3522
SEDRO-WOOLEY, WA 98284

NEWELL, BILL
1898
LEAVENWORTH, WA 98826

NEWELL, BILL
3996
LEAVENWORTH, WA 98826

NEWELL, BYRON
0742
LEAVENWORTH, WA 98826

NEWELL, GARY
2447
SEATTLE, WA 98102

NEWELL, LAURA E
2484
LEAVENWORTH, WA 98826

NEWELL, MRS RALPH
1926
LEAVENWORTH, WA 98826

NEWELL, RALPH E
3757
LEAVENWORTH, WA 98826

NEWGARD, KRISTIN
9041
BELLEVUE, WA 98007

NEWMAN, CONSTANCE
4280
SILVERDALE, WA 98383

NEWMAN, LOREE
3758
ELLENSBURG, WA 98926

NEWSON, HAROLD
1428
BEAVERTON, OR 97005

NEY, CLAUDIA
0723
WENATCHEE, WA 98801

NICE, ALBERT
1484
KENNEWICK, WA 99336

NICHOLS III, CRANZ
3142
WALLA WALLA, WA 99362

NICHOLS, L.R.
2338
GOLDENDALE, WA 98620

NICHOLS, PAULA & MICHELLE
3141
WALLA WALLA, WA 99362

NICHOLS, SKIP
3133
WALLA WALLA, WA 99362

NICHOLSON, MARK A.
1812
PHOENIX, OR 97535

NICKLES, LEW
1038
YAKIMA, WA 98902

NIEBERL, HELEN R.
0842
SEATTLE, WA 98115

NIEBLING, HARRY W
1491
STURGIS, MI 49091

NIELSEN, B L
0130
KENNEWICK, WA 99338

NIELSEN, DOUG
2554
YAKIMA, WA 98901

NIELSON, GARY
2365
GOLDENDALE, WA 98620

NIELSON, LOWELL
1345
YAKIMA, WA 98908

NIEMAN, KEITH C
0970
YAKIMA, WA 98908

NIEMAN, SHARON
0971
YAKIMA, WA 98908

NIKORA, BEVERLEY
3038
ISSAQUAH, WA 98027

NILES, CHARLES A
2812
LEAVENWORTH, WA 98826

NILSEN, THOMAS R.
2170
SEATTLE, WA 98115

NISHITANI, LOUISA A.
2998
NACHES, WA 98937

NIST, EMMET J
0892
KENT, WA 98032

NIXON, BRANDON
0518
PORT ORCHARD, WA 98366

NIXON, MATTHEW LOUIS
3510
PORT ANGELES, WA 98362

NOBLE, PHILIP A
1076
SELAH, WA 98842

NOBLE, RALPH
0517
KEYPORT, WA 98345

NOEL, TOM
1295
YAKIMA, WA 98901

NORMAN, RAY H
0397
LEAVENWORTH, WA 98826

NORSEN, NANCY R
3717
SEATTLE, WA 98136

NORTHROP, JEANIE
1314
UNION GAP, WA 98903

NORTHWEST FORESTRY
4489
PORTLAND, OR 97201

NORVELL, JOHN M
3952
SEATTLE, WA 98105

NORWARK, M CATHY
3591
YAKIMA, WA 98926

NORWOOD, RAY
2147
CHELAN, WA 98816

NOTTER, TORRIS K.
0075
SPOKANE, WA 99214

NOVAK, GLENN
1897
ASHLAND, OR 97520

NUSSBAUM, MONA
2614
YAKIMA, WA 98902

NUTT, ERIC L.
2039
SEATTLE, WA 98199

NYSTROM, MARK W
1332
CENTRAL POINT, OR 97502

O'BRIEN M D, TIMOTHY
3052
CHELAN, WA 98816

O BRIEN, JAKE & ROBERTSON,
SUSAN
3562
SEATTLE, WA 98117

O'BRYAN, CONNIE L.
0893
CASHMERE, WA 98815

O'BRYAN, DOUG
0895
CASHMERE, WA 98815

O'BRYAN, GARY C
1782
CASHMERE, WA 98815

O'BRYAN, HAROLD
1917
CASHMERE, WA 98815

O BRYAN, KELLI
0894
CASHMERE, WA 98815

O'CALLAGHAN, DR P D
4259
EDMONDS, WA 98020

O CALLAGHAN, MARILYN
4228
EDMONDS, WA 98020

O'CONNOR, DAN
4468
LEAVENWORTH, WA 98826

O'DELL, HILDA
4115
YAKIMA, WA 98902

O DONNELL, JIM
1651
SPOKANE, WA 99201

O'HARA, PAT
2801
PORT ANGELES, WA 98362

O'NEAL, MR & MRS JOHN
2068
MINNEAPOLIS, MN 55405

OBORNE, FRANK
3229
OMAK, WA 98841

OCHSNER, LORIS
3039
SEATTLE, WA 98102

OGLE JR, SHIREL F
0711
PESHASTIN, WA 98847

OGLE, CHARLES C
1795
PESHASTIN, WA 98847

OKER, PAUL E
9003
EDMONDS, WA 98020

OLDHAM, DAVE
2544
YAKIMA, WA 98942

OLDS, VIRGINIA
3144
ELLENSBURG, WA 98926

OLER, NOEL
4099
CLE ELUM, WA 98922

OLIN, SHELBY
2524
YAKIMA, WA 98901

OLIVER, JAY F
4362
E WENATCHEE, WA 98802

OLIVER, WENDELL H
4210
TOPPENISH, WA 98948

OLSON, NEIL L.
2655
LEAVENWORTH, WA 98826

OLSON, ARLANE
3332
BELLINGHAM, WA 98226

OLSON, CINDY L.
0038
AUBURN, WA 98002

OLSON, LAVERNE T
2654
LEAVENWORTH, WA 98826

OLSON, LEANNE M
0876
SEATTLE, WA 98119

OLSON, LYNN
3643
CHELAN, WA 98816

OLSON, R. L
1748
NACHES, WA 98937

OLSON, TY
2352
GOLDENDALE, WA 98620

ORAVETZ, JANET
2709
CLE ELUM, WA 98922

ORDWAY, ALICE
3784
SEATTLE, WA 98117

ORMBREK, JON
0798
ELLENSBURG, WA 98926

OROZCO, IGNAIS
0982
YAKIMA, WA 98901

ORTH, WILLIAM J
1710
SELAH, WA 98942

ORTIZ, ALBERT M
2961
E WENATCHEE, WA 98802

ORTMAN, DAVID E
2201
SEATTLE, WA 98105

OSBORN M D, JOHN
4035
SPOKANE, WA 99210

OSIAS, JOHN & ANDERSON,
ESTA
3521
SEATTLE, WA 98103

OSMONOVICH, DON
4351
ROSLYN, WA 98941

OSMONOVICH, JOANNE
4330
ROSLYN, WA 98941

OSTERMANN, P V
4523
WOODINVILLE, WA 98072

OSWOOD, HOWARD
1958
E WENATCHEE, WA 98802

OUDEANS, MIKE
0747
MT VERNON, WA 98273

OVERTON, JIM
4419
NACHES, WA 98937

OWEN, DENNIS W
1498
EUGENE, OR 97405

OWEN, JIM
1388
YAKIMA, WA 98901

OWENS, JUDY
4059
CLE ELUM, WA 98922

OWENS, RAY
3015
CLE ELUM, WA 98922

OWENS, TOM
3600
SEATTLE, WA 98105

PACKARD, BEN E
1905
WENATCHEE, WA 98801

PACKARD, CAROLE
4090
SEATTLE, WA 98105

PADELFORD, MARGARET N
4105
SEATTLE, WA 98105

PADILLA, JESUS H
1007
YAKIMA, WA 98901

PAGE, BOB
1028
YAKIMA, WA 98901

PAGGETT, LEE
2304
YAKIMA, WA 98901

PAGUE, NANCY A.
2698
RONALD, WA 98940

PAINTER, DAVID
3001
BENTON CITY, WA 98352

PAINTER, SYBRANDT & LARRY
4214
KETCHIKAN, AK 99901

PALACHUCK, GAYLE
2153
YAKIMA, WA 98902

PALACHUK, DOUGLAS
2151
YAKIMA, WA 98902

PALACHUK, DUANE A.
0258
YAKIMA, WA 98902

PALACHUK, GREG
0781
YAKIMA, WA 98664

PALKA, JOHN & YVONNE
3879
SEATTLE, WA 98112

PALLAYA, PAULETTE
2312
YAKIMA, WA 98908

PALMER, BARBARA
1648
YAKIMA, WA 98902

PALMER, DEAN
1952
OKANOGAN, WA 98840

PALMER, MOLLEY
4433
ROSLYN, WA 98941

PALMER, RUTH E
2934
EVERETT, WA 98203

PALUCK, PATRICIA P
1582
YAKIMA, WA 98902

PANNELL, BILL
1024
YAKIMA, WA 98903

PAOLELLA, RAYMOND
2768
YAKIMA, WA 98902

PARDEE, SUZANNE
0789
SEATTLE, WA 98105

PARK PH D, LINDA S
3214
SEATTLE, WA 98107

PARK, DONALD R.
2114
MERCER ISLAND, WA 98040

PARK, ROY
0527
CLE ELUM, WA 98922

PARKER, BOB
2127
PESHASTIN, WA 98847

PARKER, J B
3424
SANDPOINT, ID 83864

PARKER, K.
3702
SEATTLE, WA 98166

PARKINS, HENRY W
1798
LEAVENWORTH, WA 98826

PARKINSON, CONNIE
0809
YAKIMA, WA 98902

PARKS, DON, LINDA & SETH
3621
REDMOND, WA 98052

PARKS, DONALD
0112
REDMOND, WA 98052

PARKS, DONALD
3128
REDMOND, WA 98052

PARKS, DONALD
4110
REDMOND, WA 98052

PARLI, KEN
4287
CLE ELUM, WA 98922

PARRINGTON, SARAH
4277
KINGSTON, WA 98346

PARSONS, BEBE D
1820
CASHMERE, WA 98815

PARSONS, JANICE
3053
ORONDO, WA 98843

PARSONS, JOAN
1699
CASHMERE, WA 98815

PARSONS, MIKE
1911
CASHMERE, WA 98815

PARSONS, ROBERT
1700
CASHMERE, WA 98815

PARTEN, DOUG
0247
LEAVENWORTH, WA 98826

PARTIN, TOM
0301
CANYON CITY, OR 97820

PASSAGE, R. JAMES
0354
SEATTLE, WA 98177

PATNODE, DIANE
3840
SEATTLE, WA 98109

PATRICK, DAN
0686
CASHMERE, WA 98815

PATRICK, MRS ROBERT
2825
WENATCHEE, WA 98801

PATRICK, VICKI
0284
CASHMERE, WA 98815

PATTERSON, DAN
4384
YAKIMA, WA 98901

PAUL, CECIL J
0561
S GIG HARBOR, WA 98335

PAUL, RICHARD P
1789
LEAVENWORTH, WA 98826

PAUL, WENDY L
3369
SEATTLE, WA 98144

PAULL, GARY
9022
SEATTLE, WA 98117

PAULY, DOUG
4494
SEATTLE, WA 98103

PAULY, MARK J
1495
ST CLAIR, MI 48079

PAULY, PAMELA
3578
SEATTLE, WA 98112

PAULY, RUDI & JIM
4285
WENATCHEE, WA 98801

PAUNELL, BUD
1055
SELAH, WA 98942

PAXTON, ROBERT
1047
YAKIMA, WA 98902

PAYNE, JEFF
1216
NACHES, WA 98937

PAYNE, KRISTI
1229
NACHES, WA 98937

PAYNE, VERLYN
1080
NACHES, WA 98937

PEARSON, BILL
2251
SULTAN, WA 98294

PEARSON, R C
2111
ANACORTES, WA 98221

PEASE, DAVID L
2289
COLVILLE, WA 99114

PECK, JOE
2125
ROSLYN, WA 98941

PECK, JOE
4432
ROSLYN, WA 98941

PEDERANIE, STEVE
2077
CHELAN, WA 98816

PEDERSEN, KAREN
0058
SEATTLE, WA 98125

PEDERSEN, MR & MRS JOHN
9050
BRINNON, WA 98320

PEDERSEN, ROY M
1902
WENATCHEE, WA 98801

PEDIGO, BRUCE
0752
LEAVENWORTH, WA 98826

PEINECKE, RALPH G
0055
PORTLAND, OR 97205

PELECH, WALTER & DOROTHY
3194
TUCSON, AR 85712

PELTIER, RON
3634
WINSLOW, WA 98110

PENBERTHY, GARY
2228
YREKA, CA 96097

PENNINGS, MARGARET
0349
CHELAN, WA 98816

PENNY, BETTY J
4482
NO ADDRESS

PEPLOW, JOEL
4367
WENATCHEE, WA 98801

PEPPERS, JERRY
2563
YAKIMA, WA 98902

PERALA, O J
9054
YAKIMA, WA 98908

PERCY, DEB
3222
LEAVENWORTH, WA 98826

PERCY, JIM
3224
LEAVENWORTH, WA 98826

PEREZ, DAVID
0031
LEAVENWORTH, WA 98826

PEREZ, EDWARD S
1105
BUENA, WA 98921

PEREZ, GARY H
1838
PUYALLUP, WA 98373

PEREZ, JEAN
1709
YAKIMA, WA 98902

PEREZ, STEVE
1000
YAKIMA, WA 98902

PEREZ, VELMA
1066
YAKIMA, WA 98902

PERIGO, LAWRENCE W
1070
TIETON, WA 98947

PERKINS, ALLEN
2986
SEATTLE, WA 98116

PERKINS, RICHARD L.
4305
LYNNWOOD, WA 98036

PERRIGOU, RON
4524
BELLEVUE, WA 98005

PERRY, A.
3051
YAKIMA, WA

PERRY, BRYON
4288
OTHELLO, WA 99344

PERRY, EVELYNE L.
2301
YAKIMA, WA 98901

PERRY, SHARON
1485
BURR OAK, MI 49030

PERRY, TOM & CONNIE
4052
REDMOND, WA 98052

PETERSON, RONALD D
3909
REDMOND, WA 98052

PETERMANN, DAN
0223
PASCO, WA 99301

PETERS, ELSIE & WALT
4267
DRYDEN, WA 98821

PETERS, H RUSSELL
0808
OLYMPIA, WA 98502

PETERS, RICHARD G
1735
YAKIMA, WA 98901

PETERS, THOM
2834
WOODINVILLE, WA 98072

PETERSEN, NORMAN
1085
UNION GAP, WA 98903

PETERSEN, ROD
1497
JUNCTION CITY, OR 97448

PETERSON'S WATERFRONT
INC
3854
CHELAN, WA 98816

PETERSON, BRYCE A.
4323
LEAVENWORTH, WA 98826

PETERSON, CHRIS
3978
NO ADDRESS

PETERSON, DENISE
2293
YAKIMA, WA 98902

PETERSON, DONALD J
1848
TACOMA, WA 98499

PETERSON, J KEITH
3821
SEATTLE, WA 98148

PETERSON, JANET L.
3220
KIRKLAND, WA 98034

PETERSON, JOHN C
3677
YAKIMA, WA 98902

PETERSON, KAREN D
4173
SEATTLE, WA 98125

PETERSON, KAREN S
2697
CLE ELUM, WA 98922

PETERSON, KEN
1624
ELLENSBURG, WA 98926

PETERSON, L
0310
SEATTLE, WA 98147

PETERSON, MARIBETH J
1847
TACOMA, WA 98499

PETERSON, MICHELLE K.
1846
TACOMA, WA 98499

PETERSON, RALPH H
3483
WENATCHEE, WA 98801

PETERSON, RICHARD
2901
SEATTLE, WA 98165

PETERSON, ROSS B
0644
SEATTLE, WA 98125

PETERSON, STEVE
0551
BELLINGHAM, WA 98226

PETERSON, VICTOR
2022
E. WENATCHEE, WA 98802

PETERSON, WALLY
3686
MANSON, WA 98831

PETERSONS, ERIC
3703
FEDERAL WAY, WA 98023

PETRE, KERRY
0775
ELLENSBURG, WA 98926

PETRIE, WALDTRAUT
0608
KIRKLAND, WA 98034

PETTELE, PAT
2048
ORONDO, WA 98843

PETTERSEN, JEFF
0144
RENTON, WA 98056

PETTIS, KEITH
1715
YAKIMA, WA 98908

PEYTON, PATRICK J
3953
WENATCHEE, WA 98801

PFEIFER, BOB
3561
KIRKLAND, WA 98034

PHELPS, RAYMOND G
1296
YAKIMA, WA 98907

PHELPS, ROBERT L.
2144
LANGLEY, WA 98260

PHILLEY, M PETER
2187
GIG HARBOR, WA 98335

PHILLIPS, H
3974
TACOMA, WA 98444

PHILLIPS, MRS BARBARA
3975
TACOMA, WA 98444

PHILLIPS, TONY
2308
YAKIMA, WA 98908

PHILLIPS, WELLINGTON S
2063
CHELAN, WA 98816

PHILLIPS, WILLIAM O
0631
E WENATCHEE, WA 98802

PHILLIPS-HOWARD, BONNIE
3667
STANWOOD, WA 98292

PHILPOTT, TOM
4101
CLE ELUM, WA 98922

PHINNEY, BRYAN
3747
MC MILLIN, WA 98352

PHIPPS, DALE
1887
NACHES, WA 98937

PHIPPS, DUANE
1896
NACHES, WA 98937

PIATT, JIM
2191
PORT ORCHARD, WA 98366

PIATT, JIM
2814
PORT ORCHARD, WA 98366

PICKARD, GEORGE D
1765
YAKIMA, WA 98906

PICKEN, TARA
3035
BELLEVUE, WA 98007

PICKERING, MARK
4195
SEATTLE, WA 98188

PIERCE JR, FRED W
2393
OLYMPIA, WA 98503

PIERCE, JAMES
0401
YAKIMA, WA 98903

PIERCE, LISA
1831
OLYMPIA, WA 98503

PIERCE, PHYLLIS C
2392
OLYMPIA, WA 98503

PIERSON, R D
2543
YAKIMA, WA 98902

PINTER, ROBERT B
3397
SEATTLE, WA 98115

PINZON, FRANK & ANTHONY
3749
WENATCHEE, WA 98801

PIPKIN, GEORGE S
0699
CASHMERE, WA 98815

PITCHER, L
0357
SEATTLE, WA 98126

PITON, JEFFERY J
0705
WENATCHEE, WA 98801

PITT, R. JOE
1775
CASHMERE, WA 98815

PITTELKO, CHERYL
0158
YAKIMA, WA 98901

PITTS, JOHN
3698
MANSON, WA 98831

PLACHTA, FRED
0824
ELLENSBURG, WA 98926

PLATRICK, GRACE W
1090
LYNNWOOD, WA 98037

PLATT, JOANN
0925
SELAH, WA 98942

PLEASANT, GLEN W
3855
YAKIMA, WA 98902

PLEASANT, HELEN
2442
YAKIMA, WA 98902

PLEDGER, RALPH
3188
SEATTLE, WA 98105

PLIETH, GARY
1477
PORTLAND, OR 97208

PLISS, GERALD M
1547
LEAVENWORTH, WA 98826

FLOEGMAN, JAMES A
4537
RENTON, WA 98056

PLOUSE, KATHY
0803
EASTON, WA 98925

PLUNKETT-PIERCE, PATRICIA
1449
CHEYENNE, WY 82001

POINDEXTER, DEL
4499
LYNNWOOD, WA 98037

POIRIER, P E
0563
E WENATCHEE, WA 98802

POLL, ELIZABETH A
0740
EDMONDS, WA 98020

POLLOCK, RICHARD C
1063
UNION GAP, 98903

POND, MICHAEL I
3274
NACHES, WA 98937

PONG, SKOOKS
0311
LANGLEY, WA 98260

POOL, BRAD
1003
YAKIMA, WA 98908

POOL, DON
2538
YAKIMA, WA 98902

POPE, CLIFTON
1877
YAKIMA, WA 98901

POPP, STEVE
2142
LAKE OSWEGO, OR 97034

PORTER, CLINTON D
0126
BREMERTON, WA 98310

PORTER, JERRY E
1713
YAKIMA, WA 98901

POST, DOUGLAS M
3044
WOODINVILLE, WA 98072

POTTER, JUANITA
3893
MALAGA, WA 98828

POULSON, LAURA
1631
YAKIMA, WA 98902

POWELL, KATHY
0145
KENNEWICK, WA 99337

PRATER, AMEDEE
0410
E WENATCHEE, WA 98802

PRATER, BARBARA JO
3547
WENATCHEE, WA 98801

PRATER, BARBARA JO & WIL-
LIAM N
3473
WENATCHEE, WA 98801

PRATT, CHARLES M
1098
YAKIMA, WA 98908

PRATT, CLAR
2773
YAKIMA, WA 98901

PRATT, TOM
2711
ELLENSBURG, WA 98926

PRATT, WILMA
2712
ELLENSBURG, WA 98926

PRAU, S J
2410
YAKIMA, WA 98902

PREITCHARD, WM R
1499
BEAVERTON, OR 97005

PRESCOTT, CHRIS
4516
SEATTLE, WA 98148

PRESCOTT, HOWARD
4518
OLYMPIA, WA 98506

PRESCOTT, JAMES N
4517
BELLINGHAM, WA 98225

PRESCOTT, LILLIAN
4519
OLYMPIA, WA 98506

PRESCOTT, PEGGY
4515
EVERETT, WA 98204

PRESCOTT, PHILLIP H
4514
EVERETT, WA 98204

PRESSENDA, DIANNE
0714
LOPEZ, WA 98261

PRESSENDA, DIANNE
0816
LOPEZ, WA 98261

PRESSNALL JR, DALE
0073
FEDERAL WAY, WA 98003

PRESSNALL, ADA
0567
FEDERAL WAY, WA 98023

PRESSNALL, AMY
0565
FEDERAL WAY, WA 98003

PRESSNALL, DALE
0569
FEDERAL WAY, WA 98023

PRESTRUD, K.M
3793
SEATTLE, WA 98136

PRETZ, MICHAEL J C
9048
SEATTLE, WA 98155

PRICE, NORM
0978
SELAH, WA 98942

PRICE, STEVE
9039
SEATTLE, WA 98112

PRIDEMORE, C. K.
0204
ENTIAT, WA 98822

PRIDEMORE, TOM
0188
ENTIAT, WA 98822

PRIDMORE, PHILLIP D
0222
ENTIAT, WA 98822

PRIEBE DDS PS, DAVID K.
3668
WENATCHEE, WA 98801

PRIEBE, CHAS A.
3394
ELLENBURG, WA 98926

PRIMM, R.K.
9004
WENATCHEE, WA 98801

PRINGLE, ROBERT G
2807
NACHES, WA 98937

FRITCHELL, ROBERT D
2364
GOLDENDALE, WA 98620

PRITZI, FAMELA
3501
SEATTLE, WA 98145

PRONLX, MICHAEL B.
1509
REDMOND, WA 98052

PROOYER, RANDALL VAN
4342
CENTRAL POINT, OR 97502

PROUDFOOT, ANDREW
4310
SEATTLE, WA 98125

PROUTY
0092
WALLA WALLA, WA 99362

PROVO, RAYMOND
1807
WENATCHEE, WA 98801

PRUITT, KEN
1378
SELAH, WA 98842

PUCKETT JR, DALLAS
3907
OLYMPIA, WA 98502

PUCKETT, JANET
0481
LEAVENWORTH, WA 98826

PUFFENBARGER, ROBERT
1805
E. WENATCHEE, WA 98801

PULLIAM, KEN
1214
YAKIMA, WA 98901

PULSE, GERALD H
1552
LEAVENWORTH, WA 98826

PULSIFER, JANE G
3931
SEATTLE, WA 98103

PURDOM, J C
0961
YAKIMA, WA 98908

PURDOM, RAYANNA
0968
YAKIMA, WA 98908

PURINTON, DONALD
3783
RICHARDSON, TX 95080

PUTNAM, JEAN
2912
ELLENBURG, WA 98926

PUTTS, DEBBIE
3555
MANSON, WA 98831

PYLE, GERALD L
1088
SELAH, WA 98942

PYLE, STANLEY
2889
NO ADDRESS

QUAN, LINDA
9049
BELLEVUE, WA 98008

QUANTVILLE JR, WAYNE
0400
YAKIMA, WA 98908

QUIGG, JOHN
0414
ABERDEEN, WA 98520

QUIMBY, LOREN L
1813
KENT, WA 98031

QUIMBY, MARGIE L
1814
KENT, WA 98031

QUINN, PATRICIA
3893
SEATTLE, WA 98915

RABUN, L.T
9107
PRINEVILLE, OR 97754

RACE, RITA
3575
SEATTLE, WA 98103

RADACH, HARVEY
0237
DRYDEN, WA 98821

RADEL, ADOLF
1784
LEAVENWORTH, WA 98826

RADKE, FRED
1553
PESHASTIN, WA 98847

RAENFRO, CLAUDE B
1258
CLE ELUM, WA 98922

RAINES, CHARLES C
4477
SEATTLE, WA 98155

RAKDE, GERALD A.
1901
E. WENATCHEE, WA 98802

RAMBO, CLARK L.
3292
MOXEE CITY, WA 98936

RAMPS JR, JOHN
2292
WAPATO, WA 98951

RAMSEY, SCOTT
1843
TACOMA, WA 98405

RANCE, RAY L
1103
YAKIMA, WA 98901

RANCH, CURT
2045
LYNNWOOD, WA 98036

RANCH, PAUL & SHIRLENE
3777
TENINO, WA 98589

RAND, SHANN
0080
GIG HARBOR, WA 98335

RANDALL, DIANA D
2645
DRYDEN, WA 98821

RANDELL, LOUISE
3411
HENDERSONVILLE, NC 28739

RANEY, RON
1754
YAKIMA, WA 98902

RANGER, LES
2243
YAKIMA, WA 98908

RANKE, LIZ & PETER, MARK
4449
RENTON, WA 98056

RANNEY, GEORGINE
9010
BOTHELL, WA 98021

RANTALA VICTOR W,
4022
SEATTLE, WA 98115

RANTALA, DON
3415
E WENATCHEE, WA 98802

RANTALA, LINDA
3751
SEATTLE, WA 98115

RANTZ, DICK
3372
BELLINGHAM, WA 98226

RASMUSSEN CPA, GLENN
2399
WAPATO, WA 98951

RASMUSSEN, OLAF
2842
RICHLAND, WA 99352

RASMUSSEN, PATSY
1249
YAKIMA, WA 98908

RASMUSSEN, JERGEN
3049
RICHLAND, WA 99352

RATZLAFF, COLLEEN
1460
EUGENE, OR 97401

RAY, RICH
0589
OLYMPIA, WA 98507

RAYFIELD, ALLEN E
1545
LEAVENWORTH, WA 98826

RAYMOND, CHARLES
4229
SEATTLE, WA 98122

RAYMOND, CHARLES F
4447
SEATTLE, WA 98122

RAYMOND, DAVID B
2432
YAKIMA, WA 98901

RAYMOND, KAREN
3152
ELLENBURG, WA 98926

RAYMOND, STEVE
3478
LEAVENWORTH, WA 98826

RAZEY, GERALDINE
2527
YAKIMA, WA 98901

READING, GLORIA
0571
LYNNWOOD, WA 98036

REBERS, JOHN
0520
SEATTLE, WA 98144

RECKER, HEINZ
3729
SEATTLE, WA 98168

RECORD, LARRY
1673
YAKIMA, WA 98903

REDDEN, RONALD
2631
CASHMERE, WA 98815

REDLIN, MARK J
9043
SEATTLE, WA 98117

REDMONE, R.
4086
ENUMCLAW, WA 98022

REED, ANNABELLE F
2815
TACOMA, WA 98407

REED, GAIL
1842
GIG HARBOR, WA 98335

REED, JOHN
2896
ANACORTES, OR 98221

REED, JOHN E
9038
ANACORTES, WA 98221

REED, LYLE
4370
LEAVENWORTH, WA 98826

REED, ROBERTA L.
2568
MORTON, WA 98356

REEDY, R.W
1448
CHEYENNE, WY 82009

REEPEL, SADIE
3628
YAKIMA, WA 98902

REESE, LARRY
0754
DRYDEN, WA 98821

REESE, NANCY
0757
DRYDEN, WA 98821

REESE, STEPHEN F
4037
ZILLA, WA 98953

REEVE, SALLY
3939
MERCER ISLAND, WA 98040

REEVE, TOM
9028
MERCER ISLAND, WA 98040

REFF, DAVE
0093
MARYSVILLE, WA 09270

REGG, KRIS
3041
KIRKLAND, WA 98034

REHFIELD, TOM
1564
YAKIMA, WA 98909

REICHARD, SARAH E.
3154
SEATTLE, WA 98107

REICHENBACH M D, DENNIS
& JEAN
2987
SEATTLE, WA 98115

REICHENBACH, STE & JACOB-
SEN, LIN
3068
SEATTLE, WA 98133

REIF, HERBERT J
0033
SEATTLE, WA 98115

REILLY, DENNIS
3918
RONALD, WA 98940

REINMUTH, KENNETH M
1864
SUNNYSIDE, WA 98944

REISTER, ARLO
1956
WENATCHEE, WA 98801

REISTER, ARLO
2747
WENATCHEE, WA 98801

REITER, JOS J
0543
YAKIMA, WA 98902

REITZ, SPROUSE & PRINCE W
2027
CHELAN, WA 98816

REMISK, PETER A.
4064
MT VERNON, WA 98273

REMME, RONALD J
2950
PUYALLUP, WA 98373

RENECKER, BETTY
1694
YAKIMA, WA 98901

RENECKER, LAURA
1695
YAKIMA, WA 98901

RENFRO, BRENT D
2913
ELLENBURG, WA 98926

RENFRO, DAVE
4331
CLE ELUM, WA 98922

RENFRO, DONOVAN S
1278
CLE ELUM, WA 98922

RENFRO, ELDON L
1285
CLE ELUM, WA 98922

RENFRO, KAREN J
2616
CLE ELUM, WA 98922

RENFRO, KIM
4336
CLE ELUM, WA 98922

RENGSTORFF, DEANNA
3147
ELLENBURG, WA 98926

RENNIE, J RUSSELL
4187
YAKIMA, WA 98908

RESSLER, JOHN & DIANA
3108
ELLENBURG, WA 98926

RESTAD, BRUCE C
3034
SEATTLE, WA 98155

RETFERD, K L
1972
HOME, WA 98349

RETFERFORD, SYLVIA E
2038
HOME, WA 98349

RETTIG, JAMES S
3705
SPOKANE, WA 99203

RETTIG, MARK T
0935
YAKIMA, WA 98908

REYES, THOMAS C
0887
WENATCHEE, WA 98801

REYNOLDS, GEORGE
2753
LEAVENWORTH, WA 98826

REYNOLDS, KARIN
1837
FT KEWUSM, WA 98433

REYNOLDS, MARIE
1644
NO ADDRESS

REYNOLDS, ROGER
2591
CENTRAL POINT, OR 97502

REYNOLDS, TERRENCE
1039
YAKIMA, WA 98902

REZABEK, MRS CYNTHIA
2861
BELLEVUE, WA 98005

RHODES, DON
0745
AUBURN, WA 98002

RHODES, FRANK G
4028
S CLE ELUM, WA 98943

RHODES, GWEN
3900
RENTON, WA 98058

RHODUS, GRAN
4407
E. WENATCHEE, WA 98802

RIBE, MRS. MALLY
3328
SEATTLE, WA 98115

RIBE, THOMAS E.
0602
ANACORTES, WA 98221

RICE, LARRY
1415
YAKIMA, WA 98902

RICE, MIKE
2226
LAKEVIEW, OR 97630

RICHARD JR, CLINT
1108
YAKIMA, WA 98901

RICHARDS, FRANK
0990
YAKIMA, WA 98903

RICHARDSON, B.J
4393
YAKIMA, WA 98902

RICHARDSON, BOB
1373
SELAH, WA 98942

RICHARDSON, MICHAL Q
3121
CHELAN, WA 98816

RICHARDSON, NORMAN
1954
YAKIMA, WA 98901

RICHARDSON, R.F
2351
GOLDENDALE, WA 98620

RICHARDSON, WILLIAM J
4391
YAKIMA, WA 98902

RICHÉTTIS, DONALD G
3514
ELLENSBURG, WA 98926

RICHISON, ANNIE
0780
ELLENSBURG, WA 98926

RICHISON, GLEN
0783
ELLENSBURG, WA 98926

RICHMOND, ROMI
3715
SEATTLE, WA 98115

RICHS, BEV
4548
NO ADDRESS

RICO JR, TONY
0923
PARKER, WA 98839

RIDDEL, TERRIE
3358
MANSON, WA 98831

RIEKE, GLADYS & ROBERT
3322
SEATTLE, WA 98166

RIEMAN, BARBARA
3623
SEATTLE, WA 98115

RIEMAN, R E.
3775
LEAVENWORTH, WA 98826

RIGGS, DWIGHT
1889
SEATTLE, WA 98178

RILEY, LINDA S
1722
YAKIMA, WA 98901

RILL, NINON E.
1118
THORP, WA 98946

RINGER, BEVERLY
2582
ELLENSBURG, WA 98926

RINGER, BOB
2581
ELLENSBURG, WA 98926

RINGER, LEE
1094
NACHES, WA 98937

RINGER, MARLA
2408
NACHES, WA 98937

RINGLER, JOHN
0120
WENATCHEE, WA 98801

RINGRACE, MARGY L
1693
YAKIMA, WA 98901

RINIKER, ANDREA BEATTY
0579
OLYMPIA, WA 98504

RIOJAS, MARY
2308
YAKIMA, WA 98901

RIPPEY, CLAYTON
2968
EASTSOUND, WA 98245

RISLEY, VERNON
3316
CHELAN, WA 98816

RISSE, STEVEN
0595
TACOMA, WA 98493

RITCHEY, EDITH E.
0499
BELLEVUE, WA 98007

RITLAND, KEITH
2946
SEATTLE, WA 98105

RITLAND, KEN
2918
SEATTLE, WA 98125

RIXIE, RITO A.
0858
YAKIMA, WA 98902

ROAN, JUDITH G
0641
SEATTLE, WA 98112

ROBBI, MARC
4257
OLGA, WA 98279

ROBERSON, CLAUDE
0193
ENTIAT, WA 98822

ROBERTS, CLIFF
2533
SELAH, WA 98942

ROBERTS, DONALD R.
1670
YAKIMA, WA 98902

ROBERTS, GAIL
3257
SNOHOMISH, WA 98290

ROBERTS, JOANNE M
4112
SEATTLE, WA 98115

ROBERTS, PETER
3899
SEATTLE, WA 98133

ROBERTSON, ED
1949
VANCOUVER, WA 98661

ROBINS, GERALD L.
4032
YAKIMA, WA 98901

ROBINSON, PAULINE
3962
YELM, WA 98597

ROBISCH, PAUL A.
0618
SEATTLE, WA 98125

ROBISON, CHRISTINA
0448
GOLDENDALE, WA 98620

ROCHEL, KENNETH J
2550
YAKIMA, WA 98908

ROCK, DOUG
1114
ELLENSBURG, WA 98926

ROCKETT FAMILY
3745
LYNNWOOD, WA 98036

ROCKWELL, CHARLES J
2660
LEAVENWORTH, WA 98826

ROCKWELL, HELEN
2642
LEAVENWORTH, WA 98826

RODERICK, CHRISTOPHER
2978
SEATTLE, WA 98103

RODLEND, RICK
0436
SEQUIM, WA 98382

ROE, JANET MARIE
2099
KIRKLAND, WA 98034

ROE, JANET MARIE
3528
KIRKLAND, WA 98034

ROESCH, WINSTON
0538
REDMOND, WA 98052

ROETCISOENDER, MARK
2143
SNOHOMISH, WA 98290

ROGERS, DAVE
1431
TIGARD, OR 97223

ROGERS, JAMES S
1258
EASTON, WA 98925

ROGERS, LES
0172
CASHMERE, WA 98815

ROGERS, NANCY
2810
SELAH, WA 98942

ROGERS, NANCY
2939
SELAH, WA 98942

ROGERSON, CLARK
3890
YAKIMA, WA 98908

ROLAND, W J
0086
VANCOUVER, WA 98664

ROLEN, JERRY
0338
WENATCHEE, WA 98801

ROLEN, LETHA
0464
CASHMERE, WA 98815

ROLEN, OTTO
0337
CASHMERE, WA 98815

ROMERO, PHILLIP M
1017
YAKIMA, WA 98908

RONAN, DENNIS A
1714
YAKIMA, WA 98902

RONAN, GERALD J
1058
YAKIMA, WA 98901

ROOD, PAUL J
4448
WOODINVILLE, WA 98072

ROOS, DONALD A.
2067
SEATTLE, WA 98112

ROSE MD, RAY V
0085
PASCO, WA 99301

ROSE, ANDREW
0371
LEAVENWORTH, WA 98826

ROSE, CHARLOTTE
0374
LEAVENWORTH, WA 98826

ROSE, H E.
2681
YAKIMA, WA 98902

ROSE, KATHY
2685
YAKIMA, WA 98908

ROSE, KENNETH C
2683
YAKIMA, WA 98902

ROSE, LILA N
2686
YAKIMA, WA 98902

ROSE, MARSHALL & ELIZA-
BETH
3070
SEATTLE, WA 98112

ROSE, MITCH
2680
YAKIMA, WA 98908

ROSE, MRS KEN
3602
YAKIMA, WA 98902

ROSE, R V
4440
PASCO, WA 99301

ROSEBURG, CONRAD
2097
BELLEVUE, WA 98008

ROSEBURG, CONRAD
3530
BELLEVUE, WA 98008

ROSEKRANS, WARREN
1907
E. WENATCHEE, WA 98802

ROSEKRANS, WAYNE
1904
E WENATCHEE, WA 98802

ROSENKRANZ, GLORIA
2335
YAKIMA, WA 98908

ROSENMAN & ROWEEDER
2084
SEATTLE, WA 98103

ROSENRETER, GENE F
3421
E WENATCHEE, WA 98802

ROSENRETER, MARGIE
3604
E. WENATCHEE, WA 98802

ROSS, DAVID A
3935
AUBURN, WA 98002

ROSS, ELIZABETH
3675
NO ADDRESS

ROSS, ELIZABETH L
2104
NO ADDRESS

ROSS, JULIE
0255
CASHMERE, WA 98815

ROSS, THERESA
1838
GRAHAM, WA 98338

ROSS EVANS, KERRI
3356
CHELAN, WA 98816

ROSSING, NANCY
0336
E. WENATCHEE, WA 98802

ROSSING, STEVE
0335
E WENATCHEE, WA 98802

ROTH, LOIS
1608
YAKIMA, WA 98902

ROUNDY, CLEO
3796
ENTIAT, WA 98822

ROUNDY, DON
4271
ENTIAT, WA 98822

ROUNDY, RUTH
9034
MARYSVILLE, WA 98801

ROVA, JOHN
9068
SEATTLE, WA 98126-3027

ROW, DAVID
2859
FEDERAL WAY, WA 98023

ROW, STEVE
2860
HENTON, WA 98058

ROWE, MICHAEL W
0108
KENNEWICK, WA 98338

ROWLAND, JAY
3242
SEATTLE, WA 98122

ROWLES, DARCY
1629
ELLENSBURG, WA 98926

ROWLES, JAMES
1127
ELLENSBURG, WA 98926

ROWLES, JOANN
1128
ELLENSBURG, WA 98926

ROWLES, SHAWN
1630
ELLENSBURG, WA 98926

ROY, MARION
0612
EDMONDS, WA 98020

ROYCE, STEPHEN B
2194
BREMERTON, WA 98312

ROYER, CHARLES
9074
SEATTLE, WA 98104

RUBLE JR, JAMES D
3336
WENATCHEE, WA 98801

RUBLE, INA
2044
E WENATCHEE, WA 98802

RUDD, CHERYL
0526
EVERETT, WA 98204

RUELAS, RUBEN
3895
WENATCHEE, WA 98801

RUNNELS, REG
2034
MANSON, WA 98831

RUSHING, TIM & VONNA
1191
YAKIMA, WA 98908

RUSSEL, M MADELINE
3848
SEATTLE, WA 98115

RUSSELL, ELLEN
3401
EPHRATA, WA 98823

RUSSELL, GERTRUDE
3887
YAKIMA, WA 98908

RUSSELL, JIM
2885
MANSON, WA 98831

RUSSO, LEILANI
2327
YAKIMA, WA 98902

RUST, STEVEN K.
3239
SEATTLE, WA 98108

RUTHAROT, KEM
1733
YAKIMA, WA 98908

RUTHERFORD, FRANK
0074
SEATTLE, WA 98166

RUTHERFORD, JOHN
0163
ROCK ISLAND, WA 98850

RUTHERFORD, M A.
1953
YAKIMA, WA 98902

RUTHERFORD, PAM
2491
YAKIMA, WA 98907

RUTLEDGE, LORI
4525
SEATTLE, WA 98198

RUTZ, RICHARD
3190
SEATTLE, WA 98101

RYAN, CHRIS MCCARTHY
4425
ELLENSBURG, WA 98926

RYAN, DIANE K.
0554
SEATTLE, WA 98168

RYAN, FRED & JOAN
4281
ARDENVOIR, WA 98811

RYAN, JEAN
3296
SEATTLE, WA 98103

RYAN, PATRICK J
4426
ELLENSBURG, WA 98926

RYAN, RICHARD
2542
YAKIMA, WA 98901

RYAN, W J
4069
YAKIMA, WA 98908

SABINISH, RAY
1099
YAKIMA, WA 98902

SACHA, MICHAEL
2797
STEILACOOM, WA 98388

SACHA, MICHAEL T
4504
NO ADDRESS

SACHET, GLEN A.
3622
ELLENSBURG, WA 98926

SACKMANN, JAMES
2443
SELAH, WA 98942

SADLER, JERRY
2008
BOTHHELL, WA 98021

SAFAR, PHIL
0422
TACOMA, WA 98422

SAGER, JOHN
1978
SEATTLE, WA 98166

SALSGIVER, GARY
1680
YAKIMA, WA 98908

SALZBREN, A.A.
1889
TACOMA, WA 98445

SALZBREN, HELEN
1871
TACOMA, WA 98445

SAMPSON, MELVIN R
3550
TOPPENISH, WA 98948

SAMPSON, MELVIN R.
4487
YAKIMA, WA 98948

SAMSON, DOUG
0137
KENNEWICK, WA 98338

SAMUEL, MERRY
0412
PESHASTIN, WA 98821

SANBORN, ANNE M
4261
PORT ORCHARD, WA 98366

SANBORN, RICHARD E.
2892
PORT ORCHARD, WA 98366

SANBORN, ZENA
2609
SELAH, WA 98942

SANCHES, MARINA
1895
SUNNYSIDE, WA 98944

SANDBERG, MICHAEL
4319
LEAVENWORTH, WA 98826

SANDERS, DAVID A.
3844
BRIER, WA 98936

SANDERS, MICHAEL E
2493
MOXEE, WA 98936

SANER, KARA Z
2310
PARKER, WA 98939

SANGER, TOM
0299
BUCKLEY, WA 98321

SAPP, CHARLEEN
2209
TACOMA, WA 98406

SARGENT, JOHN
0285
SNOHOMISH, WA 98290

SARLI, PAUL & COHAN, AMY
9081
PORTLAND, ME 04103

SASAKI, LEELA
3063
RICHLAND, WA 99352

SASSEN, JIM
1544
CASHMERE, WA 98815

SASSES, RANDALL
4054
CLE ELUM, WA 98922

SATER, ROBERT CARL
3442
S. CLE ELUM, WA 98943

SATHER, HARRIET A.
3838
MERCER ISLAND, WA 98040

SATTEN, COREY
4005
SEATTLE, WA 98103

SAUER, CHIP
1790
PESHASTIN, WA 98847

SAUL, SUSAN M
0836
LONGVIEW, WA 98632

SAUNDEPS, RICHARD & NOEL
2850
BAINBRIDGE ISL, WA 98110

SAVAGE, ALICE
2181
KINGSTON, WA 98346

SAVAGE, GAYL
4465
E. WENATCHEE, WA 98802

SAVAGE, GAYLE
2124
E. WENATCHEE, WA 98802

SAVAGE, GLADYS F
4172
SEATTLE, WA 98105

SAVAGE, MR & MRS PARKER
4302
E WENATCHEE, WA 98802

SAVATGY, MICHAEL
0734
DEMING, WA 98244

SAWYER, MARIAN
4072
ELLENSBURG, WA 98926

SCALES, ANN
3333
SEATTLE, WA 98105

SCARDIGLI, WAYNE E
9031
BATTLE GROUND, WA 98604

SCEA, PAUL W
2265
E WENATCHEE, WA 98802

SCHAAD, RUDOLF G
3325
BELLEVUE, WA 98006

SCHAAD, SANDRA
0509
SEATTLE, WA 98105

SCHAB, ROBERT
0913
YAKIMA, WA 98902

SCHAFFER, R. L.
1532
SEATTLE, WA 98124

SCHARBACH, JOHN
9078
NASELLE, WA 98638

SCHAUF, RONALD
4383
YAKIMA, WA 98902

SCHelper, STEVE
4385
MOXEE, WA 98936

SCHERER, DONALD T
2348
GOLDENDALE, WA 98620

SCHUELEN, BOB
0125
SEATTLE, WA 98109

SCHUEMANN, DALE
1251
YAKIMA, WA 98902

SCHINKE, JAMES
0392
KENT, WA 98031

SCHUEMANN, DAVID
2559
YAKIMA, WA 98902

SCHLOSSER, NANCY
1991
SEATTLE, WA 98107

SCHLOSSER, ROBERT L.
1988
SEATTLE, WA 98107

SCHMERLER, BARBARA
3251
YAKIMA, WA 98901

SCHMIDT, LYNN
9032
EVERETT, WA

SCHMIDT, REBECCA
3498
SEATTLE, WA 98103

SCHMIDT, WILLIAM
1960
LEAVENWORTH, WA 98826

SCHMITT, DAVID
0524
SEATTLE, WA 98155

SCHNABEL, DANIEL E.
3260
YAKIMA, WA 98901

SCHNEIDER, JOACHMIN
3767
SEATTLE, WA 98115

SCHNEIDLER, JON
2148
SEATTLE, WA 98101

SCHNURMAN, PETER
0003
BRIER, WA 98936

SCHOENROCK, SCOTT
3517
ISSAQUAH, WA 98027

SCHOENROCK, SCOTT
4526
ISSAQUAH, WA 98027

SCHOESSLER, DEBBIE
1822
WENATCHEE, WA 98801

SCHOETTLE M D, ULRICH C
3546
SEATTLE, WA 98102

SCHOFFEN, HOWARD & EVE-
LYN
3158
E WENATCHEE, WA 98802

SCHOLL, LARRY
2587
YAKIMA, WA 98908

SCHOOLCRAFT, DOUG
1307
YAKIMA WA 98908

SCHOOLCRAFT, JAN
1308
YAKIMA, WA 98908

SCHOOLCRAFT, LEE
0987
YAKIMA, WA 98908

SCHOOLCRAFT, MARTY
1309
YAKIMA, WA 98908

SCHOTT, JOSEPH C
0036
RIVERSIDE, CA 92504

SCHREMPP, MRS NANCY
2740
E. WENATCHEE, WA 98802

SCHRODER, RUSSELL
2361
GOLDENDALE, WA 98620

SCHRODER, SHEILA
2377
GOLDENDALE, WA 98620

SCHROEDER, C J
2808
FRESNO, CA 93706

SCHROEDER, ED
2930
YAKIMA, WA 98902

SCHROEDER, JUDY M
2920
MERCER ISLAND, WA 98040

SCHROEDER, RICHARD
0854
ISSAQUAH, WA 98024

SCHROPP, JILL
3179
EASTSOUND, WA 98245

SCHUAL-BERKE, DAN & SHAY
1980
SEATTLE, WA 98166

SCHULER, DEAN & CAROL
0934
TIETON, WA 98947

SCHULER, J
0570
TACOMA, WA 98406

SCHULL, M D, ELIOT W
0539
WENATCHEE, WA 98801

SCHULLER, JANICE
0323
YAKIMA, WA 98908

SCHULTZ, KIRK
2347
GOLDENDALE, WA 98620

SCHULZE, HERBERT G
3533
LEAVENWORTH, WA 98826

SCHUMACKER, JUNE
3428
SEATTLE, WA 98166

SCHUSTER, SUSAN B.
2449
SEATTLE, WA 98102

SCHUT, MERLIN H
1064
UNION GAP, WA 98903

SCHUTT, ROBIN
3422
WENATCHEE, WA 98801

SCHWAB, SUZANNE
3765
CHENEY, WA 99004

SCHWARZ, JUDI
3059
SEATTLE, WA 98103

SCHWEIGHARDT, R V
0661
WENATCHEE, WA 98801

SCHWENK, MILT
2433
YAKIMA, WA 98908

SCOTT JR, ROBERT H
1304
E. WENATCHEE, WA 98802

SCOTT, BEVERLY & DAVID
2915
EVERETT, WA 98205

SCOTT, BONNIE
3792
RENTON, WA 98056

SCOTT, ROBERT C
3404
BELLEVUE, WA 98008

SCOTT, ROBIN
1637
YAKIMA, WA 98903

SCOTT, TIM
2425
YACOLT, WA 98675

SCOUGALE, GORDON A.
2731
MARYSVILLE, WA 98270

SCUDDER, KEN
3169
PUYALLUP, WA 98374

SCUDERI, MICHAEL
2802
SEATTLE, WA 98107

SCUDERI, MICHAEL R
4238
SEATTLE, WA 98107

SCULL, CHRISTINE
2000
WENATCHEE, WA 98801

SCULLY, PATRICIA
2552
YAKIMA, WA 98902

SEARS, LINDA
3197
SEATTLE, WA 98166

SEATON, CARRIE
2471
ELLENSBURG, WA 98926

SEEDGE, BILL & BEVERLY
3599
NACHES, WA 98937

SEE, HOLLY
2890
LEAVENWORTH, WA 98826

SEEFRIED, RICH
1060
YAKIMA, WA 98902

SEEGLER, HOWARD G
1993
WENATCHEE, WA 98801

SEIGEL, STUART
1516
YAKIMA, WA 98908

SEIL, REX
0633
ISSAQUAH, WA 98207

SELF, ROBERT
0394
SEATTLE, WA 98109

SELLAR, GEORGE
0709
WENATCHEE, WA 98801

SELLAR, GEORGE L.
2128
OLYMPIA, WA 98504

SEMANS, BRUCE
2985
SEATTLE, WA 98122

SENGER, ROCKS
3687
SEATTLE, WA 98112

SETON, ALICE L.
0760
CASHMERE, WA 98815

SETON, HAROLD C
0762
CASHMERE, WA 98815

SETZER, DON
2977
MONROE, WA 98272

SEWARD, HELEN L.
2369
GOLDENDALE, WA 98620

SEWARD, WM
2344
GOLDENDALE, WA 98620

SEWELL, AMY
3000
FRIDAY HARBOR, WA 98250

SEXTON JR, WALTER F
2362
LYLE, WA 98635

SEYMOUR, ALLYN H
3329
SEATTLE, WA 98105

SHAFFER JR, KENNETH L.
0694
CASHMERE, WA 98815

SHANK, LES
0218
ENTIAT, WA 98822

SHANNON, GREG
2868
WATERVILLE, WA 98858

SHANNON, KATHI RIVERS
2882
WATERVILLE, WA 98858

SHANNON, THOMAS M
1316
SEATTLE, WA 98107

SHARLOW, DON
3365
ASHFORD, WA 98304

SHARP, GARY
1053
YAKIMA, WA 98902

SHARPLES, MIKE
1250
YAKIMA, WA 98808

SHAW, LINDA L.
1246
YAKIMA, WA 98908

SHEAHAN, PATRICK K.
3029
SEATTLE, WA 98122

SHEEFER, KENNETH L.
1782
CASHMERE, WA 98815

SHELLAN, GILBERT
0769
CASHMERE, WA 98815

SHELTON, GILBERT R
3853
CASHMERE, WA 98815

SHELTON, VIRGINIA LEE
0758
CASHMERE, WA 98815

SHELTON, WALLY
1750
YAKIMA, WA 98907

SHEPHERD, DOYLE
1470
COTTAGE GROVE, OR 97424

SHEPPARD, AILEEN M
0391
SHELTON, WA 98584

SHERMAN, DAVID H
2947
SEATTLE, WA 98103

SHERMAN, MARILYN Y
1501
PORTLAND, OR 97217

SHERRY, DEMPSEY
0438
PASCO, WA 99301

SHEWCHUCK, WILLIAM
3181
SEATTLE, WA 98115

SHIELDS, MARK
1217
YAKIMA, WA 98901

SHIELDS, PAT
0654
WHITE SWAN, WA 98952

SHIELDS, PATRICIA M
1209
YAKIMA, WA 98901

SHILDMEYER, ROBERT
1481
WENATCHEE, WA 98801

SHINDLER, TOM
4403
PORT ANGELES, WA 98362

SHIPMAN, KENNETH
0929
YAKIMA, WA 98908

SHIPMAN, MARK W
2945
WENATCHEE, WA 98801

SHOCKEY, WILLIAM J
2158
FRIDAY HARBOR, WA 98250

SHORTS, CALHOUN
3346
MERCER ISLAND, WA 98040

SHOWALTER, JAY
0132
PULLMAN, WA 99163

SHUMAKER, JOHN P
1107
YAKIMA, WA 98902

SHUMAKER, LARRY
0983
YAKIMA, WA 98902

SIEGFRIED, GARY
0139
MESA, WA 99343

SIEFTS, DENNIS
0402
YAKIMA, WA 98908

SIGGS, PAT
0010
SEATTLE, WA 98112

SIKES, RON & ROSEMARY
3617
PT TOWNSEND, WA 98368

SILL, ELLEN & DON PARRISH
2775
ARLINGTON, WA 98223

SIMARI, STEPHANIE
0443
WINTHROP, WA 98862

SIMMONS, ALLAN
1077
NACHES, WA 98937

SIMMONS, CHAD
2240
NACHES, WA 98937

SIMMONS, CHARLES
0963
NACHES, WA 98937

SIMMONS, CORINNE
2241
NACHES, WA 98937

SIMMONS, DAVID
0936
NACHES, WA 98937

SIMMONS, ELMER
1402
NACHES, WA 98937

SIMMONS, ERNEST L.
1334
NACHES, WA 98937

SIMMONS, FRANCES L.
1325
NACHES, WA 98937

SIMMONS, GERALD P
0976
NACHES, WA 98937

SIMMONS, HANNAH
1403
NACHES, WA 98937

SIMMONS, JEFF
2248
NACHES, WA 98937

SIMMONS, JOHN
1467
COTTAGE GROVE, OR 97424

SIMMONS, KORY
1335
NACHES, WA 98937

SIMMONS, MARJORIE
2239
NACHES, WA 98937

SIMMONS, MARY BETH
0677
NACHES, WA 98937

SIMMONS, MIKE
1319
NACHES, WA 98937

SIMMONS, PATRICIA A.
1406
NACHES, WA 98937

SIMMONS, ROBIN
1336
NACHES, WA 98937

SIMMONS, RON
0939
NACHES, WA 98937

SIMMONS, SUSIE
2663
LEAVENWORTH, WA 98826

SIMMONS, TARA
1337
NACHES, WA 98937

SIMMONS, WARREN
2662
LEAVENWORTH, WA 98826

SIMON, CRAIG A.
2252
BOISE, ID 83703

SIMON, PHILIP
2149
BERKELEY, CA 94705
SIMON, RON
3746
LEAVENWORTH, WA 98826

SIMON, WAYNE
3869
WENATCHEE, WA 98801

SIMONIS, KATHY
1410
MORTON, WA 98356

SIMS, CRANDE E
0260
NACHES, WA 98957

SIMS, JOHN
2049
BELLEVUE, WA 98006

SINES, HARVEY
2417
YAKIMA, WA 98901

SISSON, PAUL & EMILY
3889
SEATTLE, WA 98103

SIZER, DORCAS L.
0591
TACOMA, WA 98406

SIZER, DORCAS L.
1936
PUYALLUP, WA 98371

SIZER, GEORGE R.
0599
TACOMA, WA 98406

SIZER, LUANN,
2891
TACOMA, WA 98407

SKARIN M D , ROBERT M.
3460
YAKIMA, WA 98908

SKY, K.
2055
CARLTON, WA 98814

SLATE, ROBERT C
2922
SEATTLE, WA 98115

SLEEPER, DORIAN
3569
OLYMPIA, WA 98506

SLOSS, ELIZABETH
2174
SEATTLE, WA 98109

SMALL JR, T W
0103
WENATCHEE, WA 98801

SMALL, JAMES
2679
ENTIAT, WA 98822

SMALLIDGE, JERALD E
2736
RENTON, WA 98056

SMALLING, KEVIN
2372
GOLDENDALE, WA 98820

SMART, DARRELL
9071
YAKIMA, WA 98908

SMART, DON
0215
ENTIAT, WA 98822

SMART, MURDO
0089
CLACKAMAS, OR 97015

SMART, PHYLLIS L.
0175
ENTIAT, WA 98822

SMIGG, BRENDA
2634
WENATCHEE, WA 98801

SMILLIE, JAMES
1515
PORTLAND, OR 97217

SMITH, BEN R.
2758
ANACORTES, WA 98221

SMITH, CELIA M
3819
SEATTLE, WA 98112

SMITH, CHARLES
1372
SELAH, WA 98942

SMITH, CLAIR C
1479
EUGENE, OR 97402

SMITH, CURTIS P
0735
EPHRATA, WA 98823

SMITH, CYNDY & CYNTHIA
2911
ELLENSBURG, WA 98926

SMITH, CYNTHIA & HELEN
3198
BELLEVUE, WA 98004

SMITH, D L
9065
SNOHOMISH, WA 98290

SMITH, DALE
1363
YAKIMA, WA 98908

SMITH, DARELL
1004
YAKIMA, WA 98902

SMITH, DAVID A.
9106
SNOHOMISH, WA 98290

SMITH, DESE S.
1619
ELLENSBURG, WA 98926

SMITH, DORIS B
0609
SEQUIM, WA 98382

SMITH, EDWARD B
1786
WENATCHEE, WA 98801

SMITH, EDWIN W
0049
OMAK, WA 98841

SMITH, ELLEN
1916
LEAVENWORTH, WA 98826

SMITH, ERIC AND KATHY
4536
ROLLING BAY, WA 98061

SMITH, ERNEST P
1012
YAKIMA, WA 98908

SMITH, FRANCIS
0880
COULEE CITY, WA 99115

SMITH, GEORGE T
1435
NEW WINDSOR, NY 12550

SMITH, GIL
1594
YAKIMA, WA 98908

SMITH, GREGORY N
3445
KIRKLAND, WA 98083

SMITH, HORACE O
0051
E WENATCHEE, WA 98802

SMITH, JAMES L.
1928
PESHASTIN, WA 98847

SMITH, JAMES L.
2671
YAKIMA, WA 98902

SMITH, JIMMY W
1929
CASHMERE, WA 98815

SMITH, KELLY
2897
PORTLAND, OR 97209

SMITH, KEVIN W
2874
LEAVENWORTH, WA 98826

SMITH, LANETTE
4289
WINTHROP, WA 98862

SMITH, LAURA
3552
SEATTLE, WA 98101

SMITH, MABEL LOUISE
4545
DES MOINES, WA 98198

SMITH, MARCIA E.
3735
REDMOND, WA 98052

SMITH, MAYNARD E
2949
SEATTLE, WA 98144

SMITH, MIKE & JUDY
2079
KENT, WA 98042

SMITH, MRS JAMES L.
1927
PESHASTIN, WA 98847

SMITH, R D
3653
TACOMA, WA 98443

SMITH, RAY
2511
YAKIMA, WA 98908

SMITH, ROBERT G
3478
DES MOINES, WA 98198

SMITH, RON
2250
MARYSVILLE, WA 98270

SMITH, STACIE
2326
YAKIMA, WA 98902

SMITH, STAMFORD D
3585
ELLENSBURG, WA 98926

SMITH, SUSAN A.
3539
SEATTLE, WA 98115

SMITH, SUSAN E
2940
RENTON, WA 98058

SMITH, TIM
2323
YAKIMA, WA 98902

SMITH, VICKI
1727
YAKIMA, WA 98901

SMITH, VON AND CINDI
3036
CHELAN, WA 98816

SMITH, WAYNE
1748
YELM, WA 98597

SMITH, WAYNE D
3748
CHELAN, WA 98816

SMITH, WAYNE W
0629
RICHLAND, WA 99352

SMITHSON RANCH, ALLIE
SMITHSON
2381
PESHASTIN, WA 98847

SMITHSON, GARY
1922
PESHASTIN, WA 98847

SMITHSON, TOM
1529
CASHMERE, WA 98815

SMOOT, GARY R
1388
YAKIMA, WA 98902

SMOTHERS, JIM
0208
ENTIAT, WA 98822

SMOTHERS, SUSAN
0188
ENTIAT, WA 98822

SNARING, RAYMOND
4243
SEATTLE, WA 98103

SNOMAD'S, PRESIDENT
2827
CLE ELUM, WA 98922

SNOW, D
9023
FEDERAL WAY, WA 98003

SNYDER, GEOFFREY
3438
SEATTLE, WA 98105

SNYDER, JOHN G
3357
CHELAN, WA 98816

SNYDER, JOHN T
3293
SNOHOMISH, WA 98290

SOBEMIA, CHARLES
4220
ROSLYN, WA 98941

SODEN, KAY L
1567
NACHES, WA 98937

SODERGREN, DAVID L
3486
OLYMPIA, WA 98506

SODERGREN, LYNN WHIT-
TAKER
4258
OLYMPIA, WA 98506

SOLLEE, ALLEN
0162
E WENATCHEE, WA 98802

SOLLEE, EDNA
0161
E WENATCHEE, WA 98802

SOLOWAN, R
2440
YAKIMA, WA 98901

SONSALLA, JAME
3838
RENTON, WA 98055

SOREM, GARY J
0512
OLYMPIA, WA 98501

SORENSON, GLADYS
0071
PUYALLUP, WA 98371

SOUTH, NANCY
3925
BRIER, WA 98036

SPARKS, GARRY
1780
WENATCHEE, WA 98801

SPEARMAN, ANN
2958
SEATTLE, WA 98133

SPEARS, GARY
2257
E WENATCHEE, WA 98802

SPEIDEL JR, JOHN R
2264
E WENATCHEE, WA 98802

SPEIDEL JR, JOHN R
4165
E WENATCHEE, WA 98802

SPENCE, DANIEL
2414
NACHES, WA 98937

SPENCE, LINDA
2927
YAKIMA, WA 98902

SPENCE, ROB
3897
PUYALLUP, WA 98371

SPENCE, T R
2928
YAKIMA, WA 98902

SPENCER, JOHN J
3670
KIRKLAND, WA 98033

SPENCER, KATHY
2877
WENATCHEE, WA 98801

SPENCER, NORMAN C
3997
BREMERTON, WA 98312

SPENCER, STEVEN
2924
YAKIMA, WA 98902

SPENCER, TERRI
2964
ARLINGTON, WA 98223

SPENCER, WILLIAM
3455
SEATTLE, WA 98165

SPETH, WILLIAM W
0640
ELLENSBURG, WA 98926

SPHULER, MIKE
1643
YAKIMA, WA 98908

SPIES, ALVIN
1536
DRYDEN, WA 98821

SPITZER, HUGH D
4092
SEATTLE, WA 98101

SPLAWN, ERIC L
0489
YAKIMA, WA 98902

SPONGERG, LINDA A
3980
NO ADDRESS

SPOOR, DALE A.
2997
BAINBRIDGE ISL, WA 98110

SPRING, BOB & IRA
4200
EDMONDS, WA 98020

SPRINGER, BONNIE
0423
YAKIMA, WA 98902

SPRINGER, BONNIE J
3377
YAKIMA, WA 98902

SPRINGER, IONE J
0405
PESHASTIN, WA 98847

SPRINGER, LULU M
3856
WENATCHEE, WA 98801

SPRINGER, RALPH H
3857
WENATCHEE, WA 98801

SPRINGER, RICHARD J
3375
YAKIMA, WA 98902

SPRINGER, SCOTT R
3203
SEATTLE, WA 98185

SPROUSE, WAYNE
2473
ELLENSBURG, WA 98926

SPURLING, JOHN
0685
PESHASTIN, WA 98847

ST JOHN, CHUCK
2289
WENATCHEE, WA 98801

ST JOHN, HELEN BAKER
4453
SEATTLE, WA 98177

ST JOHN, L.S
4131
SEATTLE, WA 98177

STAFF, DEL JON
0872
KENT, WA 98031

STALLINGS, FORREST
2090
WENATCHEE, WA 98801

STALLINGS, ROBBY A.
0710
PESHASTIN, WA 98847

STAN, JOSEPH W
4527
MARYSVILLE, WA 98270

STAN, SUE
3437
SEATTLE, WA 98102

STANAWAY, HAVEN
2868
ARDENVOIR, WA 98811

STANKUS, JENNIFER
0294
PORT TOWNSEND, WA 98368

STANLEY, FRED C
2830
ELLENSBURG, WA 98926

STANOVSKY, ELAINE J W
0506
RENTON, WA 98056

STANTON, B M
0615
EDMONDS, WA 98020

STAPLES, SANDRA
2518
YAKIMA, WA 98908

STARK, BILL
2755
LEAVENWORTH, WA 98826

STARK, DONALD A.
1744
GLEED, WA 98904

STARK, MARGARET P
2754
LEAVENWORTH, WA 98826

STARKEBAUM M D , GORDON
A.
3389
SEATTLE, WA 98115

STARKEY, JO
3028
REPUBLIC, WA 99166

STARKOVICH, ANTHONY
3659
RONALD, WA 98840

STARKOVICH, MIKE
3363
RONALD, WA 98940

STARKOVICK, DARYLE
3392
RONALD, WA 98940

STATE OF WASH DEPT OF
GAME
0582
OLYMPIA, WA 98504

STEARNS, ART
0342
OLYMPIA, WA 98504

STEARNS, ART
0581
OLYMPIA, WA 98504

STEEBER M D , GREGORY
DON
2785
LEAVENWORTH, WA 98826

STEELE, ALAN L.
3942
CHELAN, WA 98816

STEELE, JANE & MEAGHER,
MIKE
0749
SEATTLE, WA 98105

STEELE, WILLIAM K.
4215
SPANGLE, WA 99031

STEELE, WILLIAM K.
4442
SPANGLE, WA 99031

STEGEMAN, CUTHBERT
0030
WENATCHEE, WA 98801

STEIGER, ROGER
1422
GRESHAM, OR 97030

STEIN, JENNIFER
3074
ELLENSBURG, WA 98107

STELZER, GREG
2557
YAKIMA, WA 98903

STELZMILLER, MRS JEAN
3619
YAKIMA, WA 98901

STEPHENS, DONNA
4371
MONTESANO, WA 98563

STEPHENS, ROGER D
3374
RICHLAND, WA 99352

STEPNIEWSKI, ANDREW
3875
WAPATO, WA 98951

STEPNIEWSKI, ANDREW
4486
YAKIMA, WA 98907

STEPNIEWSKI, SUSAN J L.
3572
WAPATO, WA 98951

STERN, TOM
1429
PORTLAND, OR 97217

STERNER, DANYA
3323
EDMONDS, WA 98020

STEVENS, CARL
0922
SELAH, WA 98842

STEVENS, EDWARD
0187
ENTIAT, WA 98822

STEVENS, JANE
3896
SEATTLE, WA 98115

STEVENS, JEFF D
0556
KENT, WA 98042

STEVENS, MARLENE
9012
REDMOND, WA 98052

STEVENS, MONA
0208
ENTIAT, WA 98822

STEVENS, R W
1500
SHERWOOD, OR 97140

STEVENS, WARD A.
3430
SEATTLE, WA 98199

STEVENSON, CLO
3185
SEATTLE, WA 98112

STEVENSON, JAMES C
2733
SEATTLE, WA 98122

STEVENSON, MARGARET NEL-
SON
9097
SEATTLE, WA 98177

STEVENSON, MARJORIE L.
3753
ELLENSBURG, WA 98926

STEVENSON, THOMAS H
3583
ELLENSBURG, WA 98926

STEVENSON-FRISK, BRENDA
L.
1149
YAKIMA, WA 98902

STEWART, CLARENCE
2394
MORTON, WA 98356

STEWART, DAN
1083
NACHES, WA 98937

STEWART, JOHN,
0140
KENNEWICK, WA 99336

STEWART, KEN
2808
BELLEVUE, WA 98008

STEWART, ROBERT
4317
LEAVENWORTH, WA 98826

STEWART, STEVE
2322
SELAH, WA 98842

STILLEY, VICKIE
1642
YAKIMA, WA 98902

STIMSON, DONALD K.
4139
RENTON, WA 98056

STINER, CONNIE
1396
YAKIMA, WA 98901

STINER, LAWRENCE E
0999
YAKIMA, WA 98901

STINER, WANDA
1418
YAKIMA, WA 98901

STINGLEY, DUSTY
0950
YAKIMA, WA 98903

STIRRETT, LEE A.
3696
SILVERDALE, WA 98383

STITT, BENJAMIN D
0837
KENNEWICK, WA 99337

STOBIC, THOMAS A.
3089
BREMERTON, WA 98312

STOCKER, EVERETT S
1159
YAKIMA, WA 98908

STODDARD, JOHN
4126
REDMOND, WA 98052

STOKER, DOUG
9101
BREMERTON, WA 98312

STOKES, PATRICK H
3201
DES MOINES, WA 98198

STOKES, VERN & ROMA
4181
ELLENSBURG, WA 98926

STOLTENBERG, JOHN
3315
SEATTLE, WA 98117

STONE, FRANK
4529
STANWOOD, WA 98292

STONE, JEFF
0690
MONITOR, WA 98836

STONE, MARY ELLEN
4018
BELLEVUE, WA 98007

STONE, NED W
4020
EL CERRITO, CA 94530

STONEL, BILL
1770
CASHMERE, WA 98815

STONINGTON M D , DAVID T
2937
SEATTLE, WA 98112

STORMO, JAMES A
1950
ISSAQUAH, WA 98027

STORY, ANN
4166
WENATCHEE, WA 98801

STOTENBERG, KAREN
3822
YAKIMA, WA 98901

STOUT, KARL
1649
MT VERNON, WA 98273

STOVE, JEFF
1771
WENATCHEE, WA 98801

STOY, SANDRA
3113
RENTON, WA 98056

STRADER, CLARENCE
1362
YAKIMA, WA 98902

STRAIN, LOREN S
4083
SEATTLE, WA 98155

STRATH, B
9051
SEATTLE, WA 98145

STRAUSBAUGH, DEAN
4191
ELLENSBURG, WA 98926

STREET CPA, JOHN S
3839
SEATTLE, WA 98103

STREET, DONALD D
1621
BOTHELL, WA 98011

STREET, DORRIS E
1622
BOTHELL, WA 98011

STREHLOW, BEN & IRIS
3542
BREMERTON, WA 98312

STRICKLER, MARY
2439
DEMING, WA 98244

STRODEMIEER, DEE
3507
CHEHALIS, WA 98532

STROH, ERIN
2416
YAKIMA, WA 98906

STRONG, JANET A.
4148
MCCLEARY, WA 98557

STRONG, STEPHEN K.
3155
SEATTLE, WA 98104

STROUD, W G
0233
PESHASTIN, WA 98847

STROUP, ROBERT R
3436
LEAVENWORTH, WA 98826

STROUP, ROBERT R
3837
LEAVENWORTH, WA 98826

STRUSS, JON
3464
SEATTLE, WA 98166

STUART, LAWSON E
1563
ZILLA, WA 98953

STUCK, BYRON
0050
MERCER ISLAND, WA 98040

STUCK, BYRON
4138
MERCER ISLAND, WA 98040

STUCKRATH, LESTER W
1591
YAKIMA, WA 98908

STUCKRATH, MRS LW
1590
YAKIMA, WA 98908

STUDEBAKER, ROBERT A.
4133
SEATTLE, WA 98103

STUHMILLER, BOB
0891
REARDAN, WA 99029

STUVLAND, MARK
2721
BOTHHELL, WA 98011

SUENKEZ, MICHAEL R
0134
KENNEWICK, WA 99337

SUKOVATY, BECKEY D
2918
SEATTLE, WA 98103

SULLIVAN III, WOODRUFF T
9067
SEATTLE, WA 98103

SULLIVAN JR, PAUL
2075
MILTON, WA 98354

SULLIVAN, MARC J
3243
SEATTLE, WA 98117

SUMBARDO, BOB
4300
WENATCHEE, WA 98801

SUMEY, ANN M
2841
PUYALLUP, WA 98374

SUMEY, JR, FLOYD A.
2638
PUYALLUP, WA 98374

SUMMERS, BRUCE
2225
SHERIDAN, OR 97378

SUMMERS, EDDIE H
1293
CLE ELUM, WA 98922

SUMMERS, SUSAN
1755
ZILLA, WA 98953

SUMPTION, PATRICIA
3060
SEATTLE, WA 98125

SUNDAY, MICHAEL
0906
YAKIMA, WA 98901

SUNDQUIST, HAROLD
0627
BELLEVUE, WA 98006

SUNDQUIST, LIANN MUMMEY
3824
SEATTLE, WA 98109

SUNDQUIST, STEPHEN J
2967
SEATTLE, WA 98109

SUNNYSIDE CHAMBER OF
COMM
3656
SUNNYSIDE, WA 98944

SUNSHINE VALLEY MINERALS,
INC
0042
MANSON, WA 98831

SUPERIOR PRODUCTION MA-
CHINERY
1475
PORTLAND, OR 97217

SURFACE, JANIE
0020
TWISP, WA 98856

SUSAN, DICK
3554
TACOMA, WA 98443

SUSAN, LAURA
3306
TACOMA, WA 98443

SUSINK, DICK
3960
FEDERAL WAY, WA 98032

SUTER, RICHARD
1606
MORTON, WA 98356

SUTHERLAND, DAVID
2840
SEATTLE, WA 98102

SUTHERLAND, JOHN B.
2969
WHITE HALL, AR 71602

SUTLEY, MICHAEL L
1463
PASCO, WA 99301

SUTTEN, LARRY
1409
BAYPORT, MN 55003

SVEEN, DARLENE
3886
NACHES, WA 98937

SVEEN, DENNY
3889
NACHE, WA 98937

SVEEN, MRS D G
3888
YAKIMA, WA 98908

SWABACK, CALVIN A.
4154
SEATTLE, WA 98103

SWAIM, BARBARA
1719
YAKIMA, WA 98902

SWANSON, CONNIE
3171
TWISP, WA 98856

SWANSON, JOHN R
0292
MINNEAPOLIS, MN 55406

SWANSON, K E
3741
ENUMCLAW, WA 98022

SWANSON, M P
2909
NORTH BEND, WA 98045

SWANSON, PATRICIA & DAVE
3540
WENATCHEE, WA 98801

SWEDBERG, KENNETH
3813
CHENEY, WA 99004

SWEENEY, MARK L.
3030
KIRKLAND, WA 98034

SWEET, ROBIN T
1855
SPANAWAY, WA 98387

SWENK, DOUGLAS
4322
WENATCHEE, WA 98801

SWENSON, MONTE N
0211
ENTIAT, WA 98822

SWYNNENBURG, ROBIN
2514
OTIS, OR 97368

TAASEVIGEN, DAVID A.
1615
CLE ELUM, WA 98922

TAASEVIGEN, JAMES R.
1281
CLE ELUM, WA 98922

TAASEVIGEN, SHAWN L.
1280
CLE ELUM, WA 98922

TABAKA, GEN
4508
SEATTLE, WA 98166

TABER, TOM
0515
PORT ORCHARD, WA 98414

TABOR, ALMA
0957
YAKIMA, WA 98908

TAIT, KERRI
1219
TIETON, WA 98947

TAIT, MATT
1218
TIETON, WA 98947

TAKAHASHI, EUGENE R
3065
SEATTLE, WA 98103

TALBERT, PAUL B
2983
SEATTLE, WA 98133

TALERICO, DORIS M
0673
CLE ELUM, WA 98922

TALERICO, FRANK
0674
CLE ELUM, WA 98922

TALLMAN, BENNIE
0955
TERRACE HEIGHTS, WA 98901

TALLMAN, JOHN
2343
NO ADDRESS

TALLMAN, RANDY S
0956
YAKIMA, WA 98908

TANGREN, GERALD V
3833
WENATCHEE, WA 98801

TAROLA, WAYNE
0133
PASCO, WA 99301

TARSEN, JERRY C
4478
EVERETT, WA 98204

TARVER, GERALDINE & VIC
3529
SEATTLE, WA 98178

TARVER, RICHARD
2638
CASHMERE, WA 98815

TARVER, ROLLAND C
2687
CASHMERE, WA 98815

TAYLOR SR, GLENN S
0229
WENATCHEE, WA 98801

TAYLOR, BETTY
3647
YAKIMA, WA 98909

TAYLOR, DAN
1655
YAKIMA, WA 98908

TAYLOR, DENNIS
1652
YAKIMA, WA 98908

TAYLOR, DOUGLAS L.
2368
LYLE, WA 98635

TAYLOR, ED & DONNA
3971
YELM, WA 98597

TAYLOR, HARRY M
1753
YAKIMA, WA 98902

TAYLOR, JENNETTA
0230
WENATCHEE, WA 98801

TAYLOR, JOHN D
2337
GOLDENDALE, WA 98620

TAYLOR, JUDI
1853
YAKIMA, WA 98908

TAYLOR, MARCI
1654
YAKIMA, WA 98908

TAYLOR, MICHELLE
3948
MANSON, WA 98831

TAYLOR, ROY J
1489
BROWNSON, MI 49028

TECHLIN, J K & SCOTT,
RONNA L.
3351
EVERETT, WA 98201

TELFORD, JAMES A.
2267
WENATCHEE, WA 98801

TENNANT, LINDA
3148
SEATTLE, WA 98103

TENNEY, MARY E
1577
NACHES, WA 98937

TENNEY, MARY E (MAYOR)
3353
NACHES, WA 98937

TENNEY, ROBERT D
1580
NACHES, WA 98937

TEPPER, STEWART
0869
SEATTLE, WA 98144

TESTER, JACKSON
0948
SELAH, WA 98942

THAYER, MARY E.
1526
CASHMERE, WA 98815

THAYER, MICHAEL K
1531
CASHMERE, WA 98815

THE MOUNTAINEERS
2132
SEATTLE, WA 98119

THEBERT, JAN
3981
NO ADDRESS

THEIS, JERRY
0818
OKANOGAN, WA 98840

THETCHER, DANNY
2811
SEATTLE, WA 98103

THIE, KRISTA
9068
WHITE SALMON, WA 98672

THIE, MR & MRS
9033
COUPEVILLE, WA 98239

THIEL, VALERIE
0877
SEATTLE, WA 98102

THIER, ARTHUR
2769
RICHARD, WA 99352

THIEROFF, ROSEMARY J
1365
UNION GAP, WA 98903

THILBERG, NANCY E
9009
SEATTLE, WA 98107

THOBOIS, DANIEL
4435
NACHES, WA 98437

THOM, ROBERT
2944
SEATTLE, WA 98105

THOMAS, FRANCES
0586
CHELAN, WA 98116

THOMAS, J M
3223
YAKIMA, WA 98908

THOMAS, JAMES C & SARA
2838
HUNTSVILLE, AL 35803

THOMAS, JOANN
2302
NACHES, WA 98937

THOMAS, JOHN
0127
WHITE SALMON, WA 98672

THOMAS, JUDITH A
1726
YAKIMA, WA 98902

THOMAS, MIRIAM
2480
SELAH, WA 98942

THOMAS, PAULA
0280
NACHES, WA 98937

THOMAS, ROBERT W
0907
YAKIMA, WA 98902

THOMAS, STEVE
4343
BOISE, ID 83706

THOMAS, TAMARA
4042
WOODINVILLE, WA 98072

THOMAS, VIRGINIA R
3755
YAKIMA, WA 98908

THOMASON, MRS EDGAR C
3817
SEATTLE, WA 98107

THOMETZ, JUDITH
9104
SEATTLE, WA 98166

THOMPSON, ALLEN
3440
E WENATCHEE, WA 98802

THOMPSON, BILL 4050 SULTAN, WA 98294	THORSEN, JOHN 1788 TACOMA, WA 98467	TIPPERMAN, MARK 0115 SNOHOMISH, WA 98290	TREAT, RUSSELL L. 4262 RICHLAND, WA 99352	TURNER, GARY M & EMMA 3387 LYNNWOOD, WA 98036
THOMPSON, CATHY M 1111 ELLENSBURG, WA 98926	THORSOS, DEBORAH I 3307 SEATTLE, WA 98101	TIPTON, ANN 2678 UNION CAP, WA 98903	TREISNI, BEN 1040 YAKIMA, WA 98908	TURNER, LARRY 1090 YAKIMA, WA 98902
THOMPSON, D 0124 REDMOND, WA 98052	THROSSELL, STERLING L. 3754 YAKIMA, WA 98902	TISDEL, SAM & KAREN 0362 ALDERWOOD MNR, WA 98037	TRENARY, BENTON E 3088 BREMERTON, WA 98312	TURNER, MONTY 0109 LEAVENWORTH, WA 98826
THOMPSON, DAVID 2002 SEATTLE, WA 98115	THRUSH, THOMAS L. 1338 NACHES, WA 98937	TITCOMB, PETER 3459 SEATTLE, WA 98107	TRENARY, DOROTHY H 3064 SEABECK, WA 98380	TUSUP, PAULA 2855 SEATTLE, WA 98106
THOMPSON, DIANE 4049 SULTAN, WA 98294	THURMAN, KATHY 0328 ARLINGTON, WA 98223	TITUS, LARRY 0831 FEDERAL WAY, WA 98003	TRONSET D D S PS, ALLAN L. 3161 TACOMA, WA 98405	TUTTLE, BARBARA & DANIEL 3373 PESHASTIN, WA 98847
THOMPSON, ELBERT G 2566 YAKIMA, WA 98902	THURMAN, STEVE 0329 ARLINGTON, WA 98223	TOBISKA, LARRY & PENNY 0898 WENATCHEE, WA 98801	TROSKY JR, HENRY D 1137 ELLENSBURG, WA 98926	TUTTLE, JAMES R 3007 OLYMPIA, WA 98501
THOMPSON, GEORGE 1636 YAKIMA, WA 98902	TIBBETT, ALVIN R. 1679 YAKIMA, WA 98902	TODD, ROBERT M 2756 ENTIAI, WA 98822	TROSKY, IRENE P 1135 ELLENSBURG, WA 98926	TVEIT, STEPHEN R 2279 COLVILLE, WA 99114
THOMPSON, HOWARD 3084 BELGRADE, MT 59714	TIDRICK, GETHA C 4352 SELAH, WA 98942	TODD, VIRGIL 4380 WENATCHEE, WA 98901	TROSKY, PAULINE I 1138 ELLENSBURG, WA 98926	TWEEDY, JIM 1738 YAKIMA, WA 98908
THOMPSON, JANET A. 2893 CAMBRIDGE, MA 02238	TIDWELL, CANDI 0278 LEAVENWORTH, 98826	TOLBERT, MICHAEL A. 0993 YAKIMA, WA 98902	TROTTA, CHARLES E 3288 SPOKANE, WA 99212	TYSON, JUDITH 3277 SEATTLE, WA 98107
THOMPSON, JEFFREY D 3005 SEATTLE, WA	TIDWELL, DAVID 0277 LEAVENWORTH, WA 98826	TOM, BRENDA 4124 SEATTLE, WA 98133	TROTTER, DEAN A. 1451 SPRINGFIELD, OR 97478	TYSSELING, A.R. 2798 EVERETT, WA 98204
THOMPSON, KAREN A. 3119 FEDERAL WAY, WA 98003	TIDWELL, DON C 1787 PESHASTIN, WA 98847	TOMLINSON, RICHARD D 9026 SEATTLE, WA 98117	TROTTER, SAMMY J 2411 YAKIMA, WA 98901	U S DEPT OF INTERIOR 9094 PORTLAND, OR 97232
THOMPSON, LESLIE 1540 PESHASTIN, WA 98847	TIDWELL, MARYANNE 0276 LEAVENWORTH, WA 98826	TOMPKINS, JOEL L. 2278 KETTLE FALLS, WA 99141	TROUSDALE, JAMES ROSS 2575 YAKIMA, WA 98908	UHL, JIM, 1420 PORTLAND, OR 97209
THOMPSON, N 0064 SEATTLE, WA 98188	TIDWELL, PATTI 0688 PESHASTIN, WA 98847	TONGS, JOHN E. 2028 ISSAQUAH, WA 98027	TROWBRIDGE, JOHN 0797 LEAVENWORTH, WA 98826	UHLAR HEFFNER, GABRIELLA 3816 SEATTLE, WA 98155
THOMPSON, R L 2759 ELLENSBURG, WA 98926	TIECHNER DPM, JAC R. 3309 WENATCHEE, WA 98801	TOOMEY, JAMES 2572 OLYMPIA, WA 98506	TROXEL, MARJORIE F 2723 MALAGA, WA 98828	UJICK, THEODORE E 3188 SUMNER, WA 98390
THOMPSON, RICK 1096 YAKIMA, WA 98901	TIECHNER, JAC R 0067 E WENATCHEE, WA 98802	TOONEN, RONALD 4206 SEATTLE, WA 98107	TRUMBALL, KATHY 9002 YAKIMA, WA 98902	ULERDER, WAYNE 4182 SEATTLE, WA 98125
THOMPSON, ROBERT 1110 ELLENSBURG, WA 98926	TIEDEMAN, JEANNE M 2650 LEAVENWORTH, WA 98826	TOSTENRUDE, MICHAEL A. 0560 VANCOUVER, WA 98686	TUBB, ANDY 3468 EDMONDS, WA 98020	ULIN, GEORGE W 3864 E WENATCHEE, WA 98802
THOMPSON, ROBERT S 0621 SEATTLE, WA 98112	TIEDEMAN, LESLIE P 2651 LEAVENWORTH, WA 98826	TOWER, TIM 3884 SEATTLE, WA 98102	TUBB, BARBARA 3563 SEATTLE, WA 98177	ULLOM, JOAN 2454 YAKIMA, WA 98908
THOMPSON, RUSSELL 3655 THORP, WA 98946	TIEDEMANN, ROLAND 2774 WENATCHEE, WA 98801	TOWNER, STEVE 1575 YAKIMA, WA 98908	TUCKER, GERALD 1369 YAKIMA, WA 98902	ULMAN, BARR 4143 BELLINGHAM, WA 98225
THOMPSON, STUART M 0535 BELLINGHAM, WA 98226	TIELT, HARRIET M 3347 SEATTLE, WA 98115	TOWNSLEY, JOHN J 3068 OKANOGAN, WA 98840	TULLIN, MARYANN 3122 CHELAN, WA 98816	ULRICH, WARREN J 0490 PORTLAND, OR 97210
THOMPSON, SUSAN 3314 SEATTLE, WA 98112	TILLET, RODNEY 0264 TIETON, WA 98947	TOWRY, ROY E 0242 EPHRATA, WA 98823	TUMAN, J 0782 SELAH, WA 98942	UMBREIT, CAROL S 3219 BOTHELL, WA 98021
THOMPSON, THOR 4106 SEATTLE, WA 98117	TILLMAN, PARTRICA 0549 SEATTLE, WA 98103	TOYNBEE, JOSEPH C 1985 SEATTLE, WA 98178	TUNISON, SHERRIE 1797 E WENATCHEE, WA 98802	UNDERBRINK, JOHN M 1852 KIRKLAND, WA 98033
THOMPSON, TOMMY 1969 BELFAIR, WA 98528	TIMBER & WOOD PROD 2137 YAKIMA, WA 98907	TRAMMELL, PAUL R 1688 YAKIMA, WA 98903	TURCOTTE, PAUL 4443 ISSAQUAH, WA 98027	UNITED MINING DIST 0232 ELLENSBURG, WA 98926
THORP, JOHN M 4439 RICHLAND, WA 99352	TIMBER PURCHASERS 4534 WHITE SWAN, WA 98952	TRANTOW M D , MR & MRS JOHN 4202 QUINCY, WA 98848	TURDWELL 2157 AUBURN, WA 98002	UNSIGNED RESPONSE 0011 NO ADDRESS
THORPE PH D , SYLVIA A 3225 BELLINGHAM, WA 98226	TINKLER, KATHY 4118 YAKIMA, WA 98902	TRAPP, ROBERT F 3341 ELLENSBURG, WA 98926	TURNER, DAVID A. 0826 FERNDALE, WA 98248	UNSIGNED RESPONSE 0037 WENATCHEE, WA 98801

UNSIGNED RESPONSE
0094
NO ADDRESS

UNSIGNED RESPONSE
0119
SEATTLE, WA

UNSIGNED RESPONSE
0312
LANGLEY, WA 98260

UNSIGNED RESPONSE
0358
NO ADDRESS

UNSIGNED RESPONSE
0532
NO ADDRESS

UNSIGNED RESPONSE
0533
NO ADDRESS

UNSIGNED RESPONSE
0542
NO ADDRESS

UNSIGNED RESPONSE
0748
NO ADDRESS

UNSIGNED RESPONSE
0811
NO ADDRESS

UNSIGNED RESPONSE
2714
YAKIMA, WA

UNSIGNED RESPONSE
2728
NO ADDRESS

UNSIGNED RESPONSE
2742
WENATCHEE, WA 98801

UNSIGNED RESPONSE
2757
NO ADDRESS

UNSIGNED RESPONSE
2790
NO ADDRESS

UNSIGNED RESPONSE
2805
NO ADDRESS

UNSIGNED RESPONSE
2843
NO ADDRESS

UNSIGNED RESPONSE
2844
NO ADDRESS

UNSIGNED RESPONSE
2862
NO ADDRESS

UNSIGNED RESPONSE
2864
NO ADDRESS

UNSIGNED RESPONSE
2887
NO ADDRESS

UNSIGNED RESPONSE
2889
NO ADDRESS

UNSIGNED RESPONSE
3337
WENATCHEE, WA 98801

UNSIGNED RESPONSE
3342
YAKIMA, WA

UNSIGNED RESPONSE
3376
NO ADDRESS

UNSIGNED RESPONSE
3448
MULKITEO, WA 98275

UNSIGNED RESPONSE
3886
NO ADDRESS

UNSIGNED RESPONSE
3870
NO ADDRESS

UNSIGNED RESPONSE
4309
NO ADDRESS

UNSIGNED RESPONSE
4359
NO ADDRESS

UNSIGNED RESPONSE
4381
NO ADDRESS

UNSIGNED RESPONSE
4404
NO ADDRESS

UNSIGNED RESPONSE
4413
YAKIMA, WA

UNSIGNED RESPONSE
4417
NO ADDRESS

UNSIGNED RESPONSE
4424
NO ADDRESS

UNSIGNED RESPONSE
4456
NO ADDRESS

UNSIGNED RESPONSE
4458
NO ADDRESS

UNSIGNED RESPONSE
4461
NO ADDRESS

UNSIGNED RESPONSE
4473
NO ADDRESS

UNSIGNED RESPONSE
9005
NO ADDRESS

UNTHANK, AMY S
2847
SEATTLE, WA 98185

USHAKOFF, VLADIMIR
2849
FALL CITY, WA 98024

UTTERBACK, THOMAS P
0487
YAKIMA, WA 98902

VAIL PH D, W BANNING
3241
BOTHHELL, WA 98012

VAIL, GARRY
1882
WENATCHEE, WA 98801

VAIL, MARILYN L
3240
BOTHHELL, WA 98012

VALENTINE, BOB
4528
BELLINGHAM, WA 98225

VALENTINE, LARRY
1779
PESHASTIN, WA 98847

VALENZUEL, FRED
2536
YAKIMA, WA 98865

VAN BARGERLZ, LARRY
3457
NO ADDRESS

VAN CORBACK, BEN
1026
YAKIMA, WA 98902

VAN DE GRAAFF, DAVE
9088
BOISE, IDAHO 83704

VAN DIGGELEN, BOB
3954
LEAVENWORTH, WA 98826

VAN DYK, SUE
2438
SUMAS, WA 98295

VAN EATON, BENJAMIN P
3100
YAKIMA, WA 98902

VAN ELK, DUTCH
1894
AUBURN, WA 98071

VAN HORN, FLOYD E.
2375
GOLDENDALE, WA 98620

VAN HORTEN, RALPH L
0297
BYER, CO 80103

VAN NIEL, SALLY
3210
MOUNTLAKE TER, WA 98043

VAN STEENKILL, BECKY
0096
REDMOND, WA 98052

VAN VOAST, JORDAN
2788
SEATTLE, WA 98112

VAN, JEFF
3458
SEATTLE, WA 98115

VANCE D D S., LARRY E
3940
CASHMERE, WA 98815

VANCE, ED
2613
YAKIMA, WA 98908

VANCE, ROBERT
9070
VANCOUVER, WA 98663

VANDEGRAFT, EVA
0234
LEAVENWORTH, WA 98826

VANDEGRAFT JR, ELDON
0236
LEAVENWORTH, WA 98826

VANDEGRAFT, LARRY
0173
LEAVENWORTH, WA 98826

VANDYCK, ALAYNE
2095
SEATTLE, WA 98122

VANOVER, LESEY
3895
CHELAN, WA 98816

VARGAS, SOL
2319
YAKIMA, WA 98902

VARELMAN, MRS JEAN
4268
PATEROS, WA 98846

VAUTHIERS, JOHN
3412
PORTLAND, OR 97206

VECCHIO-SMART, MARILE A.
0210
ENTIAT, WA 98822

VEDDER, SUSAN & NICHOLAS
0669
SEATTLE, WA 98115

VEIT, KATHLEEN
2087
SEATTLE, WA 98112

VENNERI, GORDON
3271
WALLA WALLA, WA 99362

VENOTIANO, TIM
0018
KENNEWICK, WA 99336

VERGOWE, KEN
3200
SEATTLE, WA 98117

VERGOWE, KEN & SUSAN
4205
SEATTLE, WA 98117

VETTE, BRAD AND VICKI
3230
MOUNTLAKE TERR, WA 98043

VETTE, LAURIE S
3818
SEATTLE, WA 98103

VICKERS, LEON
1195
COWICHE, WA 98923

VICKERS, LON
1151
COWICHE, WA 98923

VICKERS, PAT
1192
COWICHE, WA 98923

VIDONNE, ROY & FAMILY
3513
ELLENSBURG, WA 98926

VIEBROCK, W M
2162
WOODINVILLE, WA 98072

VIETMEIER, BRYAN L
0717
SEATTLE, WA 98155

VILLAR, SUSANNE
3081
ELLENSBURG, WA 98926

VIRDEN, LARRY
1128
ELLENSBURG, WA 98926

VOGEL P E, PETER H
3750
WENATCHEE, WA 98801

VOLK DVM, CAROL
0440
PORT ORCHARD, WA 98366

VOLWILER M D, WADE
1973
SEATTLE, WA 98155

VOORHEES, TOM
4197
CLINTON, WA 98236

VOORLAS, WILLIAM C
3320
SEATTLE, WA 98103

VUORI, RICHARD O
2210
SNOHOMISH, WA 98290

WOOD, KENNETH E.
2261
E WENATCHEE, WA 98802

WA TRAILS ASSOC
2135
LYNNWOOD, WA 98037

WADDELL, DAVID A.
2180
SEATTLE, WA 98177

WADDLE, HELEN
3616
ELLENSBURG, WA 98926

WADDLE, RICHARD
0147
ELLENSBURG, WA 98926

WADE, DAVID J
1067
YAKIMA, WA 98901

WADE, JIM, BEV & RUSS
0415
MOUNTLAKE TER, WA 98043

WADKINS, LARRY
2809
WENATCHEE, WA 98801

WAGGENER, MICHELLE
2885
SEATTLE, WA 98166

WAGGENER, SUSAN A.
3110
SEATTLE, WA 98166

WAGGENER, THOMAS R
3061
SEATTLE, WA 98166

WAGNER, ALLEN
1712
YAKIMA, WA 98903

WAGONER, BETTY (BKCOUNTY HORSEMEN)
0021
PATEROS, WA 98846

WAGONER, DEBORAH
1721
YAKIMA, WA 98902

WAIT, TRAVIS
4076
SNOHOMISH, WA 98290

WAITE, J V
2652
CASHMERE, WA 98815

WATTS, FRED
1426
LYNNWOOD, WA 98037

WAKE, TOM
1245
YAKIMA, WA 98908

WALCZYK, DAVID P
4375
ROCHESTER, WA 98579

WALENTA, JOHN F
3995
SEATTLE, WA 98103

WALEN, ROBIN
3012
YAKIMA, WA 98901

WALK, FRED
2134
E. WENATCHEE, WA 98802

WALKENHAUER, DAVID
0912
MOXEE CITY, WA 98936

WALKER, ANDY M
0501
MARYSVILLE, WA 98270

WALKER, DEAN
4349
YAKIMA, WA 98902

WALKER, HUGH R
1623
ELLENSBURG, WA 98928

WALKER, JESSIE
0314
MARYSVILLE, WA 98270

WALKER, MICHAEL J
0491
WENATCHEE, WA 98901

WALKER, ROBERT V
2994
SEATTLE, WA 98105

WALKER, STEPHEN J
3789
REDMOND, WA 98053

WALKINSHAW, WALTER
9105
SEATTLE, WA 98154

WALL, JOHN S
4502
WENATCHEE, WA 98901

WALL, P M
1482
VANCOUVER, WA 98664

WALLER, RICHARD
1505
SEATTLE, WA 98136

WALLICK, JANE
2706
CLE ELUM, WA 98922

WALLIN, A M
2448
ESCONDIDO, CA 92025

WALLINGFORD, GEORGE E.
1057
SELAH, WA 98942

WALSH, MRS VIRGINIA
3304
CONCRETE, WA 98237

WALTER, RANDY
2260
E WENATCHEE, WA 98902

WALTERS, BUD
1870
BOTHELL, WA 98011

WALTERS, TOM
2884
CHELAN, WA 98916

WALTON, CAROL
0601
MERCER ISLAND, WA 98040

WANGLER, CRYSTAL
2294
UNION GAP, WA 98903

WANLESS, DONALD
4422
ELLENSBURG, WA 98928

WAPATO, S TIMOTHY
4485
PORTLAND, OR 97214

WARD, BETTY RAE
2081
KIRKLAND, WA 98033

WARD, DENNIS
0174
LEAVENWORTH, WA 98926

WARD, DEWITT H
4405
ENTIAI, WA 98822

WARD, JACK W
1168
NACHES, WA 98937

WARD, JANE
4159
ENTIAI, WA 98822

WARD, MATT
1158
SELAH, WA 98942

WARD, MRS LISA
1201
YAKIMA, WA 98901

WARD, PAT
1188
SELAH, WA 98942

WARD, ROBERT E
3139
SELAH, WA 98942

WARD, ROSEMARY
1162
NACHES, WA 98937

WARD, THOMAS W
1161
SELAH, WA 98942

WARD, WILDA
0159
LEAVENWORTH, WA 98926

WARE, JOHN W
0179
LEAVENWORTH, WA 98926

WARE, JOHN W
2749
LEAVENWORTH, WA 98926

WARE, MARY H
0180
LEAVENWORTH, WA 98926

WAREHIME, DARREN C
1165
YAKIMA, WA 98903

WARFIELD, ROBERT A.
3090
TACOMA, WA 98487

WARMAN, CYNTHIA L.
0469
PESHASTIN, WA 98947

WARMAN, LYLE A
0470
PESHASTIN, WA 98947

WARMAN, MARGARET A.
1823
PESHASTIN, WA 98947

WARMAN, SCOTT
1534
PESHASTIN, WA 98947

WARNER, MARY
0203
ENTIAI, WA 98822

WARNER, PRISCILLA
1992
SULTAN, WA 98294

WARREN, SANDRA
0375
STANWOOD, WA 98292

WARTH, JOHN F
2907
SEATTLE, WA 98125

WASH NATIVE PLANT SOCI-
ETY
3258
SEATTLE, WA 98105

WASHINGTON EARTH FIRST
0062
SEATTLE, WA 98145

WASHINGTON MECH CON
TRACT
1879
SEATTLE, WA 98168

WATANABE, STEVE
3403
MARBLEMOUNT, WA 98267

WATERFALL, LINDA
3136
SEATTLE, WA 98103

WATERS, NICK
4326
LEAVENWORTH, WA 98926

WATERS, WALT
1921
LEAVENWORTH, WA 98926

WATKINS, ANITA
4175
SEATTLE, WA 98119

WATKINS, R.L.
3642
SEATTLE, WA 98105

WATKINS, STEVE
0531
EDMONDS, WA 98920

WATSON, JAMES C
1317
WAPATO, WA 98951

WATSON, ROLAND E
0943
NACHES, WA 98937

WATTERSON, NEIL
2214
LA GRANDE, OR 97850

WATTS, CAROL & DAVID
0718
BELLEVUE, WA 98005

WAYENBERG, KAREN
3827
YAKIMA, WA 98908

WAYENBERG, LAUREL
4423
MOXEE, WA 98936

WAYLAND, JACK S
4513
OLYMPIA, WA 98504

WEAGEL, RALPH H
3768
YAKIMA, WA 98902

WEARSTLER JR, KEN
1560
MEDFORD, OR 97504

WEARY, JOSEPH
2409
YAKIMA, WA 98901

WEASELHEAD, DARWIN
2311
WAPATO, WA 98951

WEATHERLY, JEFFREY L.
2231
COLVILLE, WA 99114

WEATHERS, JAMES V
2585
MEDFORD, OR 97504

WEAVER, DARREN
1539
LEAVENWORTH, WA 98926

WEAVER, KENNETH
1821
DRYDEN, WA 98921

WEAVER, MARGARET A.
1562
YAKIMA, WA 98902

WEBB, ALLEN B
3908
WEST RICHLAND, WA 99352

WEBB, DORIS P
0859
YAKIMA, WA 98908

WEBB, FRIDERICK A.
2188
YAKIMA, WA 98908

WEBB, FRED A.
1187
YAKIMA, WA 98908

WEBB, MRS ELAINE C
1186
YAKIMA, WA 98908

WEBB, T
0806
YAKIMA, WA 98908

WEBBER, SHARON L.
4376
ABERDEEN, WA 98520

WEEKS, BARBARA
0187
LEAVENWORTH, WA 98926

WEEKS, L M
3560
BELLEVUE, WA 98004

WEEMAN, DAVID E.
2281
COLVILLE, WA 99114

WEICK, MARK
9024
WENATCHEE, WA 98901

WEICK, STACEY
2942
ARLINGTON, WA 98223

WEIS, ERIC
4253
NO ADDRESS

WEIS, FLOYD
2363
GOLDENDALE, WA 98620

WEISENBURG, MARY
0528
S CLE ELUM, WA 98943

WEISS, H RICHARD
4250
ARLINGTON, WA 98223

WEISS, MONITA
4256
NO ADDRESS

WEISS, SANDRA
4251
ARLINGTON, WA 98223

WELBERG, GARY L
2220
LA GRANDE, OR 97850

WELCH, GENE
3722
NACHES, WA 98937

WELGIE, JON B
0136
RICHLAND, WA 99352

WELLMAN, W A.
0684
BAYPORT, MN 55003

WELLS, JOHN U
1808
WENATCHEE, WA 98901

WELT M D, D W
4146
SEATTLE, WA 98112

WELTI, WALTER B
9036
SEATTLE, WA 98122

WENATCHEE TIMBER PUR
CHASERS
4548
WHITE SWAN, WA 98952

WENET, R E
3985
NO ADDRESS

WENKE, EVERETT
0353
EPHRAATA, WA 98923

WERDER, WAYNE
4530
SEATTLE, WA 98125

WERNEX, JOSEPH J
3590
ELLENSBURG, WA 98926

WERNEX, TODD E H
3490
ELLENSBURG, WA 98926

WERT, FRED
3382
NO ADDRESS

WEST, GARY R.
2741
WENATCHEE, WA 98901

WEST, GORDON
2813
WENATCHEE, WA 98901

WEST, GORDON
3301
WENATCHEE, WA 98901

WEST, STEVEN D
2288
KETTLE FALLS, WA 99141

WESTERLUND, GARY L.
3639
KENT, WA 98031

WESTERMEYER, DAN
0421
KENNEWICK, WA 99336

WESTGARD, JUDY
1854
TACOMA, WA 98465

WESTHUSING, GEORGE
1432
PORTLAND, OR 97220

WESTMAN, FRANK B
4531
LYNNWOOD, WA 98036

WESTOVER, ESTHER
3305
BREMERTON, WA 98312

WETMORE, CLEA
2578
NACHES, WA 98937

WETMORE, DOYLE J
2577
NACHES, WA 98937

WEYRANCH, SCOTT & EILEEN
3973
TACOMA, WA 98444

WHALEY, FRED A.
0289
LEAVENWORTH, WA 98926

WHALEY, MARGIE
0288
LEAVENWORTH, WA 98926

WHEALDON, EVERETT
3213
PORT TOWNSEND, WA 98368

WHEELAND, GERALD
1478
PORTLAND, OR 97206

WHEELER, CHARLEY
1261
ELLENSBURG, WA 98926

WHEELER, GENE
2787
SNOHOMISH, WA 98290

WHEELER, STEVE
3965
NO ADDRESS

WHELESS, DIXIE M
4222
SEATTLE, WA 98136

WHISLER, CLIFFORD C
1488
ELKHART, IN 46514

WHISSIEL INC PS, DR
ROBERT
4000
CHELAN, WA 98816

WHITACRE, LYLE
4237
RONALD, WA 98940

WHITAKER, PEG BAISCH
3511
CLE ELUM, WA 98922

WHITE D C , LESLIE B
0419
SEATTLE, WA 98148

WHITE, CONNIE L
0449
GOLDENDALE, WA 98620

WHITE, GLENN A.
3413
E WENATCHEE, WA 98802

WHITE, JACK
2765
ELLENSBURG, WA 98926

WHITE, KATHI
3859
E WENATCHEE, WA 98802

WHITE, L DENNIS
3253
AUBURN, WA 98002

WHITE, MICHAEL LEE
3917
S CLE ELUM, WA 98943

WHITE, RICHARD R
3299
SILVERDALE, WA 98360

WHITE, RICK
2082
WENATCHEE, WA 98801

WHITE, T E
2354
GOLDENDALE, WA 98620

WHITEHALL, BOB
0475
ENTIAT, WA 98822

WHITEHALL, DELBERT E
0453
ENTIAT, WA 98822

WHITEHALL, DUANE R
1918
WENATCHEE, WA 98801

WHITEHALL, GREG
1781
WENATCHEE, WA 98801

WHITEMAN, BRENT A.
1612
ELLENSBURG, WA 98926

WHITENER, DAVID
2203
SHELTON, WA 98584

WHITENER, KEITH & WILMA
4203
QUINCY, WA 98848

WHITISH, LARRY
1048
YAKIMA, WA 98903

WHITLAM, ROBERT G
0347
OLYMPIA, WA 98504

WHITMAN, DANE K.
2976
KETTLE FALLS, WA 99141

WHITMORE PH D , ANDREW D
3549
YAKIMA, WA 98902

WHITMORE, GARY L.
0214
ENTIAT, WA 98822

WHITMORE, RICHARD
3180
BELLINGHAM, WA 98225

WHITTAKER, RONALD E
0725
YAKIMA, WA 98901

WHITTEN, GORDON
2956
KIRKLAND, WA 98034

WHITTINGTON, ED
1472
PORTLAND, OR 97229

WICHAR, DENIS
0156
VANCOUVER, WA 98663

WICHERT, ERHARD
2734
SEATTLE, WA 98186

WICK, BARBARA
0187
AUBURN, WA 98002

WICK, DALE
0241
SNOHOMISH, WA 98290

WICK, JEFFEREY D
0823
SNOHOMISH, WA 98290

WICK, LARRY B
0188
AUBURN, WA 988002

WIDMAN, JEFF
2237
ELLENSBURG, WA 98926

WIDMER, JOHN
4327
PESHASTIN, WA 98847

WIDNER, RAY
2331
YAKIMA, WA 98908

WIDNEY, IRENE
3170
GIG HARBOR, WA 98335

WIEDRICH, TWILLA
0452
YAKIMA, WA 98902

WIEN, JOANNE POLAYES
0635
SEATTLE, WA 98109

WIENKE, KEN
2598
ASHLAND, OR 97520

WIEST, FRIEDRICH
3349
TULSA, OK 74104

WIKE, DENISE L
0568
AUBURN, WA 98001

WILBANKS JR, JIM
1323
NACHES, WA 98937

WILBANKS, DAVID
1392
NACHES, WA 98937

WILBOUR, HARRIET G
0861
CHELAN, WA 98816

WILBOUR, HARRIET G
3118
CHELAN, WA 98816

WILBURN, GARY W
3657
TACOMA, WA 98407

WILCOX, CAROL D
2807
LYNNWOOD, WA 98036

WILCOX, KEN
2751
LEAVENWORTH, WA 98826

WILCOX, LES
3196
SEATTLE, WA 98168

WILCOX, RON
2070
WAPATO, WA 98951

WILDER, J W
1434
PORT LUDLOW, WA 98365

WILKINS, HUBERT
0995
YAKIMA, WA 98901

WILKINS, RONALD J
0977
YAKIMA, WA 98903

WILLARD, DWIGHT
4127
ALBANY, CA 94706

WILLET, MIKE
1920
CASHMERE, WA 98815

WILLETT, KATHY
1723
SELAH, WA 98942

WILLIAMS, CAROL
4117
ELLENSBURG, WA 98926

WILLIAMS, CHERRY M
4347
YAKIMA, WA 98908

WILLIAMS, DALE K.
3929
BELLEVUE, WA 98008

WILLIAMS, DEBORAH
1785
TACOMA, WA 98499

WILLIAMS, DIANE M
2839
SEATTLE, WA 98155

WILLIAMS, DICK
0256
CASHMERE, WA 98815

WILLIAMS, JAMES P
2283
COLVILLE, WA 99114

WILLIAMS, JEAN
0348
NACHES, WA 98937

WILLIAMS, JOHN S
1925
CASHMERE, WA 98815

WILLIAMS, LIN D
2346
GOLDENDALE, WA 98620

WILLIAMS, MAE
4153
E WENATCHEE, WA 98802

WILLIAMS, MICHAEL L.
2929
ELLENSBURG, WA 98926

WILLIAMS, MR & MRS DALE
4135
BELLEVUE, WA 98008

WILLIAMS, PEGGY
3557
SEATTLE, WA 98104

WILLIAMS, REVA
0759
LEAVENWORTH, WA 98826

WILLIAMS, RICHARD W
4239
YAKIMA, WA 98908

WILLIAMS, SHARON
4542
BELLEVUE, WA 98008

WILLINGHAM, JAY M
4270
SEATTLE, WA 98117

WILLIS, DAVE
3221
ASHLAND, OR 97520

WILLIS, GARY
0447
GOLDENDALE, WA 98620

WILLIS, GARY A.
2767
SELAH, WA 98942

WILLIS, LIZABETH BAYLEY
0378
BAINBRIDGE IS, WA 98110

WILLIS, PAUL
2899
HOUGHTON, NY 14744

WILLSEY, DONALD
0252
PESHASTIN, WA 98847

WILLSEY, KATHERYN
0267
PESHASTIN, WA 98847

WILLY, STEVE
3441
CLE ELUM, WA 98922

WILSON, BILL
4414
SELAH, WA 98942

WILSON, BOB
1116
CLE ELUM, WA 98922

WILSON, BOB
1311
KETTLE FALLS, WA 99141

WILSON, DAVID B
2789
SEATTLE, WA 98146

WILSON, DOROTHY
0082
SEATTLE, WA 98133

WILSON, FRANK
2605
NACHES, WA 98937

WILSON, HERBERT C
2643
PESHASTIN, WA 98847

WILSON, LINDA C
2653
PESHASTIN, WA 98847

WILSON, MARGARET M
0153
LEAVENWORTH, WA 98826

WILSON, MARY M
2498
YAKIMA, WA 98903

WILSON, MIKE
2282
ALBANY, OR 97321

WILSON, R M
0185
ENTIAT, WA 98822

WILSON, RICHARD C
3360
DES PLAINES, IL 60018

WILSON, RICK
0426
SEATTLE, WA 98125

WILSON, ROBERT S
2497
YAKIMA, WA 98901

WILSON, SHERRY A
1566
YAKIMA, WA 98907

WILSON, TOM
1056
YAKIMA, WA 98902

WINDH, JOHN
3671
TACOMA, WA 98467

WINDHAM, KEITH
2865
ISSAQUAH, WA 98927

WINET, TERRY
2397
SELAH, WA 98942

WINGERTER, MARUE
1350
YAKIMA, WA 98901

WINGFIELD, RANDY
1244
YAKIMA, WA 98908

WINGFIELD, TAMMIE
1198
YAKIMA, WA 98908

WINKENWENDER, JOHN D
2555
YAKIMA, WA 98903

WINTER JR, KEN
1269
CLE ELUM, WA 98922

WINTER, SCOTT
2166
SEATTLE, WA 98107

WINTERTON, BILL
0369
CASHMERE, WA 98815

WINTERTON, GLADYS E
0274
CASHMERE, WA 98815

WINTHROP, DAVID
3388
LYNNWOOD, WA 98036

WINTHROW, ALAN
1353
SELAH, WA 98942

WISCHNOFSKE, MERLE G
0085
E WENATCHEE, WA 98802

WISDOM, JOHN J
3091
SEATTLE, WA 98115

WISE, HELEN
4180
ELLENBURG, WA 98926

WISE, MARY
3913
YAKIMA, WA 98909

WISEMAN, MAYDA
2216
LA GRANDE, OR 97850

WITHERS, LOUIS Q
1890
YAKIMA, WA 98903

WITT, CAROLINE
2623
LEAVENWORTH, WA 98828

WITT, GENE T
2622
LEAVENWORTH, WA 98828

WITT, JEAN G
3567
SEATTLE, WA 98155

WOFFENDEN, WM H
0960
SELAH, WA 98942

WOHL, DANNY R
2485
YAKIMA, WA 98908

WOHLERS, J R
2198
CASHMERE, WA 98815

WOLCOTT, GEORGE
2771
RICHLAND, WA 99352

WOLF, ED
2532
YAKIMA, WA 98908

WOLF, RALPH
1022
YAKIMA, WA 98908

WOLF, ROD
1462
KENNEWICK, WA 99336

WOLFE, HARRY K.
3502
SEATTLE, WA 98125

WOLFF, BARBARA
3798
CASHMERE, WA 98815

WOLFSTONE, DEBBIE
3172
SNOHOMISH, WA 98290

WOLL, KATIE
2488
NACHES, WA 98937

WOLL, RAY
2490
NACHES, WA 98937

WOOD, J M
1207
YAKIMA, WA 98908

WOOD, JOHN W
1197
YAKIMA, WA 98908

WOOD, ROBERT B
0287
WENATCHEE, WA 98801

WOOD, SUZANNA M
1208
YAKIMA, WA 98908

WOOD, TERRY
1772
MALAGA, WA 98828

WOODCOCK, KIM
1732
YAKIMA, WA 98903

WOODS, MRS & MRS. G R
3678
EVERETT, WA 98205

WOODS, ROBERT E
0007
MOUNTLAKE TERR. WA 98043

WOODS, W. K.
1888
BOTHELL, WA 98021

WOODWORTH, ROBERT B
0283
BELLEVUE, WA 98004

WOOLLEY, JOHN & NANCY
0780
SEQUIM, WA 98382

WOOTEN, GEORGE
3911
WINTHROP, WA 98862

WOOTEN, GEORGE F
3770
MARLOTT, WA 98829

WOOTEN, LONNIE
2658
E. WENATCHEE, WA 98802

WORCESTER, CLINT
2061
KENNEWICK, WA 99337

WORK, LEWIS M
2218
COVE, OR 97824

WORMINGTON, DAVID H
1474
GASTON, OR 97119

WORMWOOD, GARRY
4382
UNION GAP, WA 98903

WORSHAM M D , NANCY G
0597
SEATTLE, WA 98122

WRESSELL, MICKI
3956
RENTON, WA 98056

WRIGHT, AMY
1761
YAKIMA, WA 98901

WRIGHT, DOUGLAS L.
1091
YAKIMA, WA 98901

WRIGHT, ERNIE
4471
ELLENBURG, WA 98926

WRIGHT, JOHN M
3097
POULSBO, WA 98370

WRIGHT, LANCE
1763
YAKIMA, WA 98901

WRIGHT, LINDA
1762
YAKIMA, WA 98901

WRIGHT, PATRICK L.
2437
YAKIMA, WA 98908

WRIGHT, RANDY
1900
WENATCHEE, WA 98801

WRIGHT, SAM (DEPT OF FISH-
ERIES)
0580
OLYMPIA, WA 98504

WROBLEWSKI, DAVE
1507
LAKE STEVENS, WA 98258

WUESTHOFF, MIKE
1119
KITITITAS, WA 98934

WYATT, JILL L.
4437
BREMERTON, WA 98310

WYMAN, LANCE
4266
PESHASTIN, WA 98847

WYMAN, PETE
4169
SPOKANE, WA 99208

WYNNE, DONNA
2637
CASHMERE, WA 98815

YAKIMA CHAMBER OF COMM
3652
YAKIMA, WA 98907

YAKIMA CO DEVELOPMENT
ASSOC
2141
YAKIMA, WA 98907

YAKIMA COUNTY COMMIS-
SIONERS
3876
YAKIMA, WA 98901

YALOWITZ, KENNETH G
2965
ISSAQUAH, WA 98027

YAMAMOTO, CALVIN
0843
WENATCHEE, WA 98801

YATES, JOHN
3508
YAKIMA, WA 98902

YELLMAN, TED
9091
BELLEVUE, WA 98006

YERBICH, DOUG
0002
TACOMA, WA 98498

YERRINGTON, RICH
1443
MERIDIAN, ID 83642

YORBERG, JOLENE
2046
SEATTLE, WA 98125

YORKS PH D , PAMELA F
3802
SEATTLE, WA 98115

YOUNG JR, DONALD R
3739
TACOMA, WA 98448

YOUNG SR, DONALD R
3718
TACOMA, WA 98448

YOUNG, ARNOLD
4290
CLE ELUM, WA 98922

YOUNG, BRENT & TEREASA
0497
SILVANA, WA 98287

YOUNG, DAVID O
2931
ROSLYN, WA 98941

YOUNG, DEREK D
3738
TACOMA, WA 98448

YOUNG, HARVEY L.
0884
SPOKANE, WA 99218

YOUNG, MARIO W
3737
TACOMA, WA 98404

YOUNG, MARK S
2905
YAKIMA, WA 98908

YOUNG, MIKE & HELEN
3331
SELAH, WA 98942

YOUNG, RITA
2904
YAKIMA, WA 98902

YOUNG, SCOTT G
3736
TACOMA, WA 98404

YOURKOWSKI, JIM
3114
RENTON, WA 98056

ZAEGER, LYNNE
4155
WOODINVILLE, WA 98072

ZAHN, E
0114
PT LUDLOW, WA 98365

ZAHN, E.
4204
PT LUDLOW, WA 98365

ZAHN, SHIRLEY
0169
LEAVENWORTH, WA 98826

ZAHURSKY, JO
2980
SEATTLE, WA 98103

ZALESKY, LAURA
0029
EVERETT, WA 98206

ZALESKY, LAURA
0728
EVERETT, WA 98206

ZAPF, LAURIE
2971
CHELAN, WA 98816

ZAREMBA, RON
0363
YAKIMA, WA 98907

ZEDIKER, RUTH A.
1888
SUNNYSIDE, WA 98944

ZELLA, DAVID & CRISTI
1967
RENTON, WA 98058

ZEMKE, LIZZIE
4145
OLYMPIA, WA 98501

ZIEGLER, CARL & EVELYN
2215
LA GRANDE, OR 97850

ZIMMERMAN, DAVE
2673
NACHES, WA 98937

ZIMMERMAN, K A.
3799
BELLEVUE, WA 98008

ZIMMERMAN, MOREY
4272
LEAVENWORTH, WA 98826

ZIZZA, DANIEL
3150
SEATTLE, WA 98115

ZOURKOS, JACOB
4532
EVERETT, WA 98224

ZUVELA, JOHN P
2724
CLE ELUM, WA 98922

ZWIERS, GARY
2398
BELLINGHAM, WA 98225

ZWIGHT, GUILFORD
1234
YAKIMA, WA 98908

ZWIGHT, KATHRYN L.
1233
YAKIMA, WA 98908

ZWIGHT, STEVE
1172
YAKIMA, WA 98908

SUPPLEMENT RESPONDEES

AAGAARD, KNUT & ANN
1407S
BOTHELL, WA 98011

AARON P
1175S
NO ADDRESS TACOMA POST-
MARK

ABEL, TIM
0383S
ARLINGTON, WA 98223

ACY, HAROLD
1500S
COWICHE, WA 98923

ADAMS, BROCK, US SENATOR
1174S
WASHINGTON, DC 20510-6025

ADAMS, CHARLIE
1524S
SELAH, WA 98942

ADAMS, DEAN
1424S
WENATCHEE, WA 98901

ADAMS, ROSS
2422S
WATERVILLE, WA 98858

ADAMS, STEVEN G
5031S
TIGARD, OR 97223

ADDISON, RICK
2234S
EMMETT, ID 83617

ADELSON, PETER
0558S
EAST WENATCHEE, WA 98802

AEGERTER, BOB
1427S
SEATTLE, WA 98115-3802

ALAVIN, GARY
1776S
YAKIMA, WA 98901

ALBRIGHT, CHARLOTTE
1312S
SEATTLE, WA 98115

ALEXIEFF, SCOTT
1910S
YAKIMA, WA 98901

ALISEO, JANET G
1254S
ROSLYN, WA 98941

ALL, CHERYL
5012S
EAST WENATCHEE, WA 98802

ALLEN, LEE
2107S
EMMETT, ID 83617

ALLENBAUGH, W J
1963S
ELLENSBURG, WA 98926

ALLMENDINGER, DONALD
1616S
YAKIMA, WA 98908

ALPINE LAKES PROTECTION
SOC
0663S
REDMOND, WA 98052

ALSETH, KEN
2286S
EVERETT, WA 98203

ALSTON, ANGELS
1082S
SEATTLE, WA 98118

AMERICAN CANOE ASSOCIA-
TION
0425S
LORTON, VA 22079

AMERICAN MOTORCYCLIST
ASSOCIATION
0460S
WESTERVILLE, OH 4308-6114

ANDERSEN, DIRK & KAREN
1587S
LEAVENWORTH, WA 98826

ANDERSEN, WAYNE
0029S
MOUNTLAKE TERRACE, WA
98034

ANDERSON THOMAS N &
CHRISTINA E
0069S
ISSAQUAH, WA 98027

ANDERSON, CINDY
0313S
SEATTLE, WA 98119

ANDERSON, ED
0775S
YAKIMA, WA 98901

ANDERSON, FRANK J
2150S
NACHES, WA 98937

ANDERSON, HERB
0683S
ROCHESTER, WA 98529

ANDERSON, KEN M
5007S
OMAK, WA 98841

ANDERSON, LARRY D
2410S
COVE, OR 97824

ANDERSON, NEIL P
1377S
TACOMA, WA 98407

ANDERSON, RICH
0876S
ARLINGTON, WA 98223

ANDERSON, THEODORE L
0312S
SEATTLE, WA 98119

ANDIN, MARIN
1134S
YAKIMA, WA

ANDREAS, LARRY
1540S
TOPPENISH, WA 98948

ANDRESON, MARVYN
2008S
PUYALLUP, WA 98374

ANDUSI, RICK L
0146S
NO ADDRESS

ANGEL, RONALD
0180S
OAK HARBOR, WA 98277

ANKES, CLIFFORD E
1392S
PESHASTIN, WA 98847

ANSLEY, FRANK R
5040S
PUYALLUP, WA 98371

APPLE, LYNN
2365S
LA GRANDE, OR 97850

APPEGATE, DONELL J
1883S
CLE ELUM, WA 98922

APPEGATE, TOM L
1997S
CLE ELUM, WA 98922

ARMSTRONG, JUDI
1745S
YAKIMA, WA 98901

ARMSTRONG, SYLVESTER
1966S
WENATCHEE, WA 98802

ARNOLD, GILBERT
0854S
DARRINGTON, WA 98241

ARNOLD, KAREN E.
1574S
LEAVENWORTH, WA 98826

ARNOLD, ROCKY H
1351S
LYNNWOOD, WA 98036

ASCHENBRENNER, DAN
2210S
ENTERPRISE, OR 97828

ASHBROOKS, ALVIS
1499S
YAKIMA, WA 98902

ASHER, LEE
2225S
HORSESHOE BEND, ID 83629

ASHLEY, D
2371S
EMMETT, ID 83617

ASPLUND, RANDY & CICI
2277S
KIRKLAND, WA 98033

ATKINSON, EDWARD
0024S
CHELAN, WA 98816

AULT, JIM
0748S
ELLENSBURG, WA 98926

AULT, JIM
1553S
ELLENSBURG, WA 98926

AUSTIN, KEN
0479S
AUBURN, WA 98002

AUSTIN, STACEY
0683S
DARRINGTON, WA 98241

BABCOCK, THOMAS N
1904S
YAKIMA, WA 98902

BACKSTROM, RALPH V
0030S
SEATTLE, WA 98155

BAILES, FLOYD
1549S
ELLENSBURG, WA 98926

BAILEY, BARRY D
1700S
YAKIMA, WA 98902

BAIRD, RON
2425S
ENTIAI, WA 98822

BAIRETT, JAMES N
1708S
YAKIMA, WA 98902

BAKER, DAVID L
0851S
SUMMERVILLE, OR 97876

BAKER, DEAN
1297S
SEATTLE, WA

BAKER, FRED
2424S
ENTIAI, WA 98822

BAKER, MARK D
1632S
YAKIMA, WA 98903

BAKER, ROGER
2201S
SEATTLE, WA 98145-0014

BALAM, DARREN
0800S
TIETON, WA 98947

BALDWIN, LISA
0255S
SPOKANE, WA 99206

BALDWIN, MICHAEL
5072S
SEATTLE, WA 98119

BALDWIN, TOM
0256S
SPOKANE, WA 99206

BALLARD, BRAD
1851S
CLE ELUM, WA 98922

BANAKA, LARRY
0973S
LAGRANDE, OR 97850

BANIE, JACK
1338S
MARYSVILLE, WA 98270

BANISTER, D'ARCY P
1078S
SPOKANE, WA 99202

BANNISTER, JIM
2048S
ELLENSBURG, WA 98926

BARDSLEY, H M
0055S
SNOHOMISH, WA 98290

BARDUHN, A DOUGLAS
1480S
YAKIMA, WA 98908

BARDY, GUST
5073S
SEATTLE, WA 98199

BARENBERG, DAVE
2327S
EMMETT, ID 83617

BARENBERG, GARNET J
2332S
EMMETT, ID 83617

BARENBERG, JOYCE E
2328S
EMMETT, ID 83617

BARENBERG, RAYMOND J
2329S
EMMETT, ID 83617

BARICH, DOROTHY S
0360S
SEATTLE, WA 98106

BARKER, MERLE & GERALDINE
0031S
SNOQUALMIE, WA 98065

BARNES, CLAUDE
1618S
COWICHE, WA 98923

BARNES, DAVID
1691S
COWICHE, WA 98923

BARNES, DENNIS
1616S
COWICHE, WA 98923

BARNES, JOHN A.
1238S
ENTIAI, WA 98822

BARNES, M D, LEE F
0591S
SEATTLE, WA 98125

BARNETT, BILL
2047S
WENATCHEE, WA 98801

BARTA, MIMI
2159S
SEATTLE, WA 98103

BARTON, E R
2013S
LA GRANDE OR 97850

BARTON, GAIL
2069S
NACHES, WA 98937

BARTRAND, DAVID M &
HOLDER W
1178S
BEVERLY, WA 98321

BASE, LARRY D
1815S
SELAH, WA 98942

BASLINGTON, JR., DON A.
0589S
KENNEWICK, WA 99336

BATCHELDER, DAVID
0319S
SEATTLE, WA 98102

BATES, JANET E.
5059S
ELLENSBURG, WA 98926

BATES, MRS ELSIE A.
0143S
POULSBO, WA 98370

BATES, WALTER J
5061S
ELLENSBURG, WA 98926

BAUGHMAN, NICK
0504S
OMAK, WA 98841

BAUGHMAN, T J
1483S
YAKIMA, WA 98908

BAULNE, MELVIN
1950S
KETTLE FALLS, WA 99141

BAXTER, ED
1154S
YAKIMA, WA 98902

BAYNE, JOHN F
0774S
CASHMERE, WA 98815

BAYS, JIM L. (OWNER)
1214S
WOODLAND, WA 98674

BEASELY, MIKE
2343S
EMMETT, ID 83617

BEASON, ORVAN
2011S
YAKIMA, WA

BEATLEY, TIM AND WENDY
1205S
ENTIAI, WA 98822

BEATTY, ROBERT
1592S
SELAH, WA 98942

BEATY, JIM & MADELIENE
2063S
FEDERAL WAY, WA 98003

BEAUDRY, AL
1602S
YAKIMA, WA 98901

BECHARD, D M
1598S
YAKIMA, WA 98902

BECHARD, MARVIN
1695S
YAKIMA, WA 98902

BECHTOL, WILLIAM E. & MARY E.
0100S
COULEE CITY, WA 99115

BECK, MOLLY M
2271S
WOODINVILLE, WA 98072

BECK, STACEY
0222S
TACOMA POSTMARK 98418

BECKER, O N
1156S
SNOHOMISH, WA 98290

BECKER, TERRY
1909S
YAKIMA, WA 98907

BECKETT, BRUCE K.
1370S
TACOMA, WA 98424

BECKNER, BERT
0165S
NO ADDRESS

BEDDINGFIELD, RAY
2217S
SELAH, WA 98942

BEE, DAMON
0489S
BOTHELL, WA 98011

BEHME, SHERMAN
0207S
SEATTLE, WA 98107

BELCHER, STEVEN D
0285S
SHELTON, WA 98584

BELL, BONNIE
0210S
PORT ANGELES, WA 98362

BELL, THOMAS K.
0211S
PORT ANGELES, WA 98362

BELL, WAYNE
0723S
KENNEWICK, WA 99337

BENAVIDES, JOHN
1596S
YAKIMA, WA 98902

BENDER, LAURIE
2430S
ELLENSBURG, WA 98926

BENDER, PHILIP
1760S
YAKIMA, WA 98902

BENDICH, ARNOLD
1148S
SEATTLE, WA 98105

BENEFIELD, MIKE & JILL
0175S
ENTIAI, WA 98822

BENINTENDI, RON
1636S
YAKIMA, WA 98902

BENNETT, BRIAN C
0218S
REDMOND, WA 98052

BENNETT, DAN
5005S
LA GRANDE, OR 97850

BENNETT, LISA
5088S
GRANITE FALLS, WA 98252

BENNETT, WES
0004S
SEATTLE, WA 98105

BENOIT, ROD
0753S
YAKIMA, WA 98902

BENOIT, ROD
1381S
YAKIMA, WA 98901

BENSCH, JONATHAN
1766S
YAKIMA, WA 98908

BENSON, MICHAEL
0891S
CONCRETE, WA 98237

BENT, JULIA D V M
1068S
SEATTLE, WA 98103

BERGANTZ, GEORGE W
1139S
SEATTLE, WA 09105

BERGER, RALPH
1601S
SELAH, WA 98942

BERGLIN, BRIAN G
0492S
PASCO, WA 99301

BERRIO, MOLLY
1164S
SEATTLE POSTMARK

BERRY, STEPHEN M
0483S
RICHLAND, WA 99352

BETHAY, WILLIE E
1873S
YAKIMA, WA 98902

BETZOLD, FRED
2354S
EMMETT, ID 83617

BIFFORD, ROBIN
0971S
ELGIN, OR 97827

BIGAS, JOHN C
0114S
SEATTLE, WA 98115

BIGBY, DAVID E
0798S
NACHES, WA 98937

BIGBY, SAM
1488S
YAKIMA, WA 98908

BILLIE, JAMES W
2273S
SEATTLE, WA 98118

BILLINGSLEY, BRETT
0707S
SEATTLE, WA 98198

BIRD, RICHARD M
0802S
YAKIMA, WA 98902

BIRGE, DOUG
0787S
SELAH, WA 98942

BIRGE, JERRY
0818S
NACHES, WA 98937

BISCHEL, BOB
2237S
SEATTLE, WA 98133

BISHOP, DARREL
1681S
YAKIMA, WA 98908

BITOW, JOHN
0376S
GIG HARBOR, WA 98335

BITTERLING, DON
2029S
TACOMA, WA 98498

BITTERLING, SKIP
2025S
TACOMA, WA 98498

BJORKLUND, DEBBIE
0421S
YAKIMA, WA 98901

BJORKLUND, JIM
0420S
YAKIMA, WA 98901

BJORSON, FLINT L
0919S
CLE ELUM, WA 98922

BLACK, DELBERT
0639S
SEATTLE, WA 98126

BLACKBURN, ARLEEN S
1576S
LEAVENWORTH, WA 98826

BLACKBURN, BILL
2224S
HORSESHOE BEND, ID 83629

BLACKBURN, CALVIN A.
2021S
LEAVENWORTH, WA 98826

BLACKBURN, J
1580S
CASHMERE, WA 98815

BLACKER, LARRY H
2294S
EVERETT, WA 98901

BLACKLEDGE, ALVIN
1835S
SELAH, WA 98942

BLACKMAN, TODD
0679S
PASCO, WA 99301

BLACKMAN, TODD D
1142S
PASCO, WA 99301

BLAIR, DON
0262S
QUINCY, WA 98848

BLAKE, TROY
1283S
COLBY, WA 98384

BLANCHARD, LONNIE J
1798S
YAKIMA, WA 98902

BLANCHARD, MARK
1725S
YAKIMA, WA 98902

BLASCHKE, MIKE
1272S
AUBURN, WA 98002

BLOE, TED
0826S
BURNABY, B C, CANADA

BLOMQUIST, WILLIAM Y
0656S
MT VERNON, WA 98273

BLOOM, ERIC J
0365S
GRAHAM, WA 98338

BLOOR
0032S
WATTSBURG, WA 99361

BLOSSOM, ALICE P
1426S
SEATTLE, WA 98115

BOARD OF DIRECTORS
1216S
LEWISTON, ID 83501

BOCKOVEN, ROBERT & KARIN J
1052S
BELLEVUE, WA 98008

BOCZONADI, LESLIE E.
1380S
LEAVENWORTH, WA 98826

BODEN, FLORENCE
1321S
LYNNWOOD, WA 98037

BOETTNER, FRED
0329S
BELLINGHAM, WA 98226-4801

BOHN, DAVID
1535S
YAKIMA, WA 98907

BOHN, DAVID J
1536S
YAKIMA, WA 98907

BOHNHOFF-HLAVACEK, GAIL
1072S
SEATTLE, WA 98126

BOLLAERT, FIN
0155S
PESHASTIN, WA 98847

BOLSER, DUANE
0089S
LEAVENWORTH, WA 98826

BOLT, JEFF
1484S
YAKIMA, WA 98908

BONE, J L
1850S
MOXEE, WA 98936

BONLENDER, KATHI
1564S
YAKIMA, WA 98901

BONLENDER, RONALD J
1563S
YAKIMA, WA 98901

BONNEVILLE POWER ADMINI-
STRATION
5099S
PORTLAND, OR 97208-3621

BONTRAGER, DOUG
0510S
SPOKANE, WA 99204

BORCK, GRETCHEN
0264S
EPHRATA, WA 98823

BORESON, HUGH C
0813S
NO ADDRESS, WENATCHEE
POSTMARK

BOSSART, STAN
0901S
CLE ELUM, WA 98922

BOSSON, LARRY
0513S
WENTACHEE, WA 98801

BOSTER, S
1610S
YAKIMA, WA 98907

BOTTIGER, JUDY
0182S
STATE COLLEGE, PENNSYLVANIA

BOTTS, CASSANDRA R
0695S
JOSEPH, OR 97846

BOTTS, RONALD
2133S
JOSEPH, OR 97846

BOTZ, ED
0953S
ELGIN, OR 97827

BOW
1241S
MAZAMA, WA 98833

BOWDEN, DAN
1491S
YAKIMA, WA 98902

BOWEN, EARL
1140S
ARDEVOIR, WA 98811

BOWLBY, JOHN
1951S
KETTLE FALLS, WA 99141

BOWLES, KYLE
1310S
MOSES LAKE, WA 98837

BOWLES, LAURA
0544S
NO ADDRESS WENATCHEE
POSTMARK

BOWLES, T
0548S
MOSES LAKE, WA 98837

BOWMAN, TOM & MARTHA
0043S
SEATTLE, WA 98155

BOYCE, BARBARA
1462S
YAKIMA, WA 98901

BOYCE, GEORGE M
1479S
YAKIMA, WA 98901

BOYD
0093S
MERCER ISLAND, WA 98040

BOYD, BOB
0894S
DARRINGTON, WA 98241

BOYD, FRANK J
0547S
EAST WENATCHEE, WA 98802

BOYD, JIM
1495S
SELAH, WA 98942

BOYD, KEITH
0344S
BELLEVUE, WA 98006

BOYD, KELLY
1066S
BELLEVUE, WA 98006

BOYD, LEISA B
0545S
EAST WENATCHEE, WA 98802

BOYD, NADINE
0546S
EAST WENATCHEE WA 98802

BOYD, T
0557S
NO ADDRESS WENATCHEE
POSTMARK

BOYES, GORDON K
1981S
NACHES, WA 98937

BRADOTICH, DOUG
5016S
WENATCHEE, WA 98801

BRAMEL, JODY T
1395S
LEAVENWORTH, WA 98826

BRANT, MONTY
0311S
OLALLA, WA 98359

BRATHOVDE, RICHARD L.
2178S
YAKIMA, WA 98902

BRATHOVDE, SUSAN
2266S
YAKIMA, WA 98902

BRATTATROM, ROBERT K. &
LINDA L.
0013S
ROSEBURG, OR 97470

BRATTON, S.A. & E H
2054S
LEAVENWORTH, WA 98826

BRAUGHTON III, T C & JOHN
0766S
ELGIN, OR 97827

BRAUGHTON, LISA
2411S
ELGIN, OR 97827

BRAUN, MARK J
0588S
MOSES LAKE, WA 98837

BRAUNER, KALMAN
0101S
SEATTLE, WA 98109-1822

BRAUNER, KALMAN
1230S
SEATTLE, WA 98109-1822

BREADY, C SPENCER
0015S
EAST WENATCHEE, WA 98802

BRECKEN, GREG
1389S
SPOKANE, WA 99218

BREDRICK, JACK
1683S
YAKIMA, WA 98901

BRIAN'S AUTO SALES
0150S
BOTHELL, WA 98012

BRICKLIN, DAVID, PRES
1167S
SEATTLE, WA 98105

BRIGGS, HARRY
1923S
ROSLYN, WA 98941

BRIGGS, HOWARD A.
0139S
SEATTLE, WA 98198

BRIGGS, KENNETH L.
2414S
COVE, OR 97824

BRIGHAM, R
2250S
EVERETT, WA 98201

BRIGHT, DENIS
1965S
EDMONDS, WA 98020

BRINCK, GUNNAR
5033S
LAKE OSWEGO, OR 97035

BRISCOE, HARLEN
1833S
SELAH, WA 98942

BRITTON, GEORGE C
1812S
YAKIMA, WA 98901

BROCK, DALE
1947S
GOLDENDALE, WA 98620

BROCKLY, WILLIAM R
0430S
WOODINVILLE, WA 98072

BROCKMAN, FRED
1302S
RICHLAND, WA 99352

BRODERIUS, ROBERT D
0778S
ELLENSBURG, WA 98926

BRODERSON, DEWEY
1391S
WENATCHEE, WA 98801

BROKER, LEESA
1236S
LEAVENWORTH, WA 98826

BROLSMA, JACKIE
2081S
CHELAN, WA 98816

BRONSON, DON
2122S
JOSEPH, OR 97846

BRONSON, WAYNE R.
2123S
JOSEPH, OR 97846

BROOKS, ALBERT
0850S
DARRINGTON, WA 98241

BROOKS, TERRY
0738S
ARLINGTON, WA 98223

BROWETT, JEAN
2272S
ROSLYN, WA 98941

BROWITT, DAVE
2397S
ROSLYN, WA 98941

BROWITT, ROBERT A.
1405S
ROSLYN, WA 98941

BROWN, BILLY W , SR
2336S
EMMETT, ID 83617

BROWN, BOB
1438S
YAKIMA, WA 98910

BROWN, CHRISTIE
5057S
ELLENSBURG, WA 98926

BROWN, DAVE
1202S
TACOMA, WA 98498

BROWN, ELVETT
1244S
LEAVENWORTH, WA 98826

BROWN, ETTA L.
2337S
EMMETT, ID 83617

BROWN, H
0310S
NO ADDRESS, TACOMA POST-
MARK 98424

BROWN, KEITH
1521S
YAKIMA, WA 98903

BROWN, SONDI
0570S
OLALLA, WA 98359

BROWN, WILLIAM R
0433S
ENUMCLAW, WA 98022

BRUCKER, JAN E.
2085S
SEATTLE, WA 98121-2305

BRUMMETT, JIM
1643S
SELAH, WA 98942

BRUNER, MIKE L
2344S
EMMETT, ID 83617

BRUNNER, VERN
0939S
CASHMERE, WA 98815

BRYANT, GARY
1505S
SELAH, WA 98942

BRYANT, GEORGE L.
0957S
ELGIN, OR 97827

BRYANT, MILDRED R
0958S
ELGIN, OR 97827

BRYANT, N
1397S
LEAVENWORTH, WA 98826

BRYANT, ROGER
0300S
WENATCHEE, WA 98801

BRYANT, TED L.P
5109S
WENATCHEE, WA 98801

BRYCE, JOHN, JR.
2282S
ARLINGTON, WA 98223

BUCHANAN, JEFF
1362S
YAKIMA, WA 98901

BUCHANAN, KENNETH
1367S
YAKIMA, WA 98901

BUCKINGHAM, DOLLY I
2180S
EAST WENATCHEE, WA 98802

BUCKINGHAM, RICHARD
1354S
WENATCHEE, WA 98807

BUCKMAN, MORRIS J
0375S
AUBURN, WA 98001

BUEHLER, DAVID B
1832S
YAKIMA, WA 98908

BUFFINGTON, MAIDELLA
2353S
EMMETT, ID 83617

BUHRMAN, CLYDE
1687S
YAKIMA, WA 98908

BUNGER, JR., PHILLIP W
5093S
TACOMA, WA 98409

BUNKER, DELBERT R
0746S
YAKIMA, WA 98903

BURBRIDGE, LARRY
0496S
WENATCHEE, WA 98801

BURBRIDGE, WINONA E.
0518S
WENATCHEE, WA 98801

BURDYSHAW, BRAD
1268S
POULSBO, WA 98370

BURDYSHAW, GARY R.
1277S
POULSBO, WA 98370

BURGESS, LINDA
1404S
CHELAN, WA 98816

BURGESS, TED
0917S
KETTLE FALLS, WA 99141

BURK, RICHARD A.
0120S
KENNEWICK, WA 99336

BURKE, CHRISTOPHER
2074S
SEATTLE, WA 98105

BURKE, JANN R
1141S
SNOHOMISH, WA 98290

BURKE, LINDA
1146S
SNOHOMISH, WA 98290

BURKE, LISA JENNIFER
1252S
SNOHOMISH, WA 98290

BURKE, PAT & MARY
1422S
CLE ELUM, WA 98922

BURKE, SARA E
1147S
SNOHOMISH, WA 98290

BURNETT, JANE
0702S
SEATTLE, WA 98168

BURNETT, LORETTA
0620S
SEATTLE, WA 98168

BURNETT, TOM
0703S
SEATTLE, WA 98168

BURNS, BERT
1046S
MARYSVILLE, WA 98270

BURNS, JAMES A.
1802S
YAKIMA, WA 98904

BURNS, ROBERT
0796S
NACHES, WA 98937

BURRELL, J J
2033S
TACOMA, WA 98443

BURRILL, JOYCE
1666S
YAKIMA, WA 98908

BURROWES, MARK R
0814S
DES MOINES, WA 98198

BURTON SR, GARY D
0833S
YAKIMA, WA 98902

BURTON, DOT
1560S
YAKIMA, WA 98902

BURTON, JIM
1865S
SELAH, WA 98942

BURTS, DEAN
2418S
CASHMERE, WA 98815

BUSE, DAVE
0751S
ARLINGTON, WA 98223

BUSE, SHANNON
0773S
STANWOOD, WA 98292

BUTKOVICH, BEN
1827S
ROSLYN, WA 98941

BUTLER, JOHN L.
1019S
CLE ELUM, WA 98922

BUXOM, DAVID H
1972S
MARYSVILLE, WA 98270

BUZZARD, R.J
0728S
CENTRALIA, WA

BYRD, GREG
0137S
NO ADDRESS

BYRD, LAWRENCE
2004S
MOXEE, WA 98936

CAGLEY, JAMES L.
0994S
ELGIN, OR 97827

CAHIR, MARIAN
1222S
SEATTLE, WA 98105

CALAHAN, ERVIN L.
1448S
ELLENSBURG, WA 98926

CALAHAN, SHIRLEY
1460S
ELLENSBURG, WA 98926

CALDWELL, JOE
0872S
ARLINGTON, WA 98223

CALHOUN, ALLEN
0201S
SEATTLE, WA 98168

CAMPBELL, JEWELL
1752S
YAKIMA, WA 98908

CAMPBELL, LEROY
2341S
EMMETT, ID 83617

CAMPBELL, WALTER J
2026S
PUYALLUP, WA 98373

CANNADAY, SHERIDAN S &
INA R
1091S
RENTON, WA 98058

CANNON, JIM
1373S
ENTIAI, WA 98822

CANNON, RANDY
1309S
ENTIAI, WA 98822

CANTERBURY, MARILYN
HERKE
1209S
RENTON, WA 98058

CANTRALL, CALVIN L.
2413S
LA GRANDE, OR 97850

CAPELLEN, DIANE
5041S
BENTON CITY, WA 99320

CAPPS, RON
1475S
YAKIMA, WA 98908

CARDENAS, ERNESTO 1674S YAKIMA, WA 98901	CASH, ROY 1590S ELLENSBURG, WA 98926	CHITWOOD, HAROLD 2110S JOSEPH, OR 97846	CLINE, MS MARY 0358S SEATTLE, WA 98168	CONNER, BILL 1128S SEATTLE, WA
CARL, ROD 1605S YAKIMA, WA 98902	CASTOR, JEFF 0327S REDMOND, WA 98005	CHRISTENSEN, BRAD 0373S EVERETT, WA 98214	COBLEIGH, KENNETH A 0082S RENTON, WA 98056	CONNER, DOUG 0720S PASCO, WA 99301
CARLQUIST, BRAD 1056S SEATTLE, WA 98177	CAWLEY, JR, WILLIS 5071S YAKIMA, WA 98902	CHRISTENSEN, JERRY 0188S GRANITE FALLS, WA 98252	COBY, LUTHER 1818S CLE ELUM, WA 98922	CONNER, KELLY M 1280S PASCO, WA 99301
CARLQUIST, JOHN 1057S SEATTLE, WA 98177	CAWLEY, LORETTA M 2258S YAKIMA, WA 98902	CHRISTENSEN, JULIE 0772S MORTON, WA 98356	COCKLE, RON 1991S CASHMERE, WA 98815	CONTRATTO, LORI 5046S ELLENSBURG, WA 98926
CARLSON, ELIZABETH S MRS (MRS. ALBERT) 1232S SPOKANE, WA 99207	CAWLEY, SHIRLEY M 2259S YAKIMA, WA 98902	CHRISTENSEN, LJ 0473S OAK HARBOR, WA 98277	COFFELT, BYRON 0493S OTHELLO, WA 99344	CONWAY, KATHLEEN 2171S SEATTLE, WA 98107
CARLSON, JACK 1293S EATONVILLE, WA 98328	CEDER, LOREN 1379S SEATTLE, WA 98121	CHRISTENSEN, LARRY J 2398S COLVILLE, WA 99114	COFFIN, JOAN 5060S SELAH, WA 98942	COOK, DAVID 0385S TACOMA, WA 98466
CARLSON, PAT 2367S ELLENSBURG, WA 98926	CELIX, JUANITA M 0142S WOODINVILLE, WA 98072	CHRISTENSEN, LEE R 1194S ELLENSBURG, WA 98926-1442	COHEN, MATTHEW 0047S SEATTLE, WA 98144	COOK, JIM 0721S CHELAN, WA 98816
CARLSON, PATRICIA 1183S ELLENSBURG, WA 98926	CHASE, FRED L 0298S EDMONDS, WA 98020	CHRISTENSEN, VENA 2177S EAST WENATCHEE, WA 98802	COLBY, DON 0471S LAKE STEVENS, WA 98258	COOK, STEVE 0095S WENATCHEE, WA 98801
CARLSON, RUSSEL E 0257S SPOKANE, WA 99206	CHAMBERLIN, CLAUDE L. 0172S YAKIMA, WA 98901	CHRISTSON, RON 5008S LA GRANDE, OR 97850	COLEMAN, DALE 1517S NACHES, WA 98937	COOPER, DEAN W 0817S SEATTLE, WA 98109
CARLTON, TERRIA L. 5026S CLE ELUM, WA 98922	CHAMBERLIN, MARK 0579S PORT ORCHARD, WA 98366	CHURCH, KENNETH J 0266S BELLINGHAM, WA 98226	COLEMAN, MARTHA 0303S YAKIMA, WA 98908	COOPER, DICK L. 1447S NACHES, WA 98937
CARLTON, VAL 1833S CLE ELUM, WA 98922	CHAMPOUX, PAT 1556S MOXEE, WA 98936	CLARK, B D 1937S SELAH, WA 98942	COLEMAN, T L 0157S YAKIMA, WA 98906	COOPER, KENT R. 0826S GLEED, WA 98908
CAROLLO, DON 1838S ELLENSBURG, WA 98926	CHANDLER, CLARENCE D 2408S LA GRANDE, OR 97850	CLARK, BENNETT G 0468S SEATTLE, WA 98117	COLLIER, JOHN W 0106S EVERETT, WA 98208-5021	COOPER, VIRGINIA 0718S ARDENVOIR, WA 98811
CARPENTER, LEE C 1207S ISSAQUAH, WA 98027	CHANDLER, DERRILL 0990S ELGIN, OR 97827	CLARK, DAVID P 1529S MOXEE, WA 98936	COLLINS, BRIAN 0160S SEATTLE, WA 98102	COOPER, W H 0699S ARDENVOIR, WA
CARSON, HADLEY E. 2372S EMMETT, ID 83617	CHANDLER, THOMAS E 1074S KENT, WA 98031	CLARK, JEANETTE 1531S MOXEE, WA 98936	COLLINS, JOHN W 0881S CONCRETE, WA 98237	COPP, GERALD L. 1573S WENATCHEE, WA 98807-0011
CARSON, R J 1264S WALLA WALLA, WA 98362	CHANEY, FREDIE 1733S YAKIMA, WA 98901	CLARK, KEITH W 0895S ARLINGTON, WA 98223	COLLINS, MICHAEL L. 0685S OLYMPIA, WA 98506	COPPINGER, MARK 0564S PORT ORCHARD, WA 98366
CARSTENS, JOHN W 0835S SELAH, WA 98942	CHANEY, HERMAN 1754S YAKIMA, WA 98902	CLARK, RUSSELL 0726S SILVERDALE, WA 98383	COLLMAN, JIM 0345S TACOMA, WA 98422	CORECTOR, WILLIE 1897S YAKIMA, WA 98901
CARSTENS, STEVEN D 0820S YAKIMA, WA 98908	CHAPMAN, JAMES L. 0152S EDMONDS, WA 98020	CLARKE, EDWARD G 1206S PESHASTIN, WA 98847	COLLONS, IKE 0983S IMBLER, OR 97841	CORKILL, TONY L. 1845S LEAVENWORTH, WA 98826
CARTER, BILL 0394S NO ADDRESS	CHAPPELL, RALPH L., CAPT USN (RET) 1435S TACOMA, WA 98498	CLARKE, JEAN A. MRS (MRS TOM E) 1208S SEATTLE, WA 98155	COLPITTS, WILLIAM S 2140S JOSEPH, OR 97846	CORLEY, RANDY G 2439S MARYSVILLE, WA 98270
CARTER, DAVE 0561S PORT ORCHARD, WA 98366	CHASE, CHARLES E. 0001S RENTON, WA 98058	CLARKE, RICHARD S 1623S YAKIMA, WA 98902	COMBS, C S 1145S MCKENNA, WA 98558	CORNELIUS, GEORGE R 0112S YAKIMA, WA 98908
CARTER, DOROTHY E. 0017S LEAVENWORTH, WA 98826	CHEATHAM, ARTHUR D 0977S ELGIN, OR 97827	CLAY, ROBERT A. 2267S WOODINVILLE, WA 98072	CONDOTTA, GARY L. & FAMILY 0299S ISSAQUAH, WA 98027	CORNETT, H JOE 0081S SEATTLE, WA 98155
CARTER, LANNY PAUL 1396S WENATCHEE, WA 98801	CHELAN COUNTY COMMIS- SIONERS 0542S WENATCHEE, WA 98801	CLEAVER, ROYCE E 1668S YAKIMA, WA 98902	CONFER, BRUCE 0242S WENATCHEE, WA 98801	CORNETT, JERRY 2129S JOSEPH, OR 97846
CARTER, ROBERT 2393S LA GRANDE, OR 97850	CHILDRESS, DON A., DR., PRES 1181S ELLENSBURG, WA 98926	CLEMENTS, KEN 5002S YAKIMA, WA 98908	CONGDON, GORDON H DR 1087S EAST WENATCHEE, WA 98802	CORNETT, KEVIN 0503S OKANOGAN, WA 98801
CARTER, SHANE 0393S NO ADDRESS	CHITWOOD, DARREN 2111S JOSEPH, OR 97846	CLEMMER, JAMES 1939S GLENWOOD, WA 98619	CONLAN, DDS, MIKE 0600S SEATTLE, WA 98116	CORONADO, JOE 1557S TOPPENISH, WA 98948
CARTER, STEVE 2391S ROSEBURG, OR 97470	CHITWOOD, DOUG 2144S JOSEPH, OR 97846	CLENIER, JEFF 0574S PORT ORCHARD, WA 98366	CONNELLY, MEG 5083S SEATTLE, WA 98103	CORRIGAN, DOROTHY M 2196S MOSES LAKE, WA 98837

CORY, TODD M
0584S
PORT ORCHARD, WA 98368

COULTS, NORM
0287S
TACOMA, WA 98407

COVERT, GARY
1384S
LEAVENWORTH, WA 98826

COVERT, M E, MS
1180S
LONGVIEW, WA 98632

COWAN, MARY E.
1317S
LEAVENWORTH, WA 98826

COWAN, STEVE
0696S
LEAVENWORTH, WA 98826

COX, GREG L.
0730S
CHEHALIS, WA 98532

COYNE, STEVE
1089S
SEATTLE, WA 98102

COZART, LAURENCE R.
1333S
CHELAN, WA 98816

CRAFT, EMMA M
5113S
TACOMA, WA 98709

CRAFTON, GEORGE
1771S
SELAH, WA 98942

CRAM, RICHARD L.
1585S
LEAVENWORTH, WA 98826

CRAWFORD, BARTIS W., SR.
1617S
YAKIMA, WA 98908

CRAWFORD, JIM
5044S
ELLENSBURG, WA 98926

CRAWFORD, STAN
2254S
YAKIMA, WA 98908

CRECY, SR., K.L.
0442S
NO ADDRESS

CREIGHTON, ARNIE
5086S
MORTON, WA 98356

CRIDER, CHARLENE
0162S
ELLENSBURG, WA 98926

CROLL, RHEA
1584S
LEAVENWORTH, WA 98826

CROPP, RUSSELL
1334S
SEATTLE, WA 98155

CULLIER, DENNY A.
2212S
YAKIMA, WA 98908

CULBERTSON, JERRY
1837S
CLE ELUM, WA 98922

CULLEN, BOB & BLANKEN-
BAKEN, SHARRIN
0386S
PORT ORCHARD, WA 98366

CULLICKSON, GERALD & GAIL
0044S
MOUNTLAKE TERRACE, WA
98043

CULVER, SAM
1619S
COWICHE, WA 98923

CUNNINGHAM, DALE J
1506S
YAKIMA, WA 98902

CUNNINGHAM, DALLAS
1503S
YAKIMA, WA 98901

CUNRY, BOB
0634S
NO ADDRESS, TACOMA POST-
MARK 98438

CURNUTT, FRANK
0235S
SNOHOMISH, WA 98290

CURRIER, STUART L.
2310S
SEATTLE, WA 98126

CURTSINGER, J W
0793S
NACHES, WA 98937

CURTSINGER, SCOTT
0804S
NACHES, WA 98937

CUSHMAN, DICK
2396S
Pauette, ID 83661

CYR, WALTER
1818S
YAKIMA, WA 98901

CZOUCH, BRADLEY G
0612S
NO ADDRESS, WENATCHEE
POSTMARK

D'ASARO, ERIC
0187S
SEATTLE, WA 98115

DAHL, BRIAN
0523S
ROCHESTER, WA 98379

DAHL, DICK
0141S
AUBURN, WA 98002

DAHLEN, RONALD Z.
0434S
LYNNWOOD, WA 98036

DAHLEN, SANDRA K.
0435S
LYNNWOOD, WA 98036

DAHMEN, SON J
1210S
KIRKLAND, WA 98033

DAILY, ROBERT
0113S
BELLINGHAM, WA 98226

DALLMAN, GEORGIA R.
0810S
KETTLE FALLS, WA 99141

DALSASO, JULIE
0419S
HAYDEN LAKE, ID 83835

DALTON, ROBBY
2114S
JOSEPH, OR 97846

DAMBORG, NORMAN R.
2185S
SEATTLE, WA 98148

DAMMEL, BRIAN
2099S
TACOMA POSTMARK

DAN BOWDEN
0068S
YAKIMA, WA 98902

DANIELSON, ROCHELLE
2125S
ENTERPRISE, OR 97828

DANKERS, JOHANNES H M C
1059S
MONROE, WA 98272

DANUBIO, TONY
1846S
CLE ELUM, WA 98922

DAPPEN, ANDY
0058S
BRIER, WA 98036

DARLING, BRUCE K.
0096S
PESHASTIN, WA 98847

DASKAL, NEAL
1191S
SEATTLE, WA 98122

DAUENHAUER, PAUL
1652S
YAKIMA, WA 98902

DAUGHERTY, DION
2287S
CONCRETE, WA 98237

DAVI, KEVIN P
0123S
NO ADDRESS

DAVICK, JERRY
0411S
AUBURN, WA 98001

DAVIES, EVAN
5103S
PORTLAND, OR 97204-2185

DAVIES, JERRY
1213S
ELLENSBURG, WA 98926

DAVIS, CHRIS HARLEY
0671S
BREMERTON, WA 98418

DAVIS, DON
1844S
NACHES, WA 98937

DAVIS, EUGENE G
1980S
MOXEE, WA 98936

DAVIS, FRANK W
2056S
LEAVENWORTH, WA 98826

DAVIS, J V
5030S
BATTLE GROUND, WA 98604

DAVIS, RICK
0880S
MARYSVILLE, WA 98270

DAVIS, ROSALIE
1990S
MOXEE, WA 98936

DAVIS, THEODORE F
1697S
YAKIMA, WA 98908

DAWSON, BEN
1794S
YAKIMA, WA 98902

DAWSON, JOE
2252S
WAPATO, WA 98951

DAY, ARTHUR
0598S
RENTON, WA 98058

DE GARIS, W A.
0466S
BURNABY, B C, CANAFA V5C
1M7

DE JONG, DAVE
2181S
WENATCHEE, WA 98801

DE LA TORRE, ANTHONY
0668S
VANCOUVER, WA 98686

DEAN, LARRY E
1996S
MARYSVILLE, WA 98270

DECAMP, GENE
0021S
QUINCY, WA 98848

DECKORD, JIMMY
1477S
YAKIMA, WA 98901

DEESE, ALEX
0827S
EVERETT, WA 98204

DEFFENBAUGH, JOHN
2161S
KENNEWICK, WA 98337

DELLINGER, MARTIN E
5058S
ELLENSBURG, WA 98926

DELOME, DAVE
0826S
YAKIMA, WA 98902

DELOZIER, ELAINE N,
0555S
RICHLAND, WA 99352

DELOZIER, GLEN E
0516S
RICHLAND, WA 99352

DELP, GENE
1785S
YAKIMA, WA 98902

DELZER, KEVIN
1325S
PESHASTIN, WA 98847

DEMARIS, DALE S
0260S
REDMOND, WA 97756

DEMSEY, JAMES H
0965S
ELGIN, OR 97827

DENFELD, KAY F
0604S
SEATTLE, WA 98125

DENNEY, BILL
0849S
KENT, WA 98064

DENODEL, HARRY
2419S
EAST WENATCHEE, WA 98802

DETJEN, KRISTINA
1096S
SEATTLE, WA 98115

DEVERE, JAMES L
1550S
CLE ELUM, WA 98922

DEWEESE, JIM
1482S
YAKIMA, WA 98902

DEWILDE, B
1446S
YAKIMA, WA 98902

DEXTER, KATHY
0890S
CONCRETE, WA 98237

DICE, STEVEN F
1070S
FEDERAL WAY, WA 98023

DICK, DOUG
0982S
IMBLER, OR 97841

DICKENS, MICHAEL
1304S
TACOMA, WA 98467

DICKSON, JOHN B
0815S
ARLINGTON, WA 98223

DIETRICH, CHARLES E.
1028S
NACHES, WA 98937

DIETRICH, CONNIE
1193S
NACHES, WA 98937

DILLON, FRED E
2035S
TACOMA, WA 98498

DISSIN, JOHN
1566S
OREGON CITY, OR 97045

DITTUS, TWYLA B
1060S
WENATCHEE, WA 98807-3739

DIVITO, DALE
0103S
SAN DIEGO, CA 92154

DIXON, ERNEST D
2360S
EMMETT, ID 83617

DIXON, J L, DR
1273S
BREMERTON, WA 98310-2554

DIXON, JOHN
0938S
COWICHE, WA 98923

DOCTOR, STEVEN R
0715S
RICHLAND, WA 99352

DODGE & LUNDQUIST
2066S
SEATTLE, WA 98121

DOEHLERT, DAVID H
1417S
SEATTLE, WA 98125

DOLAN, W CHARLES, II
2189S
SEATTLE, WA 98103

DOLE, JEFF
1742S
YAKIMA, WA 98902

DOLES, DIANE E.
0587S
SEATTLE, WA 98122

DOMER, MARK ADAM
2300S
DARRINGTON, WA 98241

DOROUGH, DAVID
2053S
SEATTLE, WA 98126

DORSEY, GAY
2260S
YAKIMA, WA 98901

DOUCETTE, COLLEEN
0576S
PORT ORCHARD, WA 98366

DOUD, WILLARD
0963S
IMBLE, OR 97841

DOUGAN, TUDDLE
1394S
EAST WENATCHEE, WA 98802

DOUGHERTY, BILL
2204S
WALLOWA, OR 97885

DOUGHERTY, DOUG
2207S
WALLOWA, OR 97855

DOUGHERTY, HEDY
2205S
WALLOWA, OR 97885

DOUGHERTY, KATHY
2206S
WALLOWA, OR 97885

DOUGHERTY, MARIE
2202S
WALLOWA, OR 97885

DOUGLAS, STEVE
1106S
KIRKLAND, WA 98034

DOUGLASS, DON
1428S
NORTH BEND, WA 98045

DOUGLASS, ELDON R
1086S
OAK HARBOR, WA 98277

DRAKE, DON
0913S
CLE ELUM, WA 98922

DRAWHORN, LARRY
0536S
LYNNWOOD, WA 98037

DUFF, GREG
1458S
MOXEE, WA 98936

DUKE, M
0018S
YAKIMA, WA 98908

DUNBAR, ROBERT
2345S
EMMETT, ID 83617

DUNCAN, REID A.
0500S
LEAVENWORTH, WA 98828

DUNN, K W
1968S
KLAMATH FALLS, OR 97601

DUNN, STEVE
0426S
AUBURN, WA 98002

DURAND, DUNCAN
1869S
YAKIMA, WA 98902

DURHAM, KEVIN
0636S
NO ADDRESS, TACOMA POST-
MARK 98438

DURRENT, DAN
1834S
CLE ELUM, WA 98922

DYER, BOB
0200S
MILTON, WA 98354

DYER, RICHARD D
0199S
TACOMA, WA 98409

DYMOKE, WALT
2356S
EMMETT, ID 83617

EADES, EDWARD
1685S
SELAH, WA 98942

EASLING, PERRY
2024S
TACOMA, WA 98445

EASTRIDGE, MARLIN P
1728S
YAKIMA, WA 98901

EATON, CHARLES J.
1758S
YAKIMA, WA 98903

EATON, DAVE E
1288S
ENUMCLAW, WA 98022

ECTU, MARSHALL P
0380S
TACOMA, WA 98409

EDDY, JAMES M
1726S
SELAH, WA 98942

EDIGER, MARLIN
2401S
NORTH POWDER, OR 97867

EDINGER, MIKE J.
1757S
YAKIMA, WA 98908

EDWAL HARN-VANPRT MFG
INC
1017S
BORING, OR 97002

EDWARDS, JOAN
0664S
BELLEVUE, WA 98006

EDWARDS, MORRIS W & FAM-
ILY
0304S
RENTON, WA 98056

EGAN, ROBERT E
0756S
COWICHE, WA 98923

EGGERS, JIM S
1843S
EASTON, WA 98925

EHLIS, LEO
1885S
YAKIMA, WA 98902

EHRENHEIM, PAT
1294S
PUYALLUP, WA 98372

EILERS, CRAIG
2293S
YAKIMA, WA 98902

EISENHOWER, DAVE
2256S
SELAH, WA 98942

ELLINGER, JAMES E
1858S
ELLENSBURG, WA 98926

ELLIS, JOHN
1385S
LEAVENWORTH, WA 98826

ELMO, JERRY D
1853S
YAKIMA, WA 98901

EMORY, DON
0938S
LAGRANDE, OR 97850

EMTER, LLOYD
1534S
SPOKANE, WA 99216

END, KIRK
2432S
LA GRANDE, OR 97850

ENDERLEIN, CHRISTOPH
0138S
SEATTLE, WA 98125

ENDERLEIN, CHRISTOPH
2200S
SEATTLE, WA 98125

ENGELBRETSON JR, KEN
0856S
DARRINGTON, WA 98241

ENGSTROM, KENNETH R.
0033S
PASCO, WA 99301

ENQUIST, MARTY
0878S
ARLINGTON, WA 98223

ENZ, NANCY
2078S
LEAVENWORTH, WA 98826

EPHRATA SPORTSMENS AS-
SOCIATION
0417S
EPHRATA, WA 98823

EPPERSON, JACQUELINE
1364S
YAKIMA, WA 98901

EPPICH, LYNN
0126S
MESA, WA 99343

ERICKSON, ANNE
1118S
OLYMPIA, WA

ERICKSON, GERALD A.
2316S
SEATTLE, WA 98125

ERICKSON, TONY R
0968S
ELGIN, OR 97827

ERICKSON, VERNON D
0896S
DARRINGTON, WA 98241

ERVIN, CLIFFORD E.
1800S
YAKIMA, WA 98902

ESCHLER, GARY
2126S
JOSEPH, OR 97846

ESPINOLA, RICK
2412S
LA GRANDE, OR 97850

ESTES, ALLEN
2203S
ENTERPRISE, OR 97828

ESTES, MIKE
0821S
COWICHE, WA 98923

ESTEVEZ, ANTONIO D
1689S
YAKIMA, WA 98902

EVANS, ALAN G
0708S
ONALASKA, WA 98570

EVANS, CRAIG A
0316S
STANWOOD, WA 98292

EVANS, DENNIS
0022S
CHELAN, WA 98816

EVANS, L J
0900S
YAKIMA, WA 98908

EVANS, RAYMOND L.
1006S
WALLOWA, OR 97855

EVANS, SUSAN MSW, ASCW
1101S
WENATCHEE, WA 98801

EVANS-BROWN, PEG
1314S
BOTHELL, WA 98012

EVERSAUL, GARY
0374S
SUMNER, WA 98390

EVERSON, C A.
0406S
RENTON, WA 98055-4926

EWART, R K.
2215S
BOISE, ID 83712

EYERS, JOHN A.
0889S
COVE, OR 97824

FANT, KAREN M
2309S
SEATTLE, WA 98105

FAPIN, JAMES
0839S
NACHES, WA 98937

FAUGNAN, TIM
2039S
MESA, WA 99343

FAULKNER, JOSEPH, M D
2311S
SEATTLE, WA 98109

FAUST, ED & ROSEMARY
1229S
EAST WENATCHEE, WA 98802

FAY, BENJAMIN
1778S
YAKIMA, WA 98902

FAY, DARLENE
1058S
YAKIMA, WA 98903

FENLIN, GEORGE W
1350S
EVERETT, WA 98204

FENNER, KIM
5018S
LEAVENWORTH, WA 98826

FERKOVICH, JR ALEX
0051S
SEATTLE, WA 98115

FERN, MARGARET H
0619S
MONROE, WA 98272

FERNANDEZ, ROBERTA
1872S
YAKIMA, WA 98902

FICK, ARTHUR R.
0119S
BREMERTON, WA 98310

FILLEAU, STEVE
1847S
CLE ELUM, WA 98922

FINLEY, CURT
5043S
EAST WENATCHEE, WA 98802

FISCHER, CARL C
1240S
ELLENSBURG, WA 98926

FISCHER, STEPHEN
2175S
BLACK DIAMOND, WA 98010

FISCLER, GREG
1839S
ELLENSBURG, WA 98926

FISHBURN, STAN
0409S
LEAVENWORTH, WA 98826

FISHER, IZETTA R
1237S
ARDENVOIR, WA 98811

FISHER, JACQUELYN
1234S
ARDENVOIR, WA 98811

FITZPATRICK, MIKE
1600S
YAKIMA, WA 98902

FJONE, ANDRA
1401S
CHELAN, WA 98816

FLANERY, CHRISTINA
5065S
ELLENSBURG, WA 98926

FLEMING, FRED W
0288S
RICHLAND, WA 99352

FLINT, DAVE
0287S
KENNEWICK, WA 99336

FLINTOFF, ROD
0736S
ELGIN, OR 97827

FLOWERS, RAYMOND
1977S
EMMETT, ID 83617

FOGLER, SAM
1793S
YAKIMA, WA 98902

FORBES, BILL
1907S
GOLDENDALE, WA 98620

FORCE, AARON
1083S
MONROE, WA 98272

FORCE, RAY
1084S
MONROE, WA 98272

FORD, MARK
0539S
STANWOOD, WA 98292

FOREMAN, BETTY B
0275S
KENNEWICK, WA 99336

FOREMAN, JAMES
0305S
PASCO, WA 99301

FOREMAN, LYNN E
0346S
KENNEWICK, WA 99336

FOREMAN, TOMMY J
0276S
PASCO, WA 99301

FOREMAN, TONI G
0231S
PASCO, WA 99301

FORTIER, LARRY
1646S
YAKIMA, WA 98901

FORURIA, CHARLES
2359S
EMMETT, ID 83617

FOSBACK, RODNEY A
5037S
COLVILLE, WA 99114

FOSS, SAMUEL
0511S
QUINCY, WA 98848

FOSTER, JEFFREY R.
0115S
INDIANAPOLIS, WA 46208

FOSTER, KEVEN C
2417S
IMBLER, OR 97841

FOSTER, MICHAEL C.
18708
YAKIMA, WA 98903

FOSTER, RANDY DOUGLAS
21368
ENTERPRISE, OR 97828

FRANK, CHAR
02668
KENNEWICK, WA 98336

FRANK, DAVE
02678
KENNEWICK, WA 98336

FRANK, ED
17038
YAKIMA, WA 98903

FRANK, GEORGE
02668
KENNEWICK, WA 98336

FRANK, LAWRENCE D.
21678
SEATTLE, WA 98102

FRANK, WINDY
02728
KENNEWICK, WA 98336

FRANKLIN, STEVE
18258
CASHMERE, WA 98815

FRASER, HENRY F.
13018
ROSLYN, WA 98941

FRASER, HENRY F.
14188
ROSLYN, WA 98941

FRASER, JUDITH
21688
SOUTH CLE ELUM, WA 98943

FRATZKE, DAVID
12038
LA GRANDE, OR 97850

FRAZIER, RONALD L.
16148
YAKIMA, WA 98903

FREDERICKS, BILL
22328
KENT, WA 98032

FREDERICKSON, BEA
14188
TACOMA, WA 98424

FREDRICK, WILLIAM S.
05348
MARYSVILLE, WA 98270

FREDSALL, R. M.
50368
PORTLAND, OR 97223

FREELS, HAROLD
21388
ENTERPRISE, OR 97828

FREEMAN, MIKE
06378
PORT ANGELES, WA 98362

FRENGER, J. W.
12968
PASCO, WA 99301

FRIDDLE, KENNY
06628
DARRINGTON, WA 98241

FRIES, B.
03618
SEATTLE, WA 98109

FRIESTMAN, CINDY
13688
PASCO, WA 99301

FRIESZ, ROGER
18988
SELAH, WA 98942

FRIGARD, EDWIN W. & MAR-
JOFE
05888
LEAVENWORTH, WA 98828

FRIGARD, PATRICIA
10888
WENATCHEE, WA 98801

FRISK, CLARENCE
15088
YAKIMA, WA 98901

FRISQUE, MR. & MRS. R. J.
00838
NACHES, WA 98937

FROSTY HOLLOW NURSERY
00828
LANGLEY, WA 98828

FUHRMAN, DANIEL M.
07888
YAKIMA, WA 98902

FUHRMANN, DENNIS
23738
EMMETT, ID 83617

FULCHER, JIM
17828
YAKIMA, WA 98908

FULCHER, KATHY
14848
YAKIMA, WA 98908

FUNESTI, NICKIE
06528
EVERETT, WA 98205

FUNESTI, RAY
06428
EVERETT, WA 98205

FUNKHOUSER, BOB
19878
LA GRANDE, OR 97850

FYFE, ROBERT C.
20718
EATONVILLE, WA 98328

GABBARD, DANA R.
19008
NACHES, WA 98937

GABBARD, THOMAS, SR.
19288
YAKIMA, WA 98908

GABGWAR, JACK
22888
APLINGTON, WA 98223

GAHLSDORF, ALAN
18688
SALEM, OR 97302

GAIL KONEN
10888
QUINCY, WA 98948

GALES, MARVIN M. JR.
06858
COVE, OR 97824

GALES, ROBERT S.
06868
ELGIN, OR 97827

GALLEGES, F. M.
18688
YAKIMA, WA 98901

GALLIPO, RAY D.
17388
YAKIMA, WA 98902

GALPIN, GREG
06548
RICHLAND, WA 98352

GALPIN, RONALD H.
50888
KENNEWICK, WA 98337

GALPUS, GREG
01838
RICHLAND, WA 98352

GAMA, MICHAEL
20678
TACOMA POSTMARK

GAMACHE, DANIEL P.
14888
YAKIMA, WA 98903

GANGLE, HAROLD
17708
YAKIMA, WA 98908

GANS, ELMER H.
18778
YAKIMA, WA 98901

GARBE, HAROLD E.
17978
UNION GAP, WA 98903

GARBER, SAHWINA
05778
PORT ORCHARD, WA 98366

GARCIA, EDD
15888
YAKIMA, WA 98902

GARDNER, HOWARD
03888
RICHLAND, WA 98352

GARDNER, LEN
20418
SEATTLE, WA 98103

GARDNER, LEN
50828
SEATTLE, WA 98103

GARKE, ARNOLD
19848
MARYSVILLE, WA 98270

GARRETT, MARIE
04888
WENATCHEE, WA 98901

GARRETT, MELVIN
21188
JOSEPH, OR 97848

GARRISON, BILL
19558
KETTLE FALLS, WA 99141

GARRISON, GARY
19628
KETTLE FALLS, WA 99141

GARRISON, JANIE
19588
KETTLE FALLS, WA 99141

GARTON, ROY
50238
ENTERPRISE, OR 97828

GATES, JACK
08118
PHILOMATH, OR 97370

GAUD(?), THOMAS C.
04038
YAKIMA POSTMARK 989

GAUDETTE, GERALD A.
14588
YAKIMA, WA 98901

GAUDETTE, JACK E.
17318
YAKIMA, WA 98902

GAUDETTE, JAMES D.
18248
YAKIMA, WA 98901

GAUDETTE, JAMES L.
18918
YAKIMA, WA 98901

GAY, GERALD H.
18038
YAKIMA, WA 98901

GEB, MARK O.
02068
NO ADDRESS, TACOMA POST-
MARK

GEMAN, WELFORD
17888
YAKIMA, WA 98901

GILBERT, CRAIG D.
00888
YAKIMA, WA 98928

GILBERTSON, KIRK R.
04838
MARYSVILLE, WA 98270

GILDY, DANIEL L.
50888
PORTLAND, OR 97205

GILLET, RICHARD T.
08858
LAGRANDE, OR 97850

GILLET, ROSE M.
18008
YAKIMA, WA 98902

GILLET, WILLIAM D.
18888
YAKIMA, WA 98902

GILLEY, DELBERT D.
15888
YAKIMA, WA 98907

GILLOOLY, LARRY
08858
DARRINGTON, WA 98241

GIRARD, JOHN O.
22118
YAKIMA, WA 98903

GIUFFRE, RALPH
22918
LA GRANDE, OR 97850

GIUSSI, ARTHUR D.
15888
YAKIMA, WA 98905

GLASSON, DON
08838
ELGIN, OR 97827

GLAZIER, JACK
18758
YAKIMA, WA 98903

GLOSSBRENNER, NORMAN
13088
YAKIMA, WA 98901

GLOVER, JACK R.
17868
YAKIMA, WA 98902

GOBBARD, JACK
50118
SELAH, WA 98942

GOCHNER, DENNIS A.
24208
CASHMERE, WA 98815

GODFREY, R.D.
14578
YAKIMA, WA 98908

GODWIN, TED
17178
YAKIMA, WA 98908

GOFF, DIANE
17448
YAKIMA, WA 98902

GOFF, KERI L.
17438
YAKIMA, WA 98902

GOFF, ROGER
17188
YAKIMA, WA 98902

GOHEEN, DAVE
10838
EATONVILLE, WA 98328

GOHL, G.
18418
YAKIMA, WA 98903

GOLDE, MARCY J.
00878
SEATTLE, WA 98105

GOLDSWORTHY, PATRICK D.
11988
SEATTLE, WA 98145

GONZALES, ANGEL M.
18078
YAKIMA, WA 98901

GONZALES, LUIS
18258
YAKIMA, WA 98901

GONZALES, RUBEN
17878
YAKIMA, WA 98902

GONZALES, SIMON
17128
TOPPENISH, WA 98948

GOODERL, JOHN R.
18938
YAKIMA, WA 98902

GOODMAN, DONALD J.
02248
SEATTLE, WA 98102

GOODNER, ROY
08858
EVERETT, WA 98204

GOODWIN, SCOTT
04888
PASCO, WA 99301

GORDON, EARL
50538
ELLENSBURG, WA 98828

GORDON, MARIANNE
21028
THORP, WA 98948

GORDON, MERLE
11908
THORP, WA 98948

GORDON, RICK
00348
ISSAQUAH, WA 98027

GORMAN, MICHAEL
10558
STANWOOD, WA 98292

GORS, MERLE & DIANE
10688
SEATTLE, WA 98111

GOTIERREZ, LINDA
18788
YAKIMA, WA 98901

GRAEFF, RHOADA L.
03548
RICHLAND, WA 98352

GRAHAM, BILL
15678
YAKIMA, WA 98901

GRAHAM, CECIL J.
10248
CLE ELUM, WA 98922

GRAHAM, LAWRENCE 1856S EASTON, WA 98925	GREENLEIT, HARLY 0972S LAGRANDE, OR 97850	HACHTEL, GARY 2379S CALDWELL, ID 83605	HAMILTON, GARY 1360S YAKIMA, WA 98901	HARN, ROBERT 0213S SEATTLE, WA 98116
GRAHAM, MARK 1826S CLE ELUM, WA 98922	GREGG, PHILO 5032S WOODLAND, WA 98674	HADLER, JOYCE 2437S YAKIMA, WA 98903	HAMILTON, WILL & PATTY 1215S CLARKSTON, WA 99403	HARNEY, BILL 2001S CLE ELUM, WA 98922
GRAHAM, NATHAN 1840S ELLENSBURG, WA 98926	GREGORY, LYNN L 1005S ELGIN, OR 97827	HAGEN, DAVID 2183S MOXEE, WA 98936	HAMMAR, JACK 0659S EUGENE, OR 97402	HARPER, DIANE 0813S MOSSYROCK, WA 98584
GRAHAM, PATRICIA 1027S CLE ELUM, WA 98922	GRESHAM, DOUG 0596S SEATTLE, WA 98104	HAGES, GARY S. 5055S ELLENSBURG, WA 98926	HAMMERMEISTER, DAVID 1578S YAKIMA, WA 98907	HARRINGTON, JOSEPH E 1322S MONROE, WA 98272
GRAHAM, PAUL N 1884S CLE ELUM, WA 98922	GRIFFIN, HERSHELL 1882S PESHASTIN, WA 98847	HAIDER, LAURA 0353S PASCO, WA 98301	HAMMILL, AL 2218S ATHENA, OR 97813	HARRIS, BARBARA 2059S ENTIAT, WA 98822
GRAHAM, SCOTT 1841S ELLENSBURG, WA 98926	GRIFFITH, ALFRED 2348S NEWPLY, ID 83617	HAINES, ROD 2143S JOSEPH, OR 97848	HAMMONS, NANCY L 1132S LYNNWOOD, WA 98036	HARRIS, DAVID 0422S ELLENSBURG, WA 98926
GRAHMA, MITCHELL S 1828S CLE ELUM, WA 98922	GRIMM, FRANK H 0794S YAKIMA, WA 98908	HALBERG, KEVIN 1295S KIRKLAND, WA 98034	HAMMONS, RONALD E 1133S LYNNWOOD, WA 98036	HARRIS, EDWARD C 1018S SANDY, OR 97055
GRAHAM, RICHARD A. 0381S ORTING, WA 98360	GRIMM, FRANK J 0840S NACHES, WA 98937	HALBERT, C 0195S LYNWOOD, WA 98036	HAMRIN, DAVID 0458S COUER D'ALENE, ID 83814	HARRIS, JAMES 1756S YAKIMA, WA 98902
GRANUM, JORDAN 0028S GOLDENDALE, WA 98820	GRIMM, RICHARD 1640S NACHES, WA 98937	HALBERT, WILLIAM R 0188S LYNNWOOD, WA 98036	HAN???, HERTI 1894S YAKIMA, WA 98901	HARRIS, KENNETH A., M D 1369S ELLENSBURG, WA 98926
GRAY, CHARLES O 0719S LEAVENWORTH, WA 98826	GROSECLOSE, CARL G 2027S PUYALLUP, WA 98372	HALBERT, WM 0667S LYNNWOOD, WA 98036	HAND, DAVID 0230S QUINCY, WA 98848	HARRIS, KILBOURNE J 1378S ENTIAT, WA 98822
GRAY, CHARLOTTE A. 1187S LEAVENWORTH, WA 98826	GROTE, DENNIS W 2121S JOSEPH, OR 97846	HALL, CLARENCE G 5003S LEAVENWORTH, WA 98826	HANEY, WAYNE 1896S SELAH, WA 98942	HARRIS, RICK 1515S TIETON, WA 98947
GRAY, PAUL K. 1577S WENATCHEE, WA 98801	GROTH, DANA 1034S SELAH, WA 98942	HALL, DANIEL 1788S YAKIMA, WA 98902	HANSEN, CHRIS 0383S OLYMPIA, WA 98503	HARRIS, RODNEY L 1620S YAKIMA, WA 98902
GRAY, RON 0317S RENTON, WA 98056	GRUBB, JOE S 1502S SELAH, WA 98942	HALL, LARRY 2347S EMMETT, ID 83617	HANSEN, INGRID J 1315S SEATTLE, WA 98177	HARRIS, ROGER 0250S GREENACRES, WA 99016
GRAZZINI, DONALD W 0347S RICHLAND, WA 99352	GRUNE, JUDI 0586S MOSES LAKE, WA 98837	HALL, TERRY L 1386S LEAVENWORTH, WA 98826	HANSEN, JR., MARVIN E 5106S TACOMA, WA 98406	HARRISON, BRUCE 0144S NO ADDRESS
GRAZZINI, JANICE E. 0284S PASCO, WA 99301	GRUNEWALD, STEVE 1486S SELAH, WA 98942	HALLGARTH, DENNIS 2222S LA GRANDE, OR 97850	HANSEN, KHRIS 0386S OLYMPIA, WA 98503	HARRISON, BRUCE 0294S NO ADDRESS, SEATTLE POST- MARK
GRAZZINI, RUTH R 0307S RICHLAND, WA 99352	GULLICKSON, GAIL 0439S MOUNTLAKE TERRACE, WA 98043	HALSEN, DEAN 1336S EVERETT, WA 98204	HANSEN, NICK 0384S OLYMPIA, WA 98503	HARRMAN, DAVID L 2023S TACOMA, WA 98408
GREATER YAKIMA CHAMBER OF COMMERCE 2185S YAKIMA, WA 98907	GUNTER, HOOVER E 1646S YAKIMA, WA 98907	HALSEY, BILL 2406S LA GRANDE, OR 97850	HARBER, NORMAN D 2351S EMMETT, ID 83617	HARSHFIELD, MICHAEL T 2141S JOSEPH, OR 97846
GREGOR, R. B. 1329S AUBURN, WA 98001	GUNTER, WILLIAM 1507S YAKIMA, WA 98903	HALSEY, JACK E 2402S LA GRANDE, OR 97850	HARBERD, JAMES W 0786S KETTLE FALLS, WA 99141	HART, HERBERT H 0910S YAKIMA, WA 98907
GREEN, EDWARD R. 2163S RICHLAND, WA 99352	GURNSEY, STEVE D 5004S LA GRANDE, OR 97850	HALSEY, WILLIAM S 0964S LAGRANDE, OR 97850	HARDIG, ROGER 5063S ELLENSBURG, WA 98926	HARTER, LONNY 1131S YAKIMA, WA 98902
GREEN, JIM 0851S DARRINGTON, WA 98241	GUTHRIE, BARBARA 2307S SEALTH, WA 98115	HALSTEAD, CAROL 0647S EVERETT, WA 98203	HARDING, JACK H 1709S SELAH, WA 98942	HARTLIEB, EVELYN 1300S TACOMA, WA 98418
GREEN, JOE 2352S EMMETT, ID 83617	GUTHRIE, RICK 0875S EVERETT, WA 98203	HALSTEAD, DAN 0646S EVERETT, WA 98302	HARING, ROBERT O 5069S MOSES LAKE, WA 98837	HARTLIEB, ROLF 1149S TACOMA, WA 98446
GREEN, ROBERT 1496S YAKIMA, WA 98908	GUTIERREZ, JUAN A. 1867S YAKIMA, WA 98907	HAMANN, GARY D 0271S PACO, WA 99301	HARLAN, JON 0173S NACHES, WA 98937	HARTMAN, TED 1228S RICHLAND, WA 99352
GREEN, STEVE 0852S DARRINGTON, WA 98241	HAALAND, TED 1880S YAKIMA, WA 98902	HAMANN, ROSIE 0274S PASCO, WA 99301	HARLAN, PAUL 2440S LAKEVIEW, OR 97630	HASELIP, DIANA 0803S MORTON, WA 98356
GREENE, ROBERT E 1710S NACHES, WA 98937	HAASE, TIM A. 1852S CLE ELUM, WA 98922	HAMBIDGE, DAVID 0739S WOODINVILLE, WA 98072	HARMS, DON 1356S KIRKLAND, WA 98034	HASHMAN, JR., DAVID 0528S POULSBORO, WA 98370

HASKIN, DUANE
0981S
ELGIN, OR 97827

HATCH, BILL
2216S
GOLDENDALE, WA 98620

HATTAN, TIM C
0494S
OTHELLO, WA 99344

HAUG, JEFF
0884S
MARYSVILLE, WA 98270

HAUN, DOUG
0789S
NACHES, WA 98937

HAWLIN, DONALD M
2067S
YAKIMA, WA 98902

HAWES, GEORGE
1050S
BELLINGHAM, WA 98228

HAWES, TAYLOR W
1051S
BELLINGHAM, WA 98228

HAWKINS, JUANITA
1724S
YAKIMA, WA 98902

HAYDEN, DOUGLAS L.
0475S
SUMNER, WA 98390

HAYDEN, JENEEN
2366S
PORT TOWNSEND, WA 98368

HAYERTZ, RICHARD
1054S
TACOMA, WA 98409

HAYES, JERRY K.
1012S
YAKIMA, WA 98901

HAYES, KYE G
2400S
YAKIMA, WA 98907

HAYES, LELAND
2128S
JOSEPH, OR 97846

HAYES, RON
1634S
YAKIMA, WA 98902

HAYES, RONNIE R.
2137S
JOSEPH, OR 97846

HAYNES, DAN W
1291S
SHELTON, WA 98584

HAZARD, LAWRENCE & JEN-
NIE
1163S
PLACITAS, NM 87043-0705

HECKART, TONY
1840S
YAKIMA, WA 98902

HEDDEN, RONALD W
2148S
LA GRANDE, OR 97850

HEDERSTROM, ELAINE
1898S
CLARKSTON, WA 99403

HEDGES, NEAL A.
2050S
WENATCHEE, WA 98807

HEDRICK, MAX
1862S
ELLENSBURG, WA 98926

HEGNEY, KASEY M
1953S
COLVILLE, WA 99114

HEIDEL, DAN
0887S
MARBLEMOUNT, WA 98267

HEILMAN, JOHN
1658S
YAKIMA, WA 98902

HEILMAN, PHIL
1662S
YAKIMA, WA 98902

HEILMAN, RICK
1766S
SELAH, WA 98942

HEIMBIGNER, ANONA M
0105S
ODESSA, WA 99159

HEIMBIGNER, MRS ANONA M
1249S
ODESSA, WA 99159

HEINEBERG, JAYLENE
0621S
PUYALLUP, WA 98371

HELLEY, CAROL P
1225S
WENATCHEE, WA 98801

HELLJESSEN, H S, JR.
1541S
YAKIMA, WA 98907

HELM, WENDY
0677S
MONROE, WA 98272

HELTON, DEAN
0233S
KENNEWICK, WA 99337

HELTON, SARA L.
0232S
KENNEWICK, WA 99337

HELTON, STUART G
0239S
KENNEWICK, WA 99337

HELTON, WILLIAM R
0234S
KENNEWICK, WA 99337

HELVEY, ERIC
0701S
RENTON, WA 98058

HELVEY, GREGORY & MARILYN
0204S
SEATTLE, WA POSTMARK

HENDREN, DONALD
1485S
WAPATO, WA 98951

HENEGHEN, MIKE
1804S
YAKIMA, WA 98901

HENEGHES, DANIEL D
1690S
YAKIMA, WA 98901

HENNEBERG, LEMAR
0650S
PUYALLUP, WA 98372

HENNING, NANCY
5097S
SAN CLEMENTE, CA 92672

HENSON, KEN
1895S
CASHMERE, WA 98815

HERDRICH, JOHN
0758S
SELAH, WA 98942

HERMAN, JON R
2189S
ELLENSBURG, WA 98926

HERRON, BRAIN
0956S
ELGIN, OR 97827

HERRON, LORI
0960S
ELGIN, OR 97827

HERRUP, ROBERT
2317S
ORCAS, WA 98280

HERSHAW, DAN
0868S
ARLINGTON, WA 98223

HERZEN, ROBERT
0869S
ARLINGTON, WA 98223

HESS, J P
1588S
SELAH, WA 98942

HESS, JIM
1278S
BREMERTON, WA 98312

HESS, JOHN
0054S
NORWOOD, OH 45212

HESTER, JIM
1035S
YAKIMA, WA 98902

HIATT, DAVID E.
1100S
EVERETT, WA 98208

HICKS, LEONARD J
2233S
HORSESHOE BEND, ID 83629

HIGGS, DALE E.
0566S
TACOMA, WA 98403

HILDESHEIM, J
0259S
ROCKFORD, WA 99030

HILDESHEIM, TOM
0251S
POST FALLS, ID 83854

HILL, DON F
1832S
ROSLYN, WA 98841

HILL, JOHN
2358S
EMMETT, ID 83617

HILL, LARRY
1454S
SELAH, WA 98942

HILL, RICHARD
1498S
SELAH, WA 98942

HILL, ROBERT F
2416S
COVE, OR 97824

HILL, SHERRY
5020S
SELAH, WA 98942

HIMMELSPACH, MELVIN
2392S
YAKIMA, WA 98902

HINSHAW'S HONDA
0451S
PUYALLUP, WA 98371

HINTON, MR & MRS JOHN
1245S
ENTIAT, WA 98822

HIRSCHLER, GERALD
5078S
KIRKLAND, WA 98033

HISAW, BOB
2228S
HORSESHOE BEND, ID 83629

HIXON, CHARLES
1721S
YAKIMA, WA 98908

HIXON, DAVID L
1637S
YAKIMA, WA 98903

HOCKERSMITH, MIKE
5112S
KETTLE FALLS, WA 99141

HOEFNER, LYLE
0026S
MONITOR, WA 98836

HOGAN, JAMES T
0407S
KENT, WA 98031

HOGINS, CHRIS
0860S
MARYSVILLE, WA 98270

HOHLEIN, DANIEL E
1279S
PUYALLUP, WA 98373

HOHMAN, MARIET
1261S
ENTIAT, WA 98822

HOHMAN, PAUL F
1260S
ENTIAT, WA 98822

HOLBROOK, RALPH L.
0797S
YAKIMA, WA 98902

HOLCOMB, SCOTT
2131S
JOSEPH, OR 97846

HOLDREN, FRANK
2253S
MOSES LAKE, WA 98837

HOLES, NED ETC
2090S
WENATCHEE POSTMARK

HOLLAND, DONNA J
0809S
KETTLE FALLS, WA 99141

HOLMBERG, J R
0727S
KENT, WA 98032

HOLSTEN, BRIAN
0495S
RICHLAND, WA 99352

HOLTUM, MR & MRS
RONALD E
0209S
MOUNT VERNON, WA 98273

HOLTZCLAW, DANIEL G
0882S
ARLINGTON, WA 98223

HOLWEGNER, JON
1442S
YAKIMA, WA 98901

HOLZKNECHT, EVAN
2220S
ARLINGTON, WA 98224

HONEY, GEORGE
0025S
ENTIAT, WA 98822

HOOK, CRAIG & VINEY,
CAROLE
0362S
MOROE, WA 98272

HOON, JANICE V
2174S
SEATTLE, WA 98199

HOOPER, MARVIN D
2064S
EAST WENATCHEE, WA 98802

HOPKINS, JACK
0944S
LAGRANDE, OR 97850

HORISH, PETE JR
1117S
POULSBO, WA 98370

HORN, CHARLIE R.
0945S
ELGIN, OR 97827

HORNER, EUGENE R
0788S
SELAH, WA 98942

HORNUNG, T
2312S
FRIDAY HARBOR, WA 98250

HORTON, RITA
1670S
YAKIMA, WA 98901

HOUCHE, GREG A.
0286S
KENNEWICK, WA 99336

HOUSE, C E.
1935S
TIETON, WA 98847

HOWARD, BILL
2042S
COWICHE, WA 98923

HOWARD, CHRIS
2158S
WALLA WALLA, WA 99362

HOWARD, SHERRY
2361S
EMMETT, ID 83617

HOWARD, SUSAN
2301S
DARRINGTON, WA 98241

HOWLEY, WENDY K.
0877S
MARYSVILLE, WA 98270

HUCK, GARY A
1726S
YAKIMA, WA 98908

HUDSON, JEFF
1908S
YAKIMA, WA 98903

HUGHES, BUD A.
0389S
NO ADDRESS

HUGHES, MIKE
2405S
LA GRANDE, OR 97850

HUGHS, TOM
0398S
NO ADDRESS

HUIZAR, CATHARINO
1740S
TOPPENISH, WA 98948

HUMANN, STAN, VICE CHR
1172S
TACOMA, WA 98466

HUMPHRIES, JACK W
1612S
SELAH, WA 98942

HUNT, R B
2227S
HORSESHOE BEND ID 83629

HUNTWORK, L E
0622S
NO ADDRESS, WENATCHEE
POSTMARK

HUSSEY, CHARLES
0228S
WENATCHEE, WA 98801

HYATT, JAMES E
1970S
MARYSVILLE, WA 98270

HYATT, MICHAEL
1039S
YAKIMA, WA 98908

HYNES, JOHN R
1562S
YAKIMA, WA 98908

ICILE IRRIGAITON DIST
0023S
CASHMERE, WA 98815

ILLEGIBLE
2089S
SEATTLE POSTMARK

ILLEGIBLE
2092S
TACOMA POSTMARK

ILLEGIBLE
0206S
TACOMA POSTMARK

ILLEGIBLE
0992S
ELGIN, OR 97827

ILLEGIBLE
0436S
NO ADDRESS

ILLEGIBLE
0629S
EVERETT, WA 98208

ILLEGIBLE
0745S
NO ADDRESS

ILLEGIBLE
1588S
FEDERAL WAY, WA 98003

ILLEGIBLE
2097S
TACOMA POSTMARK

ILLEGIBLE RUSSEL
2094S
TACOMA POSTMARK

ILLEGIBLE (C K L.)
0665S
RENTON, WA 98058

ILLEGIBLE (LINDA)
0722S
YAKIMA, WA 98902

ILLEGIBLE (R B D???)
0757S
WENATCHEE, WA 98801

ILLEGIBLE (RUSS)
0995S
ELGIN, OR 97827

ILLEGIBLE D S
1348S
EVERETT, WA 98203

ILLEGIBLE RICHARD S
1383S
EAST WENATCHEE, WA 98802

ILLEGIBLE SIGNATURE
0090S
NO ADDRESS

ILLEGIBLE, DAVID S
0405S
YAKIMA, POSTMARK 989__

ILLEGIBLE, JOE
1542S
NO ADDRESS

ILLEGIBLE, KEN
1538S
YAKIMA, WA

ILLEGIBLE, LLOYD
1926S
PORTLAND, OR 97211

INGRAM, DENNIS
1842S
SELAH, WA 98942

IRVINE, MELVIN M.
2038S
SELAH, WA 98942

IRWIN, WARD & LOIS
1233S
MERCER ISLAND, WA 98040

ISAACSON, RICHARD N
2403S
LA GRANDE, OR 97850

ISAACSON, SANDY J
1076S
AUBURN, WA 98002

ISENBERG, LARRY
0088S
COEUR D'ALENE, ID 83814

IVERSON, GARRETT
2321S
EMMETT, ID 83617

IVES, DAVID
1313S
BELLEVUE, WA 98005

JACKINS, GORDON
0149S
SEATTLE, WA 98109

JACKSON, DELMER
1656S
YAKIMA, WA 98902

JACKSON, GREG S
1704S
YAKIMA, WA 98902

JACKSON, HOWARD
1663S
YAKIMA, WA 98908

JACKSON, PATRICIA
1641S
YAKIMA, WA 98908

JACOBSON, LAWRENCE M
0053S
OLYMPIA, WA 98502

JAECKS, DAVID N M D
1219S
WENATCHEE, WA 98807

JALI, RICK
0469S
MUKILTEO, WA 98275

JAMA?, JAMES W
2095S
TACOMA POSTMARK

JAMES, CHERYL
0630S
MARYSVILLE, WA 98270

JAMES, JEFF
2299S
EVERETT, WA 98201

JANTZ, ERWIN
2378S
EMMETT, ID 83617

JEFFERSON, GEORGE J
5009S
NACHES, WA 98937

JEFFRIS, GARY
1400S
CASHMERE, WA 98815

JEFFRIS, JERRY
1239S
PESHASTIN, WA 98847

JEFFRIS, LOVELLE
0817S
PESHASTIN, WA 98847

JENKINS, MORRIS
1259S
CLE ELUM, WA 98922

JENSEN, BRETT B
1298S
MOSES LAKE, WA 98837

JESCH, MIKE
0573S
PORT ORCHARD, WA 98366

JESMER, TOM
0447S
MONROE, WA 98272

JESMER, TOM & STEPHANIE
0724S
MONROE, WA 98272

JEWELL, MARTIN E
1357S
CENTRALIA, WA 98531

JOACHIMS, DARCI E
1528S
MOXEE, WA 98936

JOHN CALLAHAN
0334S
MERCER ISLAND, WA 98040

JOHNS, WILLIAM H
0497S
WENATCHEE, WA 98801

JOHNSON, ALFRED
1863S
ELLENSBURG, WA 98926

JOHNSON, ARTHUR
1375S
ENTIAT, WA 98822

JOHNSON, BARRY E
0690S
ELLENSBURG, WA 98926

JOHNSON, BRIAN
0572S
PORT ORCHARD, WA 98366

JOHNSON, D E
2334S
EMMETT, ID 83617

JOHNSON, DAN
0915S
KENT, WA 98042

JOHNSON, DAN
2421S
NO ADDRESS

JOHNSON, DANE
1419S
CHELAN, WA 98816

JOHNSON, DEBRA L.
0644S
NO ADDRESS, WENATCHEE
POSTMARK

JOHNSON, DONALD R
0905S
CLE ELUM, WA 98922

JOHNSON, ERIC S
0018S
LAKEWOOD, CO 80215

JOHNSON, ERVIN H
1629S
YAKIMA, WA 98901

JOHNSON, J L
0254S
SPOKANE, WA 99208

JOHNSON, JIM
2247S
ENTIAT, WA 98822

JOHNSON, JOAN E
0337S
SPOKANE, WA 99206

JOHNSON, KATHERINE E
0431S
BOTHELL, WA 98012

JOHNSON, LAURA C
0248S
RENTON, WA 98056

JOHNSON, LAURA C
0338S
SPOKANE, WA 99206

JOHNSON, LAURENA H
0249S
RENTON, WA 98056

JOHNSON, LORRAINE M
0906S
CLE ELUM, WA 98922

JOHNSON, MATHEW C
0335S
BOTHELL, WA 98012

JOHNSON, RICHARD E.
1525S
GOLDENDALE, WA 98870

JOHNSON, RICK
1918S
SELAH, WA 98942

JOHNSON, ROCKNE
0436S
BOTHELL, WA 98012

JOHNSON, RONALD
1355S
TACOMA, WA 98422

JOHNSON, RONALD L.
0624S
NO ADDRESS, WENATCHEE
POSTMARK

JOHNSON, RUSSELL L.
0443S
SEATTLE, WA 98125

JOHNSON, SHERYL
1111S
TACOMA, WA 98422

JOHNSON, STEPHEN R
1185S
RENTON, WA 98056

JOHNSON, WILLIAM D
1430S
YAKIMA, WA 98907-2217

JOHNSON, WILLIS
1519S
YAKIMA, WA 98902

JOHNSTON, CASEY
2333S
EMMETT, ID 83617

JOHNSTON, DENNIS R
2242S
ROY, WA 98580

JOHNSTON, JACKIE L.
0238S
KENNEWICK, WA 98937

JOHNSTON, JIM
0522S
CINEBAR, WA 98533

JOHNSTON, LARRY
1720S
YAKIMA, WA 98901

JONES, A. WILLIAM
0035S
SEATTLE, WA 98125

JONES, BARBARA
5038S
ZILLA, WA 98953

JONES, BONNIE
1865S
ONALASKA, WA 98570

JONES, CHRIS L.
2226S
HORSESHOE BEND, ID 83629

JONES, JEFF
0828S
YAKIMA, WA 98903

JONES, JEFFERY R
1184S
CLE ELUM, WA 98922

JONES, KAREN
0161S
SUMNER, WA 98390

JONES, KATHRYN E
1561S
MILWAUKIE, OR 97267

JONES, LEON
1255S
ROSLYN, WA 98941

JONES, LESLIE
0867S
ARLINGTON, WA 98223

JONES, LISA D
2289S
DARRINGTON, WA 98241

JONES, ROD
1136S
ISSAQUAH, WA 98027

JONES, ROD
1305S
ISSAQUAH, WA 98027

JONES, SHEREN R
0324S
PORT ANGELES, WA 98362

JONES, WARREN W
0050S
SEATTLE, WA 98199

JORDAN, J RANDAL
0760S
TACOMA, WA 98422

JORGENSEN, BERNIE & CINDY
0616S
RICHLAND, WA 99352

JORGENSEN, LESLIE M
1945S
YAKIMA, WA 98908

JORGENSEN, PIERRE R
1467S
YAKIMA, WA 98908

JOSAY, WESLEY
0819S
YAKIMA, WA 98908

JOSLIN, JAMES L.
2433S
FRUITVALE, ID 83620

JOUNBY, STANLEY R
0831S
YAKIMA, WA 98908

JOYCE, JOHN E
2388S
EMMETT, ID 83617

JOYNT, D Y
1931S
YAKIMA, WA 98908

JUDSON, BRUCE E
2036S
STEILACOOM, WA 98388

JUST, RICHARD D
1020S
COLVILLE, WA 98114

JUSTICE, MARGARET
0747S
SELAH, WA 98942

KALAHAR, JOHN
5080S
WENATCHEE, WA 98801

KALUZA, KEITH
1746S
YAKIMA, WA 98908

KANZLER, GARY
1508S
YAKIMA, WA 98908

KARPILOW, CRAIG, M D
1425S
SEATTLE, WA 98119

KARR, KEN
1554S
YAKIMA, WA 98903

KARRELS, ALEX
0979S
LAGRANDE, OR 97850

KATALINICH, GEORGE L.
1835S
CLE ELUM, WA 98922

KAUFMAN, JEROME J
2156S
ELLENSBURG, WA 98926

KEEFER, ROBERT R.
1621S
YAKIMA, WA 98902

KEENER, ED
0474S
TACOMA, WA 98407

KEETER, MICHAL L.
0823S
NACHES, WA 98937

KEEZER, RICHARD L.
0331S
EVERETT, WA 98204

KEISTER, WAYNE
1796S
SELAH, WA 98942

KELLER, ANNE L.
1581S
WENATCHEE, WA 98801

KELLER, CHRIS
1805S
YAKIMA, WA 98902

KELLER, JACK W
1582S
WENATCHEE, WA 98801

KELLER, PATRICK D
1768S
YAKIMA, WA 98902

KELLER, THADDEUS J
0131S
EAST WENATCHEE, WA 98802

KELLEY, VAN
0370S
YAKIMA, WA 98902

KELLS, DR. F E.
0075S
EAST WENATCHEE, WA 98802

KELLY, KENT S
2214S
EDDYVILLE, OR 97343

KEMMERER, WALTER O
0680S
MT VERNON, WA 98273

KEMPERTON & CARRIE
0533S
SEATTLE, WA 98177

KENDALL, STEPHEN A.
5114S
YELM, WA 98597

KENNEDY, TIM
1327S
SEDFORD WOOLLEY, WA 98284

KENSTETTER, KENT
0512S
QUINCY, WA 98848

KENWORTHY, DALE & MEL-
ODY
0263S
AUBURN, WA 98002

KENWORTHY, LEWIS
0202S
ENUMCLAW, WA 98022

KEOUGH, ROBERT
0348S
RICHLAND, WA 99352

KESSINGER, J L.
1883S
UNION GAP, WA 98903

KETCHAM, CHRIS
5035S
CLACKAMAS, OR 97015

KEY, FRANK L.
0225S
REDMOND, WA 98053

KIBBER, G E
0163S
PUYALLUP, WA 98371

KICKBORGER, A.
5048S
ELLENSBURG, WA 98926

KILGORE, GARY
2229S
HORSESHOE BEND, ID 83829

KILLEN, RONALD
0463S
GRESHAM, OR 97080

KILPATRICK, ALVIN
1753S
NACHES, WA 98937

KILPATRICK, JAME
0999S
ELGIN, OR 97827

KIMES, JERRY
1722S
SELAH, WA 98942

KIND, ELIZABETH
0444S
RENTON, WA 98056

KINDER, BILL
0502S
WENATCHEE, WA 98801

KING, JAMES Z
0170S
NO ADDRESS

KINGSFORD, STEPHEN L.
2136S
JOSEPH, OR 97848

KINNER, J DANIEL JR
1062S
YAKIMA, WA 98901

KINNON, GARY
1830S
ELLENSBURG, WA 98926

KINSEL, BILL
2314S
SEATTLE, WA 98122

KIRKPATRICK, DAN
0731S
OLYMPIA, WA 98502

KISER, DON
2206S
JOSEPH, OR 97848

KITTELSON, DEAN
1821S
RONALD, WA 98940

KITTITAS AUDUBON SOCIETY
0102S
ELLENSBURG, WA 98926

KITTITAS CO COMMISSION-
ERS
2270S
ELLENSBURG, WA 98926

KITTITAS CO FIELD & STREAM
CLUB
0109S
ELLENSBURG, WA 98926

KITTLESON, ALBERTA S
1201S
TACOMA, WA 98445

KITTRICK, J A.
1316S
PULLMAN, WA 99163

KLEIN, D H
1296S
TACOMA, WA 98443

KLEIN, SHAUN H
2101S
TACOMA POSTMARK

KLEMP, LISA
5090S
RAYMOND, WA 98577

KLEMP, ROBERT M
5087S
RENTON, WA 98055

KLINGELE, PHIL
1784S
YAKIMA, WA 98901

KLINGEMAN, PEGGY & CARL
0003S
OTHELLO, WA 99344

KLINGER, DAVID M
1188S
LEAVENWORTH, WA 98826

KLIPPENSTEEN, JACK
1406S
SEATTLE, WA 98115

KLOSTERBOER, JANA
2083S
CHELAN, WA 98816

KLOSTERBOER, JOHN
2082S
CHELAN, WA 98816

KLUNDT, WILLIAM F
1699S
YAKIMA, WA 98902

KNAPP, C A.
0130S
NO ADDRESS

KNAPP, LAREY
1449S
YAKIMA, WA 98903

KNIBB, DAVID
0036S
SEATTLE, WA 98104

KNIPFER, SUSAN C
0697S
ARDENVOIR, WA 98811

KNIPFER, SUSAN C
1166S
ARDENVOIR, WA 98811

KNOBEL, CLIFFORD P
0754S
YAKIMA, WA 98901

KNOBEL, CLIFFORD P
1363S
YAKIMA, WA 98901

KNOBEL, EDWARD
1878S
YAKIMA, WA 98908

KNOBEL, EUGENE
1365S
YAKIMA, WA 98901

KNUDSON, MARGARET (MRS
EVERETT)
1109S
SEATTLE, WA 98115

KOCH, LLOYD A.
1654S
YAKIMA, WA 98902

KOHNSHAK, DENNIS
0174S
YAKIMA, WA 98903

KOHOUT, BEVERLY
1992S
CASHMERE, WA 98815

KOHOUT, MICHAEL D
1993S
CASHMERE, WA 98815

KOLM, PETER A
0625S
SEATTLE, WA 98125

KOGLER, DR & MRS. WIL-
LIAM
2305S
VASHON, WA 98070

KOOISTRA, AUGUST D
0478S
EVERETT, WA POSTMARK

KOONTZ, CHRISTOPHER
1376S
BOTHELL, WA 98011

KORAND, MARYLEN
1934S
YAKIMA, WA 98908

KORAND, ROGER
1933S
YAKIMA, WA 98908

KORR, DENNIS G
0856S
DARRINGTON, WA 98241

KOTZ, DEAN J
0765S
ELGIN, OR 97827

KOWIS, MARY KAY
2084S
HOUSTON, TX 77068

KRAFT, DANIEL E
1469S
YAKIMA, WA 98901

KRAKOWKA, GEORGE
0071S
WENATCHEE, WA 98801

KRAMER, BILL
0243S
PORT ANGELES, WA 98362

KRAMER, ORVILLE
1761S
YAKIMA, WA 98901

KRAUSE, TIMOTHY
1412S
SEATTLE, WA 98115

KRAUSE, W R
0866S
ARLINGTON, WA 98223

KRETCHMAR, JOHN
1476S
YAKIMA, WA 98903

KRIENER, WILLIAM
0922S
OLYMPIA, WA 98506

KRUEGER, LYLE A
0700S
YAKIMA, WA 98903

KRUG, JOE
1893S
YAKIMA, WA 98902

KRUG, WAYNE
0121S
KENNEWICK, WA 98337

KRUG, WAYNE
0355S
KENNEWICK, WA 98337

KRUHLAK, RUSSELL
0871S
ARLINGTON, WA 98223

KRUMWIEDE, DENNIS L.
2022S
PUYALLUP, WA 98374

KRUSE, ARTHUR
1838S
NACHES, WA 98937

KUCH, RHONDA
0290S
KENNEWICK, WA 98336

KUCH, ROB
0306S
KENNEWICK, WA 98337

KUCHNERT, DARLENE
1626S
YAKIMA, WA 98901

KUCIEJ, WALTER A.
1220S
SEATTLE, WA 98119

KUCKLICK, CHRIS
2031S
PUYALLUP, WA 98373

KUEHN, DENNIS
0832S
NACHES, WA 98937

KUNKEL, NORMAN C
0594S
SEATTLE, WA 98126

KUNKLE, CHARLES R
2132S
ENTERPRISE, OR 97828

KUNZ, ALDO J
2112S
JOSEPH, OR 97848

KUSICKER, BONNIE
2134S
JOSEPH, OR 97848

KUSMERTZ, TIM
0811S
BOISE, ID 83709

LA COURSIERE, B
1341S
MUKILTEO, WA 98275

LACY, TIM
1501S
YAKIMA, WA 98908

LAKE, JAMES C
0974S
LAGRANDE, OR 97850

LAKEY, BOBBY L
1717S
SELAH, WA 98942

LAKEY, RODNEY
1706S
SELAH, WA 98942

LAMBE, THOMAS
0368S
KENT, WA 98031

LAMBE, THOMAS & CATHER-
INE
0147S
KENT, WA 98031

LAMBERT, RICHARD
0628S
LYNNWOOD, WA 98038

LAMBERT, TOM
0698S
SEATTLE, WA 98125

LAMBERTON, MICHAEL
0531S
NO ADDRESS TACOMA POST-
MARK 98414

LANCASTER, STEPHEN K.
2246S
EAST WENATCHEE, WA 98802

LANDIN, EARL
0215S
LEAVENWORTH, WA 98828

LANE, MILT
0861S
ARLINGTON, WA 98223

LANE, ROBERT
1038S
WENATCHEE, WA 98801

LANGER, WILLIAM D
1335S
SEATTLE, WA 98112

LANGSTON, DANNY
1523S
NACHES, WA 98937

LANGSTON, MARVIN
1882S
NACHES, WA 98937

LANGTON, KATHLEEN H
1120S
COLORADO SPRINGS, CO
80922

LAPIERRE, LEO L.
1730S
ZILLA, WA 98953

LARNER, GARY
0725S
BOTHELL, WA 98012

LAROZA, STEVEN R.
1270S
PORT ORCHARD, WA 98366

LARSEN, DANE
1855S
CLE ELUM, WA 98922

LARSEN, ROBERT
1328S
MOUNTLAKE TERRACE, WA
98043

LARSON, ENID
0678S
AUBURN, WA 98002

LARSON, ERNEST
1816S
SO CLE ELUM, WA 98943

LARSON, JEN
5070S
CHELAN, WA 98816

LARSON, LARRY
0643S
NO ADDRESS, TACOMA POST-
MARK

LAURY, CHARLES J
1806S
YAKIMA, WA 98901

LAVIGNE, A. B
5088S
SEATTLE, WA 98115

LAWLER, MARK
2319S
SEATTLE, WA 98112

LAWRENCE, SON R
1221S
KIRKLAND, WA 98034-2232

LAWSON, JESSE W
1866S
NACHES, WA 98937

LAWSON, KEN
1615S
NACHES, WA 98937

LAWSON, RICHARD
1456S
GOLDENDALE, WA 98820

LAWYER, GLENN
2183S
SEATTLE, WA 98101

LAYMAN, GEORGE
0834S
YAKIMA, WA 98907

LE DELLE, ALLEN
2357S
EMMETT, ID 83617

LEACH, BRAD & JANET
0140S
MORGAN HILL, CA 95037

LEACH, C. E.
1281S
BENTON CITY, WA 99320

LEACH, CHARLES E.
0590S
KENNEWICK, WA 99336

LEACH, KAREN
1224S
RICHLAND, WA 98352

LEACH, LARRY
1948S
COLVILLE, WA 99114

LEACH, RAYMOND K.
1734S
PARKER, WA 98939

LEACH, RHONDA
1949S
COLVILLE, WA 99114

LEACH, S
1445S
YAKIMA, WA 98902

LEASE, DONNA M
1975S
ELLENSBURG, WA 98926

LEASE, JOHN L.
1831S
ELLENSBURG, WA 98926

LEAUMONT, RICHARD J
2165S
PASCO, WA 99301

LEAVON, VINCE
1548S
YAKIMA, WA 98902

LEE, DONALD W
2370S
SNOHOMISH, WA 98290

LEE, JENNIFER D
1415S
CHELAN, WA 98816

LEE, PAUL A.
1274S
BREMERTON, WA 98310

LEE, RON
1673S
YAKIMA, WA 98901

LEE, RONALD A.
2188S
SEATTLE, WA 98101

LEE, TAMRA
1682S
YAKIMA, WA 98901

LEE, THOMAS
5115S
SEATTLE, WA

LEFOR, KIM & LUE ANN
0341S
PUYALLUP, WA 98374

LEGARRETA, JOSE R.
2362S
EAGLE, ID 83616

LEGREID-FLINT, KATHLEEN
1211S
TACOMA, WA 98409

LEHMAN, K.N
0006S
NACHES, WA 98937

LEHMANN, AMY M
1403S
CHELAN, WA 98816

LEIBOLD, MICHAEL J
0662S
EVERETT, WA 98204

LEIDER, ALLAN R.
0426S
REDMOND, WA 98052

LEINGANG, JANICE
1544S
YAKIMA, WA 98908

LEINGANG, KEN
1545S
YAKIMA, WA 98908

LEISTER, JOHN E.
0997S
PORTLAND, OR 97230

LEMMON, BRET
1097S
BOTHELL, WA 98011

LEMMONS, JACK
2389S
EMMETT, ID 83617

LEMRICK, JACK L.
2105S
EMMETT, ID 83617

LEONARD, BILL
1185S
ENTIAT, WA 98822

LEONARD, DAVE
0002S
LEAVENWORTH, WA 98826

LESTER, C P
0509S
CASHMERE, WA 98815

LEVERS, JIM
0808S
COLVILLE, WA 99114

LEWIS, ANDREW U
0691S
SEATTLE, WA 98119

LEWIS, DAVID
0750S
ARLINGTON, WA 98223

LEWIS, FELISE
1838S
YAKIMA, WA 98901

LEWIS, MICHAEL F
1533S
SPOKANE, WA 99216

LEWIS, WAYNE
2383S
EMMETT, ID 83617

LILIENTHAL, MERLE
0845S
KETTLE FALLS, WA 99141

LINDAHL, DIANE
1085S
OAK HARBOR, WA 98277

LINDORIN, MARTIN
2295S
MT VERNON, WA 98273

LINDSAY, MARTIN D
0518S
EVERETT, WA 98204

LINDSTRA, JERRY A.
2100S
TACOMA POSTMARK

LINDSTROM, HAL
1575S
ELLENSBURG, WA 98926

LIPINSKI, ANN
1080S
MERCER ISLAND, WA 98040

LIPINSKI, DAVID B
0525S
CENTRALIA, WA 98531

LITTL, JAMES
0371S
KINGSTON, WA 98346

LITTLE, KERI
2298S
STANWOOD, WA 99201

LITZENBERGER, DALE M
1382S
PASCO, WA 99301

LIVELY, LINDA
1915S
WENATCHEE, WA 98801

LIVELY, SR, CURTIS
0049S
PORT ORCHARD, WA 98368

LIVINGSTON, LEONARD
1597S
YAKIMA, WA 98902

LIVINGSTON, WAYNE
1647S
YAKIMA, WA 98901

LOCKWOOD, STUART PL &
YVONNE
0241S
NO ADDRESS, EVERETT POST-
MARK

LOEWEN, PAM
1090S
MOSES LAKE, WA 98837

LOEWEN, RUSSELL
0501S
MOSES LAKE, WA 98837

LOGAN, H JAMES
1539S
YAKIMA, WA 98901

LOGAN, SCOTT M
0940S
CLE ELUM, WA 98922

LOGSDON, KEVIN
0515S
EAST WENATCHEE, WA 98802

LOHMAN, MARY
1999S
CLARKSTON, WA 99403

LOHR, SR, JAMES R
0537S
PULLMAN, WA 99163

LONG, ALBERT
0717S
ENTIAT, WA 98822

LONG, RICK
2369S
MARYSVILLE, WA 98270

LONG, TERRY
2223S
HORSESHOE BEND, ID 83629

LONGMIRE, ROB
1942S
SELAH, WA 98942

LORAN, BILL
2404S
LA GRANDE, OR 97850

LORD, BERNARD F & FAMILY
0336S
OLYMPIA, WA 98581

LOTSPEICH, JOHN D
1836S
YAKIMA, WA 98901

LOUNSBURY, ROLAND E
0779S
COWICHE, WA 98923

LOUNSBURY, TIM
0828S
NACHES, WA 98937

LOUNSBURY, TODD
1518S
NACHES, WA 98937

LOVE, BETH
0734S
EVERETT, WA 98203

LOVEDAY, ABIE A.
0816S
PESHASTIN, WA 99847

LOW, BRUCE A.
1337S
LYNNWOOD, WA 98037

LUCE, HAROLD O
0117S
SEATTLE, WA 98103

LUDWIG, RODNEY D
1285S
PORT ORCHARD, WA 98366

LUISI, JERRY
1723S
SELAH, WA 98942

LUMSDEN, EDITH
1917S
ROSLYN, WA 98941

LUMSDEN, MARJORIE S
1922S
ROSLYN, WA 98941

LUNGREN, THOMAS W
2257S
YAKIMA, WA 98902

LYKKE, GREGORY H
0527S
BELLINGHAM, WA 98226

LYLE, SHEILA
1347S
LAKE STEVENS, WA 98258

LYLES, KELLY
0223S
SEATTLE, WA 98189

LYNGHOLM, MICHAEL
2151S
DILLON, MT 59725

LYONS, DOYLE
0792S
NACHES, WA 98937

LYTLE, FARREL
1326S
SEATTLE, WA 98168

M E COVERT, CONS CHR.
1103S
LONGVIEW, WA 98632

MACK, BRIAN L
0330S
SPRINGHILL, D1KS 86083

MADCHE, JEFF J
1275S
SILVERDALE, WA 98383

MAE, CAROL
2068S
COWICHE, WA 98923

MAGRUDER, ROBERT J
1176S
ELLENSBURG, WA 98928

MAHER, JOHN
0928S
SELAH, WA 98942

MAHON, WILLIAM H
2444S
LA GRANDE, OR 97850

MALLON, RAY
2127S
JOSEPH, OR 97846

MALPASS, T W
5081S
WENATCHEE, WA 98801

MALTBIE, ROBERT
1599S
SELAH, WA 98942

MALTMAN, WILLIAM L
0712S
SEATTLE, WA 98104

MALTSBERGER, RICHARD
1492S
SELAH, WA 98942

MAMBA, RONALD T
1738S
YAKIMA, WA 98902

MANJERREZ, J E
1684S
YAKIMA, WA 98908

MANKE, JAMES
2007S
TACOMA, WA 98422

MANN, CECIL S
0980S
LAGRANDE, OR 97850

MANN, JACK O
1817S
LEAVENWORTH, WA 98826

MANNIN, MARLENE
0781S
YAKIMA, WA 98901

MANNIN, STACEY
0780S
YAKIMA, WA 98902

MANTON, EILEEN & SOTA,
CHARLES G., JR.
2364S
KIRKLAND, WA 98034

MARBOURG, STEPHEN A.
2279S
EVERETT, WA 98201

MARCELLUS, EARL L.
1586S
LEAVENWORTH, WA 98826

MARCELLUS, LINDA
1583S
LEAVENWORTH, WA 98826

MARKHAM, ED
0066S
KENT, WA 98032

MARKHAM, ED
0081S
KENT, WA 98032

MARNEY, KELLY
1494S
NACHES, WA 98937

MARSH, DAVE
0395S
NO ADDRESS

MARSTON, KIRK
2324S
IDAHO CITY, ID 83651

MARTENSEN, RAE W
1217S
EPHRATA, WA 98823

MARTIN, CHARLES L.
1714S
YAKIMA, WA 98901

MARTIN, PATRICK
2368S
CAMANO ISLAND, WA 98290

MARTINEZ, MARIO
1684S
YAKIMA, WA 98901

MARTINEZ, REYES
1750S
YAKIMA, WA 98902

MARTINEZ, ROSEI
1749S
YAKIMA, WA 98901

MARUSA, ROB
0748S
SOUTH CLE ELUM, WA 98943

MARX, DONALD L.
1003S
LA GRANDE, OR 97850

MARY, BERT M
0946S
LAGRANDE, OR 97850

MASHBURN, AL
1359S
GIG HARBOR, WA 98335

MASON, CHARLOTTE G
0308S
KENNEWICK, WA 98338

MASSEY, R DAYLE
1107S
SEATTLE, WA 98105

MASSEY, STEVE
1389S
CASHMERE, WA 98815

MAST, JOHN C
2275S
EVERETT, WA 98204

MAST, JOHN C
2306S
EVERETT, WA 98204

MATHESON, CAROL
5101S
KIRKLAND, WA 98033

MATHESON, GREGORY JOHN
0676S
KIRKLAND, WA 98033

MATHIS, RON
0859S
ARLINGTON, WA 98223

MATSON, DARRYL W
1320S
ARLINGTON, WA 98223

MATSON, DAVE
1313S
EDMONDS, WA 98020

MATSON, RONALD A.
1330S
LYNNWOOD, WA 98037

MATTSON, KENNETH R.
1842S
YAKIMA, WA 98902

MAUSSER, JOHN & JAN
2191S
LEAVENWORTH, WA 98826

MAXEY, BEN
1891S
YAKIMA, WA 98901

MAY, STEPHEN P
2088S
TACOMA POSTMARK

MAY, STEVEN S
0316S
BELLEVUE, WA 98006

MAYER, HARVEY, SR.
1608S
YAKIMA, WA 98902

MAYFIELD, HOWARD B
5010S
HARRAH, WA 98933

MAYHEW, RAY C
0179S
NORTH BEND, WA 98045

MC ALESTER, MARK
2285S
ARLINGTON, WA 98223

MC CALL, GEORGE D
2374S
EMMETT, ID 83617

MC CARTNEY, MIKE
2297S
ARLINGTON, WA 98223

MC CLURE, JACKIE
5024S
ELGIN, OR 97827

MC CONNELL, JAMES R
1813S
YAKIMA, WA 98901

MC CRAW, SHARON
5028S
ELGIN, OR 97807

MC CRAW, STEPHEN E
5029S
ELGIN, OR 97827

MC DOWELL, JEANNIE
5019S
HARRAH, WA 98933

MC DOWELL, ORVAL
5022S
HARRAH, WA 98933

MC EVOY, JOHN W
2073S
GRAND COULEE, WA 99155

MC KINNIS, LARRY
2145S
JOSEPH, OR 97846

MC NEIGHT, J
2431S
ELLENSBURG, WA 98926

MC QUARRIE, RUBY
2062S
ARDENVOIR, WA 98811

MCCANDLESS, GENE
1387S
DRYDEN, WA 98826

MCCARTHY-RYAN, CHRIS
1381S
CASHMERE, WA 98815

MCCLELLAN, DAVE
1114S
YAKIMA, WA 98902

MCCLELLAN, DAVE
1122S
YAKIMA, WA 98902

MCCLURE, MELANIE
1010S
ELGIN, OR 97827

MCCLURE, RICK
1179S
RANDLE, WA 98377

MCCLURE, TODD R.
1008S
ELGIN, OR 97827

MCCORD, JANE
0281S
KENNEWICK, WA 98337

MCCRAW, MIKE
0991S
LAGRANDE, OR 97850

MCDANIEL, MARK
0445S
NO ADDRESS

MCFARLAND, JOE
1393S
CASHMERE, WA 98815

MCFEELEY, MICHAEL R.
1774S
YAKIMA, WA 98903

MCGEORGE, MARIE
0489S
PASCO, WA 99301

MCGOVERN, DAVID
1559S
YAKIMA, WA 98902

MCGREEVY, MICHAEL G
0758S
KETTLE FALLS, WA 99141

MCGUIRE, DARRELL
0937S
SELAH, WA 98902

MCGUIRE, GREG
1924S
YAKIMA, WA 98908

MCGUIRE, JACK J
1013S
YAKIMA, WA 98902

MCGUIRE, LARRY L.
0805S
YAKIMA, WA 98908

MCGUIRE, MEL
0930S
YAKIMA, WA 98902

MCGUIRE, RICK
0831S
SELAH, WA 98942

MCGUIRE, ROBERT L.
1014S
YAKIMA, WA 98908

MCGUIRE, TERRY
0932S
SELAH, WA 98942

MCKEEVER, DOUG
0212S
BELLINGHAM, WA 98226

MCLEAN, SCOTT J
0784S
TIETON, WA 48947

MCMILLEN, BELINDA
0184S
ELLENSBURG, WA 98926

MCMULLEN, BETH
1022S
ELGIN, OR 97827

MCMULLEN, PAT
1021S
ELGIN, OR 97827

MCNIL, LAVON E
0145S
BOTHELL, WA 98011

MCNULTY, TIM
1138S
QUILCENE, WA 98376

MCQUOWN, JAMES G
0484S
PASCO, WA 99301

MCRAE, BRUCE
0118S
SEATTLE, WA 98188

MCRAE, JEFFREY
0246S
OTIS ORCHARDS, WA 99027

MEACHAM, LAURA
1095S
CHELAN, WA 98816

MEADOWS, RICHARD T
1029S
CHEWELAH, WA 99109

MEAGHER, MICHAEL & STEEL,
JANE
0414S
SEATTLE, WA 98105

MEAGHER, MICHAEL L &
STEELE, J
0851S
SEATTLE, WA 98105

MEASSICK, JOE & EVA
1078S
STEILACOOM, WA 98399

MEDINA, STEVE
2377S
EMMETT, ID 83617

MEEKS, KEVIN
0899S
YAKIMA, WA 98902

MEIER, M J
0410S
ELLENSBURG, WA 98926

MEIER, WALTER R.
1667S
YAKIMA, WA 98901

MELTON, GARY W
1735S
YAKIMA, WA 98908

MENIG, KEITH
1547S
ELLENSBURG, WA 98926

MENIG, TONI
1546S
ELLENSBURG, WA 98926

MENKE, MICHAEL J
0933S
YAKIMA, WA 98901

MERKER, CHRISTOPHER 0076S ROCHESTER, WA 98579	MILLER, WAYNE 1857S YAKIMA, WA 98902	MOORE, ALICE 2017S LEAVENWORTH, WA 98826	MORRIS, GARRY G 2389S GOLDENDALE, WA 98620	MURPHY, ROBBIN D 0162S SEATTLE, WA 98125
MERRILL, BRYAN 2098S TACOMA POSTMARK	MILLER, WILLIAM B 0128S NO ADDRESS	MOORE, CATHERINE 1920S CLE ELUM, WA 98922	MORRIS, LEE 1151S MESA, WA 98343	MURREY, TIM 0388S NO ADDRESS
MERRITT, KEVIN 0853S ARLINGTON, WA 98223	MINTO, CRAIG 1844S CLE ELUM, WA 98922	MOORE, E. NIEL 1919S CLE ELUM, WA 98922	MORSE, JOE 1737S ZILLA, WA 98953	MYERS, GENE 1308S SEATTLE, WA 98115
MERRITT, PAT 1829S CLE ELUM, WA 98922	MITCHELL, BARBARA 1332S OLYMPIA, WA 98501	MOORE, JAMES L. 1423S LEAVENWORTH, WA 98826	MORTLAND, RICHARD L. 5056S ELLENSBURG, WA 98926	MYERS, THOMAS R. 5116S SEATTLE, WA 98133
MERWOOD, DENNIS L. 0228S TACOMA, WA 98401	MITCHELL, MARTY 0377S TACOMA, WA 98445	MOORE, JEAN E. 2014S LEAVENWORTH, WA 98826	MORTON, VIRGIL D SR 0988S LAGRANDE, OR 97850	NAGEL, JUSTINE F 2313S VASHON, WA 98070
MESSINGER, R. 2434S LA GRANDE, OR 97850	MITCHELL, WILLIAM R 0378S PUYALLUP, WA 98374	MOORE, KEVIN L. 0893S MARYSVILLE WA 98270	MOSEBAR, CORA 0902S CLE ELUM, WA 98922	NALL, DAN R 1440S SELAH, WA 98942
METTLER, REED 0769S EATONVILLE, WA 98328	MITZEL, FRANK 1472S YAKIMA, WA 98902	MOORE, MARK A. 1912S ELLENSBURG, WA 98926	MOSEBAR, LUTHER 0907S CLE ELUM, WA 98922	NALLEY, GENE & DOROTHY 0037S SELAH, WA 98942
MEYER, BONNIE 0185S SEATTLE, WA 98112	MITZEL, PETE 1783S YAKIMA, WA 98902	MOORE, TROY A. 2015S LEAVENWORTH, WA 98826	MOSER, ROBERT 1782S YAKIMA, WA 98901	NANCE, JOHN 1628S YAKIMA, WA 98902
MEYER, GEORGE 0364S TACOMA, WA 98444	MITZEL, ROBERT 0928S YAKIMA, WA 98902	MOORE, TROY J 2018S LEAVENWORTH, WA 98826	MOSES, BRUCE W 1115S CASHMERE, WA 98815	NASBY, FRANK 1489S YAKIMA, WA 98909
MICHAEL, CLEVE 1898S YAKIMA, WA 98902	MOATS, BARRY L. 5017S LEAVENWORTH, WA 98826	MOORE, W 0735S ELGIN, OR 97827	MOTORCYCLE INDUSTRY COUNCIL 0080S IRVINE, CA 92718	NASH, RONALD 2340S EMMETT, ID 83617
MIHALLT, MARIA 2055S LEAVENWORTH, WA 98826	MOATS, LEAH 5015S LEAVENWORTH, WA 98826	MOORE, WILLIAM R. 1438S MOXEE, WA 98936	MUIR, MIKE 1048S YAKIMA, WA 98902	NAUGHT, RICHARD L. 1159S COWICHE, WA 98923
MILES, DOUG 0935S YAKIMA, WA 98907	MOATS, TRACI 5014S EAST WENATCHEE, WA 98802	MOREHEAD, ETHEL 2109S JOSEPH, OR 97846	MULLEDDY, THOMAS C 0538S TACOMA, WA 98465	NEAL, JOHN 0517S EAST WENATCHEE, WA 98802
MILLA, JOHN 1773S SELAH, WA 98942	MOCAN, ANDY 0741S MORTON, WA 98356	MOREHEAD, PAUL 0672S JOSEPH, OR 97846	MULLEN, PETER 0314S SEATTLE, WA 98177	NEGRI, LEWIS A 1680S YAKIMA, WA 98902
MILLER, CHARLES R 1045S EVERETT, WA 98201	MODIAN, ESTA 1067S SEATTLE, WA 98115	MOREHEAD, PAUL 2154S JOSEPH, OR 97846	MULLINEX, JERRY D 2255S NACHES, WA 98937	NELSON, BETTY K. 1318S SEATTLE, WA 98125
MILLER, DENNIS 0387S NO ADDRESS	MOELLER, ALFRED 2355S EMMETT, ID 83617	MORFORD, LEROY A. 1685S YAKIMA, WA 98903	MULVANEY, KENDALL 1913S ENTIAT, WA 98822	NELSON, HENRY 1556S YAKIMA, WA 98901
MILLER, ERNA 0129S NO ADDRESS	MOEN, MARTIN 1113S KENT, WA 98042	MORGAN, DAN 5052S ELLENSBURG, WA 98926	MUMFORD, MIKE 1099S BELLEVUE, WA 98008	NELSON, JAY O 1340S LAKE STEVENS, WA 98258
MILLER, JACK D 0481S PASCO, WA 99301	MOHRBACHER, MICHAEL 0681S ISSAQUAH, WA 98027	MORGAN, HELEN G 1979S ELLENSBURG, WA 98926	MUNDALE, TODD 0857S DARRINGTON, WA 98241	NELSON, JOE 1986S CLE ELUM, WA 98922
MILLER, KEVIN W 0188S EDMONDS, WA 98020	MOLLER, J CHRISTIAN 5075S SEATTLE, WA 98109	MORGAN, J P 2005S ELLENSBURG, WA 98926	MUNGER, BILLIE G 2342S EMMETT, ID 83617	NELSON, M JANET 0340S ALOHA, OR 97007
MILLER, MICHAEL P 0379S SPANAWAY, WA 98387	MONCE, GREGORY Z 0296S REDMOND, WA 98053	MORGENTHALER, E RAE 1265S WOODINVILLE, WA 98072	MUNGER, JEFF M 0575S NO TOWN NAME	NELSON, SCOTT 0190S AUBURN, WA 98001
MILLER, MIKE 0608S SALEM, OR 97308	MONCREIF, DAN 2116S JOSEPH, OR 97846	MORGENTHALER, R D 2445S WOODINVILLE, WA 98072	MUNOZ, NICHOLAS 2322S EMMETT, ID 83617	NEUBORN, CALVIN 1765S YAKIMA, WA 98901
MILLER, ROBERT 1001S ELGIN, OR 97827	MONOIAN, JOHN J 0834S YAKIMA, WA 98902	MORGENTHALER, R D 0321S WOODINVILLE, WA 98072	MUNSELL, CLARENCE E & PATRICIA 0655S LEAVENWORTH, WA 98826	NEUMEYER, CHUCK 1473S YAKIMA, WA 98908
MILLER, RUSSELL L. 0954S WALLOWA, OR 97885	MONTOYA, DEAN 0605S EDMONDS, WA 98020	MORGENTHALER, R D 0413S WOODINVILLE, WA 98072	MURCHISON, DAN 0968S LAGRANDE, OR 97850	NEVERS, KATHRYN L. 2326S EMMETT, ID 83617
MILLER, TED R. 1836S GOLDENDALE, WA 98620	MOON, GLORIA L. 1790S YAKIMA, WA 98903	MORONEY, JOHN 2235S SWEET, ID 83670	MURPHY, ALAN M 5074S MERCER ISLAND, WA 98040	NEVERS, ROYAL P 2309S EMMETT, ID 83617
MILLER, VANESSA L. 0490S PASCO, WA 98301	MOORE, ALBIN T 2016S LEAVENWORTH, WA 98826	MORRILL, ROY H 0078S RICHLAND, WA 99352	MURPHY, J R 0169S SEATTLE, WA 98125	NEVEU, CHERI 1431S ENTIAT, WA 98822

NEWBERRY, DALE
0450S
MOSCOW, ID 83843

NEWBY, ALFRED E.
1952S
COLVILLE, WA 99114

NEZBITT, TOM
2387S
EMMETT, ID 83617

NICHOLAS, RAYMOND L.
2283S
EVERETT, WA 98204

NICHOLS, JOE
2407S
LA GRANDE, OR 97850

NICHOLS, JOHN L.
2172S
TACOMA, WA 98401

NICHOLS, LAURE
1434S
LAKEBAY, WA 98349

NICHOLS, THOMAS
0705S
GIG HARBOR, WA 98335

NICKELS, LEW
1887S
YAKIMA, WA 98902

NIEDOHMEGEN, T J
2396S
PORTLAND, OR 97204

NIELSEN, JEFF
0194S
SEATTLE, WA 98199

NIELSEN, LOWELL
1622S
YAKIMA, WA 98908

NIELSON, PAUL
1073S
BELLINGHAM, WA 98226

NIPNER, JAMES E
1762S
YAKIMA, WA 98902

NIXON FAMILY
1271S
PORT ORCHARD, WA 98368

NO NAME
1161S
NO ADDRESS WENATCHEE,
WA 98801

NOBBS, STEVE
0873S
EVERETT, WA 98203

NOE, MARLENA
2147S
ELGIN, OR 97827

NORMAN, CHARLES
1696S
YAKIMA, WA 98902

NORMAN, CHRISTI
5085S
CARNATION, WA 98014

NORMAN, LIND
1267S
YAKIMA, WA 98908

NORMAN, OLIVE
1266S
YAKIMA, WA 98908

NORRIS, CHARLES
2375S
EMMETT, ID 83617

NORRIS, KENNETH E.
2028S
TACOMA, WA 98443

NORTH, DOUGLAS A.
2157S
SEATTLE, WA 98111-088

NORTHWEST FOREST RE-
SOURCE COUNCIL
1371S
PORTLAND, OR 97201

NORTON, LESTER
1284S
BREMERTON, WA 98310

NOVICK, ADAM
1084S
SEATTLE, WA 98118

NOWKA, HEATHER
0578S
PORT ORCHARD, WA 98368

NW SALES & SERVICE
0458S
BELLINGHAM, WA 98004

O HARA, SHARON M
0046S
NORDLAND, WA 98358

O'MAHONY, TIM
0530S
PUYALLUP, WA 98371

OBEE, DAVID
1339S
EVERETT, WA 98203

OCCUPANT
0122S
SEATTLE, WA ?????

OCHILTREE, MARK
0543S
BOTHELL, WA 98011

OCHS, CULENE D
0610S
NO ADDRESS, SEATTLE POST-
MARK 981

ODOM, JEFF
1104S
MONROE, WA 98272

ODOM, KELLI
0615S
NO ADDRESS, SEATTLE POST-
MARK

OFFLUTT, CYNTHIA L.
1353S
LYNNWOOD, WA 98037

OKANOGAN VALLEY
BACKCOUNTRY HORSEMAN
2046S
OKANOGAN, WA 98840

OLDHAM, DAVID A.
1609S
SELAH, WA 98942

OLIVER, CHARLES E
2385S
EMMETT, ID 83617

OLIVER, ROBIN L.
0688S
SPOKANE, WA 98166

OLNEY, DOUG
1777S
WAPATO, WA 98951

OLSEN, CRAIG K
1126S
PORT ORCHARD, WA 98368

OLSEN, DAVID C
2350S
EMMETT, ID 83617

OLSEN, GARY
0402S
EVERETT, WA POSTMARK
982_

OLSON, CHET
1552S
YAKIMA, WA 98902

OLSON, RICHARD L.
1471S
YAKIMA, WA 98801

OLSON, VERONICA
1458S
MOXEE, WA 98938

OLTEAR, BECKY
0110S
CHEWELAH, WA 99109

OPPRIECHT, MONA K.
1414S
BELLEVUE, WA 98008

ORITZ, ALBERT M
1162S
WENTACHEE, WA 98801

ORTH, WILLIAM J
1890S
SELAH, WA 98942

OSBORNE, MARK
0878S
EVERETT, WA 98204

OSTAFIN, BLAINE
0221S
SEATTLE POSTMARK

OSWALD, MR & MRS B J
2244S
YAKIMA, WA 98902

OVIDIA
2363S
CASHMERE, WA 98815

OWEN, JIM
1630S
YAKIMA, WA 98902

OWENS, RAY
1848S
CLE ELUM, WA 98922

PACK RIVER MANAGEMENT
0716S
SANDPOINT, ID 83864

PAINE, JENNIFER
0094S
PORT TOWNSEND, WA 98368

PALACHUK, GREG
0801S
YAKIMA, WA 98902

PALACHUK, PAT
0791S
YAKIMA, WA 98902

PALMER, BARBARA
1943S
YAKIMA, WA 98908

PALMER, DEBORAH
0151S
PESHASTIN, WA 98847

PALMER, LINDA K.
2303S
ISSAQUAH, WA 98027

PALMER, MIKE
2155S
ISSAQUAH, WA 98027

PAOLELLA, RAYMOND L.
2168S
YAKIMA, WA 98907-2201

PARDO, ROBERT S
0866S
ARLINGTON, WA 98223

PARE, CHERYL
1466S
YAKIMA, WA 98907

PARKER, BOB
5013S
WENATCHEE, WA 98801

PARKER, JR, DONALD F
0326S
DES MOINES, WA 98198

PARKER, WAYNE
1694S
YAKIMA, WA 98908

PARKS, DONALD, LINDA &
SETH
1199S
REDMOND, WA 98052

PARR, CANDACE
1246S
COLVILLE, WA 99114

PARRISH, RONALD D
0472S
PORT ANGELES, WA 98362

PASSMORE, J C
2043S
CARBONADO, WA 98323

PATRICK, DAN
1396S
CASHMERE, WA 98815

PATTERSON, BRET D
0349S
KENNEWICK, WA 99336

PATTERSON, DAN
1443S
YAKIMA, WA 98901

PATTIN, SANDRA K.
1023S
LA GRANDE OR, 97850

PAUL E POIRIER
0178S
E WENATCHEE, WA 98802

PAUL, LLOYD
2376S
EMMETT, ID 83617

PAUL, PATRICE A.
0904S
LEAVENWORTH, WA 98826

PAUL, RICHARD P
1049S
LEAVENWORTH, WA 98826

PAULSON, DONALD
5006S
PORTLAND, OR 97225

PAULSON, JERRY L.
1345S
KENT, WA 98031

PAULY, DOUG
2308S
SEATTLE, WA 98145-0187

PAVINS, JAMES L.
0674S
LYNNWOOD, WA 98046

PAXTON, ROBERT S
1688S
YAKIMA, WA 98908

PAYNE, MELODY
2427S
ELGIN, OR 97827

PAYNE, NELDA
0950S
ELGIN, OR 97827

PAYNE, TINA V
1352S
LYNNWOOD, WA 98037

PE???, GARY D
1954S
COLVILLE, WA 99114

PEARSON, ED
0742S
WALLA WALLA, WA 99362

PEASE, DAVID L.
0783S
COLVILLE, WA 99114

PEERY, KRIS
1960S
KETTLE FALLS, WA 99141

PENFIELD, GRANT W
0743S
ARLINGTON, WA 98223

PEPIN, BRUCE
0669S
MUKILTEO, WA 98275

PERDUE, FRED E
1451S
COWICHE, WA 98923

PEREZ, GEORGE G
1671S
YAKIMA, WA 98902

PEREZ, STEVEN
1718S
YAKIMA, WA 98908

PERRIGO, III, THOMAS P
0448S
SEATTLE, WA 98103

PERRIGO, PAUL
0135S
SEATTLE, WA 98103

PERRIGO, PAUL
0449S
SEATTLE, WA 98103

PERRIGO, THOMAS V
0133S
SEATTLE, WA 98103

PERSON, ALFRED & BEATRICE
E
0014S
SAN ANTONIO, TX 78228

PERSON, BEATRICE & ALFRED
0657S
SAN ANTONIO, TX 78228

PETERSEN, MARJIEN M
0289S
RENTON, WA 99056

PETERSON, DEBRA K
0440S
EVERETT, WA 98204

PETERSON, FRED
2052S
ELGIN, OR 97827

PETERSON, RALPH H
0136S
WENATCHEE, WA 98801

PETERSON, REYNOIR D
2037S
PUYALLUP, WA 98371

PETTIS, KEITH
1678S
YAKIMA, WA 98902

PEYTON, CARMEN
0551S
ROCK ISLAND, WA 98850

PEYTON, MR & MRS PATRICK
J
0038S
ORONDO, WA 98843

PEYTON, PATRICK
0416S
ORONDO, WA 98843

PEYTON, SCOTT
0550S
ORONDO, WA 98843

PEYTON, SHIRLEY
0415S
ORONDO, WA 98843

PEYTON, TOM
0592S
ROCK ISLAND, WA 98850

PFAU, S J
1649S
YAKIMA, WA 98902

PFEIFFER, SALLY
1318S
SEATTLE, WA 98133

PHILLIPS, GLORIA
1871S
YAKIMA, WA 98908

PHILLIPS, JUNIOR
1755S
YAKIMA, WA 98902

PHILLIPS, MERYL E
1043S
BOTHHELL, WA 98012

PIDEMORE, C K
0912S
ENTIAT, WA 98822

PIERCE, JAMES
0830S
YAKIMA, WA 98908

PIERSON, ROBERT
0412S
SEATTLE, WA 98166

PIETI, MICHAEL N
1692S
YAKIMA, WA 98902

PIETI, SUZANNE
1878S
YAKIMA, WA 98902

PINTLER, WARREN
0485S
RICHLAND, WA 98352

PITMAN, KEMET
1444S
YAKIMA, WA 98902

PITON, GARY
1388S
PESHASTIN, WA 98847

PITTELKO, RICHARD
1769S
YAKIMA, WA 98908

PITTS, BETTY L
1250S
COLVILLE, WA 99114

PITTS, JOHN
0072S
MANSON, WA 98831

PLATT, J R
0737S
MARYSVILLE, WA 98290

PLATZ, BOB
2318S
OLYMPIA, WA 98501

PLUMLEY, ROUNDY R
2149S
LA GRANDE, OR 97850

POBST-BROWN, M MARGAR-
ITE
2070S
LEAVENWORTH, WA 98826

POIRIN, C B
0640S
PORT ANGELES, WA 98362

POLITYKA, CHARLES
2448S
PORTLAND, OR 97208

POND, GARTH & FAMILY
0315S
BOTHHELL, WA 98012

POND, MICHAEL
0706S
NACHES, WA 98837

PONICHTERN, KENNETH C
1976S
THE DALLES, OR 97058

POOLE, KENNETH
1593S
YAKIMA, WA 98908

POPOFF, MIKE
2281S
YAKIMA, WA 98901

POTTENGER, CHARLES R &
BETTY
5094S
LEWISTON, ID 83501

POTTER, ERIC W
0508S
WENATCHEE, WA 98807

POULSON, LAURA
1463S
YAKIMA, WA 98902

POWELL, CODY
0282S
KENNEWICK, WA 99337

POWELL, DOUG
0098S
KENNEWICK, WA 99337

POWELL, HELEN
0744S
PORTLAND, OR 97232

POWELL, JOE
1248S
ELLENSBURG, WA 98926

POWELL, KATHY
0278S
KENNEWICK, WA 99337

POWERS, JIM D
2142S
JOSEPH, OR 97848

POWERS, TIM
0240S
KENT, WA 98031

POWERS, MARGARET M
0633S
NO ADDRESS, TACOMA POST-
MARK 98438

PRATT, JAMES R
1298S
MANCHESTER, WA 98353

PRICE, DEBORAH M
0648S
NO ADDRESS, TACOMA POST-
MARK

PRICE, RANDY
0641S
PORT ANGELES, WA 98362

PRIDEMORE, CYNTHIA K,
PRES
1170S
ENTIAT, WA 98822

PROJE, THOMAS
5089S
TUMWATER, WA 98501

PRUITT, KENNETH
1886S
SELAH, WA 98942

PRYOR, RICHARD
1537S
YAKIMA, WA 98903

PRYOR, ROD
1532S
YAKIMA, WA 98902

PURCELL, DOREEN
1102S
CASHMERE, WA 98815

PURCELL, RANDY
0927S
YAKIMA, WA 98908

PURDOM, J C
2262S
YAKIMA, WA 98908

PUTNAM, ELIZABETH DR
1223S
SEATTLE, WA 98103

QUARTERMAN, BOB
0323S
GRANITE FALLS, WA 98252

RACKLEY, BILL
0012S
NICEVILLE, FL 32578

RADFORD, ROBIN
2091S
SEATTLE POSTMARK

RAINES, CHARLES C
0710S
SEATTLE, WA 98107

RAMSEY, JUDY
0761S
MORTON, WA 98356

RANCE, RAY L
1713S
YAKIMA, WA 98901

RANDEL, ERIC C
0562S
PORT ORCHARD, WA 98366

RANDLEMAN, MARK
1075S
PARKLAND, WA 98444

RANTALA, LINDA & VICTOR
0156S
SEATTLE, WA 98115

RATCLIFF, EUGENE R
2104S
NEW PLYMOUTH, ID 83655

RATHJEN, JIM
1137S
TAKIMA, WA 98902

RAY, RICHARD D
0085S
OLYMPIA, WA 98507

RAYMOND, CHARLES F
1243S
SEATTLE, WA 98122

RAYMOND, STEVE
0040S
LEAVENWORTH, WA 98826

REAMY, CHUCK
1292S
SUMNER, WA 98390

REBHOLTZ, TOM
2197S
SEATTLE, WA 98185

RECHTERMAN, M E
2065S
EAST WENATCHEE, WA 98902

RECORD, LARRY
1751S
YAKIMA, WA 98903

REDA, LARRY
0399S
NO ADDRESS

REED, GARY M
0770S
MORTON, WA 98356

REED, WILLIAM A.
0909S
EMMETT, ID 83617

REFF, DAVE
0183S
MARYSVILLE, WA 98270

REID, JOSEPH E
1256S
WINTHROP, WA 98862

REINER, JEFF
0535S
ABERDEEN, WA 98520

REINHART, A. TROY
0005S
ROSEBURG, OR 97470

REINMUTH, KENNETH M
1772S
SUNNYSIDE, WA 98944

REISTER, ARLO
0070S
WENATCHEE, WA 98801

REITAN, GARY
1130S
YAKIMA, WA

REITE, MARK
1303S
KENT, WA 98042

REITER, JOSEPH J
0342S
YAKIMA, WA 98902

REMYNGTON, MICHAEL L
0692S
BOTHHELL, WA 98011

RESTAD, BRUCE
2076S
SEATTLE, WA 98102

RETFERFORD, K L
0059S
HOME, WA 98349

RETFERFORD, SYLVIA
0060S
HOME, WA 98349

REYNOLDS, ART
0822S
NACHES, WA 98937

REYNOLDS, MARIE
1465S
YAKIMA, WA 98908

REYNOLDS, TERRENCE
1651S
YAKIMA, WA 98908

RHOADS, DENNIS E
2034S
NO ADDRESS

RHODES, ARCHIE J
2139S
ENTERPRISE, OR 97828

RHODES, CLIFFORD MILO
2119S
LOSTINE, OR 97857

RHODES, DAVID
0187S
KENT, WA 98031

RICE, MIKE
1987S
LAKEVIEW, OR 97630

RICE, TONY, JR.
1607S
PARKER, WA 98939

RICHARDS, CECELIA M, MRS
1186S
LEAVENWORTH, WA 98826

RICHARDS, DAVE
2436S
OMAK, WA 98841

RICHARDS, FRANK
1715S
YAKIMA, WA 98901

RICHARDS, HEATHER A
2435S
OMAK, WA 98841

RICHARDSON, JERRY
0846S
NACHES, WA 98937

RICHARDSON, THOMAS D
1366S
YAKIMA, WA 98901

RICHBOURG, A. T
2292S
LAKE OSWEGO, WA 97034

RICHTER, DENNIS L.
1342S
OAK HARBOR, WA 98277

RIDDELL, CAROL A., PRES
1198S
EVERETT, WA 98206

RIDDLE, HENRY
1681S
MOXEE, WA 98936

RIGGS, CHERYL
5108S
NO ADDRESS

RIGGS, RON
5107S
NO ADDRESS

RILEY, ALAN, WA WILDLIFE,
STUDY COUNCIL
0067S
SEATTLE, WA 98155

RILEY, JEROME A.
1282S
BREMERTON, WA 98312

RILOLY, JR., HOWE E
0340S
NO ADDRESS

RINEHART, WILLIAM
1705S
YAKIMA, WA 98901

RINGER, LEE
1801S
NACHES, WA 98937

RINGER, MARLA
1813S
NACHES, WA 98937

RINGSRUD, MARY ANN
5118S
EAST WENATCHEE, WA 98802

RISENMAN, INGRID
2243S
MERCER ISLAND, WA 98040

RISSE, NANCY
1123S
SEATTLE, WA 98117

RITZMAN, CHERYL
0567S
PORT ORCHARD, WA 98366

RITZMAN, DARLENE
0569S
PORT ORCHARD, WA 98366

RITZMAN, GLEN
0568S
PORT ORCHARD, WA 98366

RITZMAN, MIKE D
0565S
PORT ORCHARD, WA 98366

RITZMAN, PHILLIP
0563S
PORT ORCHARD, WA 98366

ROACH, JIM E
0428S
RAINIER, WA 98576

ROBARDS, GENE
0711S
WENATCHEE, WA 98801

ROBARDS, KIM
0713S
WENATCHEE, WA 98801

ROBERSON, WAYNE K.
1025S
UNION GAP, WA 98903

ROBERT, GLEN J
0154S
WENATCHEE, WA 98801

ROBERTS, EVERETT R.
2113S
ENTERPRISE, OR 97828

ROBERTS, JOHN
2190S
JOSEPH, OR 97846

ROBERTS, LEE
0396S
NO ADDRESS

ROBERTSON, BRUCE F
0343S
BELLEVUE, WA 98005

ROBERTSON, CARL & LISA
0541S
BAINBRIDGE ISLAND, WA
98110

ROBINSON, RYAN
0888S
ARLINGTON, WA 98223

ROBY, EMERY
1892S
YAKIMA, WA 98908

ROCHEL, LERON
0532S
BOTHELL, WA 98011

ROCHEL, NANCY
0166S
BOTHELL, WA 98011

ROCHEL, ROBERT M
0132S
BOTHELL, WA 98011

ROCK, DOUG
5001S
ELLENSBURG, WA 98926

RODGERS, RON E
2384S
EMMETT, ID 83617

RODRIGUEZ, LUIS
2221S
LA GRANDE, OR 97850

RODRIGUEZ, RICHARD
1515S
YAKIMA, WA 98908

ROESLER, OLIVER J
1974S
SULTAN, WA 98294

ROETCISOENDER, MARK H
1290S
MARYSVILLE, WA 98270

ROGERS, BRAIN
0941S
ELSIN, OR 97827

ROGERS, CHARLES
0292S
KENNEWICK, WA 99336

ROGERS, DEBBIE
0943S
ELGIN, OR 97827

ROGERS, JARED C
0946S
ELGIN, OR 97827

ROGERS, TODD
0942S
ELGIN, OR 97827

ROHLFS, W MITCHELL PH D
1081S
YAKIMA, WA 98901

ROHLMAN, LEROY
2057S
LEAVENWORTH, WA 98826

ROJAS, ROBERT
1919S
ZILLAH, WA 98953

ROLFS, ROBERT R
0016S
TUMWATER, WA 98502

ROMERO, PHILLIP M
1880S
YAKIMA, WA 98909

ROMPPANEN, PAUL W
2268S
MERCER ISLAND, WA 98040

RONAN, JERRY
1639S
YAKIMA, WA 98901

ROOS, DONALD A.
0661S
SEATTLE, WA 98112

ROSENSTRETER, MARGARET
M
5068S
EAST WENATCHEE, WA 98802

ROSENRETER, GENE F
5077S
EAST WENATCHEE, WA 98802

ROSENRETER, JARROD
5076S
EAST WENATCHEE, WA 98802

ROSS, BARRY C
0446S
NO ADDRESS

ROSS, GERALD
0086S
WENATCHEE, WA 98801

ROSS, MARK
0916S
YAKIMA, WA 98902

ROSSING, BARBARA
5100S
WATERTOWN, MA 02172

ROUNDY, MR & MRS DONALD
2061S
ENTIAT, WA 98822

ROUNDY, RUTH
0181S
SEATTLE, WA 98212

ROWELL, DALE E
2188S
RICHLAND, WA 99352

ROWLAND, JR, TOM
0258S
VALLEYFORD, WA 99306

ROWLAND, THOMAS R
0252S
VERDALE, WA 99037

ROWLES, JAMES
2186S
ELLENSBURG, WA 98926

ROY, MARION F
0467S
EDMONDS, WA 98020

ROY, THOMAS R.
1644S
YAKIMA, WA 98908

ROYCE, STEPHEN
0291S
BREMERTON, WA 98312

ROZGOWSKI, FRANK
2010S
PUYALLUP, WA 98373

RJARK, HEIDI A.
2130S
ENTERPRISE, OR 97828

RUBALCABA, OSCAR
1037S
YAKIMA, WA 98902

RUBIN, ANTHONY
1390S
CASHMERE, WA 98815

RUBLE, JAMES & INA
0027S
EAST WENATCHEE, WA 98802

RUNNELS, REG
0041S
MANSON, WA 98831

RUSE, DANELL
0457S
SNOHOMISH, WA 98290

RUSE, DAVID
0455S
SPOKANE, WA 99212

RUSE, EVELYN L.
0432S
SPOKANE, WA 99223

RUSE, GARY
0454S
SNOHOMISH, WA 98290

RUSE, SCOTT
0456S
EVERETT, WA 98205

RUSS, RANDY M
0776S
CASHMERE, WA 98815

RUSSELL, DON R
1526S
YAKIMA, WA 98901

RUSSELL, JOHN W & BAR-
BARA
1182S
ANCHORAGE, AL 99516

RUSSELL, WILLIAM A.
0217S
SEATTLE, WA 98133

RUTHERFORD, MRS LORNA E.
0078S
WENATCHEE, WA 98801

RUTLEDGE, DWIGHT
1108S
SNOHOMISH, WA 98290

RUTZICK, MARK
1036S
PORTLAND, OR 97204

RYAN
0056S
ELLENSBURG, WA 98926

RYAN, FRED
1242S
ARDENVOIR, WA 98811

RYSDAM III, JOHN E.
0952S
ELGIN, OR 97827

RYSDAM, GENE A.
1004S
LA GRANDE, OR 97850

S TIMOTHY WAPATO, EX. DIR
1169S
PORTLAND, OR 97214

SAGER, HUBERT B
5025S
REPUBLIC, WA 99166

SAGER, JOHN
2170S
SEATTLE, WA 98166

SAITZ, JEFFREY
0686S
RENTON, WA 98058

SAMUEL, MERRY
2423S
PESHASTIN, WA 98847

SANBORN, ANNE M
2276S
PORT ORCHARD, WA 98366

SANCHEZ, RODRIGO
1672S
YAKIMA, WA 98901

SANDERS, NICHOLAS J
2438S
BOTHELL, WA 98021

SANDNES, TOM
1861S
ELLENSBURG, WA 98926

SANFORD, JEFFREY C
0236S
NO ADDRESS, WENATCHEE
POSTMARK

SANSUM, E. LEE
2320S
SEATTLE, WA 98115-0278

SAVAGE, GLADYS F
0052S
SEATTLE, WA 98105

SAVATGY, MICHAEL
1428S
DEMING, WA 98244

SAVINISH, RAY
1606S
YAKIMA, WA 98902

SAVOL, A. MARTIN
2274S
SUMNER, WA 98390-8907

SCH????, DON
1767S
ZILLAH, WA 98953

SCHARBACH, JOHN
0073S
NASELLE, WA 98638

SCHEEL, TOM
1775S
YAKIMA, WA 98902

SCHERE, HARLAN
0653S
KENNEWICK, WA 99337

SCHULEN, BOB
1413S
SEATTLE, WA 98109

SCHIFIEL, GERALD
2096S
TACOMA POSTMARK

SCHIVELY, DIXON P
1437S
RICHLAND, WA 99352

SCHMID, H
1406S
WENATCHEE, WA 98801

SCHMID, HULDREICH
1822S
LEAVENWORTH, WA 98826

SCHNEIDER, DAVE
0505S
WENATCHEE 98801 POST-
MARK

SCHOENING, CLIFFORD
0470S
BREMERTON, WA 98312

SCHOETTLE, ULRICH C M D
1218S
SEATTLE, WA 98102

SCHOLLER, WILBER J
1453S
YAKIMA, WA 98908

SCHONBERG, BONNIE
1251S
WENATCHEE, WA 98801

SCHONS, TOM
2241S
LEAVENWORTH, WA 98826

SCHOOLCRAFT, LEE
1604S
YAKIMA, WA 98908

SCHOOLEY, LAUREN
1791S
UNION GAP, WA 98903

SCHOTT, JOSEPH C
0427S
BEALE AFB, CA 95903

SCHROCK, DAVE
1675S
YAKIMA, WA 98901

SCHROEDER, ED
1579S
YAKIMA, WA 98902

SCHULER, DEAN
2002S
TIETON, WA 98947

SCHULTZ, FRANKLIN O
1925S
CENTERVILLE, WA 98613

SCHUT, KATHY
1441S
YAKIMA, WA 98901

SCHUT, MERLIN
1631S
UNION GAP, WA 98903

SCHUTZ, NEVA
0437S
NO ADDRESS

SCHWAB, JOHN H
0607S
SEATTLE, WA 98112

SCHWAGER, CALLIE
0328S
BOTHELL, WA 98012

SCHWENKE, ROBERT
1063S
TUKWILA, WA 98188

SCOTT, NANCY
5067S
WENATCHEE, WA 98801

SCOTT, SHERRY A.
1764S
YAKIMA, WA 98902

SCULL, M D, ELIOT W
0408S
WENATCHEE, WA 98807

SECK, CHARLES
1859S
ELLENSBURG, WA 98926

SEE, CHARLES
0048S
CAMANO ISLAND, WA 98292

SEEFRIED, RICH
1729S
YAKIMA, WA 98902

SEIBEL, WALT, JR
2230S
HORSESHOE BEND, ID 83629

SELDERS, HAROLD
2382S
EMMETT, ID 83617

SELIVANOFF, KATHY
0848S
THORP, WA 98946

SELIVANOFF, MIKE
0849S
THORP, WA 98946

SEPPA, KENNETH L.
5111S
VANCOUVER, WA 98684

SERVID, L P, M D
0203S
LYNDEN, WA 98264

SEVERTSON, S PETER
5082S
ARDENVOIR, WA 98811

SHAFFER, ROD
0247S
SPOKANE, WA 99206

SHALES, BILL
1571S
WENATCHEE, WA 98801

SHANK-BARNES, FERN
2051S
ENTIAT, WA 98822

SHANNON, KEVIN
5064S
ELLENSBURG, WA 98926

SHANNON, MICHAEL
0159S
CASTLE ROCK, WA 98611

SHARP, R E
0441S
SNOHOMISH, WA 98290

SHAW, ROBERT K.
2335S
EMMETT, ID 83617

SHELTON, JOHN
1888S
RANDLE, WA 98372

SHEPARD, JUDITH
1000S
ELGIN, OR 97827

SHERRELL, JIM
0506S
WENATCHEE 98801 POST-
MARK

SHIELDS, MACK
1504S
YAKIMA, WA 98901

SHILEY, DORIS
1253S
LEAVENWORTH, WA 98826

SHIRLEY, LARRY D
2153S
JOSEPH, OR 97846

SHIRLEY, RON
0861S
JOSEPH, OR 97846

SHOEMAKER, KURT C
1964S
YAKIMA, WA 98902

SHROEDER, DARRELL R
0367S
PORT ORCHARD, WA 98366

SHUTT, JOHN G
1286S
LAKE STEVENS, WA 98258

SIDES, CHARLES A.
0008S
REDMOND, WA 98052

SIDES, JOHN
1033S
YAKIMA, WA 98908

SIDOTI, GACE C
2124S
JOSEPH, OR 97846

SIEGFRIED, GERALD
0134S
MESA, WA 99343

SILLIMAN, RAY
0125S
SEATTLE, WA 98121

SIMMENS, GORDON E
0582S
PORT ORCHARD, WA 98366

SIMMONS, ERNEST L.
1522S
NACHES, WA 98937

SIMMONS, JONI
0976S
ELGIN, OR 97827

SIMMONS, MARK
0966S
ELGIN, OR 97827

SIMMONS, ROBIN
1823S
NACHES, WA 98937

SIMMS, LEE
0552S
ROCK ISLAND, WA 98850

SIMMS, SHARON
0549S
ROCK ISLAND, WA 98850

SIMON, RON
0603S
LEAVENWORTH, WA 98826

SIMPSON, DAVID
2190S
SEATTLE, WA 981

SIMS, CRANDHE E
0782S
NACHES, WA 98937

SINCLAIR, ROBERT F
2390S
YAKIMA, WA 98907

SINES, HARVEY
1877S
YAKIMA, WA 98901

SINN, WENDELL
0261S
SPOKANE, WA 99206

SKAGGS, CHARLES E
0302S
PORT ANGELES, WA 98362

SKEWIS, NANCY
0476S
OLYMPIA, WA 98503

SLACK, KAY
1551S
CLE ELUM, WA 98922

SLATER, DEAN
2394S
PESHASTIN, WA 98847

SLAVIN, JANICE
1905S
YAKIMA, WA 98901

SLAWNIKOWSKI, DARYL R.
0843S
E. WENATCHEE, WA 98802

SLOAN, CURTIS
0714S
KENNEWICK, WA 98336

SLOAN, DONALD D
0996S
ELGIN, OR 97827

SMALL, DEBBY
2048S
ENTIAT, WA 98822

SMALL, JAMES R
2080S
ENTIAT, WA 98822

SMALL, JON L.
2192S
ENTIAT, WA 98822

SMART, DAINIEL
0423S
ENTIAT, WA 98822

SMART, DAN & MARIE
0418S
ENTIAT, WA 98822

SMART, FLOYD J
0827S
NACHES, WA 98937

SMART, IVA
1432S
ENTIAT, WA 98822

SMART, JACK
1433S
ENTIAT, WA 98822

SMITH, BERNIE
0595S
LYNNWOOD, WA 98036

SMITH, C A.
1888S
SELAH, WA 98942

SMITH, COURTNEY
0923S
MARYSVILLE, WA 98270

SMITH, DALE
1645S
YAKIMA, WA 98908

SMITH, DARELL V
1889S
YAKIMA, WA 98902

SMITH, DAVID A.
2249S
SNOHOMISH, WA 98290

SMITH, DOUG
0863S
ARLINGTON, WA 97223

SMITH, ERNEST P
1886S
SELAH, WA 98942

SMITH, F S
0825S
ELGIN, OR 97827

SMITH, GAYLORD & DEBBIE &
FAMILY
0597S
MOUNTLAKE TERRACE, WA
98043

SMITH, GIL
1470S
YAKIMA, WA 98908

SMITH, GUY
1042S
MARYSVILLE, WA 98270

SMITH, J H
1044S
LEAVENWORTH, WA 98826

SMITH, JARED
0870S
ARLINGTON, WA 98223

SMITH, JEFFREY D
0507S
WENATCHEE 98801 POST-
MARK

SMITH, JOE E.
1047S
LEAVENWORTH, WA 98826

SMITH, MERRIL R
1257S
WATERVILLE, WA 98858

SMITH, PHILLIP R
2284S
CONCRETE, WA 98237

SMITH, ROBERT M
1527S
YAKIMA, WA 98901

SMITH, ROBERT W
2304S
SEATTLE, WA 98121

SMITH, RON
0921S
MARYSVILLE, WA 98270

SMITH, RON
1011S
EVERETT, WA 98206

SMITH, RUSS
2236S
CHEHALIS, WA 98532

SMITH, SHANNON
2231S
YAKIMA, WA 98907

SMITH, SHIRLEY
1256S
WATERVILLE, WA 98858

SMITH, STEVE D
0229S
WENATCHEE, WA 98801

SMITH, TANYA
1040S
MARYSVILLE, WA 98270

SMITH, VICKI
2236S
YAKIMA, WA 98907

SMITHSON, RICHARD
0842S
PESHASTIN, WA 98847

SNELL, ROGER G
0524S
CHEHALIS, WA 98532

SNYDER, BARB
0897S
CLE ELUM, WA 98922

SNYDER, FAY C
1061S
SEATTLE, WA 98103

SNYDER, FRANCES A.
1071S
SEATTLE, WA 98103

SNYDER, JEFFREY
2152S
PARKDALE, OR 97041

SNYDER, JOHN T & JERI A
0618S
LEAVENWORTH, WA 98826

SNYDER, TIMOTHY J
2117S
JOSEPH, OR 97846

SOBRALSKI, MARY LOU
2339S
EMMETT, ID 83617

SODERGREN, DAVID L.
1410S
OLYMPIA, WA 98506

SODERGREN, LYNN WHIT-
TAKER
1408S
OLYMPIA, WA 98506

SOLE, ROB
0245S
QUINCY, WA 98846

SOUDER, PHIL E
1588S
YAKIMA, WA 98901

SOUTHWICK, STEPHEN
0887S
ELGIN, OR 97827

SPARKS, JAN
2179S
CENTRALIA, WA 98531

SPENCER, KATHY
5079S
WENATCHEE, WA 98807-0674

SPENCER, TODD
1490S
HARRAH, WA 98933

SPELNE, GARY A.
0309S
KENNEWICK, WA 99336

SPICER, JIM
1177S
SUMMERVILLE, OR 97876

SPOKANE CANOE AND KAYAK
CLUB INC
0197S
SPOKANE, WA 99210

SPRAGUE, M D
2331S
EMMETT, ID 83617

SPRING, FRED
0673S
PORT ANGELES, WA 98362

SPRING, IRA
0666S
EDMONDS, WA 98020

ST GEORGE, JOHN E
1763S
YAKIMA, WA 98902

ST GEORGE, MONTE
1789S
NACHES, WA 98937

ST MARTIN, JERRY
0824S
YAKIMA, WA 98901

STAEHEL, MARGARET ROSE
5084S
SEATTLE, WA 98136

STAMBAUGH, JEFF
0265S
NO ADDRESS, TACOMA POST-
MARK

STANDERFER, DAN
0740S
SUMMERVILLE, OR 97876

STARK, BILL & PEG
2176S
LEAVENWORTH, WA 98826

STARKOVICH, D
0091S
RONALD, WA 98940

STARLING, SHARON
2000S
CLE ELUM, WA 98922

STEELE, JANE
1344S
SEATTLE, WA 98105

STEELE, SR, R. L.
0914S
ROSLYN, WA 98941

STEELE, WILLIAM K.
1247S
SPANGLE, WA 99031

STEIN, DANIEL E.
2442S
JOSEPH, OR 97646

STEIN, JENNIFER
0064S
ELLENSBURG, WA 98926

STEIN, MONTE M
0609S
WOODINVILLE, WA 98072

STEINER, JOSEPH
2077S
SEATTLE, WA 98102

STEINER, LEONARD
2184S
BELLEVUE, WA 98007

STENNETT, DALE
2218S
JOHN DAY, OR 97845

STEPHENSON, LARRY
2426S
EMMETT, ID 83617

STEPHNEY, E. E.
1565S
YAKIMA, WA 98908

STERLING, BOB
2325S
EMMETT, ID 83617

STEVEN BOTTIGER, GRAND
PRIX MOTORCYCLES
0198S
LYNNWOOD, WA 98036

STEVENS, CARL
1810S
SELAH, WA 98942

STEVENS, DOUG
1906S
CASHMERE, WA 98815

STEVENS, EDWARD L.
5000S
ENTIAT, WA 98822

STEVENS, JAMES E.
2278S
CONCRETE, WA 98237

STEVENSON, JAMES C
PRES & LEN GARDNER
1171S
SEATTLE, WA 98122

STEWART, CAROL
0285S
KENNEWICK, WA 99337

STEWART, CARRIE
0583S
PORT ORCHARD, WA 98366

STEWART, JACK
0352S
KENNEWICK, WA 99336

STEWART, JAMES
1902S
YAKIMA, WA 98902

STEWART, JOHN
1126S
KENNEWICK, WA 99337

STEWART, JOHN B
0216S
KENNEWICK, WA 99337

STEWART, SR, DAVID R.
0480S
KENNEWICK, WA 99337

STEWART, WENDY K.
1016S
LA GRANDE, OR 97850

STIDHORN, DICK
0732S
ONALASKA, WA 98570

STINER, CONNIE M
1759S
YAKIMA, WA 98901

STINER, LAWRENCE E
1747S
YAKIMA, WA 98901

STINER, WAYNE
1801S
YAKIMA, WA 98901

STINGLEY, DUSTY
1846S
YAKIMA, WA 98903

STOLEN, ALICE
2093S
TACOMA POSTMARK

STONE, DUANE A.
1849S
ELLENSBURG, WA 98926

STONE, ROBERT
5051S
ELLENSBURG, WA 98926

STONEDRAKE, STEVE L.
0962S
LAGRANDE, OR 97850

STOUT, KARL G
0104S
BELLINGHAM, WA 98226

STRADER, CLARENCE
1881S
YAKIMA, WA 98902

STRANG, OTIS
2346S
EMMETT, ID 83617

STRAUSBAUGH, DEAN
1853S
CLE ELUM, WA 98922

STRAWN, CHARLES L.
1374S
EAST WENATCHEE, WA 98802

STRAWN, CHUCK
0171S
EAST WENATCHEE, WA 98802

STREET, KEVIN
2280S
ARLINGTON, WA 98223

STREET, MARK
2281S
ARLINGTON, WA 98223

STREIB, FRED P
2245S
LEAVENWORTH, WA 98826

STRICKLAND, FREDRICK A.
0482S
KENNEWICK, WA 99336

STRICKLAND, JAMES
1748S
YAKIMA, WA 98902

STRINGER, PRICE W
2302S
EVERETT, WA 98201

STROUD, JIM
2146S
ENTERPRISE, OR 97828

STROUD, LOWELL
1474S
WAPATO, WA 88951

STROUP, ROBERT R., CONS
CH
1197S

STROYAN, JERRY
5034S
COLVILLE, WA 99114

STUCK, BYRON
1160S
MERCER ISLAND, WA 98040

STUDMAN, BOB
0397S
NO ADDRESS

STYLES, CHARLES
2019S
LEAVENWORTH, WA 98826

STYLES, MAXINE
2020S
LEAVENWORTH, WA 98826

SUDWAY, DOM
2395S
LA GRANDE, OR 97850

SUENKEL, BRIAN
0293S
KENNEWICK, WA 99337

SUENKEL, KATHY
0301S
KENNEWICK, WA 99337

SUENKEL, KELLIE
0277S
KENNEWICK, WA 99337

SUENKEL, MIKE
0273S
KENNEWICK, WA 99337

SUHOVERSNIK, R J
1916S
ENUMCLAW, WA 98022

SUITS, MIKE
1513S
NACHES, WA 98937

SULLIVAN, CAROLYN B
0220S
RICHLAND, WA 98352

SULLIVAN, R G
0283S
RICHLAND, WA 99352

SULLIVAN, ROBERT G
0096S
RICHLAND, WA 99352

SULLIVAN, TESA
5047S
ELLENSBURG, WA 98926

SULLIVAN, THOMAS LEO
2441S
YAKIMA, WA 98901

SUMMERS, BRUCE
0888S
SHERIDAN, OR 97373

SUMPTER, ROBERT
2003S
ROSLYN, WA

SUNDAY, MICHAEL
1594S
YAKIMA, WA 98901

SUNDSTROM, MARK
0521S
ELMA, WA 98541

SUNSHINE VALLEY MINERALS,
INC
0111S
MANSON, WA 98831

SUTTON, BRIAN P
0369S
YAKIMA, WA 98902

SUTTON, BRIAN P
0404S
YAKIMA POSTMARK 989__

SVEEN, CRAIG
1516S
NACHES, WA 98937

SWANSON, BARBARA J &
RICHARD D
0540S
TACOMA, WA 98444

SWANSON, JOHN R.
1144S
MINNEAPOLIS, MINN 55406

SWENSON, CHARLES A.
0006S
SEATTLE, WA 98168

SWOPE, JIM
1368S
YAKIMA, WA 98901

SYL, SR, RAYMOND R
0487S
KENNEWICK, WA 99337

TABER, TOM
1276S
PORT ORCHARD, WA 98366

TABOR, BILL
1818S
YAKIMA, WA 98903

TACOMA MOTOR CYCLE
0177S
SUMNER, WA 98390

TACOMA MOTORCYCLE CLUB
0244S
TACOMA, WA 98443

TAHKEAL, DON, SEC
1173S
TOPPENISH, WA 98948

TAIT, DOUG
1971S
MARYSVILLE, WA 98270

TALL TIMBER HOMEOWNERS
ASSOC
0682S
BELLEVUE, WA 98006

TALLER JR, JOSEPH A.
0704S
NO ADDRESS SEATTLE POST-
MARK

TAMTE, PERRY D & TAMARA L.
2160S
REDMOND, WA 98062

TANASSE, CLIFFORD E
0936S
YAKIMA, WA 98908

TANEY, EDWARD L.
0984S
ELGIN, OR 97827

TANKE, MARK, PETER & LIZ
1212S
RENTON, WA 98056

TAROLA, WAYNE B
0279S
KENNEWICK, WA 99336

TAYLOR, MARY A
1803S
TIETON, WA 98947

TAYLOR, STACEY
0107S
BASIN CITY, WA 99343

TAYLOR, STEVEN D
0638S
SNOHOMISH, WA 98290

TAYLOR, TIM
0108S
BASIN CITY, WA 99343

TAYLOR, TOM
2162S
KENNEWICK, WA 99337

TEAL, RONALD G
0350S
PASCO, WA 99301

TELMANN, HARRY
2269S
ENTERPRISE, OR 97828

TELMANN, SANDRA
2209S
ENTERPRISE, OR 97828

TELFORD, JUDI
1572S
EAST WENATCHEE, WA 98802

TERHAAR, KEN
2290S
DARRINGTON, WA 98241

THE HERITAGE INSTITUTE
0670S
SEATTLE, WA 98199

THE MOUNTAINEERS
0658S
SEATTLE, WA 98119

THEIS, JERRY
2012S
OKANOGAN, WA 98840

THEIS, JERRY
2045S
OKANOGAN, WA 98840

THIE, KRISTA
5042S
WHITE SALMON, WA 98672

THIEROLF, ROSEMARY J
1874S
YAKIMA, WA 98907

THOMAS, RICHARD E
1064S
REDMOND, WA 98052

THOMAS, RICHARD H
5096S
YAKIMA, WA 98908

THOMAS, ROBERT W
1808S
YAKIMA, WA 98902

THOMPSON, AL
0020S
EAST WENATCHEE, WA 98802

THOMPSON, ARIC P
5102S
SNOHOMISH, WA 98290

THOMPSON, CATHY M
5050S
ELLENSBURG, WA 98926

THOMPSON, DENNIS
1150S
BREMERTON, WA 98310

THOMPSON, DOUG
0219S
REDMOND, WA 98052

THOMPSON, GEORGE L.
1450S
YAKIMA, WA 98903

THOMPSON, JANET A. 2182S SEATTLE, WA 98115	TOM, PARKS 1041S BOTHELL, WA 98011	TURNER, GARY M 1125S LYNNWOOD, WA 98036	VANDLING, JAMES 1030S ELLENSBURG, WA 98926	WALKER, JIM P 1331S POULSBORO, WA 98370
THOMPSON, ROBERT 5049S ELLENSBURG, WA 98926	TOMAN, BILLY 0645S OREGON CITY, OR 97045	TURNER, PRISCILLA 1083S SEATTLE, WA 98115	VANLANDINGHAM, DOUG 0631S MARYSVILLE, WA 98270	WALKER, PATRICK 1961S EPHRATA, WA 98823
THOMPSON, TED 1015S YAKIMA, WA 98908	TOMPKINS, JOEL L. 0762S COLVILLE, WA 99114	TUSUP, PAULA, MS 1158S SEATTLE, WA 98106	VANOUREK, JIRI 0063S OTHELLO, WA 99344-1092	WALKER, R. M 1226S WENATCHEE, WA 98807-4217
THOMPSON, TIM 2336S EMMETT, ID 83617	TOMS 1307S OLYMPIA, WA 98507	TVIET, STEVE 0806S COLVILLE, WA 99114	VELIKANJE, JOAN 1092S OLYMPIA, WA 98503	WALKER, ROBERT V 2315S SEATTLE, WA 98105
THOMPSON, TODD 0280S KENNEWICK, WA 98336	TONEY, LARRY L. 0946S ELGIN, OR 97827	UNITED 4WD ASSOCS LAND USE TEAM 0602S FELTON, PA 17322	VELLER, KEN 5110S OLYMPIA, WA 98504	WALKER, TODD 0560S PORT ORCHARD, WA 98366
THOMSON, DERK 0623S MOSES LAKE, WA 98837	TOWNER, ERIN S 0892S DARRINGTON, WA 98241	UNSIGNED RESPONSE 0038S NO ADDRESS	VELZ, DAVID 1627S YAKIMA, WA 98905	WALKERHAUER, DAVID 1898S MOXEE, WA 98936
THOMSON, GORDON 2080S SEATTLE, WA 98105	TOWNER, SHEILA 1478S YAKIMA, WA 98908	UNSIGNED RESPONSE 5117S TACOMA, WA	VENGLAR, MOLLY 0580S PORT ORCHARD, WA 98366	WALL, HUBERT A R 1780S YAKIMA, WA 98901
THOMSON, ROBERT A. 5095S YAKIMA, WA 98906	TOWNSLEY, JOHN F & RENEE 0011S OKANOGAN, WA 98840	UTTER, JOAN E 1856S KETTLE FALLS, WA 99141	VI ROSE, RAY 2240S PASCO, WA 99301	WALLINGFORD, GEORGE E 1727S SELAH, WA 98942
THOMSON, TOMMY 1105S BELFAIR, WA 98528	TOYNBEE, JOSEPH C 0608S SEATTLE, WA 98178	UTTER, KEN 1957S KETTLE FALLS, WA 99141	VICKERS, LEON 1487S COWICHE, WA 98923	WALLIS, ALAN 0529S SW ROCHESTER, WA 98579
THORNBURGH, DALE 1414S CHELAN, WA 98816	TRAVIS, HOWARD L. 0841S UNION GAP, WA 98903	VAL ELK, DUTCH, PRES 1200S AUBURN, WA 98002	VIEBROCK, SHERI 2058S WATERVILLE, WA 98858	WALSH, BOB 1110S TACOMA
THORNBURGH, PAT 1402S CHELAN, WA 98816	TRAVIS, JAMES 0771S ELGIN, OR 97827	VALENTINE, LARRY 0785S PESHASTIN, WA 98847	VIEBROCK, WALTER M. 0158S WOODINVILLE, WA 98072	WALT, J, SR 2086S TACOMA POSTMARK
THURSTON, JEFF 0320S WHITE CENTER, WA	TRAVIS, KIRK J 2409S LA GRANDE, OR 97850	VAN CORBACH, BEN 1676S YAKIMA, WA 98902	VILLASENOR, VICTOR F 1436S SEATTLE, WA 98112	WALTER, ANDREA 1959S EPHRATA, WA 98823
TIBBETT, ALVIN R 1903S YAKIMA, WA 98902	TREVINO, BERNARDO 1716S NO TOWN NAME	VAN DORN, TOM 0489S PASCO, WA 99301	VILLINES, KENNETH D 2030S TACOMA, WA 98445	WALTER, BILL 0889S DARRINGTON, WA 98241
TIECHNER, D P M, JAC R 0484S WENATCHEE, WA 98801	TROTTER, LYGRE R 0556S KENT, WA 98042	VAN DUIN, DUSTIN 0357S SEATTLE, WA 98133-5216	VOGEL, PETER H 0084S COUPEVILLE, WA 98239	WALTER, PAT 2239S YAKIMA, WA 98901
TIFFANY, GEORGE B 1112S EAST WENATCHEE, WA 98802	TROTTER, PATRICIA J 0477S KENT, WA 98042	VAN DUIN, TAMI 0356S SEATTLE, WA 98133-5216	VOLLRATH, SCOTT P LS 1153S LEAVENWORTH, WA 98826	WALWORTH, LISA 2173S ORONDO, WA 98843
TILLET, FRANK G 0836S NACHES, WA 98937	TROTTER, SAMMU J 1732S YAKIMA, WA 98901	VAN DUIN, TED 0339S SEATTLE, WA 98133-5216	VOLWILER, WADE 0097S SEATTLE, WA 98155	WANGLER, RONALD S, SR 1481S SELAH, WA 98942
TILLET, RODNEY 0790S TIETON, WA 98947	TROUT, J MICHAEL 0351S KENNEWICK, WA 98336	VAN ELB, JOSEPH 0611S AUBURN, WA 98002	WA NATIVE PLANT SOCIETY 0227S SEATTLE, WA 98115	WARD, ALLISON A. 0390S NO ADDRESS
TIMMONS, JIM 0127S W RICHLAND, WA 99352	TROXEL, MARJORIE F 2251S MALAGA, WA 98628	VAN ELK, CHRISTOPHER 1355S AUBURN, WA 98002	WA. DEPT OF WILDLIFE 0148S WENATCHEE, WA 98801	WARD, BRENT 0382S NO ADDRESS
TINNING, PAUL 0763S SPOKANE, WA 99213	TRUMMER, HANS 0777S LEAVENWORTH, WA 98826	VAN WEY, DANELL L. 2263S YAKIMA, WA 98901	WADDINGTON, PAUL 1850S ELLENSBURG, WA 98926	WARD, CAROLINE B 0924S IMBLER, OR 97841
TOBEY, LINDA 0593S NO ADDRESS SEATTLE POST- MARK 981	TRUMMER, SANDRA 0837S LEAVENWORTH, WA 98826	VAN WOUDEBERG, BRUCE 0322S POULSBORO, WA 98370	WADE, DAVE 1876S SELAH, WA 98942	WARD, JASON W 0391S NO ADDRESS
TOBIUS, FRANK 1497S YAKIMA, WA 98908	TUBB, JIM 0874S MARYSVILLE, WA 98270	VANCE, DON 0847S YAKIMA, WA 98902	WADIMS, JON D 0514S NO ADDRESS WENATCHEE POSTMARK	WARNEX, TODD E H 0553S ELLENSBURG, WA 98926
TODD, JAMES S 1124S WALLA WALLA, WA 99362	TUCKER, GERALD 1655S YAKIMA, WA 98902	VANCE, ED 0755S YAKIMA, WA 98907	WAEHLTE, TIMOTHY L 1493S TIETON, WA 98947	WARNOCK, CHARLES 0087S LEAVENWORTH, WA 98826
TOKSTAD, TOM 0520S CENTRALIA, WA 98531	TURNER, EMMA 1127S LYNNWOOD, WA 98036	VANCE, MICK 1927S YAKIMA, WA 98908	WAGNER, DOUGLAS S 0864S ARLINGTON WA 98223	WARTH, JOHN 0694S SEATTLE, WA 98125
TOLBERT, MICHAEL A. 1809S MOXEE, WA 98936	TURNER, EUGENE 2264S DALLESPOUR, WA 98617	VANDEGRAFF, DAVE 1195S BOISE, ID 83704	WAHL, DAVID R 1349S SNOHOMISH, WA 98290	WASHINGTON TRAIL ASSOCIA- TION 0452S SEATTLE, WA 98101

WATERS, NANCY
2108S
JOSEPH, OR 97846

WATKINS, RON
1702S
YAKIMA, WA 98901

WATNE, HOWARD
0975S
LAGRANDE, OR 97850

WATSON, BRENT
1031S
YAKIMA, WA 98902

WATTS, CAROL G & DAVID R
1189S
BELLEVUE, WA 98006

WAXBOM, NEIL L.
0733S
ELGIN, OR 97827

WAYBON, JERRY R.
0978S
ELGIN, OR 97827

WAYENBERG, KAREN
2194S
MOXEE, WA 98936

WAYLAND, MARY LANE
0341S
BREWER, MAINE 04412

WEBER, SCOTT J
0124S
EVERETT, WA 98205

WEED, THOMAS A.
1510S
YAKIMA, WA 98903

WEEDMARK, ROBERT A.
1984S
ARLINGTON, WA 98223

WEEMAN, DAVID E.
0844S
COLVILLE, WA 99114

WEESE, JAY
0925S
YAKIMA, WA 98908

WEIGEL, BRUCE J
1512S
NACHES, WA 98937

WEIGEL, DAN
1520S
NACHES, WA 98937

WEIHER, GARY
0601S
YAKIMA, WA 98906

WEINERG, LOUIS P
2296S
NO ADDRESS

WEINERT, LARRY C
1372S
LEAVENWORTH, WA 98826

WEISEMAN, DWIGHT A.
0491S
KENNEWICK, WA 99336

WELBERG, GARY L.
0675S
LAGRANDE, OR 97850

WELCH, ART W
0559S
PORT ORCHARD, WA 98366

WELCH, GENE C
0812S
SELAH, WA 98942

WELCH, ROBERT A.
2381S
BOISE, ID 83705

WELCOME NUGGET MINES
0214S
LEAVENWORTH, WA 98826

WELLANDER, MIKE
0526S
CHEHALIS, WA 98532

WELLS, ELIZABETH J
5027S
FEDERAL WAY, WA 98003

WELLS, ERNEST R
1007S
ELGIN, OR 97827

WELLS, RUTH C
1009S
ELGIN, OR 97827

WELLS, SHANE R
1514S
YAKIMA, WA 98901

WENATCHEE CHIWAHA IRR
DIST
0462S
LEAVENWORTH, WA 98826

WENSLEY, PETE A.
1857S
ELLENSBURG, WA 98926

WENTZ, DEWAYNE
1814S
YAKIMA, WA 98901

WERNEX, JIM
0689S
ELLENSBURG, WA 98926

WESSMAN, GEORGE "BUD"
0189S
STANWOOD, WA 98292

WESSMAN, SHARLENE M
0191S
STANWOOD, WA 98292

WESSMAN, SHARON
0193S
STANWOOD, WA 98292

WEST, DAVE - MAX WEST INC
0045S
RANDLE, WA 98377

WEST, OTIS
1884S
YAKIMA, WA 98902

WEST, RODA
0920S
CLE ELUM, WA 98922

WEST, ROY W
0918S
PESHASTIN, WA 98847

WESTERFIELD, STEVE
1701S
SELAH, WA 98942

WESTERN FORET SYSTEMS,
INC
1570S
LEWISTON, ID 83501

WESTMARK, RUSS
2009S
SUMNER, WA 98390

WEYAND, JAMES O
1860S
ELLENSBURG, WA 98926

WHEAT, JACK A.
0684S
LYNNWOOD, WA 98036

WHEELER, CHARLEY
1854S
ELLENSBURG, WA 98926

WHITAKER, CINDY
0784S
EMMETT, ID 83617

WHITE, HOLLY
1978S
BAINBRIDGE ISLAND, WA
98110

WHITEHALL, DELBERT E.
0424S
ENTIAT, WA 98822

WHITEHALL, DUANE R
1118S
WENATCHEE, WA 98801

WHITEHALL, GREG A & PATTIL
0654S
WENATCHEE, WA 98801

WHITEMAN, LESLIE
5045S
ELLENSBURG, WA 98926

WHITHAM, ROBERT M
0632S
EVERETT, WA 98204

WHITMORE, RICHARD
0903S
BELLINGHAM, WA 98225

WHITWILL, DAVID K.
1168S
KETTLE FALLS, WA 99141

WI FOREST PRODUCTS
0176S
PESHASTIN, WA 98847

WICHAR, DENIS
1121S
VANCOUVER, WA 98663-3063

WICHER, ROGER G
2072S
LYNNWOOD, WA 98206

WICK, DALE
1157S
SNOHOMISH, WA 98290

WICKER, ROGER
2044S
LYNNWOOD, WA 98206

WICKWIRE, RICH
5062S
ELLENSBURG, WA 98926

WIDENER, JOHN R
0635S
PORT ANGELES, WA 98362

WIEDRICH, TWILLA
1491S
YAKIMA, WA 98902

WIELAND, KURT
0333S
KENT, WA 98031

WIGGINTON, J R
0253S
VERDALE, WA 99037

WILEY, CAROL R
1026S
TACOMA, WA 98421

WILHELM, LES C
0967S
LAGRANDE, OR 97850

WILKIE, STEVE & SHERYL
1421S
OLYMPIA, WA 98502

WILKINS, HUBERT
1899S
YAKIMA, WA 98901

WILKINS, KATHLEEN & RICH
ARD HOLIDAY
1143S
SEATTLE, WA 98199

WILKINSON, R. M., SR
1989S
SO CLE ELUM, WA 98943

WILLIAM, LELAND
0614S
ISSAQUAH, WA 98027

WILLIAMS, CHRISTINE A.
1077S
POULSBORO, WA 98370-9212

WILLIAMS, DONNA
2415S
LA GRANDE, OR 97850

WILLIAMS, JAMES P
0807S
COLVILLE, WA 99114

WILLIAMS, LARRY E.
1204S
BELLINGHAM, WA 98225

WILLIAMS, MAKC
0571S
PORT ORCHARD, WA 98366

WILLIAMS, MARTIN B
1659S
YAKIMA, WA 98902

WILLIAMS, MR & MRS J
2248S
SEATTLE, WA 98155

WILLINGHAM, JAY
2187S
SEATTLE, WA 98117

WILLIS, PAUL
0461S
CARPINTERA, CA 93013

WILLIS, ROBERT & PATRICIA
0325S
PUYALLUP, WA 98371

WILLIS, WINDA
1343S
DESMOINES, WA 98148

WILMOTH, JEFF
1032S
TIETON, WA 98947

WILSON, BOB
0768S
LAGRANDE, OR 97850

WILSON, CAROL
2428S
TACOMA, WA 98466

WILSON, FLOYD V
0855S
MARBLEMOUNT, WA 98267

WILSON, HARRY E
2040S
BREMERTON, WA 98312-2908

WILSON, RICHARD B
0795S
YAKIMA, WA 98902

WILSON, SHERRYL
0581S
OLALLA, WA 98359

WILSON, THOMA M
1669S
NACHES, WA 98937

WILSON, THOMAS C
1452S
YAKIMA, WA 98902

WIMER, KEN
0709S
SPOKANE, WA 99219

WINDH, CAROLE A.
1286S
TACOMA, WA 98467

WINDH, JOHN
1287S
TACOMA, WA 98467

WINDHAM, KEITH
0596S
ISSAQUAH, WA 98027

WINKEL, WILLIAM C
0205S
TACOMA POSTMARK

WINN, NORMAN L.
1155S
SEATTLE, WA 98101

WINN, ROBERT
5054S
ELLENSBURG, WA 98926

WINTERTON, RANDY
0959S
LAGRANDE, OR 97850

WITHERS, LOUIS D.
1741S
WAPATO, WA 98951

WITHROW, CLAY
1791S
SELAH, WA 98942

WITTE, DON
2443S
HINES, OR 97738

WJAN, DENNIS
0988S
LAGRANDE, OR 97850

WOCK, JULIUS L.
0372S
MOUNTLAKE TERRACE, WA
98043

WOHL, DEAN K.
2006S
YAKIMA, WA 98908

WOLCOTT, G
0042S
RICHLAND, WA 99352

WOLSLEBEN, ROBERT D
2213S
HORSESHOE BEND, ID 83629

WOOD, DENNIS
0947S
COVE, OR 97824

WOOD, JEFFREY L.
0270S
KENNEWICK, WA 99336

WOOD, JEFFREY L.
1346S
KENNEWICK, WA 99336

WOOD, JIM
5104S
NO ADDRESS, TRI CITIES
POSTMARK 993

WOODCOCK, KIM
1530S
YAKIMA, WA 98903

WOODRUFF, TRUMAN C
1235S
ELLENSBURG, WA 98926

WOODS, ROBERT E
0062S
MOUNTLAKE, WA 98043

WOODS, WILLIAM G
0465S
MOORHEAD, MN 56560-1436

WOGERD, ROD
1543S
YAKIMA, WA 98902

WOOTEN, GEORGE
1227S
WINTHROP, WA 98862

WORK, LEWIS M
0767S
BOISE, ID 83702

WORTHEN, DEL
2265S
LYLE, WA 98635

WORTZ, BARBARA
1152S
WENATCHEE, WA 98801

WRIGHT, DONALD E & ALMA
JUNE
0010S
MOSES LAKE, WA 98837

WRIGHT, DOUGLAS
1779S
YAKIMA, WA 98901

WRIGHT, GRAHAM J
1323S
BAINBRIDGE ISLAND, WA
98110

WRIGHT, JOHN M
1065S
POULSBO, WA 98370

WRIGHT, KEITH E.
1002S
ELGIN, OR 97827

WRIGHT, LEROY
5091S
MEDFORD, OR 97504

WRIGHT, MARVIN J & LINDA M
0729S
PORT ANGELES, WA 98362

WUSSEN, VIRGINIA
1914S
LEAVENWORTH, WA 98826

WYATT, DAVE
0196S
SEATTLE, WA 98118

WYCKOFF, T EVANS
0074S
SEATTLE, WA 98802

WYMAN, PETE
0116S
SPOKANE, WA 99208

WYSSEN, JUDY
1921S
LEAVENWORTH, WA 98826

WYSSEN, KARL
1824S
LEAVENWORTH, WA 98826

YAGER, PAT S
2380S
NO ADDRESS

YAKER, ROD
2032S
TACOMA, WA 98408

YATES, MACK C
2106S
EMMETT, ID 83617

YATES, RUSSELL
2349S
EMMETT, ID 83617

YESKE, LARRY
0752S
LAGRANDE, OR 97850

YOCUM, DENIS L.
0908S
CLE ELUM, WA 98922

YOKE, KENNETH E
0332S
BRIER, WA 98036

YORK, DANIEL
2429S
TACOMA, WA 98461

YORK, DAVE
0362S
TOUTLE, WA 98649

YORK, HERBERT E
1973S
STANWOOD, WA 98292

YORK, HERSCHEL
2103S
EMMETT, ID 83617

YORK, JIM
2164S
KENNEWICK, WA 99337

YOST, MICHAEL
2323S
EMMETT, ID 83617

YOSTING, MARK
1116S
MOSES LAKE, WA 98837

YOUNG, ALISON
1231S
SEATTLE, WA 98112

YOUNG, D
0237S
TACOMA, WA 98446

ZAGA, NICHOLAS
1820S
LEAVENWORTH, WA 98826

ZAHN, E
0007S
PORT LUDLOW, WA 98365

ZAHN, E
0164S
PORT LUDLOW, WA 98365

ZAHN, E.
1324S
PORT LUDLOW, WA 98365

ZAVON, BRUCE PAUL
0660S
BAINBRIDGE ISLAND, WA
98110

ZELLER, GERALD
0687S
SEATTLE, WA 98166

ZEMKE, RUTH
0970S
IMBER, OR 97841

ZENNER, CHRISTINE
2078S
SEATTLE, WA 98102

ZERRENNER, CARL F
1263S
ENTAIT, WA 98822

ZERRENNER, MARILYN J
1262S
ENTAIT, WA 98822

ZIEGLER, KIM S
1182S
SEATTLE, WA 98115

ZIER, MEL
1707S
YAKIMA, WA 98908

ZIMMERMAN, MOREY
0077S
LEAVENWORTH, WA 98826

ZOLLMAN, CRAIG
2115S
JOSEPH, OR 97846

ZOLLMAN, DELWYN
2120S
JOSEPH, OR 97846

ZONTEK, JR, ED
0693S
WENATCHEE, WA 98801

ZURIGN, DR SUSAN
2075S
SEATTLE, WA 98107

ZWIGHT, STEPHEN H
1420S
YAKIMA, WA 98908

REPRESENTATIVE COMMENTS AND FOREST RESPONSES

The Wenatchee National Forest received 4,665 responses to the Forest Plan and Draft EIS and 2,650 responses to the Supplement to the Draft EIS. Many of the individuals who responded to the Draft EIS also responded to the Supplement EIS. Comments received on the Supplement are distinguished by the letter "S" after the number.

The comments are arranged by resources and subjects with specific topics and concerns addressed under each category. These are followed by the Forest Service response.

The comments received were instrumental in the development the final Forest Plan and Final EIS. Several changes have been made that directly reflect the concerns and issues that were raised by the public.

Because of the magnitude of the response, there were comments that were similar in content. We have, therefore, chosen to respond to what we believe to be representative comments. Although some reviewers may not find their exact comment, we are confident they can find one that represents their point of view.

In responding to public comment the Forest Service followed regulation 40 CFR 1503.4, therefore responses are based on one or more of the following areas:

1. Modification of alternatives including the preferred alternative.
2. Development and evaluation of alternatives not previously given serious consideration by the agency.
3. Supplementation, improvement or modification of the analyses.
4. Factual corrections
5. Explanation of why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response.

Types of comments received, not related to this planning process and, therefore not responded to include:

Several comments were of a site-specific nature or were an expression of opinion not related to the Forest Plan or EISs. Examples include, administration of rules in campgrounds, design of campground facilities, or littering of the forest. Comments relating to a specific Ranger District were forwarded to the District. Comments not relating to the Plan or EIS were not addressed and cannot be traced in this Appendix.

Several comments were editorial in nature and referred to errors in tables or inconsistency in numbers. We have not responded directly to all of the editorial type comments, but we have reviewed each and have made appropriate corrections where applicable.

Comments received on rules and regulations for the administration of contracts and permits have not been included. These types of concerns are responded to through another process which includes publishing rules and regulations in the Federal Register under the Code of Federal Regulations (CFR). When new regulations are published a public comment period is involved in that process.

Comments on the need for more law enforcement have been noted but not responded to in this process.

In order to make it easier for the respondent to find the response to their comments we have included respondent numbers just before the forest service response. Please recognize due to the volume of responses received and the logistics involved in this effort some errors or omissions may have occurred.

RECREATION

1 HOW WILL LAND ALLOCATIONS PROVIDE FOR VARIOUS RECREATION OPPORTUNITIES?

COMMENTS INCLUDED:

“I would like to see more land open for hunting and fishing, etc.”

“I feel your emphasis should be on recreation not timber.”

“Whether it is planned or not, as the population of the country increases, there will continue to be a substantial increase in recreation uses throughout the Wenatchee National Forest. (The Pacific Northwest is just being “discovered” recreationally by the rest of the country!) Any place chosen that does not take this increase into consideration is unrealistic.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0001, 0017, 0023, 0035, 0049, 0080, 0147, 0228, 0430, 0442, 0540, 0578, 0587, 0589, 0618, 0669, 0749, 0896, 1675, 1939, 2004, 2053, 2059, 2073, 2097, 2168, 2180, 2205, 2414, 2723, 2730, 2737, 2747, 2752, 2756, 2759, 2776, 2778, 2791, 2795, 2797, 2826, 2832, 2849, 2850, 2854, 2881, 2919, 2929, 2994, 3016, 3019, 3020, 3081, 3083, 3118, 3125, 3142, 3171, 3176, 3186, 3220, 3241, 3249, 3278, 3282, 3287, 3346, 3381, 3400, 3427, 3473, 3478, 3479, 3493, 3516, 3530, 3572, 3603, 3621, 3650, 3832, 3833, 3867, 3873, 4073, 4086, 4160, 4181, 4198, 4243, 4269, 4302, 4406, 4434, 4439, 4459, 4460, 4489, 4491, 4493, 4494, 4496, 4498, 4501, 9074, 9092, 0022S, 0040S, 0061S, 1053S, 1154S, 1155S, 1405S, 2055S, 2071S

FOREST SERVICE RESPONSE:

These points are well taken. An emphasis on recreation has occurred nationally with the new Recreation Strategy initiated by the Chief of the Forest Service. We have modified all the alternatives in the final Forest Plan to place more emphasis on recreation opportunities, maintenance of the recreation setting and improving the quality of trails, trailheads, campgrounds and other recreation facilities. We have greatly increased the scope and scale of our Capital Investment Program for developed sites and trails. (See Appendix A of the Forest Plan). In most alternatives we have increased the number of acres that will remain unroaded for more semi-primitive opportunities.

As part of the emphasis on recreation we have completed an analysis of additional rivers to be recommended for Wild and Scenic designation in various alternatives. (See Appendix E of the FEIS.) A specific management prescription for the Mather Memorial Parkway has been developed with more emphasis on recreation and scenery. (See Management Prescriptions, Chapter IV of the Forest Plan.)

2 MANAGEMENT OF DEVELOPED RECREATION SITES. (CAMPGROUND, PICNIC AREAS, BOATING SITES, ETC.)

COMMENTS INCLUDED:

“Recreation uses should be limited to those which will eventually provide a natural, historic, restored condition. We would wish to see the flow of recreational traffic stopped on National Forest lands.”

“We hope you will continue to provide many small, dispersed campgrounds (including some primitive ones) rather than over developing and centralizing them.”

“Some or maybe all campgrounds need to be fixed up. My family likes camping where there is a water system.”

“Allowing small non-fee developed campgrounds to deteriorate and disappear is the wrong answer.”

“I do not like the idea of campgrounds and recreation areas being contracted out for operation.”

“Our desire is to avoid a structural campground. Facilities and improvements desired are sanitary facilities, all weather surface (crushed gravel), some tent camping spots on the periphery, maximum retention of forest, and water supply.”

“There are few R.V. dump stations on the Forest.”

“I'd put more emphasis on developing nature trails, VIS opportunities, retrofitting developed sites for handicapped use and longer vehicles, replacing worn-out facilities, installing ski huts...etc.”

“Although it makes fiscal sense to invest recreation dollars in fee sites, the Forest Service should also resist the temptation to phase out all non-fee sites. Non-fee sites have been extremely popular over the years because many users prefer not to camp in large camp areas.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0018, 0037, 0044, 0061, 0094, 0147, 0262, 0540, 0562, 0577, 0587, 0588, 0598, 0605, 0881, 0896, 0899, 0950, 1873, 1940, 1945, 2062, 2143, 2414, 2716, 2723, 2748, 2749, 2755, 2780, 2789, 2791, 2796, 2800, 2819, 2826, 2835, 2851, 2856, 2862, 2869, 2872, 2877, 2879, 2887, 2888, 2889, 3241, 3256, 3478, 3650, 3742, 3833, 3862, 3865, 3872, 3873, 4083, 4156, 4198, 4199, 4209, 4239, 4295, 4434, 4435, 4447, 4465, 4467, 4470, 4489, 4512, 9014, 9034, 9047, 0052S

FOREST SERVICE RESPONSE:

The Forest Service, nationwide, has initiated a new recreation strategy that provides new goals and policies in the management of outdoor recreation programs. This emphasis is responsive to public interest across the nation and agrees with the majority of the comments we received regarding the management of developed sites and areas.

In the development of the alternatives we considered a range of developed recreation sites in all Recreation Opportunity Spectrum (ROS) Classes and a range of developed recreation management emphasis. We have also placed an emphasis on the quality of the recreation setting in the Standards and Guidelines in Chapter IV of the Forest Plan and in the various alternatives as described in Chapter II of the FEIS.

We have planned an extensive Recreation Construction Capital Investment Program for the next decade. (See Appendix A of the Forest Plan.) This program is geared to restore and rehabilitate our deteriorated recreation facilities and improve resource condition at developed sites.

The consequences of the alternatives on the recreation setting and recreation opportunities is explained in Chapter IV of the FEIS.

3 DEVELOPMENT OR EXPANSION OF DOWNHILL SKI AREAS.

COMMENTS INCLUDED:

“Downhill skiing is also highly destructive of forest ecosystems Downhill skiing far exceeds any acceptable level of impact and ought to be kept off public lands.”

“...would like to see alternative of down hill skiing in the Stormy Mountain region included in Final Draft of Forest Plan.”

“I want to go on record supporting expansion of all 3 ski areas to facilitate greater avenues of wholesome winter recreation for our growing population.”

“The alpine ski industry is a clean industry, with very low impact on the environment. It provides a healthy winter recreation with a very low impact on the environment.”

“All ski areas must be fully developed before new sites are considered.”

“It is equally important to include in the final plan, an RE-1 Category recognizing the expansion and development potential of Echo Valley and the Stormy Mountain Ski areas since winter sports help expand our recreation season.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0582, 0614, 0793, 0834, 2034, 2068, 2097, 2120, 2138, 2734, 2835, 2850, 2968, 2970, 3021, 3023, 3036, 3312, 3316, 3478, 3530, 3556, 3643, 3695, 3748, 3862, 4186, 4295, 4415, 4419, 4434, 4457, 4502

FOREST SERVICE RESPONSE:

The alternatives displayed in Chapter II of the FEIS each contain a discussion concerning expansion or development of new ski areas. The amount of ski area development emphasis is consistent with the emphasis of the specific alternative.

Any expansion outside the present permit boundaries of a ski area requires thorough environmental analysis, usually including an environmental impact statement. Such a document includes detailed analysis of potential environmental impacts, the demand for additional ski capacity, and the benefits to the public.

There is currently no proposal for development of a ski area on Stormy Mountain. In the preferred alternative the land allocations on Stormy Mountain are GF and RE-2a (unroaded motorized recreation). Neither allocation precludes future consideration for a ski area there, however a change in allocation to RE-1 would likely be necessary as part of an EIS.

Recognizing potential for new development, the Alpine Lakes Area Land Management Plan provides direction to manage the Dardenelles Area east of Stevens Pass to retain its potential for future development of an Alpine Ski Area.

4 HOW WILL THE FOREST PLAN ALLOCATE WINTER RECREATIONAL OPPORTUNITIES AND HOW WILL THEY BE MANAGED?

COMMENTS INCLUDED:

“We recommend additional trails for winter sports. The district needs to address the demand of groomed trails for snowmobiles and cross country skiing.”

“We need x-c ski trails which are easy to get to, not too difficult, and are restricted for skiers only. Some forest roads should be closed to ORV’s and snowmobiles for this reason.”

“I saw little attention paid to increased opportunity for winter sports, especially ski touring.”

“Areas set aside for winter, non-motorized use (outside wilderness and RE-3) should be designated.”

“During winter additional campgrounds and parking areas should be made available for snow-oriented recreationists.”

“The Forest Plan is also over-emphasizing snowmobile use over non-motorized use, such as cross-country skiing.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0066, 0363, 0493, 0577, 0587, 0898, 1943, 2097, 2728, 2827, 2885, 2932, 2945, 2958, 3016, 3255, 3333, 3439, 3473, 3700, 3746, 3748, 3873, 3911, 4211, 4264, 4276, 4439, 4440, 4475, 4477, 4493, 4500, 4503

FOREST SERVICE RESPONSE:

The various alternatives place an emphasis on a balance of recreation opportunities evenly distributed across a wide spectrum of natural settings. This balance is as important for winter recreation as it is for summer recreation. The 10 year Capital Investment Program for trails and trailheads includes planned cross-country ski trails and new snoparks.

The needs for cross-country ski trails, snowmobile trails, dog sledding, snow shoeing or general snow play activities are normally addressed in Recreation Composite plans developed for specific recreation areas or major drainages. These plans are prepared at the District level and are coordinated with the known users of the area or other interested organizations, groups, and the general public. Such composite plans generally include an environmental assessment. The plans form the basis for development of specific project proposals.

Specific balances of uses or emphasis of one use over another are issues to be identified and resolved in the Composite plans. The Forest Plan provides the guidance in terms of land allocation.

Winter recreation is compatible with all prescription except EW-1 and partially with EW-3. In EW-1 winter range for big game is the primary emphasis which may preclude some winter recreation activities. In EW-3, which emphasizes unroaded key big game habitat, motorized winter recreation may be affected. Winter logging may impact winter recreation particularly in the GF prescription. However, snow plowing associated with winter logging may also provide access for some types of winter recreation. Winter recreation activities need to be well planned and managed in coordination with relevant management prescriptions. Refer to Chapter IV of the Forest Plan, Management Prescriptions, for a description of the recreational component within various land allocations.

5 WE ARE CONCERNED ABOUT COMMODITY DEVELOPMENTS SUCH AS ROADS AND TIMBER HARVEST AND THEIR IMPACT ON THE TRAILS, THE RECREATION SETTING, AND RECREATION OPPORTUNITIES.

COMMENTS INCLUDED:

“The Wenatchee area deserves the highest degree of protection from road building, ORV’s, and timber cutting.”

“The withdrawing of mineral rights would have a positive effect on the forest, especially recreation.”

“Timber harvest and recreation do not overlap usually. Save some old growth for nature study in special areas (nature trail at picnic ground for example).”

“Rerouting trails around clearcuts is unacceptable.”

“I am particularly concerned about the degradation and elimination of hiking trails through adoption of the ‘Multiple-Use’ concept, which in fact results in sole use by off-road vehicles, and by the expansion of logging operations and logging roads.”

“The difference between resource users is frequently exaggerated. One can and does complement the others. Recreation is a major use of the Forest partly as a result of, not in spite of timber management. Further development of recreation need not come at the expense of timber production.”

“To reduce the conflict between cutting and trails, we would prefer a management policy which would assure that trails which are impacted will be restored and properly marked.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0035, 0036, 0045, 0064, 0150, 0325, 0386, 0390, 0415, 0507, 0520, 0528, 0556, 0579, 0582, 0594, 0612, 0635, 0729, 0745, 0812, 0879, 1939, 2004, 2005, 2017, 2040, 2053, 2094, 2132, 2135, 2475, 2596, 2719, 2723, 2734, 2751, 2767, 2789, 2790, 2791, 2796, 2817, 2835, 2854, 2892, 2919, 2954, 3004, 3057, 3058, 3080, 3146, 3148, 3150, 3160, 3171, 3198, 3208, 3211, 3245, 3246, 3249, 3256, 3260, 3261, 3272, 3282, 3284, 3287, 3323, 3373, 3378, 3396, 3426, 3427, 3466, 3472, 3493, 3518, 3520, 3535, 3590, 3606, 3610, 3611, 3621, 3627, 3648, 3650, 3685, 3712, 3715, 3723, 3766, 3819, 3824, 3862, 3876, 3905, 3914, 4082, 4128, 4141, 4200, 4241, 4257, 4259, 4296, 4410, 4476, 4484, 4491, 4494, 4498, 4503, 4511, 4534, 9003, 9038, 9047, 9074, 9092, 9113, 0029S, 0414S

FOREST SERVICE RESPONSE:

Between the Draft and Final the alternatives have been modified to reflect the importance of recreation and wilderness. The Standards and Guidelines in Chapter IV of the Forest Plan have also been changed to provide greater emphasis on recreation.

The Forest Plan contains management prescriptions with Standards and Guidelines that provide direction for coordination of commodity activities with recreation management. Each prescription, depending on the emphasis of land allocation, has different criteria which guide recreation management within that area. The standards and guidelines also provide direction for the protection of the recreation setting and recreation opportunities. (Refer to the Forest Plan, Chapter IV)

There will be some disturbance of trails by development on the Forest such as timber sale activity. Where trails are involved in a sale area the trails will be either restored to pre-timber sale conditions, relocated or rehabilitated. There will be no loss of trail mileage, however there will be modification of the recreation setting in areas allocated to the GF prescription, which emphasizes timber production.

In all cases, projects will be planned to minimize impacts on recreation resource values.

6 MANAGEMENT POLICY REGARDING RECREATION SPECIAL USE PERMITS.

COMMENTS INCLUDED:

“The DEIS did not address the issue of special use recreation permits.”

“How many guides and how many use days occur so the public can comment.”

“The Alpine Lakes Plan prohibits commercial use (outfitter-guides) from operating in the Enchantments....Our proposal is to allocate 10 percent of the PAOT (currently 6 people at one time) for guided use.”

“I do not like the idea of the campgrounds and recreation areas being contracted out for operation. While it may seem economically desirable, I have seen other areas where the commercialization has destroyed the very experience the people seek in using the forest.”

“I do hope that plans will allow continued use of cabin (recreation residence).”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0003, 0022, 0344, 0415, 0582, 0900, 1940, 1943, 1946, 2029, 2073, 2727, 2832, 2868, 2889, 3229, 3286, 3879, 4176, 4425, 4434, 4465, 4494, 4498, 4512, 9014, 0224S

FOREST SERVICE RESPONSE:

With the new National Recreation Strategy, recreation special use permits will continue to be a major program for providing recreation activities and opportunities for the public. We see no significant changes in the range of activity or the type of permits that are granted to the private sector for services on the National Forest. This strategy is consistent with the preferred alternative of this Plan.

A part of the emphasis of the new recreation strategy is partnerships. We will be actively seeking out partners to expand the capacity of our funds in meeting recreation demand. A major means in securing partnerships is through special use permits.

The recreation residents permits will continue through the life of this Plan at near the current number.

Outfitter-Guides will continue to provide unique recreating opportunities in a wider range of recreation activities. Outfitter-Guide permits have specific management criteria for operations in wilderness (see Forest Plan, Appendix E). This direction also provides the flexibility necessary for operators to negotiate party size and caching of equipment necessary for their specific operation.

Resorts, organization camps, and club sites will continue to be important developments for public recreation. The Forest Service will encourage partnership with such organizations to develop a cadre of interpretive naturalists Forest-wide to offer tours and interpretive programs to the visiting public.

Proposed recreation development will still require appropriate environmental analysis and will be subject to the site specific requirements of the applicable land management prescription.

7 HAS RECREATION PLANNING ANALYSIS ADEQUATELY ADDRESSED RECREATION SUPPLY AND DEMAND AND ECONOMIC VALUES?

COMMENTS INCLUDED:

“The economic value of recreation and forest amenities is under-estimated, and the potential for economic loss to these sectors is not reported.”

“ROS classifications are not a good indicator of economic values (DEIS II-156) since, except for wilderness, there is no correlation with the budget line items and Forest Service cost and revenues. There is a high probability that ROS use will be abandoned by the Forest Service in the near future due to the limited utility in recreation planning and management.”

“With over 1 million acres of Wilderness and roadless areas under any alternative receiving less than 10% of the total RVD’s clearly shows the supply exceeds the demand for that type of allocation. On the Forest as a whole, the recreation supply exceeds the demand by considerable margin.”

“You have assumed demand for recreation facilities will grow commensurate with population growth. Be aware that recreation demand can and often does exceed population growth and must be anticipated.”

“DEIS page IV-107. The Forest has assumed that the number of recreations visits won’t vary between alternatives. This is wishful thinking used to backup large cutting levels.”

“Level of analysis and accuracy of data - validity of conclusions drawn - doubtful about number of visitor days.”

“The Forest Plan makes the assumption that there is an enormous excess capacity of trails and roadless area on the Forest. This assumption is based on theoretical RVD capacity estimates that work well in a computer but often don’t apply on the ground.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0001, 0013, 0034, 0069, 0107, 0363, 0393, 0417, 0578, 0579, 0580, 0582, 0588, 0589, 0635, 0650, 0816, 0840, 0868, 0870, 1977, 1998, 2002, 2053, 2058, 2097, 2137, 2166, 2205, 2206, 2723, 2737, 2751, 2755, 2771, 2773, 2776, 2791, 2832, 2868, 2881, 2929, 2945, 2949, 2967, 2968, 2996, 3008, 3016, 3032, 3050, 3081, 3085, 3131, 3138, 3141, 3161, 3165, 3189, 3227, 3243, 3255, 3300, 3309, 3315, 3317, 3322, 3409, 3410, 3439, 3443, 3446, 3493, 3509, 3516, 3551, 3553, 3570, 3572, 3573, 3602, 3648, 3667, 3692, 3725, 3746, 3755, 3871, 3872, 3911, 3945, 4011, 4068, 4112, 4173, 4199, 4200, 4229, 4248, 4405, 4426, 4435, 4448, 4449, 4477, 4484, 4485, 4489, 4490, 4493, 4493, 4494, 4498, 4501, 4511, 9024, 9041, 9067, 9068, 9082

FOREST SERVICE RESPONSE:

The economic values for recreation are the best figures that are available to us at this time. We are concerned that we use appropriate estimates and will be using research to refine of estimates in the future. Placing a dollar value on recreation opportunities and related amenity values is a difficult endeavor.

The Recreation Opportunity Spectrum (ROS) classes are not indicators of economic value, but are indicators of the recreation opportunities and recreation settings available in the forest. These settings, or the recreation experiences they provide, have economic value. The ROS system of describing the recreation opportunities is increasing in use and application. In the future, there is strong likelihood that ROS classes will be further refined and broken down into subclasses. We are now using the ROS system in wilderness with further breakdown of the Primitive and Semi-Primitive classes into pristine and transition.

The figures for recreation supply and demand have been significantly modified since the Draft (see Chapter II of the Forest Plan). Estimates of growth in recreation visitor use were underestimated when the original projections were made in the period 1982-1984.

The percent of the total of Recreation Visitor Days (RVD's) that occur in wilderness and unroaded areas is not a good measure of the relative value or significance of unroaded and wilderness recreation experiences. What is of significance is the estimated visitor use or demand for recreation opportunities compared to the capacity of the forest to provide those opportunities. For developed recreation, the capacity of 6,700,000 RVD's exceeds the estimated demand of 3,449,300 RVD's. However, for the capacity to be fully utilized, the sites would have to be full seven days a week for the entire managed season. Generally sites are only full on weekends and holiday periods.

The estimated demand for dispersed roaded recreation is far less than the capacity. However, this is not surprising considering the large capacity of the roaded areas of the forest to accommodate road-related recreation.

At this time, we lack the data to know the exact capacity of the forest areas outside of developed recreation sites and areas. Our estimates are based on the Region 6 Recreation Opportunity Spectrum User Guide which contains a user density coefficient that is applied to each acre of a roaded or unroaded area. The density coefficient is an attempt to estimate how many users will recreate in a given area before they find the area too crowded and go elsewhere.

In wilderness, we have shifted away from carrying capacities and are using the limits of acceptable change concept in determining when an area is receiving overuse or unacceptable impact. This does not give us an estimate of the capacity for visitor use. In the future, we will be doing inventories which will help us estimate the people-at-one-time (PAOT) capacity of areas of wilderness. For the present, we are using the density coefficients for undeveloped areas.

Our estimated demand figures take into account new users and population growth. In the future, we hope to account for displaced users who come to this forest from other areas and users who are shifting their activity or setting preferences. There also will be new users introduced to the forest through the development of new technology.

We have assumed that the estimated number of RVD's of use will not change by alternative. This is because there is not a large difference in the recreation allocations and emphasis between alternatives for Developed and Roaded Dispersed Recreation activities which make up 90 percent of the estimated use. Furthermore, there is no variation in wilderness management between alternatives.

8 WILL THE FOREST SERVICE RECEIVE THE RECREATION BUDGET TO REPAIR AND REPLACE FACILITIES, MAINTAIN TRAILS, AND IMPLEMENT THE FOREST PLAN?

COMMENTS INCLUDED:

“Comments on the proposed land and resources management p. 113: Your admission that the potential to expand or develop new developed recreation facilities is affected by budgets is quite revealing. Why does the Forest Service continue to submit budgets to Congress which continually under-budget funds for wildlife, fisheries, trails, and recreation and over-budget funds for timber sales and road construction?”

“We note the Alpine Lakes Management Plan has been incorporated in all DEIS alternatives. We also note that although the plan has been implemented, the Forest's level of funding has not been adequate to realize all the components of the plan. Can we expect this to be true also with the Forest Plan?”

“Sufficient monies should be budgeted to maintain trails, including those in Wilderness Area.”

“I would like to see the Bush Administration promote and support through expanded budgets, recreational uses of our National Forests including improved maintenance of trails, access roads and campsites.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0828, 2201, 2778, 2791, 3255, 3873, 4083, 4468

FOREST SERVICE RESPONSE:

Local recreation budget requests typically exceed the amounts appropriated in the Federal budget. Of course, Congress and the President must balance this appropriation against budget needs for a vast array of other Federal budget needs. Budgets for Forest Service recreation programs have increased in recent years despite reductions in other areas of the Federal budget. We have built a projected budget for each Forest Plan alternative by decade that is our best estimate of the cost of full implementation of the Forest Plan. We can now, probably better than ever before, display to Congress what outputs can be achieved at a specific level of funding. Based on National priorities, we will likely receive some percentage increment less than the full implementation budget with a proportional decrease in outputs.

9 WE ARE CONCERNED ABOUT THE IMPACTS OF RECREATION VISITORS ON FOREST RESOURCES AND OTHER PEOPLE.

COMMENTS INCLUDED:

“The Forest Service would be better off trying to maintain the existing state of the area’s National Forests, as increasing numbers of outdoor recreationists are causing severe nature and wildlife damage itself.”

“All users should pick up what they pack out.”

“We would wish to see the flow of recreational traffic stopped on National Forest lands.”

“Damage is also often apparent from off-road vehicles in sensitive meadows and backcountry places.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0001, 0010, 0017, 0021, 0045, 0060, 0062, 0064, 0066, 0082, 0097, 0107, 0113, 0124, 0127, 0147, 0226, 0262, 0286, 0344, 0357, 0376, 0381, 0417, 0420, 0432, 0434, 0493, 0508, 0528, 0535, 0541, 0552, 0557, 0559, 0562, 0575, 0582, 0587, 0591, 0597, 0598, 0602, 0605, 0612, 0624, 0630, 0634, 0635, 0636, 0670, 0721, 0730, 0738, 0789, 0792, 0812, 0818, 0826, 0827, 0898, 0950, 1300, 1304, 1939, 1940, 1947, 1960, 1964, 1971, 1978, 1981, 1989, 1997, 2002, 2003, 2005, 2007, 2016, 2017, 2031, 2053, 2064, 2079, 2080, 2081, 2086, 2093, 2094, 2121, 2131, 2132, 2159, 2166, 2176, 2177, 2197, 2208, 2715, 2719, 2732, 2739, 2769, 2772, 2773, 2775, 2776, 2782, 2787, 2791, 2800, 2815, 2816, 2817, 2819, 2820, 2832, 2834, 2837, 2850, 2852, 2853, 2856, 2862, 2865, 2868, 2877, 2887, 2907, 2909, 2911, 2913, 2916, 2919, 2932, 2942, 2944, 2945, 2956, 2958, 2960, 2964, 2967, 2968, 2969, 2992, 2993, 2994, 2995, 3000, 3006, 3024, 3027, 3029, 3034, 3047, 3048, 3055, 3057, 3079, 3085, 3103, 3114, 3115, 3117, 3118, 3125, 3126, 3129, 3130, 3133, 3150, 3156, 3162, 3172, 3182, 3183, 3186, 3191, 3198, 3203, 3210, 3211, 3212, 3214, 3225, 3228, 3229, 3233, 3235, 3239, 3245, 3246, 3255, 3256, 3257, 3261, 3263, 3287, 3309, 3310, 3318, 3328, 3361, 3392, 3394, 3396, 3409, 3410, 3429, 3439, 3446, 3448, 3460, 3462, 3464, 3469, 3473, 3475, 3486, 3489, 3501, 3509, 3515, 3518, 3520, 3534, 3548, 3550, 3552, 3553, 3560, 3567, 3572, 3575, 3576, 3588, 3606, 3607, 3610, 3611, 3615, 3621, 3627, 3632, 3655, 3667, 3668, 3671, 3677, 3682, 3700, 3707, 3710, 3715, 3720, 3725, 3728, 3729, 3732, 3741, 3751, 3769, 3782, 3783, 3802, 3809, 3810, 3811, 3814, 3824, 3834, 3873, 3877, 3878, 3883, 3885, 3910, 3911, 3936, 3939, 3940, 3949, 3991, 4019, 4023, 4035, 4049, 4050, 4065, 4066, 4067, 4069, 4074, 4082, 4083, 4092, 4104, 4109, 4124, 4133, 4139, 4140, 4143, 4148, 4149, 4150, 4156, 4166, 4167, 4169, 4173, 4208, 4209, 4243, 4244, 4245, 4246, 4257, 4259, 4263, 4269, 4277, 4298, 4400, 4409, 4410, 4415, 4416, 4417, 4418, 4433, 4439, 4449, 4450, 4451, 4453, 4456, 4464, 4475, 4477, 4493, 4496, 4496, 4498, 4501, 4507, 4510, 4511, 9003, 9004, 9009, 9011, 9014, 9018, 9033, 9045, 9050, 9052, 9055, 9084, 9093, 9098, 9105, 0332S, 0675S, 0678S, 0698S, 0718S, 1063S, 1156S, 1359S

FOREST SERVICE RESPONSE:

The perception of undesirable impact often is in the eye of the beholder. Many long-time forest managers believe that individual users have less impact on the forest environment than they did 10 or 20 years ago. Many users understand minimum impact camping principles and are willing to clean up litter or put out campfires left by others.

Land allocation in the Forest Plan is an attempt to match land capabilities and forest environmental characteristics with appropriate land use. This approach seeks to avoid the incompatibility of high recreation use within critical habitat for a specific wildlife species, for example. Understanding that some impact may accompany human activity, each land allocation has a set of Standards and Guidelines to

direct land managers. These standards set limits on the degree of effect an activity is allowed to generate or prescribes approaches to avoid or mitigate undesirable impacts. (See Chapter IV of the Forest Plan.)

Many social impacts such as noise, dust, litter, and minor user conflicts can be avoided through planning and design of recreation sites and facilities as well as user education. We are working to improve our recreation planning capabilities. Other social impacts may be handled through administrative actions or law enforcement at the local level.

10 HOW WILL CONFLICTS BETWEEN MOTORIZED AND NON-MOTORIZED USERS OF TRAILS BE RESOLVED?

COMMENTS INCLUDED:

“I strongly oppose the proposal to open any trails in roadless to ORV’s. There are no words for the helpless rage and frustration of a hiker blasted off a beautiful and quiet trail, the damage ORV’s do to the fragile vegetation that hikers have been so careful to protect.”

“The Forest Service has not adequately considered the compatibility of ORV use with the environment or with other forest users. Such an omission violates Executive Orders 11644 and 11989 as well as NFMA (36 CFR 219.21(g)).”

“Enforce ORV regulations on motorized trails. Until the FS can insure better enforcement of ORV regulations, no new ORV trails should be constructed.”

“Such short ORV trails dead ending at Wilderness only invite violation of the boundary.....In areas where conflicts exist, such as Mad Lake high country, consideration should be given to development of separate trails to lessen conflict.”

“Most motorcycle riders do not camp up in the fragile mountain areas. They stick to the trails. Camping hikers are the ones responsible for the damage to the environment around favorite camping areas.”

“I would hope that you will take these concerns very seriously as you review the Forest Plan for the Wenatchee National Forest and make sure that whenever there is conflict, ORV use be eliminated so the letter and spirit of Executive Orders 11644 and 11989 can be fully enforced.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0001, 0010, 0017, 0021, 0027, 0029, 0039, 0045, 0050, 0058, 0060, 0062, 0063, 0066, 0070, 0071, 0076, 0080, 0082, 0090, 0096, 0097, 0101, 0107, 0108, 0114, 0119, 0123, 0125, 0127, 0134, 0150, 0226, 0312, 0325, 0344, 0376, 0381, 0385, 0389, 0396, 0415, 0417, 0420, 0423, 0427, 0432, 0436, 0438, 0439, 0441, 0488, 0489, 0493, 0497, 0507, 0520, 0521, 0525, 0528, 0535, 0536, 0539, 0540, 0549, 0550, 0552, 0555, 0556, 0557, 0558, 0559, 0570, 0571, 0572, 0588, 0590, 0591, 0594, 0599, 0601, 0605, 0608, 0609, 0610, 0612, 0616, 0618, 0621, 0624, 0626, 0630, 0632, 0636, 0637, 0646, 0655, 0659, 0663, 0717, 0726, 0730, 0736, 0744, 0745, 0748, 0749, 0789, 0792, 0793, 0796, 0812, 0816, 0821, 0822, 0826, 0832, 0841, 0862, 0863, 0864, 0871, 0873, 0877, 0898, 1300, 1304, 1305, 1939, 1940, 1943, 1947, 1955, 1960, 1962, 1964, 1965, 1967, 1970, 1971, 1972, 1973, 1977, 1978, 1980, 1981, 1984, 1989, 1990, 1991, 1995, 2002, 2003, 2004, 2005, 2006, 2007, 2016, 2017, 2019, 2021, 2022, 2025, 2028, 2031, 2032, 2035, 2038, 2040, 2047,

2052, 2053, 2055, 2060, 2064, 2065, 2071, 2074, 2079, 2080, 2081, 2086, 2093, 2119, 2121, 2131, 2132, 2135, 2139, 2159, 2165, 2168, 2170, 2173, 2174, 2176, 2177, 2179, 2180, 2182, 2183, 2197, 2201, 2203, 2205, 2208, 2718, 2719, 2728, 2732, 2734, 2735, 2743, 2750, 2751, 2757, 2767, 2768, 2769, 2772, 2775, 2776, 2778, 2780, 2791, 2793, 2799, 2807, 2815, 2817, 2820, 2823, 2826, 2833, 2834, 2846, 2850, 2851, 2852, 2853, 2855, 2856, 2862, 2865, 2868, 2871, 2877, 2885, 2887, 2888, 2892, 2893, 2897, 2900, 2901, 2907, 2909, 2911, 2913, 2914, 2915, 2916, 2919, 2920, 2921, 2932, 2934, 2939, 2941, 2942, 2945, 2950, 2951, 2952, 2953, 2955, 2956, 2957, 2958, 2959, 2960, 2962, 2964, 2965, 2966, 2967, 2977, 2979, 2981, 2989, 2990, 2993, 2994, 2995, 2996, 2999, 3000, 3004, 3006, 3007, 3011, 3013, 3017, 3019, 3020, 3027, 3028, 3030, 3033, 3034, 3038, 3039, 3040, 3042, 3045, 3047, 3048, 3056, 3057, 3058, 3060, 3065, 3067, 3070, 3074, 3078, 3085, 3090, 3096, 3099, 3103, 3109, 3112, 3114, 3115, 3117, 3118, 3119, 3127, 3130, 3134, 3136, 3138, 3140, 3141, 3142, 3148, 3149, 3150, 3152, 3153, 3155, 3156, 3161, 3162, 3163, 3164, 3172, 3173, 3176, 3177, 3179, 3181, 3184, 3185, 3186, 3187, 3188, 3189, 3191, 3198, 3201, 3202, 3203, 3208, 3210, 3211, 3212, 3214, 3217, 3220, 3221, 3225, 3228, 3229, 3233, 3235, 3238, 3239, 3242, 3243, 3245, 3246, 3247, 3249, 3255, 3256, 3260, 3263, 3266, 3270, 3276, 3278, 3284, 3286, 3291, 3298, 3301, 3303, 3307, 3308, 3314, 3319, 3320, 3321, 3325, 3328, 3329, 3330, 3333, 3335, 3339, 3343, 3346, 3348, 3360, 3362, 3363, 3370, 3373, 3376, 3389, 3394, 3395, 3402, 3404, 3406, 3409, 3410, 3423, 3425, 3429, 3433, 3439, 3443, 3448, 3460, 3464, 3469, 3474, 3480, 3483, 3489, 3491, 3493, 3495, 3501, 3511, 3515, 3516, 3519, 3529, 3530, 3534, 3538, 3542, 3543, 3544, 3557, 3561, 3563, 3565, 3567, 3573, 3575, 3576, 3577, 3579, 3580, 3606, 3608, 3609, 3610, 3611, 3615, 3621, 3623, 3625, 3627, 3632, 3634, 3635, 3638, 3645, 3646, 3648, 3649, 3651, 3667, 3668, 3669, 3673, 3677, 3682, 3683, 3685, 3689, 3692, 3693, 3694, 3700, 3705, 3707, 3710, 3719, 3720, 3721, 3724, 3725, 3728, 3733, 3734, 3735, 3741, 3742, 3744, 3749, 3751, 3752, 3763, 3764, 3765, 3767, 3769, 3770, 3771, 3773, 3777, 3782, 3783, 3792, 3795, 3801, 3802, 3803, 3806, 3807, 3809, 3810, 3811, 3815, 3817, 3819, 3820, 3832, 3838, 3839, 3840, 3858, 3872, 3873, 3874, 3877, 3883, 3885, 3901, 3909, 3910, 3911, 3925, 3926, 3928, 3933, 3939, 3940, 3947, 3949, 3950, 3951, 3955, 3961, 3963, 3975, 3985, 3986, 3990, 3992, 3994, 3995, 4004, 4005, 4009, 4015, 4018, 4019, 4020, 4021, 4022, 4027, 4034, 4035, 4041, 4043, 4044, 4049, 4050, 4052, 4061, 4066, 4067, 4074, 4081, 4082, 4087, 4089, 4092, 4094, 4109, 4113, 4124, 4125, 4126, 4128, 4133, 4138, 4139, 4140, 4141, 4143, 4145, 4148, 4149, 4150, 4152, 4154, 4156, 4157, 4158, 4161, 4162, 4166, 4167, 4169, 4172, 4173, 4174, 4179, 4194, 4200, 4202, 4204, 4206, 4207, 4208, 4211, 4218, 4224, 4228, 4231, 4232, 4235, 4242, 4243, 4244, 4245, 4257, 4258, 4259, 4261, 4263, 4264, 4266, 4269, 4270, 4277, 4282, 4293, 4298, 4312, 4400, 4403, 4404, 4408, 4416, 4417, 4419, 4433, 4439, 4440, 4441, 4447, 4449, 4450, 4451, 4453, 4454, 4455, 4464, 4470, 4474, 4476, 4477, 4491, 4493, 4494, 4496, 4498, 4501, 4503, 4507, 4510, 4511, 9004, 9008, 9011, 9017, 9018, 9025, 9034, 9041, 9042, 9043, 9045, 9046, 9048, 9055, 9067, 9075, 9084, 9091, 9093, 9098, 9105

FOREST SERVICE RESPONSE:

We received extensive comment expressing high levels of concern about the user conflicts occurring on the Forest trail system. The majority of these conflicts are between hikers and ORV riders. Due to the magnitude of comment and the complexity of the uses of the trail system, we formulated an Interdisciplinary Team to analyze all aspects of ORV use on the Forest. Their major task was to look closely at the trail system available for ORV use and hiking, study the overlapping interests, and formulate proposals to reduce conflict and address problems identified in the public comments. The results of this analysis and the concurrent evaluation of unroaded areas were merged to form the management direction and unroaded area allocation described in the alternatives in the FEIS.

The most significant opportunity to reduce conflict through the Forest Plan is in allocation of unroaded areas into either RE-2a and 2b, Unroaded Motorized, or RE-3, Unroaded Non-Motorized. Refer to the alternatives in Chapter II of the FEIS. This allocation provides for separation of users on an area basis in some of the more controversial areas.

Also in the FEIS there is a breakout of the miles of trail available for different uses including hiking and motorized use (see Chapter II FEIS). These allocations were made in an effort to provide opportunities for motorized use and hiking in a variety of recreation settings. They also seek to match the designated use to other resource values of the immediate area and reduce user conflicts. Several changes were made to balance use. Some compromises are necessary by both hikers and motorized user.

We recognize that over the past 10 years emphasis has been placed on the improvement of multi-purpose trails open to trail bikes. For the next 10 years we will place emphasis on expanding trail opportunities for the non-motorized user. The Plan calls for the construction of more than 400 miles of new trail outside wilderness, most for non-motorized use. Of this, about 125 miles of construction is planned for multi-purpose trails open to trail bikes. This will be designed to provide loop trail opportunities and allow for separation of user groups. The new construction is expected to help reduce user conflict.

Outside of the Forest Plan allocations, user conflicts will be resolved through user education, monitoring of use and conflicts, and administration and enforcement of regulations at the Ranger District level. Increased patrols by back-country rangers are one example of increased administration.

11 HOW MANY MILES OF TRAIL WILL BE AVAILABLE FOR VARIOUS USER GROUPS SUCH AS HIKERS, HORSES, ATV, ORV, MTN. BIKES, AND 4X4'S?

COMMENTS INCLUDED:

"Please preserve and expand ORV use in the WNF. Our family recently entered the sport of 2 wheel ORV recreation. We find it very family oriented."

"I favor maintaining all existing trails for future use and not closing any trails for stock."

"I am concerned about the possibility of loss of hiking trails without plans for replacement. There is a need to maintain a good trail network for non-motorized users."

"Non-motorized recreationists need lower elevation areas so that they can hike, etc. most of the year."

"New trails should be built for livestock usage....."

"One of the best new concepts to be developed lately is the idea of hiking areas."

"In my opinion as an occasional backpacker: Horses are very destructive to trails and to meadow areas where they are grazed and bedded. It is an obnoxious nuisance to have to dodge their excrement as well as smell it on the trail"

"The Draft Plan, page IV-9, states that areas for the ATV type vehicle will be developed, yet nowhere in the document is it mentioned when and where such developments will take place...."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0001, 0005, 0012, 0014, 0015, 0017, 0019, 0020, 0021, 0022, 0029, 0035, 0036, 0039, 0046, 0050, 0060, 0061, 0062, 0066, 0067, 0069, 0070, 0071, 0074, 0078, 0080, 0091, 0096, 0099, 0108, 0114, 0115, 0119, 0123, 0124, 0128, 0130, 0131, 0132, 0134, 0135, 0148, 0150, 0310, 0311, 0313, 0315, 0316, 0317, 0343,

0344, 0345, 0358, 0361, 0381, 0390, 0406, 0409, 0415, 0416, 0419, 0421, 0423, 0432, 0433, 0436, 0437, 0484, 0502, 0512, 0514, 0516, 0522, 0548, 0551, 0553, 0556, 0558, 0560, 0578, 0579, 0587, 0591, 0593, 0594, 0597, 0598, 0599, 0605, 0609, 0612, 0617, 0618, 0622, 0624, 0625, 0627, 0630, 0633, 0634, 0635, 0646, 0649, 0662, 0668, 0669, 0681, 0721, 0723, 0727, 0737, 0738, 0739, 0745, 0749, 0750, 0793, 0796, 0818, 0819, 0827, 0828, 0837, 0841, 0845, 0863, 0872, 0896, 1300, 1304, 1939, 1940, 1947, 1956, 1959, 1962, 1965, 1966, 1990, 1991, 2002, 2006, 2008, 2010, 2019, 2022, 2028, 2039, 2040, 2051, 2052, 2053, 2062, 2065, 2080, 2086, 2094, 2120, 2132, 2135, 2143, 2159, 2162, 2174, 2179, 2180, 2182, 2189, 2200, 2203, 2206, 2562, 2713, 2715, 2719, 2721, 2728, 2732, 2734, 2745, 2746, 2747, 2751, 2763, 2767, 2772, 2775, 2776, 2777, 2780, 2787, 2789, 2791, 2796, 2797, 2798, 2804, 2807, 2820, 2830, 2832, 2840, 2844, 2851, 2852, 2854, 2856, 2866, 2868, 2877, 2889, 2892, 2900, 2911, 2913, 2914, 2919, 2939, 2942, 2950, 2954, 2955, 2957, 2962, 2968, 2989, 3004, 3005, 3014, 3020, 3034, 3045, 3056, 3062, 3073, 3076, 3080, 3085, 3096, 3099, 3112, 3146, 3148, 3160, 3189, 3198, 3199, 3202, 3208, 3212, 3217, 3218, 3220, 3225, 3228, 3229, 3233, 3242, 3243, 3246, 3249, 3255, 3256, 3262, 3273, 3276, 3279, 3285, 3286, 3291, 3297, 3301, 3304, 3313, 3323, 3326, 3333, 3336, 3343, 3349, 3352, 3365, 3371, 3373, 3374, 3375, 3377, 3378, 3383, 3385, 3387, 3392, 3393, 3402, 3404, 3410, 3416, 3417, 3418, 3419, 3426, 3431, 3439, 3440, 3465, 3469, 3474, 3480, 3482, 3483, 3486, 3490, 3492, 3493, 3519, 3520, 3530, 3544, 3553, 3554, 3561, 3564, 3568, 3569, 3572, 3579, 3590, 3603, 3604, 3606, 3608, 3611, 3615, 3621, 3627, 3631, 3633, 3638, 3648, 3649, 3650, 3660, 3671, 3672, 3687, 3689, 3690, 3710, 3712, 3714, 3718, 3725, 3733, 3735, 3736, 3738, 3739, 3740, 3744, 3745, 3746, 3761, 3764, 3769, 3796, 3809, 3820, 3823, 3833, 3859, 3862, 3864, 3865, 3872, 3873, 3874, 3877, 3879, 3891, 3900, 3901, 3903, 3905, 3907, 3909, 3911, 3914, 3924, 3955, 3957, 3958, 3959, 3961, 3962, 3963, 3964, 3966, 3968, 3969, 3970, 3972, 3973, 3974, 3975, 3976, 3977, 3978, 3979, 3980, 3981, 3982, 3983, 3984, 3985, 3987, 3989, 3992, 3994, 4003, 4004, 4005, 4007, 4020, 4023, 4027, 4049, 4050, 4066, 4068, 4075, 4085, 4086, 4092, 4093, 4094, 4105, 4113, 4129, 4138, 4139, 4141, 4143, 4151, 4155, 4200, 4207, 4224, 4228, 4243, 4246, 4251, 4258, 4259, 4263, 4268, 4276, 4281, 4283, 4296, 4298, 4312, 4339, 4360, 4408, 4410, 4415, 4417, 4428, 4434, 4436, 4441, 4449, 4452, 4454, 4455, 4465, 4469, 4472, 4476, 4477, 4491, 4493, 4494, 4498, 4503, 4504, 4507, 4511, 4534, 9003, 9004, 9014, 9041, 9043, 9045, 9048, 9056, 9067, 9075, 9113, 9114, 0018S, 0029S, 0052S, 0064S, 0190S, 0200S, 0212S, 0240S, 0321S, 0322S, 0330S, 0368S, 0413S, 0414S, 0460S, 0476S, 0500S, 0539S, 0544S, 0553S, 0619S, 0659S, 0662S, 0688S, 0689S, 0698S, 0715S, 1069S, 1073S, 1080S, 1100S, 1136S, 1200S, 1305S, 1328S, 2040S, 2045S, 2243S, 5115S

FOREST SERVICE RESPONSE:

The Interdisciplinary (ID) Team that was formulated to analyze ORV use on the Forest did a thorough analysis of the trail system as a whole. With involvement of representatives from each Ranger District, the ID Team made some changes in management objectives and trail use allocations. This new emphasis was responsive to public input and is the Team's best effort to formulate an equitably balanced trail system with outstanding opportunities for all users.

In the description of each alternative in Chapter II of the FEIS is a table showing the miles of trail available to motorized use by land allocation and the miles of trail administratively closed to motorized use. These figures are changed from the Draft EIS and are a result of the ID team analysis.

Appendix C of the FEIS, Roadless Areas, also contains an analysis and further breakdown of the trail system in unroaded areas. For information regarding uses of trails in wilderness refer to Chapter IV of the Forest Plan and Appendix E of the FEIS, Wilderness Management.

About 211 miles of the trail open to use by hikers, horses, and motorcycles have been constructed or reconstructed in past years with tread hardening and turnpiking for use by trail bikes. These trails are very popular with motorcycle riders. Although these trails are available to hikers or horseback riders, those who object to periodic trail bike encounters may wish to choose other trails.

In addition to this trail system, there are about 100 miles of trail which have been built specifically for 4x4 vehicles and are open to ATV's. These trails are not well-suited to other uses.

We have no specific proposals for ATV use opportunities although we are open to suggestions and proposed routes. We know there is interest from the public.

12 MAINTENANCE AND OPERATION OF TRAILS AND TRAILHEADS.

COMMENTS INCLUDED:

“Public maintenance of trails should be encouraged to offset revenue loss.”

“The idea of connecting trails together to form loops is very important. But the money that's being spent on cinder-blocks is really appalling.”

“Trail maintenance work must also be increased on existing trails.”

“More signs should be placed, particularly at intersections of trails.”

“That primitive toilets be placed every so often off trails.”

“Why not provide the most primitive crossings on a foot log accommodating hikers but not pack animals.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0038, 0062, 0494, 0517, 0556, 0636, 0657, 0738, 0747, 0748, 1940, 1943, 2017, 2022, 2073, 2198, 2713, 2772, 2775, 2832, 2866, 2891, 2892, 2945, 3160, 3189, 3248, 3255, 3281, 3286, 3301, 3313, 3370, 3374, 3377, 3387, 3569, 3631, 3712, 3725, 3746, 3811, 3859, 3873, 3879, 3914, 3992, 4049, 4050, 4069, 4104, 4186, 4200, 4259, 4408, 4410, 4476, 4498, 4511, 9014, 9034, 9046, 9075, 9092, 9113, 0063S, 1160S

FOREST SERVICE RESPONSE:

The operation and maintenance of trails and trailheads is a project level function not considered in Forest planning. Trail maintenance standards are established in Forest Service Manuals and Handbooks. Operational procedures or use of volunteers come under the administration of the Ranger Districts. However, we have passed comments received on to the Ranger Districts for their use and considerations. Public comment is very helpful in the design of trailheads and the facilities we provide for public use.

13 WHAT CAN BE DONE ABOUT TRAILHEAD VANDALISM AND VEHICLE BREAK-INS?

COMMENTS INCLUDED:

“We need better and more protected trailhead parking to help stop vandalism of parked vehicles. (Maybe a pay system of some kind to help post a guard.)”

“Trailhead vandalism and theft remain a major problem in the Wenatchee National Forest as elsewhere. This problem should be addressed in any comprehensive management plan of our forest. I believe one way to deal with this is to build campgrounds at all trailheads.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0094, 2775, 2945, 4408

FOREST SERVICE RESPONSE:

Vandalism and break-ins at trailheads is a problem that concerns us a great deal. However, this topic is outside the scope of the Forest Plan which is focused on land allocation and land management Standards and Guidelines. We have passed your comments and suggestions on to the Ranger Districts for their considerations.

There are many trailheads on the Forest at locations which would appear to be marginal locations for campgrounds. Levels of use at many trailheads, especially mid-week, probably would not be sufficient to pay a guard. However, these are creative ideas which may have use at some locations. In the short term, the best advice is to leave nothing of value in vehicles and to report vehicle license numbers of trailhead visitors behaving suspiciously.

14 COMMENTS RELATING TO THE MANAGEMENT OF ROADS FOR RECREATION.

COMMENTS INCLUDED:

“On my many trips into the Entiat Valley this summer I always saw cars parked on the narrow road while its occupants were fishing. In nearly all cases there was a closed access road nearby. Open them.”

“The maps provided do not permit us to match up following sites and road access to the areas we are interested in. We need to know what roads are likely to be closed and what new ones are proposed.”

“There are enough miles of backcountry roads in the WNF to choke a horse - God, its a messy spider web in areas when viewed from the air.”

“Many roads are now closed to entry by locked gates and water bars in the roads. Areas once open to berry picking, mushroom hunting, and rock collecting are now closed. For many senior citizens this is their only recreation to get in the woods for outings. Just keep existing roads open.”

“If roads are built, keep hunters out in using bikes or any kind of travel except by foot.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0040, 0062, 0508, 0543, 0670, 1841, 2124, 2180, 2748, 2751, 2796, 2885, 3146, 3659, 3742, 3868, 4390, 4406, 9074

FOREST SERVICE RESPONSE:

Most forest roads are constructed for timber harvest activity. A few roads have been constructed to improve recreation access. Once roads are constructed and become part of the managed system they are analyzed for their best future use and the potential impacts they may have on management of other forest resources. Many roads are closed after timber haul is completed. Roads that can provide valuable access for the public with little negative consequence are left open for use.

Roads that receive moderate to heavy use require annual maintenance, which is extremely expensive. Road maintenance funds are limited so the maintained road system must be managed carefully. Roads that are used and not maintained constitute resource management problems, for they are subject to soil erosion, plugged culverts and washouts. This could lead to increased sediment in streams and future soil and water concerns.

High public use in some areas has adverse effect on wildlife and can result in big game escapement problems during hunting seasons. Hunting quality frequently is better when some road networks are closed to vehicle access.

The present road system is generally adequate for public access to the Forest. Most of the roads constructed in the future will be closed. The miles of open road and miles of new construction is described by alternative in Chapter II of the FEIS.

15 MANAGEMENT OF THE MATHER MEMORIAL PARKWAY.

COMMENTS INCLUDED:

“Development other than dispersed recreation near this primary park entrance should be limited to ST-1 prescription, which calls for retention of the visual quality objective and for retention or enhancement of the viewing and recreation experiences along scenic travel routes.”

“No logging should be allowed on the Mather Parkway as it would mar the scenic beauty of the entrance way to Mt. Rainier National Park.”

“Somewhere in the planning process should be a unified agreement for management of Mather Memorial Parkway.”

“Alternate F should be modified to prohibit construction of Naches Pass road, provide protection to the Mather Parkway from logging and reduce grazing.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0286, 0386, 0394, 0396, 0508, 0524, 0572, 0577, 0603, 0661, 0790, 0812, 0836, 0841, 0862, 1302, 1964, 1968, 1999, 2010, 2016, 2020, 2021, 2026, 2038, 2080, 2140, 2179, 2714, 2720, 2852, 2855, 2863, 2887, 2893, 2895, 2907, 2957, 2980, 2983, 2988, 2997, 3002, 3004, 3060, 3091, 3103, 3107, 3133, 3140, 3148, 3149, 3170, 3173, 3177, 3179, 3185, 3187, 3190, 3219, 3234, 3253, 3256, 3271, 3278, 3292, 3315, 3319, 3323, 3352, 3360, 3362, 3367, 3368, 3406, 3426, 3429, 3437, 3446, 3460, 3480, 3493, 3519, 3520, 3542, 3567, 3583, 3593, 3625, 3639, 3649, 3657, 3662, 3673, 3678, 3683, 3685, 3707, 3725, 3753, 3770, 3792, 3795, 3819, 3865, 3865, 3866, 3867, 3877, 3883, 3926, 3947, 4020, 4037, 4041, 4089, 4093, 4094, 4105, 4139, 4157, 4158, 4161, 4178, 4194, 4233, 4234, 4248, 4257, 4260, 4261, 4277, 4278, 4301, 4437, 4449, 4474, 4477, 4498, 4507, 4511, 9032, 9046, 9094, 0001S

FOREST SERVICE RESPONSE:

Due to the extensive public response relating to the management of the Mather Memorial Parkway, we have established a specific prescription (MP-1) for the parkway (See Chapter IV, Management Prescription, of the Forest Plan).

The following is a summary of the prescribed management:

- Visual quality objectives will be retention and preservation.
- Emphasis on high quality recreation facilities.
- Livestock grazing will be consistent with visual quality objectives.
- There will be no scheduled timber harvesting within the areas visible from the highway.
- No silvicultural practices will be undertaken in areas visible from the highway.
- Fire suppression strategies will emphasize the protection of recreation facilities and visual resources.

The management objective for the parkway is to maintain the high visual qualities and recreation setting that is appropriate for managing a gateway to a National Park.

ROADLESS AREAS

16 ALLOCATION OF ROADLESS AREAS OUTSIDE WILDERNESS.

COMMENTS INCLUDED:

“I urge that all roadless areas and old-growth forest be retained intact ”

“I feel that we already have a great deal of country reserved for our future enjoyment through wilderness areas. I can't justify locking up all the remaining areas for 'unroaded' use, nor can I agree to give everything away to ORV and logging.”

“It is my opinion that the Washington Wilderness Legislation of 1984 resolved the roadless area question for the Wenatchee. Therefore, there should not be any land allocation made to roadless non-motorized recreation or to roadless motorized recreation with the exclusion of timber harvesting or other consumptive resource use.”

“Develop the roadless areas within the just two decades to bring those (areas) under management.”

“While some places may be less spectacular than wilderness, they enjoy longer use seasons and are often appropriate for handling larger groups like horse packers, scout troopers, etc.”

“I would like to see more ORV development in nonroaded areas. By developing more areas, the impact on any one area would be reduced.”

“More roadless area should be open to multi-use recreation.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0004, 0010, 0011, 0013, 0018, 0021, 0023, 0035, 0036, 0040, 0061, 0062, 0063, 0066, 0067, 0069, 0076, 0078, 0090, 0091, 0093, 0094, 0108, 0114, 0115, 0116, 0124, 0141, 0152, 0262, 0283, 0292, 0294, 0298, 0307, 0315, 0343, 0351, 0377, 0380, 0386, 0392, 0394, 0409, 0418, 0421, 0422, 0424, 0427, 0430, 0433, 0434, 0440, 0483, 0484, 0491, 0511, 0520, 0522, 0535, 0539, 0550, 0553, 0555, 0559, 0572, 0573, 0575,

0576, 0577, 0579, 0582, 0586, 0589, 0590, 0593, 0595, 0597, 0599, 0604, 0605, 0608, 0616, 0622, 0626, 0632, 0634, 0637, 0645, 0656, 0657, 0659, 0660, 0662, 0663, 0671, 0713, 0717, 0726, 0729, 0736, 0740, 0743, 0749, 0787, 0788, 0790, 0792, 0814, 0816, 0819, 0823, 0825, 0830, 0832, 0833, 0834, 0841, 0860, 0862, 0865, 0867, 0869, 0871, 0877, 0898, 0900, 0901, 1302, 1304, 1940, 1947, 1948, 1949, 1952, 1959, 1962, 1965, 1969, 1974, 1977, 1980, 1981, 1983, 1984, 1988, 1991, 1992, 1995, 1999, 2004, 2010, 2014, 2016, 2019, 2024, 2026, 2035, 2048, 2053, 2072, 2073, 2079, 2080, 2086, 2123, 2128, 2131, 2132, 2134, 2141, 2162, 2164, 2165, 2174, 2176, 2178, 2180, 2181, 2182, 2183, 2185, 2186, 2201, 2205, 2473, 2719, 2722, 2726, 2728, 2731, 2732, 2734, 2736, 2739, 2740, 2742, 2745, 2746, 2747, 2750, 2751, 2752, 2766, 2768, 2772, 2774, 2776, 2777, 2780, 2782, 2789, 2791, 2796, 2799, 2803, 2804, 2805, 2807, 2815, 2816, 2820, 2822, 2824, 2826, 2833, 2834, 2835, 2842, 2843, 2844, 2851, 2854, 2862, 2863, 2864, 2868, 2869, 2876, 2877, 2878, 2881, 2882, 2885, 2886, 2887, 2893, 2895, 2907, 2908, 2913, 2914, 2915, 2916, 2921, 2922, 2923, 2925, 2929, 2931, 2934, 2937, 2940, 2944, 2947, 2950, 2951, 2953, 2957, 2959, 2964, 2965, 2967, 2969, 2975, 2977, 2978, 2979, 2987, 2989, 2990, 2993, 2994, 2995, 2996, 2997, 3000, 3002, 3003, 3004, 3006, 3016, 3018, 3020, 3024, 3027, 3028, 3034, 3038, 3047, 3048, 3056, 3057, 3058, 3062, 3065, 3069, 3070, 3080, 3085, 3088, 3090, 3109, 3110, 3111, 3112, 3115, 3116, 3126, 3130, 3132, 3133, 3134, 3136, 3138, 3141, 3143, 3146, 3147, 3148, 3150, 3152, 3154, 3161, 3162, 3171, 3178, 3179, 3181, 3184, 3186, 3188, 3190, 3193, 3198, 3201, 3202, 3203, 3208, 3212, 3214, 3215, 3216, 3217, 3219, 3220, 3221, 3222, 3223, 3224, 3225, 3227, 3232, 3233, 3234, 3238, 3239, 3242, 3244, 3245, 3247, 3248, 3251, 3252, 3255, 3256, 3257, 3259, 3263, 3270, 3271, 3272, 3273, 3275, 3278, 3280, 3282, 3287, 3290, 3293, 3298, 3307, 3310, 3314, 3315, 3317, 3320, 3321, 3325, 3333, 3335, 3338, 3339, 3345, 3352, 3359, 3369, 3374, 3377, 3379, 3381, 3385, 3389, 3392, 3393, 3394, 3395, 3399, 3402, 3409, 3422, 3423, 3427, 3428, 3437, 3438, 3443, 3449, 3460, 3465, 3468, 3472, 3473, 3475, 3479, 3480, 3483, 3485, 3489, 3491, 3493, 3497, 3509, 3510, 3511, 3518, 3519, 3520, 3522, 3531, 3539, 3551, 3553, 3559, 3565, 3573, 3580, 3583, 3584, 3587, 3590, 3591, 3593, 3596, 3606, 3610, 3611, 3617, 3621, 3622, 3625, 3628, 3630, 3632, 3634, 3636, 3638, 3640, 3641, 3648, 3649, 3650, 3651, 3652, 3654, 3659, 3669, 3679, 3683, 3689, 3692, 3693, 3702, 3707, 3709, 3715, 3719, 3721, 3725, 3727, 3731, 3732, 3734, 3735, 3746, 3751, 3752, 3753, 3762, 3775, 3776, 3777, 3779, 3782, 3789, 3790, 3791, 3793, 3794, 3796, 3797, 3800, 3801, 3805, 3806, 3811, 3814, 3815, 3816, 3818, 3821, 3838, 3839, 3840, 3858, 3862, 3871, 3872, 3873, 3877, 3879, 3883, 3884, 3885, 3899, 3901, 3903, 3915, 3923, 3928, 3930, 3935, 3936, 3940, 3947, 3949, 3952, 3955, 3964, 3967, 3973, 3987, 3988, 3989, 3992, 3996, 4001, 4003, 4004, 4005, 4011, 4014, 4015, 4019, 4020, 4021, 4022, 4023, 4026, 4027, 4034, 4038, 4043, 4044, 4045, 4046, 4052, 4061, 4067, 4068, 4071, 4073, 4082, 4083, 4094, 4107, 4110, 4112, 4139, 4141, 4142, 4143, 4145, 4148, 4149, 4150, 4153, 4156, 4158, 4159, 4160, 4161, 4162, 4168, 4171, 4174, 4179, 4186, 4194, 4200, 4204, 4206, 4207, 4209, 4211, 4214, 4219, 4228, 4231, 4241, 4243, 4245, 4246, 4259, 4260, 4261, 4263, 4266, 4270, 4276, 4282, 4293, 4296, 4298, 4312, 4341, 4403, 4404, 4406, 4418, 4424, 4425, 4426, 4427, 4428, 4434, 4439, 4440, 4447, 4448, 4449, 4450, 4452, 4454, 4458, 4460, 4467, 4468, 4470, 4471, 4476, 4477, 4485, 4489, 4490, 4491, 4493, 4494, 4496, 4498, 4499, 4501, 4503, 4504, 4507, 4508, 4511, 4534, 9004, 9005, 9008, 9009, 9010, 9013, 9014, 9022, 9023, 9028, 9031, 9041, 9042, 9043, 9046, 9047, 9052, 9057, 9074, 9077, 9084, 9092, 9093, 9114, 0054S, 0071S, 0081S, 0227S, 0469S, 1058S, 1159S, 1161S, 1370S, 2063S

FOREST SERVICE RESPONSE:

The unroaded areas of the Forest received extensive public interest and comment. Opinion ranged from the extremes of “keep all present unroaded areas roadless”, to “allocate all unroaded areas to multiple use”. The response was so varied and extensive that a special interdisciplinary team was formed to evaluate the public comments and further examine the unroaded areas and their land use potentials.

The analysis of the roadless areas resulted in changes in the allocation of unroaded areas for all alternatives. Public input played an important role in these changes. The allocation by alternative is contained in the alternative section, Chapter II of the FEIS. Appendix C, Roadless Areas, contains a description and analysis of each individual unroaded area.

The changes were designed to meet the overall expressed public desire for more area to be retained for roadless attributes, with emphasis on the areas that received considerable interest and comment. This was done with considerable effort to balance the need for roadless recreation opportunity with the other demands for timber harvest, other commodity use, and roaded recreation opportunities.

17 MANAGEMENT OF AREAS BEING RETAINED IN UNROADED CONDITION.

COMMENTS INCLUDED:

“I would support all roadless areas and old-growth forest be retained intact and oppose any increase in livestock grazing.”

“Don’t build roads into roadless areas.”

“No more than 1/3 of unroaded forest should be opened to vehicles.”

“We would like to express our strong belief that all existing roadless areas and old growth forests be retained intact. These areas need to be protected in the areas wildlife habitat, watershed quality and fish habitat.”

“I would like to have all of the roadless areas outside of wilderness open for trailbike use.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0017, 0028, 0033, 0039, 0050, 0063, 0067, 0084, 0101, 0113, 0116, 0127, 0130, 0294, 0351, 0382, 0418, 0511, 0539, 0541, 0559, 0573, 0577, 0582, 0586, 0587, 0599, 0602, 0631, 0635, 0645, 0657, 0748, 0835, 0860, 0896, 0900, 0901, 1947, 1959, 1981, 1992, 2021, 2024, 2053, 2061, 2073, 2076, 2089, 2131, 2132, 2174, 2177, 2179, 2181, 2182, 2185, 2186, 2206, 2722, 2726, 2731, 2732, 2734, 2745, 2751, 2766, 2767, 2768, 2779, 2781, 2798, 2816, 2824, 2826, 2843, 2844, 2849, 2853, 2868, 2872, 2877, 2885, 2887, 2888, 2891, 2892, 2893, 2895, 2900, 2915, 2929, 2944, 2946, 2950, 2953, 2954, 2964, 2965, 2967, 2968, 2969, 2989, 2994, 2995, 2996, 3001, 3062, 3065, 3079, 3085, 3090, 3109, 3112, 3118, 3130, 3134, 3138, 3140, 3146, 3148, 3150, 3152, 3155, 3171, 3179, 3188, 3201, 3202, 3203, 3208, 3215, 3232, 3234, 3239, 3243, 3244, 3256, 3273, 3283, 3298, 3333, 3334, 3343, 3351, 3359, 3374, 3385, 3389, 3395, 3473, 3480, 3482, 3493, 3522, 3551, 3553, 3557, 3583, 3592, 3593, 3621, 3626, 3628, 3648, 3650, 3672, 3707, 3721, 3725, 3727, 3732, 3734, 3735, 3771, 3776, 3792, 3796, 3803, 3858, 3862, 3871, 3873, 3877, 3883, 3884, 3907, 3930, 3931, 3940, 3952, 3957, 3986, 4015, 4019, 4022, 4026, 4037, 4038, 4043, 4109, 4113, 4128, 4138, 4150, 4156, 4160, 4162, 4174, 4194, 4197, 4200, 4204, 4206, 4228, 4230, 4241, 4245, 4246, 4259, 4298, 4312, 4403, 4417, 4419, 4427, 4428, 4434, 4438, 4439, 4451, 4470, 4477, 4491, 4493, 4494, 4496, 4498, 4503, 4504, 4507, 4510, 4511, 9009, 9010, 9014, 9022, 9023, 9028, 9041, 9046, 9047, 9092

FOREST SERVICE RESPONSE:

The management of areas to be retained in unroaded condition received a great deal of public comment. Much of the comment dealt with the issue of motorized versus non-motorized recreation. The Interdisciplinary Team analyzing the allocation of unroaded areas also addressed the use of these areas. The large volume of public comment was again a strong factor in the decision process.

Future management of unroaded areas will be guided by the application of a management prescription (RE-2a, RE-2b, RE-3, RE-4, EW-3, SI-1) to portions or all of an individual roadless area. Each of these unroaded prescriptions has a management emphasis or use emphasis. The allocation by alternatives is located in Chapter II of the FEIS. The Standards and Guidelines in Chapter IV of the Forest Plan provide specific direction for the management of areas under the prescriptions.

The allocations by alternative are the result of the ID team analysis and are our best effort to retain areas with high value and public interest in an unroaded condition while at the same time providing for multiple use on portions of unroaded areas with high value for commodity production. The RE-4 prescription is an attempt to provide a high quality semi-primitive recreation setting while still making allowance for some timber harvest on high production growing sites. The prescribed small-size harvest units and aerial logging systems should avoid most recreation impacts in areas allocated to RE-4. There will be no road construction allowed in this prescription.

18 COMMENTS RELATING TO THE LAKE CHELAN SCENIC AREA.

COMMENTS INCLUDED:

“Why has the full Lake Chelan Scenic area proposal from the Chelan Planning Unit (CPU) not been carried intact into the Forest Plan.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3062, 3621, 9094

FOREST SERVICE RESPONSE:

Since the original proposals for a Lake Chelan Scenic Area, many factors have changed in the management of the area. There also has been a change in land managers assigned to the area which brings change in perspective and management philosophy. The designation of the Lake Chelan Sawtooth Wilderness was a significant factor in the establishment and protection of recreation and visual qualities of the area. It is believed the establishment of a Scenic Area now would not afford any more specific protection of the area than is provided by the preferred alternative of the Forest Plan. The preferred alternative keeps virtually all of the unroaded land adjacent to upper Lake Chelan in an unroaded state.

19 WHICH UNROADED AREAS WILL BE ALLOCATED FOR MOTORIZED RECREATION USE?

COMMENTS INCLUDED:

“The Draft Plan severely degrades the quality of hiking trails in the Wenatchee by losing 50 miles, rerouting many others, and allowing use of most trails by ORV’s. The Mad River, North Fork Entiat, Chelan-Gold Creek, and Teanaway should be designated as hiking areas.”

“I would like to have all the roadless area outside of wilderness open for trailbike use and want to ask that the following areas remain open for fishing, camping, trailriding, and sightseeing: Sawtooth area, North Fork Entiat area, Mad River, Naneum-Devil’s Gulch, Teanaway-Negro-Shaser, Chelan North, Myrtle Lake, Stormy Mt., Taneum, Thorp, Mt. Tronsen.”

“While an RE-3 designation for all roadless areas would safeguard hikers and horses, it would eliminate motorcycles on some trails that have little conflict and such an area-wide designation is not needed.”

“Maintaining maximum availability of roadless areas for trail bike use. N. Chelan, Boiling, and Cub Lakes. Two of twelve fishable lakes open to trailbikes in the State.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0001, 0010, 0029, 0033, 0035, 0045, 0050, 0066, 0074, 0077, 0080, 0091, 0093, 0095, 0097, 0098, 0101, 0107, 0113, 0116, 0124, 0125, 0127, 0130, 0131, 0132, 0135, 0150, 0226, 0298, 0343, 0382, 0389, 0392, 0396, 0415, 0423, 0484, 0486, 0491, 0497, 0511, 0518, 0519, 0522, 0531, 0535, 0539, 0549, 0552, 0559, 0578, 0582, 0591, 0593, 0595, 0601, 0608, 0622, 0624, 0635, 0637, 0645, 0659, 0660, 0663, 0717, 0726, 0731, 0749, 0790, 0794, 0796, 0816, 0821, 0830, 0831, 0832, 0833, 0837, 0839, 0860, 0862, 0863, 0864, 0871, 0874, 0877, 1305, 1962, 1964, 1977, 1984, 1990, 1995, 1997, 2002, 2006, 2007, 2010, 2016, 2021, 2022, 2023, 2024, 2025, 2038, 2055, 2061, 2071, 2073, 2074, 2079, 2119, 2132, 2164, 2165, 2166, 2168, 2174, 2177, 2197, 2200, 2205, 2713, 2718, 2734, 2750, 2767, 2777, 2798, 2802, 2815, 2832, 2840, 2852, 2853, 2863, 2868, 2871, 2887, 2893, 2897, 2907, 2909, 2913, 2916, 2919, 2921, 2941, 2945, 2950, 2951, 2953, 2958, 2965, 2967, 2977, 2983, 2992, 2994, 2995, 2997, 3000, 3007, 3030, 3033, 3034, 3038, 3047, 3058, 3062, 3065, 3068, 3070, 3073, 3078, 3085, 3109, 3115, 3116, 3119, 3130, 3132, 3134, 3138, 3140, 3147, 3148, 3149, 3152, 3154, 3155, 3160, 3161, 3163, 3164, 3173, 3177, 3178, 3181, 3189, 3191, 3193, 3202, 3208, 3214, 3221, 3225, 3235, 3238, 3239, 3241, 3243, 3244, 3256, 3260, 3271, 3272, 3276, 3277, 3278, 3279, 3287, 3298, 3307, 3308, 3314, 3315, 3323, 3326, 3334, 3336, 3349, 3360, 3362, 3369, 3383, 3406, 3408, 3409, 3429, 3479, 3482, 3483, 3484, 3491, 3511, 3518, 3520, 3553, 3554, 3564, 3566, 3567, 3569, 3573, 3575, 3580, 3583, 3604, 3606, 3608, 3611, 3621, 3623, 3626, 3634, 3638, 3648, 3651, 3667, 3669, 3672, 3673, 3683, 3689, 3692, 3693, 3694, 3705, 3725, 3728, 3741, 3749, 3751, 3752, 3753, 3770, 3785, 3791, 3792, 3821, 3832, 3834, 3858, 3898, 3901, 3924, 3926, 3931, 3940, 3947, 3989, 3992, 4005, 4018, 4021, 4022, 4035, 4036, 4037, 4044, 4046, 4066, 4089, 4092, 4094, 4105, 4109, 4113, 4124, 4128, 4139, 4143, 4150, 4152, 4156, 4157, 4161, 4162, 4168, 4169, 4173, 4179, 4194, 4197, 4200, 4204, 4219, 4222, 4232, 4233, 4241, 4243, 4245, 4248, 4257, 4261, 4269, 4276, 4277, 4279, 4282, 4298, 4437, 4438, 4439, 4449, 4451, 4476, 4477, 4492, 4493, 4494, 4496, 4498, 4504, 4507, 4510, 4511, 9023, 9041, 9042, 9062, 9077, 9093, 9100, 9113

FOREST SERVICE RESPONSE:

We received extensive comments concerning the allocation of unroaded areas and motorized versus non-motorized use. The ID Teams assigned to analysis of roadless areas and trails reviewed public comments, considered the attributes of each area and trail system, and made recommendations to the Forest Management Team. The allocation of areas to remain roadless and the mix of use in an area is designed to best fit the suitability of the land and the expressed public desires for the area. See Chapter II and Appendix C of the FEIS for the motorized allocation for each roadless area.

The final decision is not likely to completely satisfy advocates of either non-motorized nor motorized recreation. However, we believe it to be an equitable allocation with much to offer all users. Proposed new trail construction offers exciting new opportunities for all. However, the key to resolution of conflict on shared trails is education of users in minimum impact principles, courtesy, and understanding others. See the Record of Decision for a discussion of steps taken to reduce trail user conflicts.

WILDERNESS

20 COMMENTS RELATING TO WILDERNESS BUFFER AREAS.

COMMENTS INCLUDED:

“The designated Wilderness areas must have a protected buffer zone around them. It is extremely irresponsible to propose clear cutting up to wilderness boundaries.”

“The Wilderness boundaries should be bordered by roaded areas whenever possible and motorized recreation should be allowed on all old logging and skid trails.”

“Vehicle use designation of trails in areas adjacent to Wilderness boundaries not only causes inappropriate levels of noise and even drifting exhaust in the adjacent Wilderness areas, thus violating the purpose of Wilderness designation, but also encourages motorized recreationists to violate Wilderness boundaries and ride vehicles into Wilderness areas.”

“The Wenatchee Forest should place greater emphasis on developed and accessible dispersed recreation. Buffer zones around Wilderness should be eliminated to comply with Section 9 of the Washington State Wilderness Act.”

“We definitely oppose running roads right up to wilderness boundaries. There should be a buffer zone.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0141, 0150, 0344, 0497, 0521, 0579, 0586, 0590, 0605, 0618, 0792, 0793, 0896, 0901, 2000, 2032, 2053, 2058, 2137, 2398, 2734, 2739, 2750, 2768, 2779, 2791, 2796, 2810, 2826, 2832, 2842, 2846, 2868, 2877, 2882, 2887, 2916, 2920, 2934, 2941, 2946, 2958, 2959, 2962, 2968, 2995, 2996, 3012, 3030, 3033, 3085, 3116, 3134, 3164, 3171, 3241, 3251, 3253, 3256, 3290, 3392, 3394, 3462, 3492, 3493, 3509, 3520, 3551, 3553, 3573, 3621, 3672, 3727, 3742, 3771, 3820, 3834, 3871, 3876, 3877, 3903, 3926, 3992, 4027, 4036, 4094, 4269, 4312, 4400, 4434, 4439, 4448, 4454, 4468, 4470, 4489, 4494, 4494, 4498, 4511, 9041, 9094, 1578S

FOREST SERVICE RESPONSE:

The intent of Congress regarding buffer strips around wilderness was described in Section 9 of the Washington State Wilderness Act of 1984. “The fact that non-wilderness activities or use can be seen or heard from areas within wilderness shall not, of itself, preclude such activities up to the boundary of the wilderness area”. However, the public has expressed, over a number of years, the desire for maintaining a more natural appearing environment and a high quality recreation setting as visitors approach back country and wilderness on the primary travel routes and access to wilderness.

The way we have to accomplish this objective, where it is desirable, is the Recreation Opportunity Spectrum System. The six ROS classes range from highly developed to primitive which also is very similar to the transition a visitor experiences when traveling into the Forest toward more remote areas. As a visitor travels into the Forest, there is generally less development, decreasing road standards, more rustic and primitive facilities and finally, wilderness. The natural characteristics of the topography, vegetative composition and site capabilities for commodity production generally follow this same transition from the low country to the higher elevations. Sensitive management can encourage this transition. This is the general management framework we are emphasizing when unroaded area land allocations are retained adjacent to wilderness, or when trails that had to lead to wilderness are closed to motorized use. Refer to Chapter II of the FEIS for land allocation by alternative.

21 COMMENTS RELATING TO USE LEVELS AND CARRYING CAPACITY OF WILDERNESS.

COMMENTS INCLUDED:

“Some safeguards are needed to control the amount of usage of fragile ecosystems, but this control should be based on carrying capacity of the land (or water), not some planner prescribing a preconceived notion of ‘solitude’. We feel the ‘Prescription Solitude’ is unnecessary and silly and should be eliminated.”

“I think you need stronger language saying that if carrying capacity is exceeded you will through a variety of devices reduce use, to, at, or below the carrying capacity.”

“How is the carrying capacity of a Wilderness determined? This would affect both the ability to protect the Wilderness resource and the estimation of future adequacy of Wilderness to meet recreational pursuits. However this says nothing of the capacity of the Wilderness acreage and spatial arrangement to meet the needs of wildlife and other dependent resources.”

“A more satisfactory carrying capacity needs to be established for regularly established climbing routes. Access routes which are also used as day hikes and backpacking trips need to be given special attention. The Forest Service’s emphasis on solitude in the Wilderness may not be a reflection of the visitors Wilderness values. Physical and mental challenge, scientific study, inspiration, and primitive recreation may be equally or more important on a particular recreation experience.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0150, 0579, 0582, 2132, 2749, 2832, 2877, 2968, 3085, 3202, 3203, 3229, 3233, 3371, 3522, 3621, 3725, 3746, 3776, 3873, 3879, 3903, 4485, 4493, 4499

FOREST SERVICE RESPONSE:

The concept of carrying capacity has been replaced with the Limits of Acceptable Change (LAC) system in the final Forest Plan. Rather than focus on the maximum number of people an area can support before resource impacts occur, we are now focusing on how much physical, biological and social change can occur before wilderness values are degraded, without trying to determine how many people can use the area. Under the LAC system, we have established standards to specify the amount of impact that may occur before management actions are implemented to reduce the impact. These actions are designed to change the way an area is used and/or the number of people who visit there.

The LAC standards for the social setting and the wilderness recreation experience are the most difficult to quantify. For what is solitude to one person may not be solitude to another. Some users of wilderness don’t care if they experience solitude or not. The important factor is that wilderness was created as a place people would have an extremely high probability of experiencing isolation and solitude. Based on our interpretation of the Wilderness Act, we have set LAC standards for social resources at levels which guarantee solitude can be experienced. We understand that some users believe our standards are too restrictive. We believe this restrictiveness was built into the Wilderness Act and until the law is changed, we expect to continue this management approach. Any changes in the law would have to be made nationally, hopefully with input from all users of wilderness. See Appendix E of the Forest Plan for more detailed discussion of wilderness management concepts.

22 ACTIVITIES, USES AND FACILITIES WHICH MAY BE INCOMPATIBLE WITH WILDERNESS.

COMMENTS INCLUDED:

“Chain saws should be allowed in Wilderness to speedily clear trails.”

“I think it is a crime to tear down old shelters and lookouts just because somebody feels there is not enough money to maintain them.”

“Early buck hunting should not be allowed in Wilderness areas because it conflicts with the Wilderness Act guidelines.”

“Apropos the jets: Are you afraid to tangle with the military establishment? The jets are illegal here and elsewhere over the Cascades. You know it; we know it; everybody knows it.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0005, 0062, 0582, 0605, 1947, 2722, 2775, 2832, 2962, 3374, 3862, 3873, 4263, 4468, 4477, 4498

FOREST SERVICE RESPONSE:

Federal regulations prohibit the possession or use of mechanized equipment in wilderness. This regulation applies to the Forest Service as well as the public. The Secretary of Agriculture has authorized the use of mechanized and motorized equipment for emergency purposes such as threats to life and private property. Fire suppression Search and Rescue and some law enforcement are such situations. There are allowances in the Wilderness Act for continuation of specified prior existing rights. Use of mechanized equipment may be approved if reasonably necessary to carry out those rights. On rare occasions helicopters can be approved if there is no other feasible way to get a job done, such as flying full toilet vaults out of the Enchantments area of the Alpine Lakes Wilderness. Other work, including trail maintenance, will be done by primitive means to avoid impacts on wilderness visitors. Primitive means will be used even if shown to be more costly.

The purpose and need of temporary structures and facilities is generally to meet wilderness management objectives. There are to be no permanent structure in wilderness (See Appendix E, Wilderness Management, of the Forest Plan). However, old buildings and lookouts that qualify as cultural resources can be preserved and maintained for as long as they last if they are significant to the history of the area and if proper Cultural Resource Management procedures are followed. They may also be removed if they present management problems such as occupancy trespass, vandalism, or safety hazard to visitors.

The Forest Service is currently working with the Department of Defense to solve the problems of low level military overflights of wilderness. The military believes, these flights are highly important to pilot training and are critical to National Security. We are hoping we can influence where and when these flights occur.

23 WILDERNESS PLANNING AND MANAGEMENT.

COMMENTS INCLUDED:

“Page IV-3, Wilderness, 4. What kinds of facilities are to be developed? This goal appears to conflict with goal 20, page IV-5.”

“I notice that limitations are going to be put into effect in the Enchantments which I think is a good move, and overdue.”

“More education on Wilderness ethics and minimum impact camping is highly desirable for the good of the Wilderness.”

“Volunteers are great, but the increasing reliance on volunteers moves the Forest Service further from accepting their duty to manage.”

“You should enact a user fee system for both Wilderness users and vehicle road use.”

“Finally, with regard to the Wilderness Management Plan, I would like to emphasize that current limitation on pack stock and size of horse parties should be continued. A strong program for dedicated trailless areas within Wilderness should be continued.”

“Pets should not be permitted in Wilderness areas.”

“I’m concerned about not taking initial action on wild fires within the Wilderness areas. The impact on air pollution, damage to headwaters and watersheds, and mass soil movement and wildlife habitat should be logical reasons enough for any prudent, responsible resource manager to change this poorly conceived idea.”

“Other items of concern include the restrictions of numbers of people and animals per party traveling in the Wilderness areas. Is there a need for these restrictions and is this the only and best way to solve the ‘overuse’.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0001, 0018, 0020, 0021, 0049, 0062, 0067, 0127, 0150, 0360, 0385, 0561, 0579, 0582, 0587, 0602, 0605, 0718, 0793, 1588, 1937, 1947, 1959, 1973, 1997, 2004, 2053, 2076, 2132, 2714, 2719, 2725, 2749, 2751, 2760, 2768, 2807, 2832, 2868, 2879, 2888, 2936, 2939, 2996, 3007, 3233, 3239, 3256, 3277, 3374, 3446, 3491, 3495, 3522, 3548, 3588, 3611, 3621, 3679, 3746, 3776, 3849, 3862, 3864, 3873, 3879, 3932, 3988, 4125, 4200, 4298, 4425, 4433, 4448, 4477, 4493, 4498, 4499, 4503, 4511, 9022, 9026, 9092, 9104

FOREST SERVICE RESPONSE:

The section of the Forest Plan which provides direction, Standards and Guidelines, for wilderness management has been substantially rewritten and expanded (See Chapter IV and Appendix E of the Forest Plan). All public responses have been well addressed. We have greatly increased the explanation of management actions and procedures in wilderness management.

We have instituted the Limits of Acceptable Change system to assure wilderness degradation does not occur, or that management actions are implemented to stop a downward trend in resource condition.

We have changed our Wilderness Recreation Opportunity Spectrum (WROS) classes to pristine, primitive, semi-primitive and transition, to better describe the recreation setting and resource conditions in wilderness. We have provided more detailed descriptions of the standards for physical, biological, or social resource values we are striving to maintain in each WROS class.

We are managing to allow natural processes, such as fire, insects and diseases and natural plant succession to occur without the influence of human interference.

The key factor to keep in mind in wilderness management is that recreation is an appropriate use of wilderness, but wilderness was not designated solely as a recreation areas. Wilderness is managed so that it will not be degraded as wilderness, and so that its natural ecosystems will be preserved.

24 HOW MUCH WILDERNESS SHOULD WE HAVE?

COMMENTS INCLUDED:

“First, I’d like to see you headed towards a direction that would label everything over 4000 ft. in elevation ‘Wilderness’.”

“We are very concerned about the loss of more and more of our precious Wilderness areas to logging sales.”

“As our population continues to grow, and as an increasing higher percentage of it pursues outdoor recreational activity, it is critical that we preserve those Wilderness areas that are still left in their natural state.”

“I think there will be too many jobs lost and our taxes raised too much to allow for more Wilderness areas.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0017, 0047, 0066, 0147, 0198, 0271, 0292, 0400, 0407, 0418, 0541, 0573, 0579, 0718, 0742, 0792, 0823, 0825, 0997, 1027, 1033, 1063, 1069, 1091, 1125, 1127, 1255, 1299, 1328, 1361, 1502, 1582, 3633, 1652, 1658, 1664, 1679, 1697, 1762, 1763, 1956, 1970, 1973, 1997, 1998, 2053, 2076, 2137, 2144, 2181, 2201, 2242, 2353, 2380, 2474, 2544, 2573, 2611, 2768, 2777, 2780, 2789, 2845, 2882, 2887, 2905, 2924, 2927, 3007, 3065, 3134, 3139, 3239, 3244, 3245, 3269, 3270, 3374, 3394, 3400, 3433, 3437, 3551, 3553, 3615, 3712, 3718, 3732, 3740, 3743, 3811, 3873, 3876, 3914, 3956, 3958, 4098, 4118, 4142, 4239, 4263, 4380, 4412, 4416, 4422, 4425, 4448, 4467, 4477, 4484, 4489, 9013, 9014, 9028, 9030, 9047, 9097, 1200S

FOREST SERVICE RESPONSE:

The areas remaining unroaded following the Wilderness Act of 1964 and the Alpine Lakes Wilderness Act of 1976, have been through several stages of analysis for their suitability as wilderness. This analysis culminated, for the present, with the Washington Wilderness Act of 1984 (See section 2 Washington State Wilderness Act of 1984). The passage of this act also established that the Secretary of Agriculture shall not be required to review the suitability of released lands until revision of the current Forest Plans. From that point, the wilderness option will be considered every 10 to 15 years (See Section 5 Washington Wilderness Act of 1984).

For each alternative a specific number of acres will be retained in an unroaded condition at the end of the first, second and fifth decade. See Chapter II of the FEIS. During the next round of planning, in 10 to 15 years, the areas still in unroaded condition may be considered for wilderness designation.

SCENERY

25 MORE CONSIDERATION SHOULD BE GIVEN TO SCENIC QUALITIES.

COMMENTS INCLUDED:

“Nearly all of the timber base (lands are) to be managed with low emphasis on visual quality--especially in recreation corridors that are wilderness portals also (e.g. Entiat, Chiwawa Rivers). These portals and recreation roads are supposed to be sensitive travel routes, and should be managed to at least meet a VQO of PR (partial retention)--but this alternative [B] violates policy and Forest Service manual direction, and guidelines in the visual management handbook (Ch. 5-Timber).”

“DEIS P. II-124. Qualitative resource outputs. Reducing visual character in preferred Alternative C is not acceptable. Alternatives E and F are much more reasonable in maintaining this visual character that is so prized by so many.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0010, 0017, 0035, 0049, 0061, 0067, 0069, 0147, 0305, 0432, 0577, 0587, 0730, 1939, 1981, 2134, 2138, 2201, 2720, 2732, 2780, 2789, 2791, 2808, 2832, 2845, 2849, 2854, 2855, 2879, 2914, 2927, 2928, 2930, 2955, 2963, 2968, 3031, 3044, 3057, 3081, 3085, 3173, 3177, 3185, 3209, 3228, 3246, 3325, 3333, 3363, 3377, 3394, 3495, 3520, 3529, 3531, 3535, 3593, 3616, 3621, 3624, 3627, 3690, 3691, 3742, 3803, 3862, 3871, 3911, 4081, 4160, 4205, 4210, 4273, 4298, 4447, 4450, 4471, 4489, 4490, 4496, 4497, 4498, 4501, 4510, 9066, 9097

FOREST SERVICE RESPONSE:

The visual resource management system was developed by the Forest Service nationally to recognize the scenic attractions and areas of high concern for scenic quality. In recognition of the concern for scenic quality on the Wenatchee Forest, 34 viewsheds and 19 lakes have been recognized as travel routes and places for travelers to enjoy the natural forest environment and scenic quality. Visual Quality Objectives have been developed and applied to all management prescriptions. Depending on the specific location and land allocation, Visual Quality Objectives provide for a range of scenic values from low to high visual quality.

Major scenic attractions, key viewsheds and important lakes will have a high visual quality allocation, while in other areas of the managed forest the natural landscape will be modified. But, in all cases, the visual resource management system will be applied to the design of management activities on all lands to provide the highest possible visual quality. See Chapter IV of the Forest Plan for further details on landscape management requirements.

26 WHY DO TRAVEL ROUTES WITHIN THE VIEWSHEDS VARY IN THEIR VISUAL QUALITY, ESPECIALLY IN SIGNIFICANT SCENIC AREAS?

COMMENTS INCLUDED:

“It is with grief that I read that a Forest Service analysis predicts that the timber industry’s alternative would result in a reduction in scenic quality of the Swauk Pass corridor. Prediction holds true for all 20 scenic corridors inventoried in the Plan.”

“Some parts of the lands allocations adjacent to the Alpine Lakes Plan is not integrated to protect scenic travel ST-1 or ST-2. The tie between Table Mountain road corridor to Highway 97 is an example for the final land allocation.”

“We have previously addressed the fact that the WNF cannot cover up the I-90 corridor scar with verbiage such as ‘all major travel routes and lakes are protected.’”

“Alternative C-the effects of this alternative on visual quality are not as fully described in Appendix C (e.g. Alternatives A, H, B and D are more fully described.) For C and I it often says ‘will allocate many areas to ...’ What’s many, more than half?”

“Views from trails, the south fork Tieton, and the view from Goat Rocks...The middle ground view from White Pass...as viewed across Rimrock Lake will have slightly altered to some altered visual condition. These are viewsheds of utmost scenic importance. They must be protected.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0095, 0552, 0587, 0900, 1947, 2134, 2201, 2720, 2963, 3085, 3138, 3437, 3440, 3593, 3621, 3865, 3866, 3876, 4081, 4273, 4490

FOREST SERVICE RESPONSE:

Major travel routes, encompassing 24 of the 34 identified viewsheds, will be managed to maintain high visual quality. Highly scenic areas have been reassessed along with other resource values to ensure scenic protection. Examples of areas with high visual sensitivity are the Highway 410 viewshed and the lower Lake Chelan viewshed. These areas will have high visual protection. In other viewsheds management can emphasize other resource values such as wildlife or timber management and still provide moderate to high visual quality. Some places within the viewshed may be altered to provide for these higher overriding land uses. The wildlife prescription, EW-1, is an example of an area where the main emphasis will be placed on management of wildlife habitat rather than on maintenance of a natural scenic setting. A range of visual quality can be expected in such an area. Ten of the viewsheds will have parts of the foreground and middleground in an altered scenic condition. Refer to Chapter IV of the FEIS for a discussion of each alternatives effects on visual quality.

In areas of mixed ownership such as Snoqualmie Pass, private land management is likely to alter the landscape. Private land management can produce an altered landscape even though the Forest Service goal is to maintain the highest possible visual quality in a given scenic viewshed.

27 WILL SCENIC CORRIDORS, BOTH FOREGROUND AND MIDDLEGROUND, AS WELL AS SCENIC VIEWPOINTS BE PROTECTED AND MAINTAINED?

COMMENTS INCLUDED:

“The I-90 corridor from Snoqualmie Pass east through the Wenatchee National Forest is currently a national disgrace, a major eyesore...an example of clearcutting and desecration at its worst and a corridor of the lowest visual quality.”

“I like the percentage cut idea per decade in the entire viewshed, but still don’t believe it is applied adequately to the middle and background area as the visual planning system suggests.”

“It appears that most scenic corridors have 1/4 to 1/2 mile wide swaths to be managed for retention in the foreground but the middle and background areas are not visually managed.”

“Are the prescriptions (or Forest regulations) clear on how managers are to meet this scenic goal, what constitutes foreground, middleground, acceptable alteration, etc?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0035, 0049, 0061, 0069, 0147, 0152, 0432, 0562, 0570, 0577, 0590, 0744, 1981, 1999, 2134, 2138, 2201, 2257, 2734, 2772, 2779, 2783, 2789, 2791, 2832, 2845, 2849, 2854, 2855, 2866, 2879, 2912, 2914, 3080, 3081, 3085, 3103, 3105, 3109, 3177, 3209, 3246, 3291, 3318, 3325, 3363, 3377, 3394, 3429, 3440, 3493, 3576, 3593, 3616, 3624, 3627, 3689, 3690, 3742, 3749, 3862, 3876, 4069, 4080, 4081, 4273, 4447, 4491, 4493, 4494, 4496, 4498, 4501, 4510, 4534

FOREST SERVICE RESPONSE:

Scenic travel corridors and viewshed will be managed for scenic quality. The foreground (up to 1/2 mile) and the middleground (1/2 to 5 miles or a logical topographic break) are the areas considered from a roadside. In any given scenic travel route, the foreground will be managed to maintain scenic qualities. The management of the middleground depends on the specific travel route and the importance of the middleground view as it contributes to scenic quality. In some cases wildlife values will prevail over scenic considerations.

Maintenance of visual quality will be given high consideration on most travel routes. The exception is where intermingled ownership lands, such as in the Snoqualmie Pass corridor, are highly visible to the traveler. Forest lands within intermingled ownership will be managed to provide the highest possible aesthetic qualities.

Past experience, landscape management handbooks, the Standards and Guidelines in Chapter IV of the Forest Plan, and interdisciplinary teams including design arts specialists, will be integrated into project planning to achieve a blending of management activities on the landscape.

28 MAINTAINING VISUAL QUALITY WITHIN SCENIC VIEWSHEDS WHERE INTERMINGLED OWNERSHIP PATTERNS EXIST.

COMMENTS INCLUDED:

“Checkerboard ownership within the National Forest along major transportation routes, such as Snoqualmie Pass and Stevens Pass, would have a striking effect upon the scenic qualities because of the sharply contrasting geometric forms that are created by timber harvest activities.”

“Alternative C. I do not think we should be stressing scenic management strategies in areas of mixed ownership. The Alpine Lakes plan area should be revised to de-emphasize scenic management in the checkerboard areas. Holding to the VQO’s that will not be met regardless of our own actions forces trade-offs in commodity goods that are not needed nor wise.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0744, 0900, 2138, 2201, 3871

FOREST SERVICE RESPONSE:

There are approximately 293,100 acres of intermingled ownership land within the Wenatchee National Forest. Intermingled ownership patterns create geometric patterns that are not compatible with the natural patterns of form, line, color and texture of the landscape. The goal of the Forest Service is to shape and blend management activities seeking the highest aesthetic design possible, while other land owners may have different objectives. It is believed that sensitive project design on National Forest land will help maintain scenic value in a corridor of mixed ownership even though it will not approach the natural scenic appearance of a key corridor located within solid National Forest ownership.

29 WILL SCENIC AREAS VIEWED FROM TRAILS BE MAINTAINED AND PROTECTED?

COMMENTS INCLUDED:

“Ironically, the greatest views on the forest are not always within the wilderness. Often, in fact, the views from the wilderness are toward a maze of logging roads while the greater views are those from vantage points such as old lookouts. In my experience, roads aren’t built simply to open it up for the recreating public, rather, it is simply the precursor to timber activity.”

“ST-2 - We applaud what appears to be the retention of the “natural landscape.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0552, 1947, 2720, 2800, 2817, 2879, 2963, 2968, 3029, 3085, 3246, 3544, 3615, 3936, 4275, 4491

FOREST SERVICE RESPONSE:

Along important scenic trails the foreground will be maintained for high visual quality. The majority of the trails, approximately 90%, will have scenic protection. Other trails of lower use will have lesser protection of visual quality.

The degree of visual quality depends on the type of trail and what land use allocation the trail traverses. High scenic quality will not be maintained along trails in general forest and some trails within the wildlife prescription allocation. High vista points and viewpoints along trails that have panoramic views may have the middleground and background views slightly altered to heavily altered due to the superior view angle, and the vastness of the lands visible. (Refer to the Management Prescriptions in Chapter IV of the Forest Plan.)

30 VISUAL RESOURCES SHOULD BE MONITORED BY THE LANDSCAPE ARCHITECT.

COMMENTS INCLUDED:

“Wouldn’t the visual resource monitoring be best done by the landscape architect in the recreation staff offices area, rather than the timber staff officer? The fox guarding the hen house?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2832

FOREST SERVICE RESPONSE:

The landscape architect is a team member who is involved with monitoring impacts on the visual resource. Administratively, on the Wenatchee National Forest, the visual resource program is located within the timber organization because the timber management program has the most potential for affecting scenic views. We feel that this strengthens coordination and cooperative relationship towards meeting visual resource objectives.

31 WHAT ARE THE LANDSCAPE ARCHITECTURAL PRINCIPLES THAT WILL BE APPLIED ON TRAIL LOCATION AND DESIGN?

COMMENTS INCLUDED:

“There is an inference to ‘landscape architectural principles.’ I would be interested in knowing what principles will be applied to trail design and location. Both Forest Service personnel and the trail using public should know these principles so they can ensure as well as monitor conformance.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3440

FOREST SERVICE RESPONSE:

Six basic principles affect the visual dominance of form, line, color and texture in a landscape. These principles are: contrast, sequence, axis, convergence, codominance, and enframement. The main consideration for trails is providing a sequence of experience in viewing varied landscapes. Reference - Agr. Handbook Number 4343, USDA Forest Service, 1973.

32 ARE SCENIC QUALITIES IMPORTANT FOR TOURISM AND RECREATION JOBS?

COMMENTS INCLUDED:

“The preferred alternative continually discusses the importance of scenic qualities but fail to recognize and consider the importance of these tourism and recreation jobs. This manifests itself in the plans calling for the alteration of 14 out of 28 identified viewsheds.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0508, 0713, 2037, 2053, 2955, 2963, 3105, 3185, 3209, 3228, 3323, 3394, 3425, 3495, 3520, 3648, 3690, 3871, 3911, 4081, 4241, 4450, 4453, 4493, 4496, 4501

FOREST SERVICE RESPONSE:

We recognize the importance of scenery in attracting visitors to the Wenatchee Forest and adjacent tourism-based communities like Leavenworth. We believe the Forest Plan emphasis on protection of key scenic views and careful design of management activities will ensure that the Wenatchee Forest is a beautiful place to visit for generations to come.

33 WILL SCENIC AREAS VIEWED FROM LAKES BE MAINTAINED AND PROTECTED?

COMMENTS INCLUDED:

“Why is there no inventoried viewshed (P. IV-40) around Lake Wenatchee, one of the most scenic and most photographed locations on the forest?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0609, 2720, 2894, 2923, 3143, 3293, 3294, 3295, 3296, 3449, 3529, 3641, 3661, 3863, 4107, 4477

FOREST SERVICE RESPONSE:

Most lakes and surrounding areas will be managed for high scenic qualities. The exceptions are where intermingled ownerships are adjacent to the lakes and where other resource values exist. In these instances, some lakes will not have the highest visual protection. The National Forest land around Lake Wenatchee will have high visual quality objectives. (Refer to the alternative maps and Chapter IV of the FEIS.)

34 HOW CAN TIMBER HARVESTING IMPROVE VISUAL QUALITY?

COMMENTS INCLUDED:

“The Forest is stuck to the idea that it can improve the scenery by managing the resource. We see this as simply a ploy to increase the ASQ. The I-90 corridor is a mess. Now Longview Fiber is in the process of trashing the Swauk Pass area.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2054, 2835, 3621, 4467, 4479, 4490, 4496

FOREST SERVICE RESPONSE:

A natural appearing existing landscape is dynamic and constantly changing community of plants and animals. The manipulation of this dynamic situation to achieve a desired variety of conditions is the essence of a managed forest. Timber harvesting over time and space can provide a variety of vegetation age classes and openings for viewing distant landscapes. It can expose large contrasting tree boles, encourage plant community diversity, and fall colors. Vegetative variety and natural appearing edges create visual variety along travel routes.

There are many examples of timber harvest along travel routes on the Wenatchee National Forest where the long-term visual variety and diversity have been increased. Refer to Chapter IV of the FEIS for a graphic illustration of the retention and partial retention visual quality objectives.

WILD AND SCENIC RIVERS

35 RECOMMENDATIONS FOR THE DESIGNATION OF WILD AND SCENIC RIVERS.

COMMENTS INCLUDED:

“Wild and Scenic Rivers. I would go with the maximum.”

“The draft Wenatchee Forest Plan does not go far enough for river protection.”

“I believe wild, scenic, and recreational designation should be applied to the Forest after study.”

“Your Forest Plan should also evaluate segments of candidate Wild and Scenic Rivers which are within designated Wilderness.”

“We support your recommendation of the eight rivers for Wild and Scenic classification.”

“We oppose the designation of the eight rivers as Wild and Scenic.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0011, 0018, 0035, 0040, 0061, 0074, 0076, 0090, 0091, 0108, 0113, 0114, 0115, 0145, 0152, 0156, 0262, 0285, 0292, 0294, 0363, 0376, 0380, 0388, 0394, 0396, 0422, 0429, 0432, 0433, 0438, 0440, 0486, 0491, 0497, 0511, 0519, 0522, 0528, 0549, 0553, 0554, 0555, 0559, 0562, 0572, 0582, 0602, 0604, 0608, 0609, 0622, 0626, 0635, 0644, 0645, 0663, 0669, 0717, 0726, 0731, 0740, 0790, 0812, 0814, 0822, 0830, 0831, 0832, 0833, 0836, 0846, 0847, 0862, 0865, 0877, 0896, 1302, 1305, 1941, 1947, 1962, 1970, 1985, 1988, 1997, 2002, 2012, 2016, 2023, 2024, 2025, 2026, 2036, 2044, 2050, 2053, 2060, 2064, 2071, 2074, 2075, 2078, 2085, 2119, 2132, 2138, 2162, 2170, 2172, 2174, 2179, 2180, 2196, 2197, 2201, 2205, 2714, 2718, 2723, 2725, 2732, 2738, 2776, 2780, 2789, 2796, 2804, 2826, 2839, 2847, 2852, 2868, 2877, 2878, 2882, 2887, 2893, 2897, 2898, 2907, 2923, 2939, 2940, 2949, 2951, 2952, 2953, 2957, 2959, 2965, 2968, 2977, 2987, 2989, 2992, 2994, 2995, 2996, 2997, 3004, 3006, 3008, 3016, 3024, 3030, 3031, 3033, 3037, 3038, 3045, 3047, 3056, 3057, 3058, 3060, 3065, 3066, 3070, 3083, 3111, 3117, 3119, 3132, 3136, 3138, 3140, 3142, 3143, 3148, 3152, 3159, 3161, 3162, 3164, 3173, 3177, 3178, 3181, 3183, 3184, 3185, 3187, 3190,

3193, 3199, 3202, 3203, 3205, 3206, 3208, 3211, 3217, 3225, 3228, 3231, 3235, 3238, 3239, 3242, 3245, 3256, 3261, 3270, 3271, 3273, 3277, 3288, 3293, 3298, 3304, 3307, 3308, 3314, 3315, 3317, 3319, 3320, 3321, 3323, 3328, 3335, 3341, 3343, 3352, 3360, 3362, 3365, 3369, 3379, 3381, 3384, 3393, 3399, 3402, 3406, 3408, 3409, 3429, 3449, 3464, 3468, 3472, 3473, 3475, 3479, 3483, 3491, 3493, 3509, 3510, 3515, 3518, 3519, 3520, 3521, 3557, 3558, 3567, 3579, 3583, 3593, 3600, 3601, 3606, 3621, 3623, 3630, 3632, 3634, 3638, 3640, 3641, 3648, 3651, 3667, 3669, 3673, 3683, 3692, 3694, 3705, 3723, 3728, 3735, 3744, 3749, 3752, 3753, 3769, 3770, 3791, 3792, 3795, 3797, 3805, 3811, 3816, 3821, 3832, 3837, 3858, 3868, 3878, 3899, 3926, 3928, 3930, 3940, 3947, 3955, 3989, 4004, 4005, 4013, 4015, 4019, 4021, 4022, 4034, 4035, 4037, 4046, 4061, 4067, 4094, 4107, 4109, 4110, 4112, 4127, 4128, 4139, 4141, 4142, 4146, 4150, 4157, 4158, 4161, 4166, 4169, 4179, 4194, 4195, 4204, 4207, 4222, 4232, 4234, 4243, 4257, 4261, 4269, 4270, 4277, 4279, 4282, 4298, 4306, 4406, 4408, 4415, 4427, 4434, 4437, 4442, 4444, 4446, 4449, 4452, 4454, 4460, 4469, 4470, 4477, 4491, 4493, 4494, 4498, 4502, 4507, 4507, 4511, 9007, 9017, 9034, 9040, 9041, 9042, 9045, 9046, 9062, 9066, 9074, 9077, 9079, 9094, 9097, 0002S, 0007S, 0017S, 0018S, 0019S, 0023S, 0024S, 0026S, 0030S, 0032S, 0033S, 0034S, 0036S, 0039S, 0040S, 0041S, 0047S, 0051S, 0052S, 0053S, 0054S, 0055S, 0055S, 0056S, 0058S, 0059S, 0060S, 0061S, 0062S, 0063S, 0064S, 0065S, 0066S, 0067S, 0068S, 0069S, 0070S, 0071S, 0075S, 0075S, 0076S, 0082S, 0084S, 0085S, 0086S, 0087S, 0088S, 0089S, 0090S, 0091S, 0094S, 0095S, 0097S, 0099S, 0102S, 0106S, 0110S, 0112S, 0115S, 0116S, 0118S, 0138S, 0143S, 0149S, 0151S, 0156S, 0157S, 0159S, 0160S, 0165S, 0173S, 0175S, 0176S, 0178S, 0180S, 0181S, 0183S, 0185S, 0187S, 0197S, 0209S, 0212S, 0215S, 0223S, 0224S, 0225S, 0227S, 0229S, 0303S, 0312S, 0313S, 0316S, 0333S, 0340S, 0359S, 0361S, 0363S, 0408S, 0410S, 0417S, 0419S, 0425S, 0426S, 0452S, 0460S, 0461S, 0463S, 0464S, 0467S, 0469S, 0498S, 0585S, 0587S, 0590S, 0591S, 0593S, 0594S, 0599S, 0600S, 0604S, 0607S, 0617S, 0618S, 0619S, 0648S, 0656S, 0658S, 0660S, 0661S, 0664S, 0666S, 0667S, 0668S, 0670S, 0675S, 0677S, 0680S, 0691S, 0693S, 0694S, 0706S, 0712S, 0720S, 0721S, 0723S, 1038S, 1038S, 1053S, 1056S, 1056S, 1057S, 1058S, 1059S, 1060S, 1062S, 1064S, 1067S, 1068S, 1070S, 1072S, 1077S, 1079S, 1080S, 1081S, 1082S, 1083S, 1084S, 1087S, 1089S, 1096S, 1098S, 1101S, 1102S, 1103S, 1107S, 1109S, 1117S, 1121S, 1123S, 1123S, 1138S, 1138S, 1139S, 1144S, 1145S, 1148S, 1152S, 1153S, 1155S, 1157S, 1157S, 1158S, 1159S, 1161S, 1163S, 1164S, 1167S, 1171S, 1177S, 1178S, 1179S, 1179S, 1180S, 1180S, 1181S, 1185S, 1188S, 1189S, 1190S, 1191S, 1192S, 1194S, 1196S, 1198S, 1199S, 1201S, 1202S, 1204S, 1206S, 1207S, 1208S, 1209S, 1210S, 1211S, 1212S, 1215S, 1216S, 1218S, 1219S, 1220S, 1222S, 1223S, 1224S, 1227S, 1227S, 1229S, 1230S, 1232S, 1234S, 1235S, 1236S, 1239S, 1240S, 1242S, 1243S, 1248S, 1249S, 1251S, 1256S, 1257S, 1258S, 1259S, 1264S, 1302S, 1306S, 1308S, 1313S, 1314S, 1315S, 1316S, 1318S, 1319S, 1322S, 1323S, 1324S, 1333S, 1335S, 1354S, 1369S, 1375S, 1376S, 1377S, 1381S, 1382S, 1401S, 1402S, 1403S, 1404S, 1407S, 1408S, 1411S, 1412S, 1413S, 1414S, 1415S, 1416S, 1417S, 1418S, 1419S, 1423S, 1425S, 1426S, 1427S, 1428S, 1429S, 1433S, 1434S, 1435S, 1436S, 1437S, 1571S, 1572S, 1580S, 1581S, 1582S, 1582S, 1584S, 2014S, 2015S, 2016S, 2017S, 2018S, 2019S, 2020S, 2040S, 2041S, 2042S, 2043S, 2045S, 2046S, 2047S, 2050S, 2058S, 2059S, 2060S, 2061S, 2062S, 2063S, 2064S, 2064S, 2065S, 2067S, 2068S, 2069S, 2071S, 2073S, 2074S, 2074S, 2075S, 2076S, 2077S, 2078S, 2079S, 2080S, 2081S, 2082S, 2083S, 2102S, 2155S, 2158S, 2159S, 2160S, 2165S, 2167S, 2168S, 2169S, 2170S, 2171S, 2172S, 2172S, 2173S, 2174S, 2175S, 2176S, 2177S, 2180S, 2181S, 2182S, 2183S, 2184S, 2185S, 2187S, 2187S, 2189S, 2190S, 2192S, 2193S, 2193S, 2194S, 2194S, 2196S, 2197S, 2200S, 2201S, 2240S, 2242S, 2243S, 2248S, 2249S, 2250S, 2251S, 2271S, 2273S, 2274S, 2276S, 2277S, 2303S, 2304S, 2305S, 2307S, 2308S, 2308S, 2309S, 2310S, 2311S, 2312S, 2313S, 2315S, 2316S, 2319S, 2319S, 2320S, 2364S, 2366S, 5042S, 5043S, 5067S, 5070S, 5072S, 5074S, 5075S, 5078S, 5080S, 5081S, 5082S, 5083S, 5085S, 5097S, 5098S, 5100S, 5102S, 5102S, 5118S

FOREST SERVICE RESPONSE:

We received considerable public response to the draft Forest Plan concerning Wild and Scenic Rivers. In fact, there was so much that we formed an interdisciplinary team (ID Team) to study the public comment and consider the rivers of interest to the public in greater detail. The majority of the comment supported adding additional rivers to those recommended for designation in the Draft.

The ID Team analyzed 20 rivers that were identified in the public comments as having significant resource values worthy of further review. During the review, the ID Team found that 9 of these 20 rivers possessed at least one outstandingly remarkable value and were eligible for designation. Of the nine rivers, eight were found to be suitable for designation. The change of recommendation to include eight rivers was such a departure from the Draft Forest Plan that a supplement was prepared and issued to provide the opportunity for public comment. A series of public meetings were held in conjunction with the public comment period to help inform people of the proposal and explain the implications of river designation under the Act. Following the public comment period, an additional 13 rivers were examined for eligibility, and some of the original 20 were reassessed. As a result of the renewed study, a ninth river was recommended for inclusion in the Wild and Scenic River System. A complete description of the eligibility and suitability analyses is provided in Appendix E of the FEIS.

36 MANAGEMENT AND FINANCING OF RIVERS DESIGNATED UNDER THE WILD AND SCENIC RIVERS ACT

COMMENTS INCLUDED:

“What specifically can the property owners expect if Congress decides to move ahead with Wild and Scenic River designations?”

“River management plans will be developed after designation, so how can you presume to discuss it?”

“The ORV use in river corridors is inconsistent with the objectives of the Wild and Scenic Rivers Act.”

“The public has good access to the waterways, lakes, forests and wilderness areas. We do not need more public access.”

“River rafting should be prohibited with the possible exception of individual inner-tube rafting and even that should be discouraged.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0562, 0582, 2853, 3083, 3878, 4013, 4477, 4485, 4494, 4498, 4502, 0004S, 0024S, 0041S, 0046S, 0078S, 0115S, 0217S, 0316S, 0360S, 0409S, 0590S, 0655S, 0716S, 0719S, 1071S, 1199S, 1234S, 1238S, 1238S, 1576S, 1577S, 1587S, 2016S, 2021S, 2042S, 2056S, 2085S, 2191S, 2201S, 2243S, 2247S, 5042S, 5085S

FOREST SERVICE RESPONSE:

The objectives of designation of a river as Wild, Scenic or Recreational are provided in the Wild and Scenic Rivers Act. They are to:

- Preserve the river in free-flowing condition, without impoundments or diversions, and to protect water quality.
- Protect the river and its immediate environment for the benefit and enjoyment of the present and future generations.
- Protect or enhance the unique resource values which caused the river to be designated under the Act.

To ensure these objectives are carried out, the Wild and Scenic Rivers Act requires that a detailed management plan be prepared for each designated river. The plan will address the specific where's, how's and when's of development and uses within the river corridor, including questions relating to public access, the type of recreation activities and facilities appropriate to the river and corridor areas, the levels of motorized and other recreation use that are appropriate and desirable, measures for the protection of private property along the river, the relationship of Federal plans to State and County administration within the corridor, and protection of the significant river resource values.

While it is true that the specifics of these plans have not been developed, there are certain principles common to their preparation that we intend to follow. Each plan will rely heavily on public involvement throughout its development, including that of landowners, other involved government agencies, and groups interested in river management. In fact, we will be encouraging partnerships between the Federal government and local government and the private sector, in the management of these rivers. The issues and concerns identified during the Suitability Study (see Appendix E of the FEIS) will be addressed, as will any new issues that surface during the public involvement. The management plans will be the key documents in resolving potential conflicts, in identifying sensitive resource values, and in protecting private property within the river corridors.

With the exception of a 200 foot stretch of right-of-way near the Highway 209 bridge at Plain, there are no plans for acquisition of private lands in connection with river designation. Land uses and developments on private lands within the river area which were in existence when the river was designated will be permitted to continue, to the extent these are compatible with county zoning and state regulations. Finally, we have offered some "umbrella guidelines" in Appendix E of the FEIS. These outline the direction that we propose to follow in developing our management plans and in administering the designated rivers.

The level of funding provided for development and management of the Wild and Scenic River corridors will be determined by Congress. Regardless of the final allocation, we are committed, at the very minimum, to the protection of those values for which the individual rivers are recognized.

37 THE WILD AND SCENIC RIVERS ACT IS UNCLEAR IN MANY RESPECTS

COMMENTS INCLUDED:

"The Wild and Scenic Rivers Act is vague and not a vehicle to protect our rivers. The intent of the act is good and noble, but the Act itself is a mess open to many legal and ethical questions."

"Most of the opposition to Wild and Scenic Rivers is based on misunderstanding of the Wild and Scenic Rivers Act and uncertainty about future river management plans for designated rivers."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2044, 0102S, 0464S, 0498S, 1157S, 1238S, 1423S, 2050S

FOREST SERVICE RESPONSE:

Congress enacted the Wild and Scenic Rivers Act in 1968 in an attempt to keep selected rivers or river segments in a free-flowing condition, and to recognize their importance to our natural and cultural heritage. As is true of many of our Federal laws, the language is fairly broad, in order to encompass a

complex and variable situation. However, there are additional mechanisms by which the implementation of the law and its application in individual situations are more clearly defined. These include the joint Department of Interior/Department of Agriculture Revised Guidelines for Eligibility, Classification and Management of River Areas, as well as the Forest Service Land and Resource Management Planning Handbook, Chapter 8, which describes the process for identifying and evaluating potential river additions to the system, and the procedures for obtaining public review and comments.

Detailed management plans for designated river corridors will be prepared with the full involvement of the public, including any potentially affected landowners (See Item 12 of the Management Guidelines in Appendix E of the FEIS). These plans will try to resolve specific issues and questions that might exist, and will provide direction that incorporates public needs and concerns, while assuring the protection of the special values for which the rivers or river segments were designated.

38 DESIGNATING ADDITIONAL RIVERS INTO THE WILD AND SCENIC RIVER SYSTEM WILL COST TOO MUCH MONEY AND TAKE MORE LANDS OUT OF "MULTIPLE USE"

COMMENTS INCLUDED:

“There is already more Federal and State land designated for preservation and recreation than what is feasible to financially and efficiently manage.”

“Why should there even be a thought of adding more expensive responsibilities of policing private property?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0011S, 0034S, 0072S, 0096S, 0214S, 0215S, 0316S, 0342S, 0654S, 0655S, 0697S, 0719S, 1119S, 1152S, 1168S, 1215S, 1217S, 1234S, 1242S, 1244S, 1253S, 1372S, 1373S, 1376S, 1378S, 1380S, 1422S, 1577S, 1587S, 2014S, 2017S, 2042S, 2045S, 2054S, 2055S, 2057S, 2142S, 2156S, 2191S, 2245S, 2246S, 2247S

FOREST SERVICE RESPONSE:

Congress enacted the Wild and Scenic Rivers Act in an attempt to balance the need to develop some of the nation's rivers for hydropower purposes with that of retaining some of the rivers in their free-flowing, natural state. These latter rivers were to be recognized for their special physical, recreational and cultural values, regardless of ownership (see Chapter III of the FEIS). It is true that management of these rivers will cost additional money, but Congress clearly indicated that the outstandingly remarkable values of the designated rivers are worth protecting. At the same time, we will use prudent measures in the management of the river corridors. River designation does not require that lands be removed from multiple use. As is described in the suitability analysis in Appendix E of the FEIS, timber harvest, recreation development, construction of needed facilities, and other uses are permitted within a Scenic or Recreational river corridor, as long as these are sensitive to the values to be protected.

Appendix E also notes that where privately-owned property is included within the proposed boundaries, it is our intent to rely on State and County control for their administration.

39 THE PROCESS FOR ANALYZING ELIGIBILITY IS FLAWED

COMMENTS INCLUDED:

“The final lists of ineligible and eligible rivers suggest that a review of the eligibility determination process is necessary.”

“No landowners of private lands which could be affected by the Wild and Scenic Rivers designation were included in selection of rivers to be studied.”

“The criteria for eligibility were entirely subjective. More objective standards must be developed and utilized.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

9094, 0004S, 0036S, 0041S, 0062S, 0072S, 0102S, 0115S, 0148S, 0165S, 0212S, 0215S, 0358S, 0361S, 0425S, 0655S, 0668S, 0676S, 1167S, 1171S, 1199S, 1238S, 1301S, 1373S, 1576S, 1577S, 1587S, 2041S, 2042S, 2048S, 2065S, 2085S, 2178S, 2191S, 2241S, 2315S, 2319S,

FOREST SERVICE RESPONSE:

Rivers were identified for potential eligibility through the Nationwide Rivers Inventory published by the National Park Service in 1982, through in-Service study, and through the public response to the DEIS and the 1988 Supplement. The comments of those private landowners who responded to the latter documents were included in the selection of rivers and in the eligibility and suitability studies which are presented in Appendix E of the FEIS.

We agree that our distinction between outstandingly remarkable and above average values was frequently unclear in the Supplement, and we have amended the descriptions accordingly in the Appendix. To the extent possible, objective standards were applied in determining eligibility. Scenic values, for instance, were rated on the character type of the area (either Northeastern or Recent Cascades character types), with landform, waterform, rockform, and vegetative type providing the defining characteristics. However, as the joint Department of Interior/Department of Agriculture Guidelines for Eligibility, Classification and Management of River Areas state, the determination that a river area contains outstandingly remarkable values is a professional judgement on the part of the study team. There is no known way to write criteria so as to automatically or mechanically determine that certain values are outstandingly remarkable. In making these assessments, we used our most knowledgeable specialists and river experts. Other agencies, such as the U.S. Fish and Wildlife Service, the Washington State Department of Game, Washington State Natural Heritage within the Department of Natural Resources, and the Washington State Scenic Rivers Program were also consulted. The eligibility determination took into consideration each river's values as viewed within the state or national context, as well as within the particular physiographic area.

We did examine some of the larger tributaries of those rivers proposed for designation during the evaluation study. A few of these merited recommendation for inclusion in the Wild and Scenic Rivers System (such as the Waptus River, and of course the various tributaries of the Wenatchee River), but most lacked the outstandingly remarkable values to qualify them for eligibility. However, riparian manage-

ment prescriptions exist that can be used to protect specific values within these other river/creek corridors. See Chapter IV of the Forest Plan.

40 THE SUITABILITY ANALYSIS WAS DONE IMPROPERLY

COMMENTS INCLUDED:

“You have purposely combined two important, independent issues into one. They are the reasonably foreseeable potential uses of the land and water which would be enhanced, foreclosed or curtailed if the area were included in the Wild and Scenic River System, and the values which could be foreclosed or diminished if the area is not protected as part of the system.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2021S

FOREST SERVICE RESPONSE:

Current national direction combines these issues as a single factor in determining suitability of a river for designation. However, in our amended Suitability Analysis (see Appendix E of the FEIS), we have tried to more clearly distinguish these two points. It is also interesting to note that Section 4(a) of the Wild and Scenic Rivers Act requires an analysis of only the first of these issues, as listed in the comments above.

41 HOW WERE RIVERS SEGMENTED FOR PURPOSES OF CLASSIFICATION?

COMMENTS INCLUDED:

“The Supplement to the DEIS segmented the White River into two “Scenic” segments. The upper segment is totally Federal and the lower mostly private. Why?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0002S, 1156S, 1577S

FOREST SERVICE RESPONSE:

In defining river segments, we considered such factors as physical changes in the river character, significant differences in the level of development along the river corridor, and changes in land ownership patterns. We segmented the Scenic stretch of the White River on the basis of land ownership, so as to facilitate management within this part of the corridor. The lowest segment is approximately 64% private, and it is our intention to rely on State and County administration of the private holdings here. A full description of the segments can be found in the suitability analysis of the White River in Appendix E of the FEIS.

42 RECOMMENDING ELIGIBLE RIVER SEGMENTS AT LESS THAN THEIR HIGHEST POTENTIAL CLASSIFICATION IS QUESTIONED.

COMMENTS INCLUDED:

“We strongly object to the Forest’s practice of downgrading river segments found eligible for inclusion in the National Wild and Scenic Rivers System.”

“The Forest has generally done a good job of classifying the river segments, but should not recommend river segments for designation at a classification less than they qualify for.”

“...opposed to scenic designation for the Entiat in that portion that meets ‘wild’ criteria.”

“Upgrade the Recreation classification on the Cle Elum River.”

“The Icicle, Chiwawa and Entiat Rivers contain segments that Alternative ‘C’ proposes for designation at less than their highest potential classifications. However, an adequate discussion of the reasons those particular segments should be designated at lower levels of classification has not been provided.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3190, 0017S, 0018S, 0026S, 0036S, 0055S, 0058S, 0095S, 0110S, 0115S, 0165S, 0183S, 0197S, 0227S, 0229S, 0333S, 0419S, 0426S, 0498S, 0587S, 0593S, 0599S, 0604S, 0606S, 0656S, 0658S, 0664S, 0677S, 0693S, 1062S, 1067S, 1068S, 1095S, 1103S, 1106S, 1107S, 1145S, 1155S, 1156S, 1167S, 1170S, 1171S, 1173S, 1181S, 1188S, 1191S, 1194S, 1196S, 1199S, 1204S, 1210S, 1211S, 1212S, 1222S, 1223S, 1229S, 1257S, 1258S, 1264S, 1301S, 1302S, 1308S, 1314S, 1318S, 1319S, 1369S, 1375S, 1379S, 1381S, 1401S, 1407S, 1411S, 1417S, 1423S, 1425S, 1426S, 1427S, 1434S, 1435S, 1437S, 1575S, 2040S, 2041S, 2050S, 2063S, 2064S, 2065S, 2066S, 2074S, 2075S, 2076S, 2079S, 2081S, 2157S, 2158S, 2159S, 2167S, 2171S, 2172S, 2176S, 2180S, 2182S, 2187S, 2194S, 2196S, 2197S, 2273S, 2305S, 2308S, 2313S, 2314S, 2315S, 2319S, 2364S, 2366S, 5042S, 5067S, 5072S, 5074S, 5084

FOREST SERVICE RESPONSE:

As described in Chapter III and Appendix E of the FEIS, there are three steps involved in considering a river for inclusion in the Wild and Scenic Rivers System. The first step is to determine the eligibility of the river, or river segments, based on the free-flowing characteristics and any “outstandingly remarkable” values that the river might possess. If a river or segment thereof is determined eligible, the next step in the process is to classify it as Wild, Scenic or Recreational, based on the present attributes of the corridor, as observed from the river itself. This is an objective assessment, directed to the highest potential classification of the river (Chapter III of the FEIS lists all eligible rivers at their highest potential classification). As required by the Wild and Scenic Rivers Act, the final step is to determine the suitability of the eligible river or river segments for designation based on such factors as the values of the river that are to be protected, existing landownership patterns, and the nature of current and projected uses in the corridor.

Appendix E provides the details of this analysis for all eligible rivers on the Wenatchee National Forest. The recognition of all of these needs may result in a recommendation for designation at less than the highest potential classification. This was the case for the following eligible rivers or river segments:

Chiwawa River, Segment 2 (between the Wilderness boundary and Goose Creek) - Although this segment meets the standards for classification as a Scenic River, we are recommending a Recreational classification because of anticipated plans for recreational development and use of National Forest lands within the corridor, as well as plans for proposed in-stream fisheries enhancement structures and improvements.

Cle Elum River, Segment 3 (between Tucquala Lake and the Salmon La Sac bridge) - Seventy-one percent of the acreage in this segment is private. A Recreational classification better incorporates the objectives of local government, and the potential developments on private land.

Entiat River, Segment 2 (between Cottonwood and the Wilderness boundary) - We are recommending a Scenic rather than Wild classification of this segment primarily because of continued motorized use along Trail #1400 as far as the Myrtle Lake Trailhead. Although trail bike use is allowed under both Wild and Scenic classifications, it is more compatible with the latter. Furthermore, this area is allocated in the Forest Plan to unroaded, non-motorized use southwest of the river, and unroaded, motorized use northeast of the river. There would be no scheduled timber harvest or road construction within this portion of the corridor, thus maintaining its basically "wild" characteristics.

Icicle River, Segment 2 (between the Wilderness boundary and the City of Leavenworth water intake) - We are recommending a Recreational rather than Scenic classification of this segment because of the anticipated need for future recreational developments within the corridor. The Icicle is one of the most heavily used watersheds on the Forest, and the expansion of existing recreational facilities as well as additional improvements will be necessary to meet this demand. Furthermore, approximately 46% of Segment 2 is private. A Recreational classification would better accommodate the private ownership here.

White River, Segment 3 (from the private land boundary above Tall Timber Ranch to Lake Wenatchee) - Although the highest potential classification of this segment is Scenic, we are recommending Recreational classification because of the management needs that exist here. One of the primary concerns is for the sockeye salmon fishery. A Scenic designation may preclude certain necessary enhancement structures or facilities, and therefore unnecessarily restrict our ability to manage one of the resource values which makes this river outstandingly remarkable.

It is important to recognize that significant river values will be protected at whatever level of classification a river is designated. There are also additional laws and regulations as well as the Forest Standards and Guidelines, special riparian prescriptions, and land allocations sensitive to the attributes of the river corridors (see Chapter IV of the Forest Plan) that would provide additional protection of these resources.

43 RECOMMEND ADDITIONAL RIVERS AND RIVER SEGMENTS FOR INCLUSION IN THE WILD AND SCENIC RIVER SYSTEM.

COMMENTS INCLUDED:

"The public has a right to have some rivers protected...to have access to rivers that reflect the wild and natural side of the way our country once was."

“Many more rivers or portions of rivers should receive Wild and Scenic River protection.”

“Their long range importance and the watersheds they represent make it difficult to accept only 8 out of 21!”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0026S, 0032S, 0047S, 0050S, 0055S, 0057S, 0060S, 0066S, 0067S, 0070S, 0073S, 0105S, 0109S, 0158S, 0164S, 0165S, 0181S, 0182S, 0197S, 0212S, 0224S, 0227S, 0312S, 0313S, 0340S, 0358S, 0360S, 0361S, 0362S, 0425S, 0587S, 0591S, 0619S, 0661S, 0668S, 0677S, 0679S, 1038S, 1058S, 1062S, 1069S, 1072S, 1077S, 1079S, 1089S, 1091S, 1107S, 1109S, 1144S, 1154S, 1161S, 1167S, 1171S, 1181S, 1185S, 1189S, 1191S, 1198S, 1199S, 1207S, 1208S, 1210S, 1211S, 1212S, 1227S, 1231S, 1233S, 1235S, 1241S, 1247S, 1249S, 1254S, 1255S, 1301S, 1308S, 1314S, 1315S, 1319S, 1324S, 1335S, 1416S, 1418S, 1426S, 1428S, 1435S, 1575S, 2041S, 2043S, 2048S, 2064S, 2067S, 2068S, 2069S, 2157S, 2166S, 2168S, 2173S, 2182S, 2183S, 2184S, 2185S, 2193S, 2194S, 2197S, 2239S, 2243S, 2248S, 2249S, 2271S, 2273S, 2304S, 2304S, 2307S, 2308S, 2309S, 2310S, 2311S, 2312S, 2313S, 2314S, 2317S, 2319S, 2320S, 5073S, 5074S, 5080S, 5097S, 5100S, 5102S,

FOREST SERVICE RESPONSE:

An analysis was conducted on 13 additional rivers, river segments and creeks, in response to public comments after publication of the Supplement. These water courses included Chiwaukum Creek, Ingalls Creek, Lake Creek (in the Little Wenatchee drainage), Deep Creek, Nason Creek, Big Creek, Gale Creek, Gold Creek, Silver Creek, Mineral Creek, Taneum Creek, the lower stretch of the Cle Elum River, and the Rainier Fork of the American River.

The lower Cle Elum was eliminated from further consideration due to the fact that it does not meet the free-flowing criteria. The river channel here was modified by the construction of the Lake Cle Elum Dam in 1934, and it currently experiences controlled stream flow fluctuations as a result of this impoundment.

The remaining rivers/creeks were evaluated on the basis of the scenic, recreational, geological, fish, wildlife, cultural, historical and ecological values that are directly associated with the river corridors (the results of this study are documented in the Analysis File for the Forest Plan). Although these rated above average in several cases, none were determined to be outstandingly remarkable in the professional judgement of the evaluators. As a consequence, these additional rivers and creeks are not eligible for inclusion in the Wild and Scenic River System.

44 THE LOWER WENATCHEE RIVER SHOULD BE INCLUDED IN THE WILD AND SCENIC RIVER SYSTEM.

COMMENTS INCLUDED:

“Is the section between Cashmere and Wenatchee being considered? If not, it should at least have ‘recreational’ designation.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0075S, 0419S, 0679S, 0693S, 1153S, 1308S, 2169S, 2271S

FOREST SERVICE RESPONSE:

Our analysis was confined to that portion of the Wenatchee River that is within the National Forest boundary. This would exclude the segments of the river below Tumwater Canyon. However, the State of Washington is presently conducting an assessment of 18 rivers in the State which possess the natural, cultural and recreational values that would make them suitable additions to the Washington State Scenic Rivers System. Among these 18 is the Wenatchee River, from its outlet at Lake Wenatchee to its confluence with the Columbia River. We would suggest contacting the State for those stretches of the Wenatchee River between Leavenworth and Wenatchee.

45 RECONSIDER CERTAIN RIVERS FOR WILD AND SCENIC DESIGNATION

COMMENTS INCLUDED:

“The Mad River offers some of the finest stands of old growth on the East Side.”

“North Fork Entiat has outstanding scenery and geology...”

“The Yakima River needs to be protected.”

“Reconsider evaluation of the Kachess River.”

“The Teanaway has unique sandstone ledges with remarkable scenery.”

“The Middle Fork and West Fork Teanaway may not have the classical scenery that other rivers have, but their remoteness and recreation opportunities they provide are what I would call ‘outstandingly remarkable values.’”

“...glaciers can be viewed from the picnic areas at Cooper Lake. Portions above the lake go through large wet meadows, old ox-bow lakes and numerous beaver ponds.”

“The Waptus is certainly a “wild river” with much scenic appeal and recreational use. The confluence of the Waptus River with Cle Elum is a special place...the length between the wilderness boundary and the Cle Elum deserves special management.”

“This river is especially interesting, due to the diversity of habitats through which it flows and the extent and complexity to the braided riparian communities just above its confluence with Lake Wenatchee. We urge you to recommend the Little Wenatchee in your final LRMP. The specific recommendation should be for Wild designation in the Wilderness stretch and Scenic status outside the Wilderness.”

“I was disappointed that the Tieton with its outstanding recreational values was not included in your recommendation. The Tieton provides excellent whitewater boating during a time of the year when no rivers are capable of being floated.”

“I am appalled that no part of the Naches River is considered for ‘recreational’ or better classification.”

“Consideration should be given to classifying the Little Naches River as scenic.”

“The upper portion of the Bumping is certainly ‘outstandingly remarkable’ in every way. We are well acquainted with it historic, geologic, scenic, recreational, wild, the whole thing...; the lower portion is simply a beautiful mountain stream, historic and runs also through some unusual, geologically speaking, country.”

“Rattlesnake Creek, which is free-flowing its entire length, has a number of outstandingly remarkable values.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3190, 3256, 3270, 0001S, 0036S, 0039S, 0055S, 0056S, 0075S, 0083S, 0089S, 0091S, 0092S, 0095S, 0097S, 0101S, 0102S, 0110S, 0114S, 0115S, 0116S, 0117S, 0148S, 0149S, 0152S, 0156S, 0160S, 0165S, 0173S, 0183S, 0185S, 0187S, 0197S, 0212S, 0217S, 0223S, 0227S, 0312S, 0313S, 0314S, 0319S, 0333S, 0334S, 0340S, 0341S, 0358S, 0359S, 0425S, 0452S, 0464S, 0469S, 0587S, 0591S, 0594S, 0598S, 0599S, 0604S, 0606S, 0607S, 0618S, 0619S, 0658S, 0660S, 0661S, 0666S, 0667S, 0668S, 0670S, 0676S, 0677S, 0679S, 0680S, 0691S, 0693S, 0694S, 0706S, 0721S, 1056S, 1058S, 1062S, 1064S, 1067S, 1068S, 1069S, 1070S, 1072S, 1077S, 1079S, 1081S, 1082S, 1083S, 1084S, 1087S, 1089S, 1092S, 1093S, 1095S, 1096S, 1103S, 1107S, 1109S, 1117S, 1121S, 1123S, 1124S, 1138S, 1139S, 1142S, 1143S, 1144S, 1145S, 1148S, 1155S, 1157S, 1158S, 1161S, 1164S, 1167S, 1171S, 1178S, 1179S, 1180S, 1181S, 1185S, 1188S, 1189S, 1190S, 1191S, 1192S, 1194S, 1197S, 1198S, 1199S, 1202S, 1204S, 1207S, 1209S, 1210S, 1211S, 1212S, 1218S, 1219S, 1222S, 1223S, 1224S, 1227S, 1229S, 1230S, 1231S, 1232S, 1233S, 1235S, 1243S, 1247S, 1248S, 1249S, 1251S, 1254S, 1255S, 1256S, 1259S, 1264S, 1301S, 1302S, 1308S, 1312S, 1313S, 1314S, 1315S, 1318S, 1319S, 1323S, 1324S, 1326S, 1329S, 1335S, 1354S, 1369S, 1381S, 1382S, 1401S, 1407S, 1408S, 1410S, 1411S, 1412S, 1413S, 1414S, 1415S, 1416S, 1417S, 1418S, 1419S, 1423S, 1425S, 1426S, 1427S, 1428S, 1429S, 1435S, 1436S, 1575S, 2040S, 2041S, 2048S, 2058S, 2063S, 2064S, 2065S, 2067S, 2073S, 2074S, 2076S, 2077S, 2078S, 2080S, 2081S, 2083S, 2102S, 2139S, 2155S, 2157S, 2158S, 2159S, 2160S, 2165S, 2166S, 2168S, 2169S, 2170S, 2171S, 2173S, 2174S, 2175S, 2176S, 2180S, 2181S, 2182S, 2183S, 2184S, 2185S, 2187S, 2189S, 2190S, 2193S, 2194S, 2197S, 2200S, 2201S, 2240S, 2251S, 2271S, 2273S, 2274S, 2276S, 2277S, 2303S, 2304S, 2305S, 2307S, 2308S, 2309S, 2309S, 2310S, 2311S, 2312S, 2313S, 2316S, 2319S, 2320S, 2364S, 5070S, 5072S, 5073S, 5074S, 5075S, 5076S, 5078S, 5079S, 5081S, 5082S, 5083S, 5084S, 5085S, 5094S, 5097S, 5100S, 5101S

FOREST SERVICE RESPONSE:

An ID Team reevaluated all of the rivers and river segments that were originally determined to be ineligible for inclusion in the Wild and Scenic River System, in response to new information presented by the public after publication of the Supplement. The process for this determination is described in the introductory comments to Appendix E of the FEIS.

With respect to the Yakima River, a formal evaluation of eligibility was not made due to the fact that National Forest lands make up less than 1% of the ownership in the drainage. However, the Yakima is listed as one of 26 rivers presently under consideration as part of the Washington State Scenic River Assessment program.

The Teanaway, which was originally considered as a single river system, was reevaluated as three separate corridors: the North Fork, the Middle Fork and the West Fork.

As a result of this reevaluation, the Waptus River has been recommended for designation as a Wild River, based on the outstandingly remarkable scenic values and pristine condition of the corridor. The full description of the eligibility and suitability analysis is provided in Appendix E of the FEIS. There was

no change made in the eligibility ratings of the remaining rivers. We do agree that there are a number of features within these drainages that could certainly be considered above average and thereby contribute to the distinctive character of the corridors. However, these values were either not directly associated with the riverine environment or, in the judgement of the ID Team, did not meet “outstandingly remarkable” standards. Other laws, land allocations, Forest Standards and Guidelines and management prescriptions are available that would more appropriately protect these attributes.

46 THE QUESTION OF HOW MUCH ANALYSIS THE FOREST SERVICE SHOULD DO BEFORE RECOMMENDING RIVERS FOR DESIGNATION WAS RAISED.

COMMENTS INCLUDED:

“The Forest Service should thoroughly analyze the impact of Wild and Scenic designation on any other resources prior to recommending any rivers suitable for designation.”

“The Forest Service should proceed with their course of recommending rivers without further analysis.”

“I do not support Wild and Scenic river designations arbitrarily, without studying the impact on all aspects affected.”

“Your recommendations were made by studying outdated maps. No recommendations should be made until each river has been physically surveyed.”

“I believe that the Forest Service should dove-tail their proposal with the Northwest Power Planning Council and others who are seeking protection of Northwest rivers.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0031S, 0085S, 0104S, 0342S, 0447S, 0601S, 0672S, 0675S, 0733S-0870S, 0872S-0892S, 0894S-0903S, 0905S-0938S, 0940S-0979S, 0981S-1037S, 1039S-1051S, 1168S, 1176S, 1177S, 1183S, 1184S, 1193S, 1195S, 1246S, 1250S, 1300S-1400S, 1405S, 1438S-1493S, 1495S, 1497S-1498S, 1500S-1504S, 1506S-1537S, 1539S-1541S, 1543S-1570S, 1579S, 1585S, 1589S-1594S, 1596S-1649S, 1651S-1663S, 1665S-1672S, 1675S-1697S, 1699S-1702S, 1704S-1737S, 1739S-1783S, 1785S-1821S, 1823S-1834S, 1836S-1881S, 1884S-1895S, 1898S-1968S, 1970S-1981S, 1983S-1988S, 1990S-2002S, 2004S-2006S, 2008S-2013S, 2052S-2053S, 2103S-2154S, 2186S, 2202S-2238S, 2254S-2259S, 2261S-2268S, 2278S, 2280S-2285S, 2291S-2296S, 2297S-2302S, 2318S, 2321S-2341S, 2343S-2362S, 2368S-2372S, 2374S-2389S, 2391S-2444S, 5000S-5004S, 5006S-5020S, 5022S-5040S, 5044S-5050S, 5052S-5066S, 5071S, 5111S-5112S

FOREST SERVICE RESPONSE:

An ID Team of professional specialists and the most knowledgeable river experts on the Forest reassessed the eligibility of all the rivers on the Wenatchee National Forest, after publication of the DEIS. Twenty of these rivers were considered possible candidates for more detailed evaluation, and an analysis of eligibility was completed. An ID Team was also assigned the task of completing a Suitability Analysis for the resulting eligible rivers. The suitability study included an evaluation of the impact of designation on other resources and uses within the eligible river corridor. In each case, the study teams included individuals familiar with the physical characteristics of the respective rivers. The results of this study were published in the 1988 Supplement.

The analysis was continued, based on new information and public response to the Supplement, on the original 20 rivers as well as on an additional 13 rivers, river segments and creeks. Comments from agencies such as the Northwest Power Planning Council, were considered in this further analysis. As a result of the additional study, some adjustments were made in the data, including changes in certain river segment classifications (see Appendix E of the FEIS). The recommendation of the Waptus River as being eligible and suitable for inclusion in the Wild and Scenic River System was also made.

47 THE ESTABLISHMENT OF THE WIDTH OF THE RIVER STUDY BOUNDARIES IS QUESTIONED.

COMMENTS INCLUDED:

“These zones seem narrower than necessary (1/2 mile) since they represent water conservation and protection of river habitat. Bare slopes above allow flood waters to bring down great gravel washes.”

“I have extensive knowledge of the White River Valley, having owned property there since 1975...I would argue for an increase (to 1/2 mile or more) of the width of the ‘pristine corridor’, and that logging be controlled not only with respect to scenic values but with respect to siltation and other water quality considerations.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0060S, 0075S, 0112S, 0181S, 0209S, 1188S, 1308S

FOREST SERVICE RESPONSE:

For the purposes of the analysis, the corridor boundaries for the eligible rivers or river segments have been set at the minimum required by law - 1/4 mile in width from each bank of the river. As rivers are designated, these boundaries will be formally determined, taking into consideration specific landmarks, resources, river values, or factors that might facilitate management of the river area. However, under provisions of the Wild and Scenic Rivers Act, no more than an average of 320 acres per river mile can be included within the boundary. This would preclude expanding the width of the corridor, on a general basis, to 1/2 mile from each bank.

We would encourage you to examine the preferred alternative map for the management prescriptions assigned to National Forest lands adjacent to the corridor, and the Standards and Guidelines in Chapter IV of the Forest Plan, with which we will manage those lands. We believe that this direction will help to protect the special resource values that exist in the White River and other eligible river drainages.

48 THE EFFECT OF WILD AND SCENIC RIVER DESIGNATION ON PROPERTY RIGHTS AND WATER RIGHTS IS QUESTIONED.

COMMENTS INCLUDED:

“Quit trying to take the rights of local landowners away by the idea that you will protect us all.”

“We should not let this Act provide for the free use of our rivers at the expense of landowners.”

“Private property values and rights, including water rights will deteriorate.”

“The Entiat Valley is so narrow that if private property were taken over by the government, there would not be enough private land left to support the local school district.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0048S, 0062S, 0077S, 0151S, 0214S, 0316S, 0409S, 0417S, 0418S, 0423S, 0424S, 0498S, 0697S, 0699S, 1049S, 1052S, 1071S, 1088S, 1140S, 1153S, 1156S, 1165S, 1168S, 1186S, 1215S, 1225S, 1237S, 1242S, 1245S, 1253S, 1260S, 1261S, 1262S, 1263S, 1309S, 1373S, 1374S, 1378S, 1379S, 1422S, 1431S, 1432S, 1433S, 1571S, 1580S, 1584S, 2014S, 2015S, 2016S, 2020S, 2059S, 2060S, 2070S, 2191S, 2192S, 2241S, 2245S, 2247S

FOREST SERVICE RESPONSE:

Designation of a river or river segment will have no effect on existing water and property rights. As mentioned elsewhere, there are no plans for acquisition of private lands, other than a short right-of-way to access National Forest land near the highway bridge at Plain. We plan to rely heavily on State and County controls for administration of private lands within the corridors. As noted in Appendix E of the FEIS, existing water rights and diversion facilities were recognized in the proposed classification of the study rivers.

In the case of the Entiat River, the channel below the proposed corridor boundary was determined to be ineligible for designation as a Wild and Scenic River due to previous modification and straightening of the channel. For this reason, the river below the private land boundary above Burns Creek could not be included, even at a later date, within the Wild and Scenic River System.

49 WILL CONGRESS INVITE PUBLIC COMMENT BEFORE THEY ACT ON DESIGNATING RIVERS TO BE INCLUDED INTO THE WILD AND SCENIC RIVER SYSTEM?

COMMENTS INCLUDED:

“Will Congress invite public comments or will they defer to your FEIS as adequate public input?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0004S, 0316S, 0655S, 0719S, 1576S, 1577S, 1587S, 2021S, 2056S, 2191S

FOREST SERVICE RESPONSE:

It is our understanding that the Washington State Congressional delegation plans to conduct field hearings prior to recommending any legislation for Wild and Scenic River designation.

50 CONCERNS ABOUT "TAKINGS" AS A RESULT OF THE DESIGNATION OF RIVERS, PARTICULARLY THROUGH THE USE OF CONDEMNATION, AND THE ISSUE OF RECEIVING JUST COMPENSATION.

COMMENTS INCLUDED:

"We do not wish to allow any access or scenic easements across our land on the river nor do we want to be coerced into selling such easements through condemnation proceedings "

"I do hope we don't lose our property to the government."

"It is doubtful the present property owners would be paid fair market value for their riparian properties if the entire river was designated Wild and Scenic and the Federal Government condemned the properties."

"Any designation . . . which would effectively restrict all development would constitute a condemnation and taking without compensation in violation of the U.S. Constitution."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0003S, 0008S, 0009S, 0012S, 0013S, 0014S, 0015S, 0016S, 0027S, 0038S, 0048S, 0068S, 0094S, 0095S, 0100S, 0165S, 0171S, 0214S, 0217S, 0224S, 0226S, 0427S, 0474S, 0603S, 0655S, 0682S, 0716S, 0723S, 1061S, 1071S, 1136S, 1182S, 1186S, 1234S, 1242S, 1253S, 1376S, 1580S, 1584S, 1587S, 2015S, 2016S, 2017S, 2019S, 2021S, 2049S, 2055S, 2066S, 2084S, 2085S, 2156S, 2191S, 2241S, 2247S, 2363S,

FOREST SERVICE RESPONSE:

As noted in Appendix E of the FEIS, the need for "takings" of any kind is expected to be very limited. The reasons for this are: (1) the Wild river segments where the need would normally be greatest are already federally owned; (2) the segments recommended for Scenic designation are in largely federally owned areas; (3) the segments recommended for Recreational river designation have numerous existing public access points; and (4) it is in the Forest's interest to rely heavily on State, County and local controls to maintain the quality along the rivers rather than on large scale acquisition of scenic or recreation easements.

In situations where acquisitions of any kind are needed federal law (the Act of Jan. 2, 1971, P.L. 91-646, 84 Stat. 1894; 42 U.S.C. 4601(6), 4601(8), 4621, 4622, 4651, 4653) requires early involvement of the owner and payment of just compensation. Any acquisition of real property rights in connection with Wild, Scenic or Recreational river designation will be subject to P.L. 91-646 and other applicable federal laws. At this time, the only projected need for land acquisition in any of the proposed river corridors is for a short, 200 foot stretch of right-of-way to access National Forest land at the Highway 209 bridge at Plain.

It is also important to note that the designation of a river or a segment of a river, under the Wild and Scenic Rivers Act, does not in itself constitute a taking. The federal government has no obligation to make compensation based solely on the act of designating a river or segment thereof.

51 CONCERN ABOUT THE NEED TO MAINTAIN EXISTING STREAMBANK PROTECTION STRUCTURES AND TO PLACE NEW STRUCTURES AS NEEDED TO PROTECT IMPROVEMENTS SUCH AS HOMES, OUTBUILDINGS, ROADS, CAMPGROUNDS, ETC.

COMMENTS INCLUDED:

“Oppose restrictions that do not allow for preventative maintenance along streams to prevent erosion of road rights-of-way.”

“Wild and Scenic Rivers designation precludes rip rap, erosion control...”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0046S, 1422S, 2270S

FOREST SERVICE RESPONSE:

Wild and Scenic Rivers designation does not necessarily preclude riprap or other erosion control measures along the river corridor. A Recreational classification specifically makes allowance for existing diversion works, riprap and other minor structures, provided the waterway remains generally natural in appearance. Although water supply dams and major diversion works are prohibited under a Scenic classification, minor maintenance structures existing at the time of designation would also be permitted. In addition, in the Management Guidelines in Appendix E of the FEIS the Forest is recommending that a provision to allow new riprapping where necessary to protect improvements existing prior to designation of the rivers, be included in legislation for designation of “Recreational” river segments. This would apply to most of the private land within the study corridors.

52 CONCERN THAT STATE, COUNTY AND LOCAL CONTROLS ARE ALREADY ADEQUATE TO PROTECT THE RIVERS BEING PROPOSED. DESIGNATION WOULD RESULT IN UNNECESSARY AND REDUNDANT RESTRICTIONS AT THE TAXPAYERS EXPENSE AND WORK A HARDSHIP ON THE PRIVATE LANDOWNERS IN THE DESIGNATED AREAS.

COMMENTS INCLUDED:

“The river corridors are already protected by County zoning, State Shorelines Act, Department of Ecology, and Washington State Department of Fisheries. The U.S. Forest Service is doing a good job protecting the rivers within their boundaries by controlling timber harvest, by restricting road development, and controlled development of trails and campgrounds. Why should we need more government involvement in this situation?”

“Existing ordinances (in Kittitas County) protect the future generations and their right to enjoy the many beautiful rivers in Washington State.”

“Chelan County opposes designation of the eight rivers because there are sufficient laws at the county and state level to protect our rivers, lakes, waterways, and other environmental areas. The needs of our county are best left at the local level.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0028S, 0068S, 0077S, 0087S, 0096S, 0214S, 0215S, 0316S, 0344S, 0409S, 0415S, 0416S, 0418S, 0423S, 0424S, 0496S, 0497S, 0518S, 0542S, 0545S, 0546S, 0547S, 0549S, 0550S, 0551S, 0552S, 0557S, 0590S, 0592S, 0655S, 0696S, 0697S, 0711S, 0713S, 0717S, 0719S, 1066S, 1071S, 1088S, 1119S, 1152S, 1153S, 1156S, 1176S, 1183S, 1186S, 1187S, 1217S, 1234S, 1236S, 1237S, 1238S, 1242S, 1244S, 1245S, 1253S, 1261S, 1309S, 1317S, 1325S, 1373S, 1376S, 1378S, 1379S, 1424S, 1432S, 1522S, 1571S, 1572S, 1576S, 1577S, 1580S, 1582S, 1584S, 1585S, 1586S, 1587S, 1736S, 2014S, 2015S, 2016S, 2018S, 2019S, 2020S, 2021S, 2042S, 2054S, 2056S, 2057S, 2060S, 2062S, 2066S, 2070S, 2085S, 2178S, 2181S, 2191S, 2192S, 2241S, 2245S, 2247S, 2270S, 2363S, 5077S

FOREST SERVICE RESPONSE:

The effects of County zoning, Shoreline Master Programs, the State Shorelines Act, special controls such as the Icicle Design Overlay and the State Forest Practices Act have been reviewed in relation to the nine rivers identified in the Supplement and are described in Appendix E of the FEIS. With the exception of those areas in Chelan County's Shoreline Master Program which are in the "Natural" category, none of the State or local controls protect the free-flowing nature of the streams being considered for designation. A review of the Master Program indicates that only the White River is extensively classified as Natural. The Wenatchee has a significant length so classified, but only on one side of the river. Even the controls in the Icicle Creek area allows hydroelectric development. This could result in the construction of diversion structures and dams. Thus without designation under the Wild and Scenic Rivers Act, there is no way to assure the continued free-flowing nature of these streams.

Numerous additional restrictions are not anticipated as a consequence of inclusion of a river in the Wild and Scenic Rivers System. It is our intent to rely on State and County controls for administration of the private land within designated river corridors as stated in the suitability study in Appendix E. Only if local governmental action cannot be implemented or cannot provide the necessary protection of river values on non-Federal land, would the imposition of additional controls or restrictions be likely.

53 DESIRE FOR PUBLIC ACCESS, PARTICULARLY TO GET TO THE STREAMS AND TO USE THE BED OF THE STREAM; CONCERN ABOUT THE IMPACT ON PRIVATE PROPERTY IF PUBLIC ACCESS IS PROVIDED.

COMMENTS INCLUDED:

“The Ephrata Sportsmen’s Association recommends that the Forest Service obtain easements or dedication deeds on privately owned stream beds to permit the public to make full use of them without having to obtain permission each time from the stream bed owners.”

“We do not wish to allow any access or scenic easements across our land on the river nor do we want to be coerced into selling such easements through condemnation proceedings.”

As a property owner on Icicle Creek, I am quite concerned about being able to build a cabin and use my property without having to open it to public access.

“I have lived here for a total of 35 years. In the past ten years I see what it is like when it is already open ‘for public (recreational) use’ and how it is being damaged as this ‘public’ descends by ever-increasing numbers. How can you ‘preserve...’ and ‘protect...’ all the ‘outstandingly remarkable’ features by openly inviting even more of the public in? Our valley, and most likely the others, also already have about all the traffic they can stand. And then to threaten that you might need to condemn private land to acquire easements ‘to protect river values’ almost in the same breath as you say ‘recreational use of public lands within the corridor would be emphasized’ and some easements might be ‘critically needed for public use.’ How unfair, particularly to landowners and wildlife.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0224S, 0417S, 1186S, 1379S, 1574S

FOREST SERVICE RESPONSE:

Since publication of the Supplement, we have reevaluated the need for acquisition of private land. With the exception of a short right-of-way near the Highway 209 bridge at Plain, we do not anticipate a need to acquire any additional lands within the recommended river corridors. Furthermore, we will rely on State and County controls, as mentioned in Appendix E of the FEIS, for administration of the private lands. With respect to the impacts created by public use, designation can provide the responsible agency with the management tools to control and direct this use, so as to preserve the values for which the river was designated. The development of a detailed management plan for the river corridor will be the first step in accomplishing this goal.

54 CONCERN ABOUT DESIGNATIONS PRECLUDING ROADS NEEDED TO ACCESS PRIVATE LANDS.

COMMENTS INCLUDED:

“We see a conflict between preservation within the Scenic or Recreational Corridor and the possible obligation of the Government to provide road access for inholders where other access is not available.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0603S

FOREST SERVICE RESPONSE:

Both Scenic and Recreational classifications allow for construction of new roads, particularly where these are required for access to private inholdings. In the case of a Scenic classification, the only restrictions posed by designation would apply to utilization of construction techniques that minimize adverse effects on river values, and to keeping the road segment well screened and inconspicuous from the river.

55 A COMMENTOR FELT THAT STATEMENTS IN THE FACT SHEET RELEASED AT THE TIME OF THE SUPPLEMENTAL DEIS CONTAINED CONTRADICTORY STATEMENTS REGARDING THE USE OF CONDEMNATION. THE STATEMENTS REFERRED TO ARE CONTAINED IN THE LAST PARAGRAPH OF PAGE 1 OF THE FACT SHEET.

COMMENTS INCLUDED:

“We are concerned about private land owners on the so called ‘scenic rivers’. Your ‘Fact Sheet’ accompanying this states in one sentence that acquisition would have to be from ‘willing sellers.’ Then the next sentence says ‘condemnation’ can be used. Which is it???”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0038S

FOREST SERVICE RESPONSE:

This appears to be a misunderstanding of the different types of acquisition referred to in the last paragraph of page 1 of the Fact Sheet. The first sentence explains that, given the ownership situation, condemnation cannot be used to acquire land in fee. That is, condemnation may not be used to purchase all right, title and interest in land within the designated area. In these circumstances, fee title could be acquired only from willing sellers or through land exchange. However condemnation could be used to acquire a partial interest (such as an easement or right of use), and this is what the Fact Sheet was referring to.

56 CONCERN THAT A RECREATION RIVER DESIGNATION AND MANAGEMENT OF THE SEGMENT OF THE WENATCHEE RIVER WITHIN TUMWATER WILL NOT ADEQUATELY PROTECT THE SCENIC VALUES OF THE CANYON. THIS CONCERN APPEARS TO BE BASED ON THE FACT THAT THE LONGVIEW FIBRE CO., AN INDUSTRIAL FOREST LAND OWNER, OWNS AND MANAGES A SIGNIFICANT AMOUNT OF LAND COMPRISING THE CANYON WALLS ABOVE THE RIVER.

COMMENTS INCLUDED:

“Upon your acquisition of the Longview Fibre Lands you will own NINETY FOUR percent of the river shore land in the canyon. I feel your effort to date has been misleading since you have not openly informed the public that you are and have been negotiating with Longview Fibre to acquire their land. The National river designation is not the vehicle to protect the scenic values of the canyon walls. The designation only affects the corridor 1/4 mile from the river. If you do not acquire the Longview Fibre Lands, by exchange, your staff will be guilty of having misled the public, since the upper portion could still be logged!!”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0152S, 2021S

FOREST SERVICE RESPONSE:

The Wenatchee National Forest has been involved in a much publicized land exchange program with the Longview Fibre Company since 1984. One large exchange was completed this past winter. A second large exchange is now nearing completion. This second exchange includes the lands which the company owns within the Tumwater Canyon. The acquisition of these particular Longview Fibre Company lands is not connected with the designation of this segment of the Wenatchee as a Recreational river. However, one of the purposes is to protect some of the scenic values within the canyon. Hence, the acquisition would compliment a Recreational river designation.

57 INCLUDING RIVERS IN THE WILD AND SCENIC RIVERS SYSTEM ADVERSELY AFFECTS THE AVAILABILITY OF MINERAL RESOURCES.

COMMENTS INCLUDED:

“Designating a river segment as part of the Wild and Scenic River System can have adverse effects on the availability of public lands for mineral exploration and development.”

“The upper scenic portion of the American River and on up into Morse Creek even though it has been prospected and small scale mining has gone on since the 1930’s; it is still scenic... I think these areas would be more appropriately designated “scenic with mining history” where people cannot only enjoy the natural beauty but expect to see people looking for gold in the stream.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0004S, 1078S, 1577S,

FOREST SERVICE RESPONSE:

As indicated in the suitability study in Appendix E of the FEIS, only those rivers designated as Wild rivers are withdrawn from mineral entry (including a corridor 1/4 mile each side of the river). Since those segments on the Wenatchee National Forest which qualify for “Wild” designation lie within wilderness areas that are already withdrawn from mineral entry, designation would have no new effect on the availability of mineral resources. In addition, prior existing valid claims would be permitted, to the extent these are consistent with the wilderness restrictions, and subject to protective measures under 36CFR228.

River segments designated as Scenic or Recreational would remain open to mineral entry, and mineral exploration and development would be provided for in the management plan adopted for such rivers. This would include panning, sluicing, recreational collecting, prospecting, and mineral exploration and development activities conducted in an environmentally acceptable manner. Finally, a rich mining history would be one of the river values identified in the eligibility determination for designation of a Wild and Scenic River.

58 MINERAL RESOURCES HAVE NOT BEEN APPROPRIATELY EVALUATED PRIOR TO A MANAGEMENT DECISION.

COMMENTS INCLUDED:

“A detailed minerals evaluation has not been completed but is necessary to determine the mineral potential of these river corridors prior to a management decision. Once this process is completed, areas identified should be omitted from proposed scenic and recreational classification.”

“No recognition has been made of the value of these public lands as historical and traditional mining areas, where concentrated mineralization still provides opportunity not only for prudent mineral strikes but public prospecting, which for most is a recreational outlet as well.”

“I also note on page E-23, fourth paragraph down that mining activities will be addressed after a river is classified. I think that kind of leaves a recreational miner in the position of not supporting your proposal or the Act.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0004S, 1078S, 1577S,

FOREST SERVICE RESPONSE:

A Suitability Analysis is completed prior to making a recommendation to include a river as part of the Wild and Scenic River System (see Appendix E of the FEIS). As part of that analysis, existing literature, information made available by the public, and records concerning mineral resources and mineral resource activity are considered. However, unless the Suitability Analysis indicates an area has a very high potential for the occurrence of mineral resources, an on-the-ground detailed mineral resource evaluation is normally not completed before making a recommendation. This is especially true in segments recommended for a Scenic or Recreational designation, where new mining activity is permitted.

59 THERE IS CONCERN OVER THE POTENTIAL EFFECTS OF A WILD AND SCENIC RIVER DESIGNATION ON A FUTURE SATELLITE FISH REARING FACILITY.

COMMENTS INCLUDED:

“The Chelan County Public Utility District (PUD) owns Tumwater Dam on the Wenatchee River and is the proponent of a proposed satellite fish rearing facility at the confluence of the Chiwawa and Wenatchee Rivers. Future development of this project could be affected or fettered by including, as “recreational” these reaches of rivers in the Wild and Scenic Rivers System. The purpose of these facilities is clearly consistent with promoting the objectives of the Wild and Scenic Rivers Act. The PUD would appreciate discussing these concerns with the Forest before completion of the FEIS.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

1573S

FOREST SERVICE RESPONSE:

The Forest is aware of the proposed satellite fish rearing facilities and is currently working with the PUD in developing an Environmental Assessment for a special use permit to construct and operate such a facility. The satellite facility has been described in the latest Eligibility and Suitability Analysis and is included in the FEIS (Appendix E). It is believed this facility and other potential fisheries enhancement projects are fully compatible with the Recreational river classification.

60 ACQUIRE PRIVATE LANDS TO ENSURE PROTECTION OF RIVER VALUES

COMMENTS INCLUDED:

“Acquire the private timber lands in Segment II of the Cle Elum River (bridge to wilderness boundary) to protect the river qualities.”

“Until recently, the U.S.F.S. has taken no interest in acquiring lands in the Icicle Creek area, and now the best that could happen would be a blend of private and Governmental ownerships that would allow residential development while protecting public interests. I think that this could be accomplished by the following steps:

1. The Federal Government should acquire fee title to the bed of the stream along the whole creek to Snow Creek Trail bridge.
2. The Federal Government should acquire fee title to the land between the main road and the creek down to the bridge.
3. The Federal Government should acquire fee title, by purchase or trade, to large blocks of undeveloped land such as Mount Cashmere, Lake Caroline, Little Eight Mile, Trout Creek, Rat Creek, Victoria Creek, and others.
4. The Federal Government should acquire fee title to those lands not between the main road and Icicle Creek that currently have public recreational uses, such as:
Snow Creek Trail Head.
Icicle Buttress.
Rat Creek boulder with an easement, and also an easement to Rat Creek Towers.
Fourth of July trailhead...”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

1212S, 2172S, 2273S

FOREST SERVICE RESPONSE:

The Forest Service is not a land acquisition agency. Generally speaking, purchases, donations or exchanges are entered into when such action is necessary or beneficial for administration and public use of the National Forests. This includes acquiring land to consolidate the National Forests, to improve resource management, and to obtain land needed for administration or research purposes. Land is not acquired simply to increase the size of the National Forest's holdings or to keep it from private development.

Although the Wild and Scenic Rivers Act has provisions for some land acquisition, the Forest has no foreseeable plans to acquire lands or interests in lands along any of the proposed rivers in connection with Wild and Scenic River designation, with the exception of a 200 foot right-of-way near Plain. As stated in Appendix E of the FEIS, acquisition of easements from private landowners would occur only if key values were in jeopardy and local government could not provide the necessary protection. It is our intention, instead, to rely on State and County controls for administration of the private lands and protection of the significant river values.

61 STATEMENT THAT NO PRIVATE PROPERTY EXISTS IN THE SEGMENTS OF THE ENTIAT RIVER PROPOSED FOR DESIGNATION IS QUESTIONED

COMMENTS INCLUDED:

“Your supplement indicates your proposed ‘Wild and Scenic’ designation for the Entiat River starts at Burns Creek and that there is no private ownership land in the proposed area. However, the area on both sides of the Entiat River up river (west) from Burns Creek to the ‘Entering the Wenatchee National Forest’ sign (over 30 parcels of land) is privately owned.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0416S

FOREST SERVICE RESPONSE:

Our description of the lower boundary of the corridor in the Supplement may have led to some confusion. It was and continues to be our intention to end the corridor at the private land boundary above Burns Creek, so that no private holdings will be included within the segments of the river that are proposed for designation. This description has been clarified in the FEIS.

62 OPPOSE DESIGNATION OF THE ENTIAT RIVER

COMMENTS INCLUDED:

“...opposed to designation of portions of the Entiat as ‘wild and scenic’.”

“...continue multiple use availability of the land as it is now.”

“...costs of management under this proposal cannot be justified.”

“Although the Wild and Scenic Rivers Act of 1968 is intended to preserve the river and its immediate environment, it is clear that your intent is to eliminate the traditional motorized use on the Entiat River Trail.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0029S, 0035S, 0049S, 0098S, 0107S-0108S, 0120S-0137S, 0139S-142S, 0144S-0147S, 0150S, 0153S-0157S, 0157S, 0161S-0163, 0165S-0170S, 0172S, 0177S, 0179S, 0186S, 0188S-0189S, 0191S-0196S, 0198S-0199S, 0201S-0202S, 0204S-0208S, 0210S-0211S, 0216S, 0218S, 0220S-0222S, 0228S, 0230S-0311S, 0315S, 0318S,

0320S-0321S, 0323S-0329S, 0331S-0332S, 0335S-0339S, 0345S-0357S, 0365S-0407S, 0410S-0414S, 0418S, 0420S-0421S, 0423S, 0424S, 0428S-0446S, 0448S-0451S, 0453S-0459S, 0466S, 0470S-0473S, 0475S, 0477S-0495S, 0499S-0517S, 0519S-0541S, 0543S-0544S, 0548S, 0553S-0556S, 0558S-0584S, 0586S, 0588S-0590S, 0595S-0597S, 0605S, 0608S-0616S, 0620S-0653S, 0662S, 0665S, 0667S, 0669S, 0671S, 0673S-0675S, 0678S, 0681S, 0683S-0687S, 0689S-0690S, 0692S, 0697S, 0698S, 0699S, 0700S-0705S, 0707S-0709S, 0714S-0715S, 0717S, 0718S, 0724S-0726S, 0728S-0732S, 1052S, 1055S, 1065S, 1073S-1076S, 1085S-1086, 1088S, 1090S, 1093S-1094, 1097S, 1099S, 1104S, 1105S, 1108S, 1110S-1116S, 1118S, 1122S, 1125S-1137S, 1140S, 1141S, 1146S-1147S, 1149S-1151S, 1160S, 1165S, 1170S, 1175S, 1200S, 1205S, 1214S, 1221S, 1225S, 1226S, 1228S, 1237S, 1238S, 1245S, 1252S, 1260S, 1261S, 1262S, 1263S, 1265S-1300S, 1303S-1304S, 1307S, 1310S-1311S, 1317S, 1320S-1321S, 1327S-1328S, 1330S-1332, 1334S, 1336S-1353S, 1355S-1358S, 1373S, 1409S-1410S, 1431S, 1432S, 1433S, 1588S, 2022S-2039S, 2044S, 2049S, 2051S, 2059S, 2060S, 2072S, 2086S-2100, 2102S, 2161S-2164, 2179S, 2188S, 2192S, 2247S, 2253S, 2275S, 2306S, 2445S, 5041S, 5068S-5069S, 5076S-5077S, 5086S-5091S, 5093S, 5104S, 5106S-5110S, 5113S, 5115S-5117S

FOREST SERVICE RESPONSE:

Our evaluation of the Entiat River identified outstandingly remarkable scenic values along the river corridor, on which basis we determined the upper segments of the Entiat to be eligible for designation as a Wild and Scenic River. Following this determination, the Forest conducted an analysis of the suitability of the Entiat for inclusion in the National System, which is documented in Appendix E of the FEIS. Suitability looks at several factors, including land ownership patterns, current and future uses, the river values to be protected, costs associated with designation and public response to designation. After careful consideration of all of these factors for the Entiat, the Forest determined that the benefits of designation outweighed any disadvantages that might exist. However, it is important to note that designation does not preclude continued multiple use within the corridor, as long as these uses are consistent with the management prescriptions for the area, and are carried out with sensitivity to the outstandingly remarkable river values that exist here.

63 SLOW DOWN TIMBER HARVESTING IN THE CLE ELUM DRAINAGE

COMMENTS INCLUDED:

“Slow down timber harvesting because of possible damage to the Cle Elum River.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0706S

FOREST SERVICE RESPONSE:

Timber harvesting is allowed on Federal lands only after meeting the requirements of the National Environmental Policy Act (NEPA). The Act requires not only an assessment of the direct impacts resulting from timber harvest on the resources and lands within the area of undertaking, but also an analysis of the cumulative effects on Federal lands that may occur as a result of harvesting on adjacent private lands. However, we have no jurisdiction over the schedule or location of harvesting by private landowners.

64 CONCERNS WITH THE IRRIGATION DAM AND CANAL ON THE ICICLE RIVER

COMMENTS INCLUDED:

“The district has concerns about its canal and dam in and along the Icicle River, the maintenance rehabilitation, and the operation and maintenance, etc. The district has vested rights for ingress and egress and serves 7,500 acres of land.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0023S

FOREST SERVICE RESPONSE:

In response to these concerns, we reexamined our original analysis of the lower segment of the Icicle. Because of the presence here of the irrigation facilities as well as the City of Leavenworth water intake, it appears that the highest potential classification of the lower 2 1/2 miles of that portion of the Icicle above the Forest boundary is Recreational. Furthermore, as a result of our reassessment, we are not recommending this 2 1/2 mile segment (below the center of Section 28, T.24N., R.17E.) for designation because of the potential future irrigation and municipal water supply needs.

65 WHERE IS THE LOWER BOUNDARY OF THE PROPOSED WENATCHEE RIVER CORRIDOR?

COMMENTS INCLUDED:

“Your document appears defective and your staff has misled the Leavenworth Residency. In the text, you identify the river segment for the ‘taking of private rights’ to be from the confluence of the Wenatchee and Icicle Creek to Lake Wenatchee...Later in the text and especially at the public meetings you say, well we really want to talk about from the mouth of the Canyon to Lake Wenatchee. NOW WHICH IS THE TRUE BOUNDARY???”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2021S

FOREST SERVICE RESPONSE:

We are sorry if the descriptions of the Wenatchee River boundaries have caused some confusion. Our initial study examined the physical characteristics of the Wenatchee River between Lake Wenatchee and the mouth of the Icicle Creek, since this latter spot marked a notable change in the character of the river corridor. However, our full Eligibility and Suitability Analysis in Appendix E of the FEIS is directed to that portion of the Wenatchee River between Lake Wenatchee and the National Forest boundary in Tumwater Canyon. We are proposing for designation only those segments of the river above the National Forest boundary.

66 CONCERN THAT DESIGNATION WILL RESULT IN UNDESIRABLE IMPACTS FROM PUBLIC USE

COMMENTS INCLUDED:

“Designating the Tumwater Canyon into the national river system will create a higher impact and use demand on an already over crowded and impacted river.”

“For recreation management practices, you need additional evaluation to determine the impact of users...Does designation of a landmark or natural resource enhance its value or does it invite destruction?”

“My husband who takes many walks through the National Forest lands next to us here on the river informs me that he has put out several campfires that their users failed to extinguish before they left these unimproved campsites. He has picked up cans and bottle debris left by these unconcerned and careless campers. Should the Forest Service build sanitary stations along the shores of these `protected' rivers, it is our definite fear that only more debris and forest fire danger will prevail. Will the Forest Service provide complete protection through more frequent patrols and restrictions on the boating campers who use these lands? (Right of way or access corridors across private land creates an opportunity for trespassers to vandalize and create problems for the owner.)”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0068S, 0087S, 0215S, 1186S, 1253S, 1309S, 1373S, 1574S, 1576S, 1577S, 1580S, 1582S, 2014S, 2018S, 2019S, 2021S, 2055S, 2191S, 2246S, 2247S, 2363S,

FOREST SERVICE RESPONSE:

We appreciate the concern with the effect river users may have on the local river area. It is our belief that the Forest Service will be better able to direct public use, provide necessary facilities, and reduce the problem areas along these rivers if they are officially designated. Development of detailed management plans after designation of specific rivers will address, on a site specific basis, where, when, and how certain facilities should be provided. We would also address the number of users that a particular river or segment could accommodate without causing environmental damage or undesirable impacts on private landowners. We do not anticipate the need to develop access or facilities on private land.

67 THERE IS AN ERROR IN THE INFORMATION FOR THE WENATCHEE RIVER

COMMENTS INCLUDED:

“You have biased your report by alluding that Thousand Trails development is on the Wenatchee River. In fact, it is not even in the corridor of the Wenatchee River!”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0423S, 0697S, 0717S, 1260S, 1261S, 2021S, 2049S, 2059S, 2060S

FOREST SERVICE RESPONSE:

We mistakenly included the Thousand Trails development in the Wenatchee River corridor. It is actually within the Chiwawa corridor, and we have amended our analysis in Appendix E of the FEIS accordingly.

68 THERE IS A NEED FOR BETTER PARKING FACILITIES AND ACCESS TO THE WENATCHEE RIVER AT SPECIFIC LOCATIONS

COMMENTS INCLUDED:

“As for the recreational access to the Wenatchee River, there remains a problem. There are two popular rafting trips down the Wenatchee River. One is a three hour trip from the Headwaters to the State Highway 209 bridge in Plain; the second is a three hour trip from the same bridge to the Tumwater Campground. Both are very easy trips, and are usually done without river guides. The problem is, that the only public access in Plain is under the State Highway bridge. The parking is limited and dangerous - one fatality has already occurred there. There is no adequate public access to the Wenatchee River in Plain. I am proposing that the Public Utility District land, just north of this bridge, become a day park for public access. I have presented this plan to the P.U.D. Commissioners with a favorable response, but they are not willing to finance the project on their Exhibit R program. They are, however, holding the property until our community can organize a financial plan. I have acquired local support for the idea from many people, but there are several unanswered questions when it comes to actual finance.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2191S

FOREST SERVICE RESPONSE:

We agree that the Wenatchee River provides excellent recreational opportunities. We are also aware of the P.U.D. property in Plain and a parcel of National Forest land directly across the river that is well located to provide a take-out/put-in facility for rafters. The management plan that would follow designation of the Wenatchee River would be an excellent vehicle through which we can evaluate needs and alternatives for recreational development of either piece of land.

69 SOME RIVERS ARE CLASSIFIED TOO HIGH FOR THEIR EXISTING CONDITION.

COMMENTS INCLUDED:

“The Chiwawa River does not meet my idea of a scenic river. About the only `scenic' view one has of these rivers is at developed recreation sites. I would suggest that the roaded access of this river continue past management trends of enhancement of developed and dispersed recreation. Thus all fitting the classification of recreational.” (This response also included the same comment for the White River and Little Wenatchee).

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0002S

FOREST SERVICE RESPONSE:

There appears to be some confusion over how the determination of Scenic versus Recreational classification is made. An important variable to remember is that the attributes of a river are determined from the river itself and not from adjacent facilities such as roads, bridges, or campgrounds. In addition, the terms "Scenic" and "Recreational" do not so much refer to particular scenic or recreational values along the river corridor as they do to the condition of the river and adjacent lands, and the level of development and range of activities permitted within the corridor at these levels of classification.

With this in mind, we still believe that the section of the Chiwawa between Trinity and Goose Creek meets the standards for a Scenic level of classification. However, in the preferred alternative we are recommending that this section be designated as a Recreational river because of anticipated plans for recreational developments and use of National Forest lands within the corridor, as well as plans for proposed in-stream fisheries enhancement structures and improvements.

70 CONCERNS REGARDING THE CLASSIFICATION AND DESIGNATION OF THE NAPEEQUA

COMMENTS INCLUDED:

"The lower Napeequa clearly should be a scenic river. The more important question is: why is it ineligible for wild river status? The answer, unfortunately, is the Forest Service has either ignored or promoted a very unwise and ecologically disastrous 'summer home' development along the lower Napeequa. At present, the results are, A) buildings in a flood plain, too close to a previously wild river, B) forced rerouting of a hiking trail so that the public is denied access to the scenic river (with No Trespassing) signs prominently displayed, and C) frivolous use of riprap by individuals who have no desire to preserve the values of a wild river. At this late date, the best way to control further destruction would be scenic designation for the lower Napeequa."

"There is now in existence, and has been since 1967, a 51 lot subdivision of 26 acres on the South and West shores of the Napeequa, in the Segment 1 area. This subdivision includes approximately the same amount of this shoreline as the Presbyterian Church Camp. The Church Camp owns 130 acres total, but much of it bordering the White River. This subdivision has a community water system, of 6 inch steel lines, hydrants and 20,000 gallon storage, furnishing 65# pressure on the system. There is underground power to all the lots. Approximately half of the lots have been developed with summer homes and trailer sites."

"The Napeequa River in Segment I contains a significant amount of riprap along the south bank, both on the Tall Timber Ranch property and along the private homeowners' lots above Tall Timber Ranch."

"I am concerned that the Forest Service may desire to acquire access rights through Tall Timbers Homeowners for access to the lower Napeequa. Trespassers have become downright indignant when advised they are on private property. I foresee serious confrontations requiring County Sheriff involvement if access rights are granted through the Homeowners area."

“I strongly suspect that the only reason this small section of all private land (on the lower Napeequa) has been included in the Scenic River system is so that the Forest Service can at a later time take part of this private land away from us for the general public.”

“The Supplement to the DEIS on page E-59 says about the Napeequa River, that future expansion of Tall Timber Ranch would not likely be affected, ‘if the church intends to maintain the present rustic theme.’ It also adds on page E-55 about the White River that Scenic designation through ‘private land could affect future development.’ This is a major concern in light of the realization that all of Tall Timber will be inside the designated Scenic River area. Tall Timber Ranch has a Long Range Master Plan which shows what future plans are to be developed...The Tall Timber Ranch Master Plan includes a new camping facility along the shores of the Napeequa River, and two bridges across the Napeequa River. There are already two bridges present. There is also a new lodge, an RV area, and several other buildings.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0003S, 0008S, 0009S, 0010S, 0012S, 0013S, 0014S, 0015S, 0016S, 0027S, 0031S, 0079S, 0095S, 0100S, 0171S, 0203S, 0217S, 0226S, 0316S, 0409S, 0465S, 0474S, 0682S, 1120S, 1182S, 1227S, 1374S, 1421S, 1577S, 2084S

FOREST SERVICE RESPONSE:

The lower Napeequa (Segment 2) flows exclusively through private land, over which the Forest Service has no jurisdiction. Although we were aware of the Tall Timber Homeowners subdivision as well as the Tall Timbers Church Camp, these were not adequately addressed in the Supplement to the DEIS. We also overlooked the riprap and some other improvements in existence at the time of the analysis. Based on this new information, we reassessed the highest potential classification of the lower mile of the Napeequa and now believe it meets the standards for a Recreational rather than a Scenic river. This level of classification allows for new structures, cluster residential developments and intensive recreation use. We also feel that the Chelan County Shoreline Master Program provides adequate protection of the river values through this portion of the corridor, and do not anticipate imposing additional controls. An analysis in Appendix E of the FEIS has been amended accordingly.

With respect to the public access issue, we recognize the concern of private landowners about the potential for trespassing and damage to private property, and have no intention of acquiring public access rights or easements through the private holdings in the lower Napeequa. As mentioned in some of the comments received on this subject, the Forest Service relocated the Twin Lakes Trail away from the private land several years ago. The trailhead is well marked on the main White River road and most people use this facility for access.

71 WHITE RIVER DESCRIPTION DOESN'T APPEAR TO BE ACCURATE

COMMENTS INCLUDED:

“You mention livestock grazing on the Chirwawa but not the White River (the Gray property is grazed by 30 to 40 head of beef and breeding stock from June through October each year). You seem to be unaware of riprap work on the White...”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0409S, 1577S

FOREST SERVICE RESPONSE:

We mistakenly omitted references to grazing in the White River, as well as to the riprap work. This has been corrected in the Appendix E analysis. In addition, all uses and improvements described in the comments received have been evaluated and determined to be consistent with a potential Scenic classification of the White River.

72 SUPPLEMENT HAS ERROR IN INFORMATION CONCERNING LOCAL INTEREST FOR DESIGNATION OF THE LITTLE WENATCHEE

COMMENTS INCLUDED:

“I found a statement in the Supplement to the DEIS, page E-51, that claims that `there has not been any local interest expressed for the designation of the Little Wenatchee River’. For the record, I ask you to PLEASE read again my letter #0563 of September 2, 1986.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0178S

FOREST SERVICE RESPONSE:

The initial interest in the proposed designation of the Little Wenatchee River was low. However, since publication of the Supplement, there has been a tremendous increase in the responses supporting designation of the river. Appendix E of the FEIS has been amended to reflect this change.

73 THE LITTLE WENATCHEE RIVER SHOULD BE DESIGNATED TO PROTECT THE OUTSTANDING SOCKEYE SALMON RUNS

COMMENTS INCLUDED:

“The Lake Wenatchee System is the ONLY example of a Sockeye Salmon spawning area occurring entirely within the boundaries of the Wenatchee National Forest. Estimates are that of all the Sockeye Salmon to use the Lake Wenatchee drainage system, approximately 25% spawn in the Little Wenatchee River.”

“In regards to the statement that the Little Wenatchee River’s `one outstandingly remarkable feature (the Sockeye run) is confined to the river’s first eight miles, and that feature is much better represented by the nearby White River,’ I feel that the intent of the Wild and Scenic Act was not to be an either/or situation and therefore, both drainages should receive highest status recommendations from the Forest Service. I urge you to reconsider your decision.”

“Your WSR study team found the Little Wenatchee eligible for designation but not suitable because it was not the best example of a sockeye salmon producing river in the area. The WSR Act does not restrict the number of eligible rivers that can be nominated for inclusion in the WSR system, nor does the Act restrict inclusion to the ‘best examples’...To arbitrarily omit from WSR consideration the Little Wenatchee which possesses such a rare feature is indefensible.”

“Because the White River is glacially fed, it is also on the average, several degrees cooler than the Little Wenatchee during spawning periods and herein lies an important reason why the Little Wenatchee needs extra protection. The dangers of increased silting, lower streamflow and higher water temperatures are just too great for this delicate habitat. Reduced water retention in springtime, created by timber harvesting, can only result in reduced water levels in the autumn, during the sockeye spawning season. These reduced streamflows increase water temperatures with the resulting rise in bacteria and algal growth. In the summer of 1987, I noticed for the first time, large areas of algae in the shallows of the Little Wenatchee. I don’t know the reason for this prolific bloom, but I can guess that it may have been the result of post-harvest fertilizing.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0178S, 0334S, 0498S, 0691S, 0693S, 1124S, 1162S, 1181S, 1212S, 1308S, 2050S, 2181S, 2315S,

FOREST SERVICE RESPONSE:

We agree that the sockeye salmon run is outstanding and we accordingly recognized this value in the Supplement. We also realize that the Wild and Scenic Rivers Act does not restrict designation solely to the best examples of an outstandingly remarkable feature. However, we have made the decision to manage the Little Wenatchee for commodity use, and believe that we can effectively manage the sockeye habitat through other land allocations and management prescriptions within the river corridor (see the Management Prescriptions and Forest-wide Standards and Guidelines in Chapter IV of the Forest Plan).

We do not know why recent algae blooms have occurred in the shallow areas of the Little Wenatchee River. We do know that fertilizers have not been used in many years in the Little Wenatchee or White River drainages and it is very unlikely that past use would have been the cause. Water quality monitoring in the rivers and lake is being conducted. We suspect that recent drought years resulting in lower than average flows into the lake have contributed to the problem. The resulting lack of turnover in water volume in the lake combined with nutrients leaching into the water from lakeside areas has made it more susceptible to algae blooms.

ARCHAEOLOGY, HISTORIC/CULTURAL AND INDIAN RIGHTS

74 THERE IS CONCERN FOR PRESERVATION OF THE NACHES TRAIL

COMMENTS INCLUDED:

“The Naches Pass Trail is probably one of the most important historic sites in Washington State.”

“A road with a hedge along it, even if in natural growth, would not reflect the historic character.”

“Naches Trail as an educational resource: The goal of this use is to give Washington State school children a unique opportunity to re-enact their State’s history by walking the Summit portion of the trail in September and early October of the school year.”

“I have not seen any reference to the historical value of the Naches Pass area. It has substantial historical value and should be preserved in its natural state. The Naches Pass Trail should be maintained as a foot and horse trail only—with perhaps a few interpretive signs.”

“We support establishing a Naches Pass National Historic Park, to preserve and interpret the historic wagon trail, Native American use, and later livestock and recreational use. Approximately 10,000 acres... would be included and managed by the National Park Service. Until that happens the areas should be managed as a special area, private lands acquired and its roadless character retained.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

2768, 2800, 4477

FOREST SERVICE RESPONSE:

Significant cultural resources receiving protection through designation as Classified Special Areas were not specifically listed in either the Environmental Impact Statement or the Forest Plan. For some of these resources, public awareness of site localities may lead to vandalism and site theft. Most of the cultural resources receiving such designation are also small in areal extent and they do not appear at the scale of maps printed with the Environmental Impact Statement. However, the Naches Trail covers a much larger area and therefore does appear on the scale used for the maps.

The Naches Trail will be protected under the Preferred Alternative through designation as a Classified Special Area - Other with the SI-2 Prescription (see Chapter IV of the Forest Plan). However, the Trail passes through three sections of privately owned land where management is not affected by this plan. On National Forest Land, only those uses which are compatible with the management objectives of the Special Area are allowed. In addition, this prescription directs that any existing impacts of public use and the special features designated for protection will be corrected. The Naches Trail is one of the earliest 4x4 trails established in Washington, dating from just after World War II when jeeps first became readily available. This use will undoubtedly continue, but needs to be properly managed in order to protect the historic features of the Naches Trail. Scheduled timber harvest is not allowed within these areas, although some cutting may occur if it is determined to be compatible with management direction for the Trail or that it will enhance the special features of the area. Generally, in order to protect the surrounding setting associated with significant cultural resources, the SI-2 Prescription is drawn to include at least the visual foreground as seen from the special features of the area. SI-2 designation also would allow for recreation and interpretation of the special features if this is compatible. However, both the Preferred Alternative and Alternative I surround the SI-2 designated area with General Forest allocations which emphasize timber harvest, thus areas seen at a distance from the Naches Trail may appear slightly to heavily altered.

Please also read the following response for a more detailed discussion of the process the Forest Service uses to ensure significant sites are protected.

75 THERE IS CONCERN FOR PRESERVING CULTURAL RESOURCES

COMMENTS INCLUDED:

“Existing fire towers (lookouts) should be maintained indefinitely as shelters. If this is costly to the Forest, outdoor groups are often willing to share the maintenance responsibilities. Indeed, application for placement of these structures on the National Register of Historic Places is appropriate.”

“Old stockmans cabins and trapper shelters/cabins should be preserved for historical value.”

“I have been shown several remnants of old trails used by Indians and early emigrants to the NW which are located between Lake Kachess and Snoqualmie Pass. These sites need to be designated as “special areas” (SI-2) and have not been addressed by the DEIS or the Management Plan.”

“Wenatchee River `Snow Place:’ house pits for cultural historic classification. Several Indian house pits next to the Wenatchee River and terraces. Unique in the pits’ large sizes and shapes. This area is in Recreational River classification within riparian areas and commercial forest lands. There are many threats to disturbance through timber harvesting and to recreational `pot hunters.”

“Raging Creek `Indian-Army Battle Site:’ for cultural historic classification. This is a very special place to the Colville Indians (Wenatchee Natives moved to Colville). A large grave site from the late 1800s is located in the area, as well as camp sites, berry fields, and trails. Very rich in cultural. It is in commercial forest classification.”

“Retain the old cabins and camp sites of our trappers, stockmen. This is part of the history of the north-west.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0484, 1947, 2744, 2750, 2800, 2807, 2858, 2879, 3862, 4462

FOREST SERVICE RESPONSE:

The goal of the Wenatchee National Forest’s cultural resource management program is to preserve the historical, cultural, archaeological, and/or architectural values of significant cultural resources for the benefit of the public through a program providing identification, protection, interpretation and management. As with all Federal agencies, the Forest Service is directed by various Congressional acts and their implementing regulations to consider all cultural resource values before undertaking actions which may affect these resources. Both Executive Order 11593 and the National Historic Preservation Act, as amended, direct that Federal agencies act cautiously and treat all cultural resources as though they are eligible for listing in the National Register of Historic Places until an evaluation of the site’s significance can be made.

This process is usually carried out by conducting an inventory or survey of the areas which may be impacted by a proposed project. This inventory is conducted using the methods outlined in the Forest’s professionally designed inventory plan. When cultural sites are located, they are recorded and generally protected so that the project’s activities will not impact the sites. If a site cannot be avoided then its significance is evaluated by a professional using the National Register criteria for evaluation. If the site is determined to be significant then alternatives are considered which will avoid, lessen or mitigate the impacts of the project on the site. During this entire process, consultation is undertaken with the State Historic Preservation Officer and the Advisory Council on Historic Preservation, agencies whose mission is preservation and protection of cultural resources. With their help, the Forest Service determines the

best course of action for management of the cultural resource. This will vary on a case-by-case basis

The specific sites and locations mentioned in public comments are protected through implementation of the process outlined above. This process is also part of the Forest-wide Standard and Guidelines listed in Chapter IV of the Forest Plan and therefore applies to all areas of the Forest, no matter what the management prescription is for any particular area.

76 ADEQUACY OF CULTURAL RESOURCE INVENTORY AND PROTECTION

COMMENTS INCLUDED:

“The document adequately considers known and anticipated cultural resources and the potential for impact to these. The precautions proposed to identify cultural resources and to avoid or mitigate anticipated impacts to identified or unidentified cultural resources are adequate.”

“How many timber sales have been done without cultural resource inventories since 1980? What is the current budget for cultural resource inventory staff. It states that at the present rate, cultural inventory work will proceed at the rate of about 27,000 acres per year. That averages out to 74 acres per day. Please explain how, with your current staff, you can carry out an acceptable cultural resource inventory covering 74 acres each day?”

“A more complete and exhaustive inventory of cultural resources should be made before development in any area is planned.”

“Alternative E [and F]: cultural resource management is lacking.”

“To accomplish the monitoring mitigation and interpretation noted, funding will have to be committed to this program. The funding in past years does not meet the needs. This falls in line with the Forest Plan Monitoring Plan. Funds are required, a commitment is required by the Wenatchee National Forest.”

“The Cultural Resource Program should define and inventory traditional use zones and archaeological sites independent of timber harvest activities. Other uses, e.g. motorized vehicles, grazing, wilderness, recreational, etc. do in fact have a significant impact on archeological sites and traditional use areas... The Yakima Nation feels many of the archeological sites outside of these timber harvest areas, mute testimony of past use are being destroyed. Furthermore this narrow approach has made no meaningful attempt to inventory and evaluate traditional use areas.”

“The Wenatchee Forest Plan and DEIS constitute an impressive, up-to-date summary of the Wenatchee National Forest program for identifying, evaluating, protecting and interpreting to the public its cultural resources. For cultural resource planning beyond the project level, this program may well have potential to serve as a model for other forests.. Complete implementation of the Wenatchee cultural resource program would be expected to produce highly desirable results for the Wenatchee National Forest.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0035, 0062, 0347, 2201, 2732, 2789, 2800, 2849, 2877, 2878, 2879, 3862, 4434, 4467, 4487, 9094

FOREST SERVICE RESPONSE:

Management of cultural resources is discussed in each of the alternative descriptions in Chapter II of the FEIS. The current situation of cultural resource management on the Wenatchee National Forest is described in Chapter III of the FEIS and Chapter II of the Forest Plan. Please refer to these sections for further information about the program.

The Wenatchee National Forest carries out its cultural resource management program with a cadre of professional archaeologists and professionally trained and certified Cultural Resource Technicians. In 1988 this cadre totalled 24 full-time employees and ten seasonal employees. The program is directed by one full-time Forest Archaeologist who reviews all cultural resource work conducted at the District level by the 28 Cultural Resource Technicians and five archaeologists. Reviews ensure that work meets the Forest-wide Standards and Guidelines listed in Chapter IV of the Forest Plan and professional quality needed to adequately document all cultural sites located and the efforts made to identify them. Further investigations are carried out by the Forest Archaeologist with District personnel as needed to ensure the best protective measures for cultural sites located. Reviews also occur to ensure that cultural resources are adequately considered in all projects which may potentially affect a cultural site.

In 1988, the Forest accomplished an inventory of lands for cultural resources totalling more than 80,000 acres. Lands inventoried for cultural resources are most often those proposed for timber sale activities simply because the preponderance of ground disturbing projects are timber sales. However, all projects that may potentially impact a cultural site are inventoried. These include such actions as campground expansion or construction, trailhead construction, and range structure construction. Even several thousand acres of Wildernesses have been surveyed, primarily to determine the historic value of small structures which predate wilderness classification. This inventory is guided by a professionally designed inventory plan. The purpose of this plan is to efficiently use time and effort in areas where prior knowledge indicates cultural resources may be located (through historic records, District files and interviews with local informants, and our knowledge of the subsistence and settlement patterns of the Indians). As more sites are found, the inventory plan is fine-tuned to reflect new information. For example, recently the physical remnants from huckleberry drying activities were found on a neighboring National Forest. This information broadens the range of physical evidence that is then considered during field surveys.

Quite frequently, but not always, areas that are known to have been used traditionally by this area's Indians do have physical evidence of this use left behind. For those areas and resources that do not contain such evidence, we must depend on Indian advice concerning these locations and their importance to the Tribe. Thus far, although several of these traditional use areas are known through historical research, the Indians have been reluctant to share information on specific localities. Only continued, frequent communications between the Tribes and the Forest will help to alleviate this problem. It is believed that the Forest-wide Standards and Guidelines and the Monitoring Plan listed in Chapters IV and V of the Forest Plan will provide the flexibility needed to protect areas of importance to today's Indians.

It is also true that funding in the past has not been adequate to carry out a fully functional cultural resource management program. National and Regional direction and emphasis have changed dramatically in recent years, and it is hoped that the Forest Plan reflects this change (more emphasis on public benefits through interpretation). However, it is up to Congress and the President to ultimately determine the level of funding for the Forest. The cultural resource management program will be adjusted accordingly using direction contained in the Forest Plan to determine funding priorities.

77 FAILURE TO RECOGNIZE AMERICAN INDIAN TREATY AND RELIGIOUS RIGHTS

COMMENTS INCLUDED:

“Not only does the plan admit that there will be irreversible impacts on cultural resources as yet unknown, the plan totally neglects to consider decisions such as the G-O Road in the Six Rivers National Forest (1983) whereby areas considered sacred to Native peoples are protected under the First Amendment.”

“Is there no way to protect more acres of American Indian land. We would not dig up cemeteries or destroy churches belonging to white communities, so why can't we respect their spiritual needs also.”

“Federal agencies owe a duty to refrain from activities that will interfere with the fulfillment of treaty rights. Moreover, this duty cannot be performed by engaging in an ‘accommodation’ or ‘balancing’ process between Indian treaty rights and a competing economic interest such as timber harvest. Any such ‘accommodation’ reached by the Forest Service would amount to a de facto abrogation of Indian treaty rights.”

“We especially appreciate the extensive recognition of and reference to the unique relationship that exists between the Forest, the Yakima Indian Nation, and other affected tribal groups. In no other forest plan that we have reviewed has the Forest Service's obligation to meet treaty rights been so plainly acknowledged.”

“A major legal and conceptual problem with the Wenatchee National Forest Forest Plan lies in its failure to recognize responsibility for all of the resource rights retained by the Yakima Indian Nation under the Treaty of 1855.”

“We find no land allocations of traditional resource areas and no discussion of how these various land use categories will affect the Nation's reserved resource rights. This is a major oversight particularly in the Draft Environmental Impact Statement.”

“The Wenatchee National Forest should introduce any and all kinds of food bearing plants what might thrive in the area that is set aside for us to use.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0062, 2730, 2891, 4485, 4486, 4487, 0090S

FOREST SERVICE RESPONSE:

American Indian Treaty and religious rights are discussed extensively in the FEIS. Treaty rights, and traditional and religious uses of the Forest are discussed for each of the alternatives in Chapter II. The effects of the alternatives are detailed in Chapter IV. The effects of the alternatives on Treaty and religious resources vary, depending on the resource. Generally, the Preferred Alternative will have a beneficial effect on huckleberry production and will retain current levels of big game habitat and fish habitat. No change is expected in the availability of edible and medicinal plants. Chapter III of the FEIS discusses in detail the nature of Treaty rights and traditional religious use. It also notes that the Indians have been reluctant to reveal traditional religious use areas to the Forest Service. Without this information it is impossible to protect or allocate protective prescriptions (such as the Classified Special Area - Other (SI-2) Prescription) to these areas at this time. We believe, through on-going coordination during specific project planning, that the Indians' concerns for specific areas can become known and addressed

in project plans. The Forest is committed to assuring continued access to traditional resource and religious use areas on Federal lands. The effectiveness of protecting such areas, once they have become known, will be closely monitored and evaluated as described in Chapter V of the Forest Plan. The reader is referred to Appendix G of the Environmental Impact Statement where the Yakima Treaty of 1855 and the American Indian Religious Freedom Act are displayed.

Because these rights are extensively discussed in the Environmental Impact Statement, the Forest Plan only discusses them as they relate to implementation of the Forest's Preferred Alternative. A section on Treaty and religious rights has been added in the Social/Economic section of Chapter II of the Forest Plan and Chapter IV includes those Standards and Guidelines which will be used to ensure these rights are protected.

OLD GROWTH

78 WHAT IS THE DEFINITION OF OLD GROWTH FOREST?

COMMENTS INCLUDED:

“Under this plan, many low-elevation old growth forests . . . would be adversely affected.”

“The old-growth definition task group (1986) presents a preliminary objective definition of old growth.”

“...utterly priceless genetic material.”

“...existing roadless areas and old growth forests be retained intact. Besides the beautiful scenery, valuable wildlife habitat and fish habitat is secure, as well as watershed quality and recreational opportunities.”

“...little chance to experience our pristine, old-growth forest.”

“...old growth ecosystem.”

“...distinguish between old growth timber in a 240 year rotation and `super old growth`.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0035, 0066, 0582, 2720, 2816, 3083, 3127, 3190, 3225, 3239, 3241, 3255, 3287, 3936, 4405, 4477, 4494, 4496, 4498, 4511

FOREST SERVICE RESPONSE:

The public responses to old growth forests showed that many people desire old growth for a variety of reasons (wildlife, recreation, timber, ecosystem, visuals, soil and water quality). The draft EIS defined old growth from a wildlife and timber viewpoint only.

To better address the old growth issue the Forest has recognized the differing definitions of old growth and, by resource, has re-defined old growth in the Affected Environment, Chapter III of the FEIS. Further evaluation of comments, in recognition of the many and varied values of old growth, resulted in a philosophical change of the old growth prescription. The previous prescription used timber harvest to provide wildlife habitat while growing old trees. The new prescription avoids timber harvest and protects old growth for aesthetics, wildlife and plant habitat, and biological diversity.

79 HOW MANY ACRES OF OLD GROWTH WILL BE PROVIDED?

COMMENTS INCLUDED:

“...leave all roadless areas and old growth.”

“...as much old growth as possible.”

“The Forest Service seems intent to continue to wipe out our old growth forest.”

“...old growth habitat is clearly lost, not increased.”

“Old growth timber should not be hoarded to waste, thus losing jobs along with timber.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0013, 0023, 0066, 0074, 0085, 0108, 0115, 0124, 0150, 0152, 0262, 0286, 0343, 0351, 0386, 0413, 0417, 0418, 0422, 0426, 0427, 0432, 0435, 0440, 0486, 0508, 0511, 0520, 0522, 0528, 0531, 0536, 0553, 0555, 0572, 0582, 0589, 0595, 0601, 0608, 0616, 0622, 0624, 0632, 0634, 0637, 0660, 0663, 0717, 0719, 0726, 0741, 0744, 0748, 0789, 0790, 0814, 0816, 0823, 0830, 0832, 0833, 0847, 0862, 0865, 0867, 0868, 0870, 0871, 0877, 0901, 1302, 1304, 1305, 1338, 1962, 1968, 1974, 1977, 1980, 1981, 1988, 1990, 1992, 1999, 2002, 2011, 2012, 2019, 2021, 2035, 2050, 2058, 2060, 2072, 2087, 2132, 2162, 2164, 2168, 2178, 2179, 2180, 2182, 2197, 2201, 2205, 2714, 2728, 2732, 2760, 2768, 2776, 2780, 2798, 2804, 2816, 2826, 2831, 2833, 2835, 2842, 2854, 2863, 2893, 2895, 2897, 2898, 2899, 2909, 2914, 2920, 2941, 2944, 2951, 2953, 2957, 2960, 2964, 2965, 2977, 2987, 2993, 2996, 2997, 3003, 3004, 3006, 3008, 3016, 3018, 3020, 3028, 3030, 3038, 3039, 3044, 3047, 3048, 3056, 3058, 3065, 3069, 3077, 3083, 3090, 3099, 3106, 3116, 3127, 3132, 3133, 3134, 3136, 3138, 3141, 3142, 3146, 3147, 3148, 3152, 3153, 3156, 3161, 3177, 3179, 3186, 3187, 3190, 3193, 3198, 3204, 3208, 3211, 3212, 3213, 3214, 3215, 3216, 3217, 3221, 3223, 3228, 3234, 3238, 3239, 3241, 3242, 3245, 3247, 3251, 3252, 3255, 3263, 3270, 3271, 3272, 3278, 3284, 3287, 3290, 3298, 3304, 3307, 3310, 3314, 3315, 3318, 3321, 3323, 3333, 3335, 3359, 3365, 3366, 3369, 3370, 3381, 3383, 3393, 3406, 3408, 3410, 3438, 3460, 3466, 3467, 3468, 3479, 3480, 3485, 3491, 3504, 3510, 3511, 3515, 3518, 3519, 3523, 3529, 3538, 3539, 3541, 3559, 3560, 3567, 3573, 3580, 3583, 3592, 3593, 3603, 3610, 3611, 3625, 3634, 3638, 3646, 3651, 3659, 3669, 3680, 3683, 3689, 3692, 3693, 3701, 3702, 3705, 3707, 3721, 3731, 3735, 3751, 3752, 3753, 3762, 3770, 3779, 3789, 3791, 3805, 3807, 3809, 3818, 3823, 3833, 3834, 3835, 3849, 3862, 3883, 3885, 3910, 3911, 3922, 3924, 3928, 3930, 3935, 3940, 3948, 3950, 3951, 3952, 3955, 3989, 3990, 4003, 4005, 4019, 4020, 4037, 4046, 4061, 4065, 4094, 4105, 4125, 4126, 4139, 4141, 4142, 4145, 4159, 4161, 4166, 4174, 4178, 4179, 4194, 4204, 4206, 4209, 4214, 4235, 4243, 4257, 4260, 4269, 4282, 4301, 4434, 4439, 4446, 4448, 4449, 4453, 4455, 4467, 4477, 4490, 4491, 4493, 4501, 4510, 9004, 9008, 9018, 9023, 9031, 9041, 9042, 9057, 9062, 9065, 9093, 9101, 9115

FOREST SERVICE RESPONSE:

The Forest's objectives are to:

1. Provide old growth where required for fish and wildlife habitat (CFR 36 219.19) and biological diversity (CFR 36 219. 27 g, 16 U.S.C 1604(g)(3)(b));
2. Provide multiple outputs from old growth where compatible (e.g., wildlife habitat, wilderness, aesthetics and biological diversity may be provided in the same stand); and
3. Allocate some of the remaining old growth to various resources to get the optimum mix of outputs (e.g., timber harvest, scenery, wildlife, recreation, and biological diversity).

The allocation of old growth to multiple use resource provides a mix of benefits to meet the desires of the mix of people who use the Forest.

There are 300,000 to 500,000 acres of old growth on the Forest depending upon what resource definition is used. Old growth allocations are designed to fulfill the needs for biological diversity. Old growth acreage above that required for biological diversity may then be allocated to other resources. There has been some adjustment in the allocation of old growth acres between the draft EIS and the final EIS. Allocation of old growth acres by alternative are listed in Chapter II of the FEIS.

The allocations are based in part on new assessments conducted between the draft EIS and final EIS for spotted owl habitat needs and aesthetics. The acreage figures and the new inventories are estimates based on available information and local knowledge of the Forest.

One of the biggest public concerns was that sufficient old growth habitat be preserved for a variety of reasons. The Forest has summarized these reasons into three previously mentioned categories, namely: wildlife and plant habitat, biological diversity, and aesthetics. A process outlined in Chapter IV of the Plan (Diversity Standards and Guidelines) provides for analysis of each proposed project that affects diversity, habitat, and aesthetics in a sub-drainage. This process allows for change in allocation of areas where sub-drainage diversity, habitat or aesthetics would be unacceptably impacted. In essence this means that even though an area of old growth is not currently included in the OG-1 prescription there is a provision to allow inclusion at a later date, if it is judged that the loss of the area could reduce the old growth in a sub-drainage to unacceptable levels.

80 HOW WILL OLD GROWTH BE MANAGED?

COMMENTS INCLUDED:

“...once cut the old growth is gone forever.”

“...old growth forest is irreplaceable.”

“...overmature trees breed insect tree and earth diseases and create fire hazards.”

“Does not second growth become old growth in 60 to 160 years?”

“What is the probability of replacing current old-growth communities?”

“...old growth should be protected.”

“...old growth forest should be preserved.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0023, 0063, 0067, 0073, 0076, 0085, 0113, 0114, 0115, 0118, 0143, 0144, 0150, 0152, 0179, 0262, 0363, 0377, 0389, 0392, 0393, 0394, 0395, 0396, 0426, 0434, 0483, 0486, 0496, 0508, 0531, 0549, 0555, 0562, 0567, 0569, 0570, 0571, 0572, 0577, 0582, 0590, 0602, 0604, 0610, 0612, 0613, 0624, 0635, 0640, 0641, 0655, 0656, 0661, 0719, 0728, 0740, 0741, 0789, 0826, 0835, 0838, 0841, 0863, 0865, 0866, 0879, 0899, 0994, 1346, 1948, 1949, 1971, 1977, 1991, 1992, 2003, 2007, 2012, 2021, 2026, 2039, 2041, 2053, 2073, 2074, 2087, 2132, 2170, 2176, 2179, 2185, 2207, 2720, 2725, 2728, 2732, 2734, 2763, 2772, 2776, 2798, 2816, 2825, 2833, 2850, 2858, 2864, 2869, 2878, 2887, 2888, 2891, 2892, 2900, 2901, 2907, 2911, 2912, 2913, 2932, 2934, 2936, 2939, 2941, 2947, 2954, 2955, 2956, 2958, 2959, 2963, 2966, 2967, 2983, 2989, 2993, 2994, 2995, 2996, 2998, 2999, 3017, 3027, 3029, 3033, 3045, 3047, 3065, 3077, 3078, 3080, 3088, 3103, 3109, 3115, 3118, 3119, 3126, 3127, 3129, 3131, 3134, 3152, 3162, 3164, 3171, 3173, 3177, 3182, 3184, 3190, 3194, 3203, 3208, 3212, 3214, 3219, 3226, 3230, 3232, 3233, 3234, 3237, 3239, 3241, 3252, 3255, 3278, 3287, 3303, 3307, 3319, 3323, 3325, 3328, 3330, 3333, 3341, 3348, 3354, 3366, 3370, 3377, 3384, 3397, 3409, 3410, 3465, 3467, 3470, 3471, 3505, 3520, 3521, 3529, 3559, 3561, 3562, 3572, 3576, 3579, 3592, 3603, 3606, 3610, 3616, 3617, 3621, 3628, 3630, 3648, 3667, 3678, 3710, 3715, 3717, 3719, 3724, 3725, 3726, 3742, 3754, 3765, 3766, 3767, 3769, 3795, 3797, 3807, 3809, 3811, 3814, 3823, 3824, 3833, 3849, 3862, 3871, 3873, 3875, 3883, 3911, 3913, 3926, 3936, 3938, 3995, 4004, 4019, 4027, 4039, 4042, 4061, 4065, 4071, 4078, 4079, 4082, 4088, 4090, 4094, 4110, 4126, 4139, 4145, 4162, 4172, 4203, 4217, 4231, 4241, 4261, 4263, 4277, 4307, 4309, 4415, 4423, 4432, 4433, 4440, 4452, 4453, 4457, 4467, 4471, 4474, 4477, 4485, 4488, 4490, 4493, 4494, 4496, 4498, 4501, 4510, 4511, 9011, 9012, 9018, 9022, 9041, 9045, 9051, 9065, 9069, 9074, 9078, 9081, 9087, 9106, 9111

FOREST SERVICE RESPONSE:

In the draft EIS old growth outside wilderness and roadless areas was scheduled for management under a prescription that would have managed timber to create old growth conditions. The objective of this prescription was to meet wildlife and timber output needs.

In response to public concerns a more conservative management view was adopted. The old growth management prescription in the FEIS was changed to recognize the inherent values of old growth and to provide for wildlife and plant habitat, aesthetics, and biological diversity. No timber harvest is planned. Additional acres of old growth have been allocated to this prescription for aesthetic and ecosystem diversity. At the same time, some acreage has been removed from this prescription and reallocated to a wildlife prescription that provides mature wildlife habitat through timber harvest.

81 HOW CAN THE ACRES OF OLD GROWTH BE INCREASING AS TIMBER IS HARVESTED?

COMMENTS INCLUDED:

“By building more roads and cutting trees on more acres, old growth will actually increase.”

“With the intention to cut over 30 square miles of old growth the draft EIS somehow manages to conclude that the total amount of old growth and therefore, the populations of some 150 species of wildlife which use these stands will increase over the same period of time.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0748, 0866, 1977, 2833, 2863, 2934, 3083, 3085, 3164, 3190, 3225, 3287, 3606, 3648, 3860, 3872, 4005, 4061, 4415, 4477, 4490, 4492, 4493, 4494, 4498, 4511, 9065

FOREST SERVICE RESPONSE:

This is largely a matter of definition. In the Draft EIS, any forest stand over 200 years old was considered to be old growth. Though the preferred alternative showed harvesting of old growth, there were more acres of mature forest (stands 150-190 years old) which would qualify as old growth over time than there was old growth scheduled for harvest.

Some acres of visual or other resources were included in this definition because they met Forest Service's Pacific Northwest Region definition of being 200 years or older, and having 15 trees per acre over 20" in diameter. These acres will support harvest by some method of partial removal of timber but after harvesting continue to meet the definition and are counted as old growth.

Because of the concern by the public and internal management concerns, the method of estimating old growth acres has been changed. In the Draft EIS any stand that was 200 or more years old was considered old growth. Currently only stands that display attributes reflective of the natural functioning of the old growth ecosystem are considered old growth. Many stands allocated for scenic or aesthetic purposes may not meet this definition because the required standing dead trees and downed logs may not be present. These stands are not counted as old growth in the FEIS.

Stands that were automatically included as old growth in the draft because they were over 200 years old were closely reviewed and only those with the essential structural characteristics of old growth are included in the inventory. This changed the acres of old growth and shows the amount of old growth decreasing over time.

82 OLD GROWTH HABITAT IS NOT WELL DISTRIBUTED THROUGHOUT THE ROADED PART OF THE FOREST.

COMMENTS INCLUDED:

“...fact that...Forest does not have the distribution of large old growth stands in the roaded portion...to meet the minimum management for old growth species...is no reason to justify finishing off the small islands...”

“The old-growth stands are inadequate to support old-growth adapted species.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582, 0605, 0656, 0812, 2956, 2994, 3065, 3083, 3134, 3177, 3185, 3225, 3509, 3742, 3899, 3911, 4005, 4139, 4241

FOREST SERVICE RESPONSE:

CFR 36 219.19 provides that “Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence and is well distributed in the planning area.”

The habitat discussion in Chapter III of the draft EIS states that the mature and old growth habitat network is not distributed throughout the roaded portion of the Forest (indicator species for this network include spotted owl, pileated woodpecker, marten and northern three-toed woodpecker). The east edge of the Forest ranges from grand fir to ponderosa pine to sagebrush habitat. In this transition area from forest to non-forest, forested habitat becomes discontinuous and suitable forested habitat is found in stringers. Some of these stringers have been subjected to wildfire and timber harvest and old growth habitat is not found in these areas at this time.

The Regional Management Requirements changed in June 1986 from a grid-like distribution of habitat to an area distribution. The new network includes more islands of mature or old growth habitat than the previous system and is more reactive to existing conditions and actual wildlife distribution. The Wenatchee National Forest changed to this new system between the draft and the final EIS.

In addition to setting areas aside for wildlife habitat, the prescription for old growth allows areas to be set aside for aesthetics and biological diversity. The value of small islands of old growth will be determined in site-specific environmental analysis before the decision is made on whether or how to proceed with a project.

There are areas which do not have mature or old growth habitat that is capable of providing habitat in the future. The areas where capable habitat has not been identified are large (4500 acres or larger).

During the time period (10-15 years) covered by the FEIS, trees in areas capable of producing old growth will be growing older. Even if activities (including timber harvest) do take place there is a low likelihood that all aging stands in the planning area will be disturbed before the next Forest Plan is completed. The next Forest Plan will then have the opportunity to expand the network using older habitat and increased knowledge of the needs of the mature/old growth network.

WILDLIFE

83 PROVISIONS ARE NOT MADE TO MEET THE “MIGRATORY BIRD TREATY ACT”.

COMMENTS INCLUDED:

“A thorough discussion should be included as to how the FS plans to prevent the destruction, and enhance the habitat, of birds, nests and eggs protected under the Migratory Bird Treaty Act.”

“...no provisions for protection of raptor nests.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2132, 3202, 9094

FOREST SERVICE RESPONSE:

In recognition of the omission of the “Migratory Bird Treaty Act,” a Forest-wide Standard and Guideline requiring protection of all raptor nests (Chapter IV of Plan in Forest-wide Standards and Guidelines) has been included.

Specific treatments will be developed for each species on a site-by-site basis.

84 THE INDICATOR SPECIES SYSTEM.

COMMENTS INCLUDED:

“We find that the indicator species system seems to have some inherent problems.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0151, 0582, 2132, 2892, 3255, 4485, 4498

FOREST SERVICE RESPONSE:

The National Forest Management Act regulations CFR 219.19 (a) provides that each alternative shall establish objectives for maintenance and improvement of habitat for management indicator species (MIS). Though the MIS system may have inherent problems, it is the direction provided for Forest planning. As new information systems are developed, the Forest will shift accordingly.

85 WHAT IS THE MANAGEMENT FOR GRIZZLY BEAR AND GRAY WOLF?

COMMENTS INCLUDED:

“These species should also be used as indicators, and recovery plans discussed in your documents.”

“The DEIS fails to address the past, present and future of wild gray wolf.”

“The discussion of threatened and endangered (T&E) species should include the grizzly bear.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0582, 0736, 3236, 3552, 3743, 3911, 4475, 4511, 9086

FOREST SERVICE RESPONSE:

The Forest Service is required to provide habitat for recovery of all threatened or endangered species under the Endangered Species Act. This usually occurs through the cooperatively developed (with U.S. Fish and Wildlife Service) recovery plans for a listed species.

In the case of the grizzly bear, the Wenatchee is participating with the U.S. Fish and Wildlife Service, Washington Department of Wildlife, the North Cascades National Park, National Park Service, Mt. Baker National Forest, and Okanogan National Forest in a cooperative grizzly bear habitat and population study. When the study is complete it will be decided whether a recovery area shall be established. In the interim, the Forest will follow Standard and Guidelines for the grizzly bear which have now been added to the Forest Plan. These include cooperation with the U. S. Fish and Wildlife Service and the Washington Department of Wildlife in assessing project impacts and developing mitigation measures. The Forest will also be consulting with U.S. Fish and Wildlife Service when biological evaluations indicate a project "may affect" grizzly bears or their habitat.

Under the Endangered Species Act, the U.S. Fish and Wildlife Service has the lead responsibility for recovery plans. Currently there is no recovery plan for the gray wolf. Until one is developed for the gray wolf, the Forest will operate on the basis of the new Forest Plan Standards and Guidelines.

If the status of either of these species should be changed during the life of the EIS, then the Forest Service will do a supplement or addendum to show the changes in management and effects mandated in the recovery plans for these two species and the effects of these changes.

86 HOW WILL PRIMARY CAVITY EXCAVATOR HABITAT BE MANAGED?

COMMENTS INCLUDED:

"...snags should be left in place to serve as nesting areas."

"...needs a more definitive, effective snag policy."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582, 2847, 3065, 3083, 3190, 3256, 3345, 3572, 3678, 3879, 4477, 4485, 4494, 9065

FOREST SERVICE RESPONSE:

We agree. In response to public comment and internal review, extensive revision was done to strengthen the snag policy. Our goal is to provide long-term dead and defective habitat for wildlife needs. See Chapter IV of the Plan for Standards and Guidelines relating to this topic.

87 MANAGEMENT AND ASSESSMENT OF SPOTTED OWLS.

COMMENTS INCLUDED:

"What assumptions were used in determining spotted owl populations will increase over the next 45 years?"

“Our research indicates the average amount of old growth used by owls in Washington is 4500 acres.”

“There is no positive finding that the owl needs old growth.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0021, 0025, 0040, 0063, 0065, 0069, 0110, 0128, 0144, 0146, 0152, 0154, 0171, 0172, 0179, 0194, 0206, 0207, 0216, 0227, 0243, 0263, 0265, 0280, 0289, 0301, 0339, 0357, 0360, 0372, 0374, 0400, 0409, 0411, 0434, 0509, 0527, 0543, 0544, 0567, 0568, 0569, 0582, 0602, 0666, 0678, 0747, 0760, 0774, 0810, 0844, 0900, 1003, 1087, 1137, 1247, 1248, 1255, 1261, 1270, 1272, 1278, 1282, 1316, 1322, 1325, 1411, 1416, 1425, 1490, 1516, 1541, 1572, 1574, 1590, 1591, 1638, 1650, 1651, 1809, 1813, 1815, 1817, 1824, 1843, 1878, 1887, 1903, 1952, 2002, 2003, 2054, 2134, 2141, 2250, 2253, 2283, 2286, 2289, 2452, 2459, 2546, 2590, 2601, 2653, 2711, 2716, 2732, 2749, 2759, 2772, 2815, 2819, 2853, 2858, 2868, 2878, 2879, 2888, 2889, 2908, 2969, 2996, 3083, 3139, 3158, 3180, 3185, 3190, 3194, 3202, 3254, 3274, 3309, 3335, 3487, 3520, 3546, 3580, 3596, 3601, 3602, 3610, 3652, 3680, 3724, 3742, 3775, 3776, 3778, 3804, 3857, 3870, 3876, 3911, 4019, 4083, 4098, 4110, 4235, 4239, 4296, 4300, 4328, 4343, 4379, 4431, 4457, 4463, 4467, 4471, 4489, 4490, 4493, 4496, 4498, 4503, 4534, 9002, 9029, 9044, 9055, 9060, 9069, 9092, 9094, 9101, 9102, 9103, 9106, 9111

FOREST SERVICE RESPONSE:

The Forest Service has completed the “Final Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide” for spotted owls. This document has been approved and provides direction on distribution, size of area per site, and definition of spotted owl habitat. For the Wenatchee National Forest the selected acreage per spotted owl habitat area is 2,200 acres.

The Final Supplement’s definition of spotted owl habitat is broad enough to fit the habitat used by spotted owls on the Wenatchee National Forest. Spotted owls do require a set of structural forest characteristics that include old growth trees.

In the draft EIS the number of acres with old growth trees increased over time. As a result the habitat for spotted owls increased and accordingly the number of spotted owls. Since the draft the Forest has inventoried spotted owls, inventoried spotted owl habitat, and redefined habitat for spotted owls. From this new information it is estimated the number of spotted owl sites will decrease from about 140-150 now to 116 in 15 years.

In the draft EIS the Forest Service proposed to manage spotted owl habitat on a 260 year rotation timber harvest-old growth habitat prescription. The Forest has changed that to a prescription which provides spotted owl habitat with no timber harvest. It is believed that more research is needed to show how timber harvest can be done economically and still provide habitat for spotted owls and other species. Several important spotted owl research studies already are under way on the Wenatchee National Forest to help answer such questions.

88 HOW WILL RIPARIAN (STREAMSIDE ZONES) BE MANAGED FOR WILDLIFE?

COMMENTS INCLUDED:

“We believe that 15-20 trees per acre would not be sufficient to provide optimum wildlife habitat.”

“...timber management in big game and riparian areas is fairly loosely defined.”

“The only species who would benefit from this improvement would be the two legged animal carrying a chainsaw.”

“I don't know anyone who claims enough knowledge to improve upon it.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0392, 0496, 0582, 2879, 3509, 3550, 3833, 4298, 4485, 4489, 4490, 4494, 4495, 4510, 9094

FOREST SERVICE RESPONSE:

Because of the public comments received, the riparian prescription has been restructured to be more definitive and responsive to the primary purposes of providing fish and wildlife habitat (see prescription in Chapter IV of the Plan).

The new riparian prescription provides for emphasis on fish and wildlife habitat while allowing some timber harvest. The prescription has been expanded to provide riparian habitat along streams that do not have water in them all year. This expansion provides protection of fish values downstream and wildlife values (amphibian habitat) in the immediate vicinity.

Most wildlife values appear to be covered by standards and guidelines for water quality and fish habitat but some standards are designed to provide wildlife habitat.

Application of constraints to benefit wildlife in riparian habitat is new to this Forest. Close monitoring will be needed to see if the diversity of habitat and deciduous tree components are maintained for wildlife.

89 PRODUCTION POTENTIAL FOR WILDLIFE WAS NOT SHOWN IN THE DRAFT PLAN.

COMMENTS INCLUDED:

“Display production potential for all indicator species”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582, 3553, 9041

FOREST SERVICE RESPONSE:

Chapter II of the Plan is where production potentials are displayed. Production potential establishes the upper end of the production curve and the management requirements for minimum viable populations of wildlife species establish the lower end of the curve. Without these two points on the production curve, it is difficult to understand the relationship of wildlife populations to the outputs for a alternative or trade-offs in comparison to other alternatives.

In the draft, no production potentials for wildlife were displayed due to the lack of information and lack of experience in developing them for wildlife. In the final, they have been estimated using recently gathered information, professional judgement and experience. As more research and information is available predictions will be refined.

90 HOW SHOULD OFF-ROAD VEHICLES AND WILDLIFE BE MANAGED:

COMMENTS INCLUDED:

“ORV’s should be permitted in these areas only when its determined there will be no conflict with wildlife.”

“No new ORV development should occur.”

“Wildlife habitat values cause some areas to be inappropriate for ORV development and uses.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582, 0900, 2132, 4494

FOREST SERVICE RESPONSE:

We will work closely with the Washington Department of Wildlife to identify wildlife areas such as deer fawning and elk calving areas or wildlife winter range where use restrictions may be needed. We believe such restrictions usually can be seasonal in nature. We intend to monitor ORV use annually over the life of the Plan to ensure unacceptable impacts are not occurring on wildlife or other forest resources.

91 HOW WILL ROADS BE MANAGED TO PROVIDE WILDLIFE HABITAT?

COMMENTS INCLUDED:

“One of the most glaring omissions in the plan’s wildlife analysis was ignoring the impacts of new roads in currently undisturbed wildlife habitat.”

“We recommend that you minimize new road mileage.”

“The Forest-wide Standards and Guidelines for road development and management do not adequately recognize and protect wildlife values.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0009, 0062, 0066, 0363, 0377, 0389, 0409, 0582, 0900, 1954, 2132, 2725, 2752, 2782, 2794, 2831, 2869, 2913, 2963, 2968, 2994, 3009, 3016, 3032, 3065, 3157, 3177, 3209, 3225, 3234, 3250, 3255, 3287, 3320, 3368, 3388, 3397, 3422, 3520, 3731, 3868, 3936, 4005, 4263, 4296, 4298, 4475, 4477, 4490, 4494, 4498, 9041, 9065, 9094

FOREST SERVICE RESPONSE:

In response to the public comments, the road closure statement in the Forest-wide Standards and Guidelines has been changed. All new roads constructed will be closed unless the project analysis documents the need for continued public motor vehicle access. Unless there is a resource reason to close existing roads they will remain open to the public. The implementation of these Standards and Guidelines are expected to result in about the same amount of public access by automobile as is currently available. Timber sale roads will remain open for firewood removal as appropriate. Nothing in this policy is intended to abridge the access rights of miners that are provided for under law.

92 STANDARDS AND GUIDELINES FOR WILDLIFE HAVE MODIFIERS WHICH SEEM INCONSISTENT WITH OTHER RESOURCES.

COMMENTS INCLUDED:

“We question whether modifiers such as ‘strive for’, ‘consider’ and ‘where possible’ are appropriate for standards. It should be noted that this language only appears in the wildlife sections.”

“...standards and guidelines relative to wildlife habitat protection are very weak.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582, 0656, 2201, 2879, 3083, 3731, 4005, 4485, 9065

FOREST SERVICE RESPONSE:

Modifiers are used throughout the Plan to better describe the management desired and the information available. Modifiers are used in describing most resource areas and are not unique to wildlife.

93 WHAT MODELS SHOULD THE FOREST USE TO PREDICT THE HABITAT SUITABILITY INDEX?

COMMENTS INCLUDED:

“The Forest Service (FS) should consider the use of two methodologies developed by the Fish and Wildlife Service (FWS): Habitat Evaluation Procedures (HEP).”

“The DEIS does not describe the procedures the planning team used to calculate either habitat effectiveness values.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

582, 4490, 9094

FOREST SERVICE RESPONSE:

The Forest Service has models that will estimate the number of animals a given area may produce. Though these models have deficiencies, they do provide a relative measure of trade-offs. In some cases we lack valid data to calibrate a model for some species. In those situations outputs for wildlife are done by professional judgement and the procedures to do the predicting vary by species.

The HEP wildlife models have been reviewed and we find they cannot be used because:

1. The Forest does not have information in the formats needed to run the model.
2. One of the outputs needed in Forest planning to evaluate trade-offs is the number of animals. The HEP model does not predict numbers of animals.

Though we have not made total application of the HEP Model we have used the information on habitat characteristics. The U.S. Fish and Wildlife Service has done a good job of identifying the characteristics that effect the species.

94 MANAGEMENT AND ASSESSMENT OF MARTEN AND PILEATED WOODPECKER AREAS.

COMMENTS INCLUDED:

“It seems unreasonable that as many acres are being allocated separately to martin/pileated (?) habitat areas as there are to spotted owls?”

“Could its habitat be managed to cause less impact on timber supply?”

“Pages II-108, Table II-32, marten. The figures given here match those for pileated woodpecker.”

“We strongly suspect the population projections for these species are just as inaccurate as the Wenatchee National Forest population projections for spotted owl.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0047, 0128, 0582, 0602, 0666, 0900, 1411, 2716, 2847, 2868, 2878, 3065, 3190, 3202, 3335, 3487, 3520, 3775, 3876, 4019, 4110, 4489, 4493

FOREST SERVICE RESPONSE:

The marten and pileated woodpecker are indicator species with Regional Management Requirements. These species were selected to provide mature and old growth habitat for all other species needing this habitat.

Using the habitat requirements for each indicator species a network for each species was built. In developing this network maximum overlap of habitat areas for indicator species with similar habitat needs was sought in order to reduce the effects on timber supply to a minimum.

The fact that there are more acres allocated to marten and pileated woodpeckers than to spotted owls is a function of site dispersal requirements. Marten and pileated woodpecker sites are much closer together than are spotted owl sites. (more sites result from shorter distances between sites). Between the draft and final, spotted owl habitat acres have increased and more flexibility has been exercised in distribution and location of marten and pileated woodpecker habitat. The relationship of acres allocated to spotted owls versus marten and pileated woodpeckers is one of species habitat requirements and not an indication of species importance.

The draft Forest Plan allowed timber management within marten and pileated woodpecker sites on a 260 year rotation (old growth habitat prescription). Established research shows marten and pileated woodpeckers use either mature or old growth habitat. Therefore the Forest has the choice of managing for old growth or mature habitat for these species. In the final the Forest has chosen to provide a mature habitat prescription based on a 180 year rotation to produce a greater flow of wood products while still meeting the wildlife needs.

It is true the marten and pileated woodpecker outputs were the same and estimated to be increasing over time in the DEIS. In the FEIS the two outputs are different and the trend for these species population is downward.

The Forest Service has provided for a viable population of these wildlife species and met the distribution requirements in alternatives where Management Requirements are included.

95 WHY HAVE INSECTS NOT BEEN ADDRESSED IN THE FOREST PLAN?

COMMENTS INCLUDED:

“Other species such as insects can have a significant impact on Forest Resources”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0579, 2201, 3083, 9018

FOREST SERVICE RESPONSE:

Insects have a significant effect on the management of a forest. Insects influence the populations of animals and how fast trees grow. Insects have been addressed in a number of places in this Forest Plan.

1. Lists of threatened, endangered and sensitive (T,E&S) insects were reviewed and it is believed none of those listed exist on the Forest. If there were the Forest would address them as it has threatened, endangered and sensitive plants and animals through consultation with US Fish and Wildlife Service.
2. Most prescriptions have standards and guidelines giving direction on what is to be done if disease or insects populations reach unacceptable levels (see Chapter IV, Management Prescriptions, of the Forest Plan).
3. Insects are important food for many species of birds, amphibians, reptiles and mammals. Therefore some discussion and consideration have been given to insects using these species as indicators for wildlife, plants, insects or organisms (FEIS, Chapter III, Wildlife subsection Primary Cavity Excavators).

Insects may have an even more important role in the forest than has been portrayed but more specific research is needed to better understand the relationship of insect communities to the forest ecosystem before additional management direction can be developed.

96 DIRECT, INDIRECT, AND CUMULATIVE EFFECTS FOR WILDLIFE HAVE INADEQUATE ASSESSMENTS AND MANAGEMENT DIRECTION.

COMMENTS INCLUDED:

“...cumulative impacts fail to meet NEPA requirements.”

“Have cumulative effects of more roads and recreation been included in big game output models.”

“The DEIS is very deficient in its consideration of wildlife.”

“...impacts are not discussed.”

“The impacts of the plan on many important species is completely ignored.”

“...entry understates adverse effects.”

“...someone’s best estimate rather than site specific research.”

“...your wildlife data base is very incomplete.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0063, 0066, 0067, 0092, 0114, 0124, 0147, 0262, 0292, 0307, 0342, 0363, 0392, 0441, 0502, 0519, 0522, 0528, 0561, 0562, 0577, 0579, 0582, 0597, 0603, 0604, 0618, 0646, 0655, 0656, 0660, 0730, 0882, 0896, 0898, 0900, 1302, 1937, 1947, 1970, 1991, 2131, 2132, 2205, 2453, 2719, 2725, 2732, 2763, 2776, 2782, 2791, 2831, 2846, 2849, 2854, 2863, 2871, 2873, 2878, 2879, 2901, 2911, 2934, 2940, 2941, 2956, 2969, 2994, 2998, 3009, 3016, 3027, 3029, 3032, 3065, 3067, 3077, 3083, 3085, 3099, 3126, 3150, 3157, 3170, 3177, 3186, 3190, 3198, 3209, 3211, 3219, 3225, 3228, 3231, 3234, 3239, 3255, 3256, 3259, 3287, 3320, 3352, 3363, 3388, 3392, 3394, 3397, 3422, 3487, 3520, 3539, 3552, 3553, 3566, 3571, 3576, 3606, 3621, 3645, 3693, 3727, 3731, 3788, 3791, 3795, 3817, 3833, 3849, 3863, 3872, 3899, 3933, 3938, 3954, 3989, 4019, 4069, 4123, 4204, 4210, 4222, 4236, 4239, 4269, 4270, 4298, 4310, 4405, 4423, 4454, 4471, 4477, 4485, 4488, 4489, 4490, 4492, 4494, 4498, 4501, 4508, 4510, 4511, 9014, 9030, 9041, 9065, 9094

FOREST SERVICE RESPONSE:

The best and most consistent way to assess the direct, indirect and cumulative effects of projects or potential changes in management direction is to use models. However, the basic vegetation information used in Forest planning is not adequately categorized to provide habitat information by habitat groups for wildlife. The Forest is currently working to develop a multi-resource inventory which will replace the present inventory. Concurrently we are developing a Geographic Information System (GIS) to store and manipulate the new inventory. When the inventory and GIS system are in operation the information needed to use models and make better estimates of effects will be available.

In the meantime the Forest plan must be completed with the best information available. In this case the best estimates of effects and outputs are done using professional judgement, past experiences, knowledge of the Forest's habitat(s), understanding the planning process, and theories of wildlife management. Between the Draft and Final, there have been many changes in the assessment of direct, indirect and cumulative effects of other projects on wildlife.

In addition, we have been emphasizing Wenatchee National Forest wildlife by gathering information and designing prescriptions that are more conservative, and reviewing mapping of allocations with more detail since the draft Forest Plan was sent out for review. This additional work has added significantly to the treatment of wildlife in the Final.

For example, we have completed 3 years of surveys on spotted owls, mapped spotted owl habitat and gathered information on grizzly bear habitat.

Two examples of more conservative prescriptions are: The old growth prescription (for spotted owls) does not allow timber harvesting now and the mature forest prescription (for marten and pileated woodpeckers) will have little if any harvesting in the core area for these species during the next 10 years.

Examples of solving problems by more detailed mapping are:

As the Forest developed the mature and old growth habitat network, individual habitat areas were located so as to compensate for losses of habitat on adjacent land ownerships effects. This was done for spotted owls by providing additional sites and/or acres near major weak points in the network created by checkerboard ownership patterns. Marten, northern three-toed woodpeckers and pileated woodpecker sites were also strategically located to meet distribution requirements across checkerboard ownerships. This process compensates for the cumulative effects of private land management on the wildlife species.

As time goes on, the Forest Service will continue to gather information and develop models to help assess the impacts of projects on wildlife. If the new information and modeling show significant problems that need resolution, an amendment to the Forest Plan may be made.

97 THE MANAGEMENT DIRECTION FOR BIG GAME.

COMMENTS INCLUDED:

“...separate prescriptions considered for transitional and summer range.”

“Its this winter range, not your total forage, that is the limiting factor for deer and elk.”

“Road management would far outweigh the effects of 1300 acre-equivalents per year of habitat improvements.”

“...general prescription is written to cover multiple species and seasons. We recommend you develop separate sections.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0005, 0062, 0116, 0307, 0386, 0577, 0582, 0586, 0619, 0791, 0794, 0900, 1954, 1955, 2120, 2123, 2131, 2132, 2137, 2732, 2749, 2753, 2763, 2776, 2777, 2780, 2782, 2796, 2800, 2824, 2869, 2871, 2878, 2879, 2907, 2913, 3068, 3099, 3203, 3228, 3255, 3341, 3363, 3394, 3410, 3529, 3551, 3592, 3742, 3776, 3804,

3865, 3866, 3867, 3871, 3873, 3879, 3911, 3926, 3936, 4036, 4142, 4194, 4214, 4239, 4243, 4263, 4270, 4298, 4405, 4434, 4435, 4457, 4467, 4474, 4477, 4484, 4485, 4486, 4489, 4490, 4494, 4498, 4502, 4503, 4510, 4511, 9000, 9041, 9046, 9064, 9065, 9094

FOREST SERVICE RESPONSE:

In the draft Forest Plan, mountain goat, mule deer and Rocky Mountain elk were all managed under one prescription. After reviewing public comments and the concerns of forest managers, mountain goat requirements were separated from the big game prescription.

The prescription for management of big game has changed from a 260 year timber rotation to one of 130 year timber rotation which allows greater timber yield without altering the emphasis on meeting deer and elk habitat requirements.

To adequately show the big game picture the outputs for both summer and winter habitat are provided. The number of animals carried in winter is much less than that carried in summer on the Wenatchee Forest.

The management prescription for deer and elk applies to winter range because it is the critical factor. Between the draft and final, Standards and Guidelines were added for managing transitional range and summer range to keep these areas from being a limiting factor (see Chapter IV of the Forest Plan).

All activities, including roads, are limited in the prescription for winter range (both in the draft and final EIS). Therefore, as winter ranges become managed under this prescription, road-related effects will be limited. On the rest of the Forest, all new roads will be closed and old roads will be closed when there are compelling resource needs (closures for deer and elk could be the reason). The road closure standard has been added from the draft to the final to address public concerns over roading.

98 DISAGREE WITH ESTIMATES OF BIG GAME NUMBERS.

COMMENTS INCLUDED:

“Please explain model relationships which show potential increases of about 40% from a habitat potential over 6 times that of current program acreage.”

“We disagree that long-term, high-intensity timber production would improve big game cover/forage relationships.”

“Big Game Estimates. Figures for 1986 seem to show that the current program is producing at maximum potential. Is this so?”

“We believe that more realistic estimates would be 29,000 deer and 14,500 elk, with harvest of 3450 and 4500 respectively.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582, 3394, 4450, 4489, 4494, 9065

FOREST SERVICE RESPONSE:

There is a large amount of forage available in summer habitat for big game on the Forest. However, forage cannot be the only factor considered because it is not the only habitat requirement. For example, cover becomes the limiting factor at some point and forage abundance then has little value. This information also does not show that the winter range limits the number of animals actually using the Forest.

At present we do not have a population model developed that uses all the factors to calculate big game numbers and our ForPlan computer model does not predict wildlife numbers. Therefore, the model referred to in the Draft is misleading and was not used to calculate numbers for the Final EIS.

Timber harvest can increase habitat for big game until a 40% cover and 60% forage condition exists, then habitat decreases. Some Management Prescriptions in the Forest Plan do not constrain areas planned for timber harvest to provide optimum big game habitat. Therefore, timber harvest will increase habitat sometimes but may decrease it at other times. However, project level planning will offset some of the potential losses in areas allocated to the General Forest Prescription.

Big game estimates in the draft were reviewed and found to be erroneous and were changed accordingly in the final Forest Plan and EIS.

Deer, elk and other wildlife outputs have been recalculated in coordination with the Washington Department of Wildlife. The revised figures reflect that coordination. In Chapter III of the FEIS and Chapter II of the Forest Plan the winter and summer estimates for deer and elk are displayed to better represent expected deer and elk populations.

99 DOES THE FOREST MEET OR EXCEED THE MANAGEMENT REQUIREMENTS FOR WILDLIFE?

COMMENTS INCLUDED:

“Do any alternatives exceed the minimums?”

“The Forest’s interpretation of the regulations is so extreme that it redefines the terms and contradicts direction from the Department of Agriculture.”

“...their [regional management requirements] adoption without consideration of alternatives violates NEPA.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0409, 0582, 0602, 2123, 2134, 2137, 2716, 2879, 3083, 3180, 3352, 3410, 3539, 3553, 3833, 3849, 4296, 4484, 4489, 4490, 4494, 4498, 9094

FOREST SERVICE RESPONSE:

The species with Regional Management Requirements for this Forest are: Northern Spotted Owl, Pileated Woodpecker, Marten, Northern Three-toed Woodpecker, Primary Cavity Excavators, Riparian (Beaver, Ruffed Grouse), Bald Eagle, Peregrine Falcon, and Grizzly Bear. The Management Requirements were applied as Regional direction directed except in the case of the bald eagle. The bald eagle

was allocated one nest site in the draft. However, the Fish and Wildlife Service's draft recovery plan for this species indicates the Forest should provide eight. This oversight has been corrected in the final EIS.

Since the draft EIS the Forest has received public comments, new Management Requirements from the Region, and new information on many species' needs. As a result of this information, there have been many changes in the management of species that have Management Requirements.

The Forest Services' "Final Supplement" for the spotted owl in the Pacific Northwest Region has been completed and new direction is provided for management of this habitat. In response, the preferred alternative for the Wenatchee Forest Plan has been changed to include 66 spotted owl habitat areas. The draft included 79 potential sites to provide the flexibility for meeting the Regional network requirements when that direction became known. Spotted owl management has changed from a 260 year old growth prescription that permitted timber harvest to a prescription that protects the spotted owl habitat without timber harvest.

Marten/Northern Three-toed Woodpecker habitat areas were relocated using new Regional direction. The prescription for these species in the draft Plan included a 260-year old growth timber harvest prescription. This has been changed to a 180 year mature habitat timber harvest prescription which is thought to fully meet habitat needs of the species while producing increased timber volumes over time.

New Regional direction has been developed to describe primary cavity excavator habitat. As a result some new standards and guidelines have been developed by the Forest. The new direction has been calculated to have a 2% reduction in potential timber harvest forest-wide.

The riparian prescription for the indicator species beaver and ruffed grouse has been rewritten to better define the management requirements for all activities.

Peregrine falcon habitat has been partially identified and Forest-Wide standards and guidelines added.

Grizzly bear management has been better defined by Forest-wide standards and guidelines.

The changes in management direction for species with Regional Management Requirements still meet or exceed the Regional direction.

Management Requirements for indicator species have been applied to alternatives. The amount of habitat above minimum levels for this group of species changed in response to changing allocations and the differing emphasis of the various alternatives.

FISH

100 SEVERAL RESPONDENTS QUESTION HOW FISH OUTPUTS WERE DISPLAYED AND THE ASSUMPTIONS USED TO DETERMINE THE OUTPUTS.

COMMENTS INCLUDED:

“The conversion of actual fishing trips to recreation visitor days means that the values in Table B-IV-2 (page B-82 of the Appendices) are unrealistically low. At these levels, the values would fall far below any of the contemporary economic valuations for Pacific Salmon benefits in the Pacific Northwest.”

“Page II-156, Economic Values: The economic indicator for anadromous fish is described as ‘commercial harvest of anadromous fish.’ While commercial harvest is an important contributor to the national economy, other values can be assigned for recreational fishing. For some species of anadromous fish this sport harvest is a major factor in their dollar value and may increase in the future.”

“Page III-47, Paragraph 5: The June 1982 NOAA Technical Memorandum, NMFS, F/NWR3, Net Economic Values for Salmon and Steelhead from the Columbia River System is cited as the source for harvest distribution data for anadromous fish spawned on the Forest. This report is now outdated.”

“Page III-26, Table IV-1. It would help a great deal to show fish and wildlife models and parameters, so that we could see how numbers in this table are derived, and comment on the assumptions you use.”

“Why is smolt habitat capability assumed to require full escapement on the Forest (Plan II-24)? Assuming conditions in the habitat are not widely fluctuating then its capability will remain unchanged regardless of escapement level. The number of smolts produced may change with parent escapements but the habitat’s ability to sustain them is a variable independent of fish numbers.”

“The Forest’s estimated commercial and sport harvest potential (Plan II-24) is misleading: What mortality rate is referred to when it is assumed that “off-forest dam losses are nearly eliminated?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0010, 0579, 0716, 3065, 3225, 3270, 3464, 3550, 3911, 4035, 4485, 4493, 4495, 4498

FOREST SERVICE RESPONSE:

All fish outputs were reviewed between the DEIS and FEIS. For background information on calculations and assumptions the reader is referred to Documentation for Formulation of Fisheries Outputs for Wenatchee Forest Plan, Second Edition by Ken MacDonald. The revised fish output estimates are reflected in Chapter III of the FEIS. These outputs include pounds of commercial fish, fish user days, smolt habitat capability and estimates of escapements of management indicator species including spring and summer chinook salmon, sockeye salmon and summer steelhead trout. In addition, projected numbers of adult cutthroat trout are shown. The only management indicator species for which there are no

projections are bull trout because there is not enough information to make the estimates. The Forest will be conducting a project in fiscal year 1989 to describe bull trout distribution and abundance.

Actual numbers of returning adult anadromous fish will be dependant upon a number of factors, including survival at mainstream Columbia River Dams, ocean and river harvest, passage improvements in streams below the National Forest boundary, as well as habitat quality on the National Forest. Due to these factors, the Forest's monitoring plan calls for monitoring smolt habitat capability as well as returning adults, in cooperation with State, Federal and Tribal fish management agencies.

The Forest Service agrees that the number of smolts produced in any year may vary due to a variety of factors. Smolt habitat capability reflects habitat condition and it is a goal of the plan that habitat capability improve over time. Anadromous fish outputs assume full seeding by the second decade in an attempt to reflect the value of the habitat and to allow comparison between alternatives. It should be emphasized that these numbers are estimates used to compare alternatives. The numbers will need to be revised as new information becomes available.

Dollar values for anadromous fish in the FEIS include not only commercial harvest, but also recreational harvest off-Forest. Values of commercial and sport fish harvest are those values used for RPA 1985 as per Forest Service direction.

101 IT APPEARS THAT THE FOREST FISHERIES PROGRAM IS TIED TO THE AMOUNT OF TIMBER HARVESTED. WILL KV FUNDS BE AVAILABLE TO USE WHEN AND WHERE NEEDED? HOW WILL PRIORITIES BE ESTABLISHED?

COMMENTS INCLUDED:

“Habitat improvement projects dependent for funding upon other fish habitat capability-reducing activities (e.g. those funded by timber-sale generated KV funds) are insufficient.”

“Wenatchee's Fisheries Inventory/Improvement program, outlined on page IV-44 (Plan) indicates that an average of \$111,000/year will be spent. Of this amount \$86,000 (77%) will be KV monies; the remaining \$25,000 (23%) will be appropriated funds. In other words, better than three quarters of the anticipated habitat work will be entirely contingent upon implementing a successful, profitable timber sale program!”

“Page IV-38: Several alternatives would include the diversion of KV funds to provide fishing access. This would further diminish the availability of these relatively modest funds for correcting past environmental damage on the Forest and fulfilling newly emerging needs in a timely manner.”

“Initially, fish habitat damaged by past timber sale activities will not likely receive benefit from these funds unless a new sale that generates KV dollars occurs in the same general area. Assuming that most new sales will be laid out in new areas, then most damage from earlier sales will likely stay unfixed.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0579, 0580, 0644, 0716, 1977, 2206, 2737, 2893, 3223, 3320, 3394, 3550, 3776, 3796, 4169, 4270, 4467, 4471, 4485, 4494

FOREST SERVICE RESPONSE:

It is the goal of the Forest Service to at least maintain and improve fish habitat capability. We have re-examined and increased the emphasis on the fish habitat management program as is reflected in updated standards and guides and monitoring guidance displayed in Chapters IV and V of the Forest Plan. Direction to create 5-year program plans and sub-drainage objectives will help prioritize how available funds will be expended.

Habitat improvement work is just a portion of the total fish habitat management program and KV funds are just one way of funding habitat improvement. Alternatives with greater timber emphasis should have more KV funds available, but those alternatives also carry greater risk of habitat degradation. While it is the Forest Services' intent, as discussed in Chapter IV of the FEIS, to use KV to help mitigate past adverse impacts, with greater resource development there is a relatively higher chance that KV funds would be needed to mitigate new problems and it would be more difficult to achieve the goal of maintaining and improving fish habitat. While it is true that some timber harvest activity would occur in new areas, other harvest activity, depending upon the alternative, will occur in previously entered sub-drainages. There is some flexibility in expending KV funds in that they need to be spent in the sale area not necessarily the cutting area and there is some flexibility in designation of the sale area.

Habitat improvement budgets were initially developed based upon the emphasis of the alternatives. While the relative distribution of habitat improvements funds have remained basically the same between the DEIS and FEIS, total funding to implement the programs was increased and the estimated budget needed for habitat management, including administration, inventory, monitoring and coordination with other resources activities, has been increased.

102 THERE WERE SEVERAL COMMENTS QUESTIONING STATEMENTS IN THE DEIS THAT FISH PRODUCTION ON THE FOREST MAY BE LIMITED BY COLD WATER TEMPERATURES AND THAT ACTIVITIES WHICH RAISE TEMPERATURE MAY BENEFIT FISH PRODUCTION.

COMMENTS INCLUDED:

“Page IV-123, Paragraph 2: It is suggested here that timber harvest along the stream corridors may increase fish production due to warming effects. We offer that many factors, in addition to temperature, limit productivity in anadromous fish streams. We recommend that the potential benefits of temperature elevation be carefully weighed against the possibility for excessive heating, decreased summer stream flow and increased sedimentation.”

“While discussing wildlife and fish (III 4-5), for example, the Plan states: ‘water quality may often limit the Forest’s fisheries production potential. For instance, most of the streams exhibit very low water temperatures year-round due to their high altitude and have low nutrient content which results in slow fish growth.’ Such statements imply that cold, relatively sterile water is of low quality. This is simply not true.”

“The provision of higher water temperatures may be a benefit in some stream reaches, but can eventually create high temperature problems as the same water moves down stream, In addition, higher summer temperature benefits can be at the expense of winter rearing habitat conditions. These potential trade-offs should be added to the narrative.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0508, 0580, 0716, 3065, 3191, 3235, 3464, 3550, 3611, 4485

FOREST SERVICE RESPONSE:

Cold water and low nutrient levels may limit salmonid production relative to other geographic areas or river systems but fish habitat is a complex matter and production depends upon many factors of which water temperature and nutrients are two. We recognize that fish have adapted to local environmental conditions and changes in these conditions to increase production must be carefully considered. It is also important to minimize the potential for habitat changes from other land use activities, until the impacts of such changes are understood. For these reasons, the Forest has adopted new Riparian and Fish Management standards to guide habitat protection and management activities (see Chapter IV of the Forest Plan).

103 MANY RESPONDENTS QUESTIONED THE ASSUMPTION THAT UNDER ALL ALTERNATIVES FISH PRODUCTION FROM THE FOREST WOULD INCREASE, NO MATTER THE LEVEL OF FOREST MANAGEMENT ACTIVITIES AND THAT HABITAT ENHANCEMENT, INCLUDING EXPENDITURES OF KV FUNDS COULD MITIGATE ANY HABITAT LOSSES.

COMMENTS INCLUDED:

“The conclusion that the Forest’s fish production capabilities would increase under any alternative is far too optimistic, since no losses of any type are calculated for environmental disturbance activities such as timber harvest, associated road building and grazing. Funding for fisheries work is treated as enhancement only, even though much of it would be diverted to problems created from past Forest management practices. The plan does not acknowledge any major risk of future environmental damage exhausting available funding sources.”

“The descriptions and analysis of water quality and related elements are disconcerting in that no degradation is promised even though the data and information provided indicate otherwise. For example, sedimentation is increasing over the life of the Plan, but at the same time water quality and anadromous fish production are supposed to increase; a relationship contrary to our experience.”

“We see fisheries benefits in Alternative B due to large expenditures of K-V funds. In essence, this alternative says that you can degrade habitat, but you will then have the money to mitigate the impacts.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0035, 0563, 0579, 0580, 0612, 0635, 0641, 0716, 0836, 0868, 0870, 1300, 1302, 2007, 2012, 2131, 2205, 2206, 2235, 2734, 2833, 2877, 2919, 2956, 2996, 3067, 3081, 3090, 3163, 3181, 3183, 3191, 3199, 3203, 3205, 3223, 3225, 3242, 3288, 3320, 3362, 3403, 3410, 3550, 3611, 3645, 3742, 3769, 3800, 3813, 3911, 3936, 3992, 4035, 4037, 4070, 4139, 4142, 4167, 4169, 4194, 4259, 4270, 4277, 4417, 4434, 4444, 4477, 4485, 4493, 4511, 9093, 9094, 1578S, 2178S

FOREST SERVICE RESPONSE:

The Wenatchee National Forest does not have a model, specific to the Wenatchee, to predict impacts on fish habitat from various land management activities. It is our intent to maintain fish habitat at least at current levels, and habitat on the Forest should show an improving trend. Since the Draft, we have added Forest-wide Standards and Guidelines for Riparian Areas, added to the Forest-wide Fish standards, increased substantially the estimated budgets necessary for fisheries and watershed management and established new monitoring guidance. It is assumed that under all alternatives except NC, that the Standards, use of Best Management Practices (BMP's) and improved coordination with other resource management activities will at least maintain fish habitat. Habitat rehabilitation dollars would also be increased to better reflect the cost of habitat improvement.

While assuming that improved standards and use of BMP's will maintain fish habitat, the Forest Service recognizes that BMP's are established to minimize, not eliminate, adverse impacts. The alternatives with the greater levels of ground-disturbing activities exhibit greater risk of not meeting habitat goals. This relationship is discussed in Chapter IV of the FEIS. We also agree that habitat "enhancement" in many cases is really habitat rehabilitation for past activities and that habitat rehabilitation techniques are not as effective in maintaining habitat capability as maintaining natural conditions. The alternatives with greater ground disturbing activities carry a greater risk that habitat rehabilitation funds will be needed to mitigate future actions and thus again run more risk of not meeting current fish production objectives. (See Appendix J of the FEIS, Best Management Practices and Chapter IV of the Forest Plan, Standard and Guidelines.)

104 SMOLT HABITAT CAPABILITY ESTIMATES SHOULD INCLUDE THE POTENTIAL FOR SOCKEYE SALMON PRODUCTION IN THE LAKE CLE ELUM SYSTEM.**COMMENTS INCLUDED:**

"We feel that table III-18 (DEIS III-47) is in error. Smolt Habitat Capability in the Yakima River is estimated in your table to be 0. In fact, studies are just beginning to determine the feasibility of fish passage at Lake Cle Elum. If passage is possible there are many miles of good habitat above the Lake, and we would not want the Forest Service to preclude any management options based on under estimations of potential smolt yield. We understand that predictions of smolt yield are in flux in the Yakima Basin at this time, but would like to see a further refinement of this number."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3550

FOREST SERVICE RESPONSE:

The Forest Service recognizes the current studies in the Yakima Basin and has included an estimate of Smolt Habitat Capability for sockeye salmon in Lake Cle Elum in Chapter III of the FEIS.

105 THE RESPONDENTS FEEL THAT THE FOREST SERVICE'S RESPONSIBILITIES INCLUDE MORE THAN MERELY FURNISHING A GIVEN AMOUNT OF HABITAT. PART OF THE CONCERN BEHIND PROTECTION OF NATURALLY SPAWNING STOCKS IS THE DESIRE TO PROTECT UNIQUE GENE POOLS THAT WILL BE NEEDED TO RESTORE THE BASIN'S FISHERIES.

COMMENTS INCLUDED:

“The Forest Service has often informed the Columbia River Intertribal Fish Commission and Tribal staff that the Forest Service is only responsible for supplying smolt habitat capability and that there is far more capable habitat than there are smolts. The Forest Service’s responsibilities include more than merely furnishing a given amount and habitat. The Forest Service must identify that which is being utilized by fish and, to the extent it can, that which will be utilized through either United States vs. Oregon Fish and Wildlife Program enhancement measures.”

“There are healthy populations of native trout which do not survive over fishing and loss of habitat.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0528, 0716, 0847, 1300, 2035, 2132, 2206, 2737, 2749, 2752, 2919, 2996, 3065, 3084, 3205, 3223, 3225, 3255, 3288, 3320, 3394, 3410, 3495, 3548, 3640, 3742, 3775, 3813, 3837, 3876, 4035, 4152, 4277, 4294, 4405, 4434, 4444, 4485, 4493, 4494, 4495, 4496, 4501, 4505, 9007

FOREST SERVICE RESPONSE:

While it is the primary responsibility of the Forest Service to furnish habitat, it can go beyond this by working cooperatively with Tribal, State and other Federal fisheries personnel to achieve objectives resulting in stronger fish runs in the Columbia River Basin and meeting resident trout objectives. Specifically, as stated in Chapter V of the Forest Plan, population trends of salmon, steelhead and native trout will be monitored cooperatively with the Washington Departments of Fisheries and Wildlife and the Tribes. Monitoring will be done to gauge conformance with standards and guidelines found in Chapter IV of the Forest Plan, and with the Best Management Practices found in Appendix J of the FEIS. We are currently working with the Environmental Protection Agency and Washington Department of Ecology in developing our monitoring program. In addition, the Forest has established a standard to develop fish habitat management objectives by sub-drainage. Since we are interested in the efficient utilization of habitat, the Forest Service will certainly share information and coordinate in identifying opportunities to best meet fisheries production objectives.

106 WHAT IS SMOLT HABITAT CAPABILITY (SHC)?

COMMENTS INCLUDED:

“What is smolt habitat capability and how is it measured? What parameters are identified in the field as a guide to future smolt habitat capability?”

“The FEIS should explain how smolt habitat capability is calculated.”

“We have some questions about the reliability of assumptions regarding smolt habitat capability when no detailed surveys have been done. Additionally, what precisely is the method for defining smolt habitat capability?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0716, 3550, 4485

FOREST SERVICE RESPONSE:

Smolt Habitat Capability Index is a measure of the productive capability of habitat on the Forest to produce smolts. SHC is usually shown as:

a. Existing SHC: The number of smolt now being produced with existing escapement levels in existing freshwater habitat.

b. Potential SHC: The number of smolt that are capable of being produced assuming there is sufficient adult escapement to fully seed existing freshwater habitat.

c. Potential SHC with Full Enhancement: The number of smolt that are capable of being produced, assuming sufficient capital investments have been made to maximize the freshwater habitat. This also assumes there is sufficient adult escapement to fully seed the existing and enhanced habitat.

Estimating smolt habitat capability for the Wenatchee National Forest is difficult due to lack of information and the fact that, generally, the anadromous fish streams are under-seeded. There is also disagreement between individuals in other agencies as to what the actual SHC is on the Wenatchee National Forest. For further information on how SHC was calculated readers are referred to Documentation for Formulation of Fisheries Outputs for the Wenatchee Forest Plan, Second Edition, by Ken MacDonald.

Generally speaking, Potential SHC found in Chapter III of the FEIS, was estimated based upon work by other agencies. These numbers are estimates and will need to be updated as more information becomes available. The Forest has scheduled an accelerated stream inventory program to quantify fish habitat. The Forest monitoring program includes an element to further define SHC and monitor trends in habitat capability, in cooperation with other fish management and Tribal agencies. Forest-wide Fish Standards call for establishing fish habitat management objectives for sub-drainages. As these programs are implemented the Forest should be better able to define SHC.

107 STANDARDS AND GUIDELINES FOR FISH HABITAT ARE FELT TO BE LACKING SUBSTANCE AND THERE IS CONCERN THAT THE STANDARDS AND GUIDELINES AS DISPLAYED IN THE DRAFT FOREST PLAN WILL NOT ADEQUATELY PROTECT FISH HABITAT.

COMMENTS INCLUDED:

“We feel that the standards and guidelines section is lacking in substance. What are the standards to be used to insure that there is adequate woody debris in streams? What stream temperature guidelines will be used? Is there a baseline input of sediment that is acceptable?”

“Page IV-71 through 133, 1st para; Forest Wide Standards and Guidelines: The Standards and Guidelines that affect fish and wildlife are inadequate in that they do not provide the detail that will be necessary for on-the-ground guidance to Forest Service personnel.”

“The DEIS lists the EW-2 Riparian Protection Zone Prescription as being the primary fisheries resource mitigation device. It states that the primary objective of this prescription is to maintain optimum riparian habitat for fish and wildlife and to protect wetlands. However, this prescription allows both shelterwoods and clearcuts in the riparian zone. How does this timber management in the riparian zone create better fish habitat...? How does increasing sediment delivery to the stream and decreasing the availability of large organic debris benefit fish habitat?”

LETTERS WITH COMMENTS ON THIS SUBJECT:

2893, 3550, 4444, 4485, 4495, 4501, 9094

FOREST SERVICE RESPONSE:

The Standards and Guidelines in Chapter IV of the Forest Plan establish the framework for management of the Forest. Improved fish habitat management is an objective of this plan and management of riparian areas is key to meeting habitat management objectives. Forest-wide standards for fish and riparian habitat management have been upgraded significantly in the final plan. Forest-wide riparian standards for fish and wildlife habitat are now included in addition to the EW-2 Management Prescription (see Chapter IV of the Forest Plan). Measurable standards have been established for temperature, sediment, in-channel wood, future wood input and ground cover. Furthermore, standards and guides have been developed for non-fish bearing streams, recognizing the importance of managing an entire watershed in order to meet fish habitat and water quality objectives.

These standards establish the desired future condition for riparian and fish habitat and along with the EW-2 Management Prescription provide the framework necessary for forest managers to make decisions regarding fish and riparian habitat.

108 THE DRAFT FOREST PLAN LISTED CHINOOK SALMON AND RESIDENT CUTTHROAT TROUT AS FISH MANAGEMENT INDICATOR SPECIES (MIS). IT HAS BEEN QUESTIONED WHETHER CHINOOK SALMON AND CUTTHROAT TROUT ADEQUATELY REFLECT THE HABITAT NEEDS OF ALL FISH SPECIES. IT WAS ALSO QUESTIONED WHETHER THE FOREST NEEDED TO INCLUDE AN ANADROMOUS FISH MANAGEMENT REQUIREMENT (MR).

COMMENTS INCLUDED:

“Monitoring element 7.1 addresses Management Indicator Species (MIS). For anadromous fish, chinook salmon are proposed as the MIS. Sockeye salmon have clearly different habitat requirements, as do coho and steelhead. Chinook habitat alone does not adequately reflect the needs of these other species.”

“After combing the DEIS, the proposed plan and the appendices, we have been unable to find the MMR for anadromous fish.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3065, 4485, 4495, 9086

FOREST SERVICE RESPONSE:

The National Forest Management Act of 1976 (NFMA) directed the Secretary of Agriculture to develop regulations to guide Forest Planning that would in part: "...provide for diversity of plant and animal communities..." In addition, this Act directed that protection would be provided "...where timber harvests are likely to seriously adversely affect water conditions or fish habitat." Each Forest, in cooperation with the State Wildlife Agency, was to identify a list of indicator species, or species associated with a certain type of habitat whose response to changes in habitat may indicate the effects of the habitat change on other species with similar habitat needs. Categories to be considered for selection of indicator species included: Endangered and threatened plant and animal species identified on State and Federal lists for the planning area are; species with special habitat needs; species commonly hunted, fished or trapped; non-game species of special interest; and other species believed to represent a larger group with similar biological needs.

Between the draft and final the Forest has reviewed its list of Indicator Species and for fish has decided to include all anadromous fish species being managed on the Forest including spring and summer chinook salmon, sockeye salmon and summer steelhead trout. The Bull trout has also been added because it is listed by the USDI Fish and Wildlife Service as a Category 2 species (candidate species for possible listing-Endangered Species Act) and a Regional Forester sensitive species.

Management requirements (MR's) were developed in response with 36 CFR 219.27 to assure that the basic productivity of the land and water resources remains unimpaired. In order to meet this direction, certain Management Requirements (MR's) were established for fish and wildlife species (see Appendix I of the FEIS). These include soil and water conservation, plant and animal density, and population viability.

It was determined that the soil and water conservation management requirement would be adequate for maintenance of viable populations of fish and no management requirement was developed specifically for fisheries.

Forest-wide standards for soil and water, including a new Best Management Practice Appendix J, a new list of Forest-wide Riparian Standards and the EW-2, Riparian Habitat Protection Zone, are the avenues selected by the Wenatchee National Forest to achieve the Soil and Water Conservation Management Requirements.

109 SEVERAL AGENCIES, INCLUDING WASHINGTON DEPARTMENT OF FISHERIES AND THE COLUMBIA RIVER INTERTRIBAL FISH COMMISSION CALLED FOR A FOREST SERVICE STUDY OF THE CUMULATIVE IMPACTS OF ALL COLUMBIA BASIN FOREST PLANS WITHIN THE RANGE OF ANADROMOUS SALMONIDS.

COMMENTS INCLUDED:

"The analysis should have considered the effects of the Forest, and activities therein, on the Columbia Basin as a whole with respect to fish and wildlife resources and their use."

“To adequately assess the environmental impacts of its actions as required by NEPA, the Forest Service must study and disclose the cumulative impacts of all 17 forest plans listed.”

“A final possibility to consider would be special treatment of anadromous fish (salmon and steelhead) via a separate supplemental EIS process, possibly for all Forests in the Columbia Basin.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0580, 2919, 4485, 4493, 9094

FOREST SERVICE RESPONSE:

Chapter IV, The Environmental Consequences chapter of the FEIS, refers the reader to an unpublished document which summarizes the aggregate effects of the decision on fisheries and other resources. This document started with aggregation of 19 Draft Forest Plans and is updated with the selection of each Final. Chapter IV of the FEIS shows the effects on and from other forests, agencies and landholders affected by or having effects on the Forest.

The document referenced is: Forest Plan Aggregate Outputs and Effects Staff Paper for the Regional Forester, Region 6 (Draft August 5, 1988). This will be updated as each Forest completes its Forest Plan.

110 MANY RESPONDENTS NOTED THAT MOST DAMAGE TO FISH RUNS IN THE COLUMBIA BASIN AND SPECIFICALLY TO THE STREAMS WITHIN THE WENATCHEE NATIONAL FOREST HAS OCCURRED BELOW THE NATIONAL FOREST BOUNDARY, AND THAT MOST OPPORTUNITIES FOR IMPROVING ANADROMOUS FISH RUNS ARE DOWNSTREAM OF THE FOREST BOUNDARY. HOWEVER, THEY CONTENDED THE WENATCHEE NATIONAL FOREST MUST RECOGNIZE THAT PAST LAND MANAGEMENT PRACTICES HAVE DAMAGED FISH HABITAT AND THAT HABITAT ON THE FOREST IS IMPORTANT TO MEETING ANADROMOUS FISH PRODUCTION GOALS. THE ANADROMOUS FISH RUNS CAN ONLY BE RESTORED IF STATE, FEDERAL, AND TRIBAL LAND, WATER, AND WILDLIFE MANAGERS ADOPT A COORDINATED “GRAVEL TO GRAVEL” MANAGEMENT APPROACH TO THIS VALUABLE AND MOBILE RENEWABLE RESOURCE.

COMMENTS INCLUDED:

“We would like to state at the outset, that although it is claimed repeatedly that increases in fish to the forest will largely be due to increased escapements, it is possible to sustain and increase escapement only if high quality fish habitat is provided. Therefore, it is of the utmost concern to the Yakima Nation that the best possible habitat for salmon and steelhead is available on forest lands. We also feel that diminished numbers of fish within the forest is not only due to downstream effects, but also because of environmental disturbance, use as grazing, road building and timber harvest within the Forest itself.”

“The text indicates that anadromous fish runs have declined solely due to commercial fishing, irrigation and mainstream Columbia River dams. We suggest that you include factors permitted on the Forest that have also contributed to this decline such as logging, grazing, road building, etc.”

“While the Forest Service can rightfully blame downstream problems for much of the harm inflicted on anadromous fish, such blame does not obviate the Forest Service’s responsibility to protect anadromous fish and the need for all parties with management authority that affects these fish to work together to improve the fishery resource ”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0563, 0716, 3205, 3514, 3550, 3800, 3949, 4142, 4444, 4477, 4485, 4498, 4501, 4509, 9034

FOREST SERVICE RESPONSE:

Chapter III of the FEIS recognizes that the survival and enhancement of anadromous fish runs within the Columbia River and tributaries requires coordination and cooperation by State, Federal and Tribal agencies and managers. The Forest Service fully supports the statement. The Wenatchee Forest has been an active contributor to sub-basin planning sponsored by the Northwest Power Planning Council.

We recognize that habitat on the Forest will play an important role in achieving anadromous fish production goals for the Yakima, Wenatchee and Entiat sub-basins. The goal of the Forest Plan is to maintain and improve fish habitat. Forest-wide Riparian Standards and Guides have been upgraded to help achieve the goal and fish standards call for establishing fish habitat objectives, in cooperation with the State, Federal, and Tribal entities, by sub-drainage.

Past land management practices on Forest may have contributed to the decline of fish numbers, although without surveys it is difficult to document reduced anadromous fish production or effects on habitat capability. Chapter III of the Plan does recognize land management activities may be partially responsible for loss of fish production and fish habitat.

111 THE FOREST PLAN WAS DEVELOPED WITH A LACK OF FISH HABITAT DATA. HOW DID THE FOREST CALCULATE THE EFFECTS OF LAND MANAGEMENT ACTIVITIES ON FISH HABITAT AND PRODUCTION. HOW IS THE FOREST GOING TO OBTAIN HABITAT INFORMATION NEEDED FOR FUTURE PLANNING AND TO MONITOR LAND MANAGEMENT EFFECTS ON FISHERIES?

COMMENTS INCLUDED:

“The DEIS states in several sections that very little data exists to evaluate forest stream habitat and fish populations. How were the effects and environmental consequences to fisheries calculated without sufficient data? How will data which is collected in the future be integrated into the Plan?”

“But what bothers us even more is that there is no clearly defined plan to obtain the missing data. Throughout the fish sections we encounter statements indicating that the information presented is appropriate based on incomplete knowledge or is simply a judgment call, but nowhere do we find a strategy for filling in the gaps.”

“The Draft Plan does generally identify fish habitat inventories as a priority and element 7.1 of the Monitoring Plan describes monitoring for fish habitat capability in the four major watersheds on the WNF. However, we find no discussion of when and how the needed habitat inventories will be completed.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0127, 0376, 0441, 0502, 0508, 0579, 0580, 0582, 0608, 0612, 0716, 0730, 0748, 0791, 1947, 1970, 2032, 2078, 2119, 2132, 2164, 2786, 2846, 2847, 2849, 2863, 2919, 2947, 2957, 2969, 2980, 2995, 3090, 3111, 3138, 3177, 3221, 3223, 3225, 3229, 3231, 3233, 3235, 3251, 3256, 3272, 3307, 3394, 3403, 3550, 3553, 3557, 3593, 3621, 3683, 3710, 3769, 3811, 3824, 3871, 3919, 3936, 3992, 4005, 4112, 4139, 4169, 4210, 4236, 4269, 4310, 4405, 4423, 4444, 4485, 4493, 4495, 4496, 4501, 4511, 9031, 9094

FOREST SERVICE RESPONSE:

Because the Forest Service had little fish habitat data when the Draft DEIS and Plan were written, we were forced to make some assumptions regarding the environmental consequences of different alternatives on fish habitat. These assumptions were based upon available information, professional judgement and local knowledge. We recognize the lack of data makes it not only difficult to make planning decisions but also to implement an effective fish habitat management program. As outlined in Appendix A and in the Forest-wide Standard and Guidelines in Chapter IV of the Forest Plan, we will implement an accelerated stream inventory program, with the goal of having all fish-bearing streams surveyed within four years of completion of the Forest Plan. Streams will then be scheduled to be re-surveyed every 10 years at a minimum. This inventory program began in fiscal year 1989.

In addition, we have updated the fisheries/watershed monitoring guidance in Chapter V of the Plan. The monitoring guidance outlines the framework for developing a yearly fish/watershed monitoring plan, to be coordinated with State fish and water quality agencies and the Tribes. The monitoring guidance includes baseline monitoring and implementation and effectiveness monitoring of standards and guidelines. The information needs section in Chapter II of the Forest Plan displays research to validate various fish and riparian habitat standards.

The Forest's goal, as displayed in Chapter IV of the Forest Plan is to maintain or enhance fish habitat quality and distribution. If monitoring shows fish habitat quality and/or quantity to be decreasing then standards, guidelines or management practices will need to be changed as displayed by the feedback loop illustrated in Chapter V of the Plan.

112 MANY RESPONDENTS URGED THAT FISH MANAGEMENT PROGRAMS AND RESEARCH RECEIVE GREATER EMPHASIS ON THE WENATCHEE NATIONAL FOREST.

COMMENTS INCLUDED:

“For starters. I see the need for a *Journeyman* Fisheries Biologist as one of the Key Forest Staff.”

“I also feel more adequate research is needed to know what are the effects of such massive changes on fishing. Will the watersheds provide enough summer flow?”

“Increase fisheries research in the WNF, both short and long term.”

“Second, the importance of the Forest's fisheries and watershed cannot be over-emphasized. I would urge that the U.S. Forest Service conduct further research and monitoring of the impacts of logging and roading on fish habitat.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0040, 0376, 0511, 0522, 0620, 0626, 0862, 1300, 1305, 1984, 1997, 2032, 2079, 2085, 2737, 2748, 2847, 2893, 2932, 2940, 3047, 3084, 3111, 3199, 3205, 3221, 3223, 3245, 3251, 3408, 3550, 3563, 3742, 3792, 3837, 3862, 3911, 3992, 4037, 4142, 4194, 4449, 4471, 4485, 4495, 4501, 4505, 9031, 9046

FOREST SERVICE RESPONSE:

The Forest Service recognizes that the Wenatchee National Forest contains valuable fish habitat. In response to the need to properly manage fish habitat, we have increased the emphasis on fisheries in the Final Forest Plan. The fish habitat management budget has been reviewed and upgraded, new forest-wide standards for fish and riparian habitat management have been added and the monitoring plan is being revised with input from Washington Department of Ecology and the Environmental Protection Agency. In addition, the Information Needs Section in Chapter II of the Plan has been revised with a list of research needs and a research budget included in the Forest fish and watershed management budget.

113 CONCERN WAS EXPRESSED REGARDING FISH HABITAT AND PRODUCTION ASSUMPTIONS STATED FOR ALTERNATIVE NC.

COMMENTS INCLUDED:

“Supplement page II-24: The comment in this table that fishing habitat numbers would decline flatly contradicts the comment on page II-9 that: ‘fish habitat capability should be maintained at current levels. Demand for fish and fishing at the present level of success, should continue to be met for the first decade’.”

“‘Fish habitat and populations would be expected to be maintained or follow the trend of the last few years.’ The trend in the anadromous fish run the ‘last few years’ has been up significantly! You imply there is no improvement. There are no grounds for your implication that they will be negatively impacted.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

1578S

FOREST SERVICE RESPONSE:

The Forest Service is responsible for managing aquatic habitat on National Forest Land. The numbers of anadromous fish returning to the Forest depends upon a variety of factors including habitat on the Forest, passage at mainstream Columbia River dams and harvest levels, among others.

Riparian and fish habitat standards included in other alternatives would not be applied in Alternative NC. Riparian habitat protection under Alternative NC would include only those measures necessary to meet the minimum requirements as specified in the Washington State Forest Practice Rules and Regulations. Forest-wide Riparian Standards included in Alternatives A-J emphasize management for fish and wildlife habitat adjacent to streams.

While the recent trend in anadromous fish runs has been up in recent years, and this trend is expected to continue, the increase is mostly due to factors off Forest. Due to the lack of Riparian standards and prescriptions in NC and because NC would allow timber harvest on more acres, including acres classified as unsuitable in other alternatives, Alternative NC poses the greatest risk of a reduction in fish capability in later decades.

RIPARIAN AND WATER

114 MANY REVIEWERS EXPRESSED CONCERN OVER THE EFFECTS OF PROPOSED MANAGEMENT ACTIVITIES ON RIPARIAN AREAS ON THE FOREST. SEVERAL REVIEWERS CHALLENGED THE ADEQUACY OF THE RIPARIAN MANAGEMENT PRESCRIPTION (EW-2) AND PROVIDED SUGGESTIONS FOR IMPROVEMENT OF THIS DIRECTION.

COMMENTS INCLUDED:

“The scientific community has repeatedly written of the importance of riparian zones for fish and wildlife. This view can be found in any number of comments submitted on Draft Plans already released. Your plans for riparian zone protection are inadequate to protect this valuable resource.”

“Aquatic habitat on the Forest is an essential part of the habitat base that will eventually be required for expanding Columbia River fish production... All existing and potential anadromous fish habitat in the Forest should be maintained in its present state or improved. This includes stringent protection for riparian zones.”

“The riparian-aquatic habitat protection zone of the proposed plan must be made more restrictive. The riparian management prescription should assure preservation of riparian communities. The use of off-road vehicles must be prohibited in riparian zones.”

“Further guidance on the amount of shelter trees to be left within the zone should also be provided. How many trees per acre would need to be left to assure adequate woody debris recruitment, and how is blowdown and natural mortality factored into this number?”

“In addition this riparian protection should be extended to all Class III streams, not just those with fish populations. Upstream activities can have a major impact on downstream siltation and stream temperatures. There is no excuse for simply cutting directly over the top of smaller creeks and streams.”

“We believe that your standard of 15-20 trees per acre leaves insufficient canopy for optimum riparian habitat. We recommend selective harvest for riparian areas.”

“We would like to suggest that on very steep slopes (70%) that there be no harvest below the first topographic break upslope from the stream. Also we have some concern that firewood cutting can have deleterious effects on successful management in this area. We would like to see no firewood cutting of live, dead or downed material be allowed within 100 feet of any Class I, II or III stream. It is only in this fashion that recruitment of woody debris can be guaranteed.”

“Riparian zones make up a small portion of the WNF, but support a larger number of species than any other management area. Because of this abundance, we support the prescription goal of optimizing habitat for wildlife. However, we do not agree that your proposed management will attain the optimization you seek... We suggest that canopy cover should exceed 60% to be more optional for wildlife.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0047, 0080, 0150, 0262, 0286, 0562, 0579, 0582, 0586, 0602, 0604, 0646, 0660, 0722, 0729, 0730, 0741, 0743, 0815, 0820, 0823, 0828, 0830, 0832, 0836, 0860, 0900, 1302, 1938, 1955, 1972, 1978, 1981, 2009, 2016, 2036, 2069, 2085, 2132, 2138, 2201, 2714, 2750, 2763, 2769, 2782, 2798, 2847, 2879, 2940, 2953, 2981, 2993, 2995, 2996, 3015, 3047, 3060, 3065, 3079, 3088, 3111, 3116, 3117, 3178, 3190, 3205, 3210, 3223, 3231, 3233, 3239, 3240, 3256, 3278, 3288, 3323, 3336, 3346, 3359, 3365, 3377, 3381, 3465, 3491, 3509, 3514, 3519, 3550, 3579, 3583, 3621, 3632, 3634, 3638, 3640, 3645, 3769, 3775, 3776, 3784, 3800, 3811, 3824, 3849, 3863, 3875, 3877, 3899, 4019, 4022, 4035, 4036, 4066, 4069, 4081, 4104, 4110, 4181, 4208, 4257, 4298, 4408, 4415, 4423, 4432, 4477, 4485, 4490, 4493, 4494, 4495, 4496, 4498, 4501, 4505, 4510, 9018, 9092, 9094, 0227S, 0360S, 0463S, 2178S, 2308S

FOREST SERVICE RESPONSE:

The Forest Service recognizes the sensitivity of riparian areas. We have substantially reworked riparian standards in response to public comment and internal review. Forest Plan Chapter IV has been modified to include goal, objective and desired future condition sections for riparian areas. A separate Forest-wide Standard and Guidelines section has also been developed for riparian area management. The EW-2 prescription has been modified to link with these new Forest-wide Standards and Guidelines.

The Forest goal is to maintain and enhance riparian management areas to perpetuate their distinctive resource values. The Plan calls for riparian management objectives to be established for all projects based upon both sub-drainage and site conditions. Management decisions will be made in favor of riparian dependent resources (e.g., water quality, fish and wildlife habitat) where conflicts exist with man's use.

The new additions to the Final Plan outline the management framework required to meet this goal for riparian areas on the Forest. The Forest-wide standards and guidelines for riparian areas provide guidance for planning and standards necessary to assure that water quality, fish and wildlife habitat meet goals and objectives. Measurable standards have been included for sediment, temperature, pool frequency, in-channel large wood, ground cover and potential large wood. In addition, standards and guidelines have been established for non-fish bearing waters, recognizing the importance of managing the entire watershed system in order to meet objectives. The “Forest in Ten Years” and “Forest in Fifty Years” sections in Forest Plan Chapter IV provide a narrative description of the desired future condition to be achieved through application of these standards and guidelines. The inventory and monitoring direction in the Forest Plan provide the mechanism to evaluate our success in achieving the desired future condition.

115 MANY REVIEWERS EXPRESSED CONCERN OVER THE EFFECTS OF PROPOSED MANAGEMENT ACTIVITIES ON WATER QUALITY AND QUESTIONED THE ADEQUACY OF THE ANALYSIS IN CHAPTER IV OF THE DEIS. SEVERAL REVIEWERS QUESTIONED THE FOREST'S MANAGEMENT DIRECTION REGARDING THE PROTECTION OF DRINKING WATER QUALITY (MUNICIPAL SUPPLY WATERSHEDS). SOME REVIEWERS REQUESTED THAT THE FINAL DOCUMENTS INCLUDE A BETTER DESCRIPTION OF THE MANAGEMENT PROCESS TO BE USED TO INSURE THE PROTECTION OF WATER QUALITY AND FISH HABITAT.

COMMENTS INCLUDED:

“Nowhere in the calculations does the Forest Service consider the cost to local governments of degraded water quality caused by Forest Service management activities.”

“It is imperative the Forest Service should do everything possible to insure adequate protection of the water resource. Total annual water quantity is less important than water quality and timing of flow. The Forest Service has inadequately evaluated the impacts its proposed plan would have on water quality and the impacts which can result from having a degraded water supply.”

“Standards and guidelines for fisheries and for water, soil and air, need to be more fully discussed/developed in the Final EIS/Plan.”

“The effects of various commodity management activities on both in-stream water quality and on ground water supplies for local communities is not adequately evaluated.”

“The Forest Service must further realize that there exist no ‘best management practices’ that can completely eliminate increased sedimentation from roads and logging.”

“The DEIS shows no substantial differences between alternatives in impacts on instream values, particularly water quality and fisheries. Based on the greatly disparate levels of roading and timber harvesting between alternatives, please provide data and other information to substantiate the apparent lack of difference in impact levels.”

“The process for managing Forest activities is not sufficiently detailed that we can be assured adverse environmental effects, particularly to water quality and fisheries, will be prevented. We suggest more fully describing the management processes of the WNF.”

“[The DEIS indicates that] water quality standards will be met on the average. We are concerned with the potential impacts on fish from events where standards are exceeded, and believe this should be discussed in your documents.”

“Did the WNF report its water quality sampling violations to the Washington Department of Ecology? What response did Ecology make to the water quality violations documented in Table II-19?”

“Another big concern is watershed protection. The DEIS predicts timber harvest within roadless areas will increase runoff thus benefiting domestic and irrigation water users. But the question of the timing of the runoff and the quality of the water is not adequately addressed. With increased road building in early spring aggravating flooding and high water problems. Streamflows will be reduced during the time more water is needed for irrigation and fish passage. Again the intermingled ownership of land complicates the problem.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0035, 0043, 0044, 0152, 0395, 0496, 0508, 0579, 0582, 0794, 0820, 0823, 0828, 1962, 1972, 1978, 2016, 2026, 2125, 2201, 2456, 2723, 2725, 2739, 2748, 2749, 2750, 2752, 2769, 2789, 2803, 2849, 2850, 2854, 2877, 2879, 2960, 2963, 2969, 3015, 3047, 3080, 3142, 3171, 3190, 3205, 3210, 3223, 3246, 3250, 3255, 3256, 3270, 3308, 3323, 3329, 3373, 3388, 3514, 3519, 3550, 3572, 3583, 3603, 3611, 3621, 3622, 3794, 3862, 3875, 3877, 3936, 3949, 4019, 4022, 4066, 4069, 4142, 4169, 4176, 4270, 4277, 4408, 4432, 4444, 4455, 4466, 4477, 4493, 4495, 4498, 4502, 4510, 9041, 9043, 9074, 9094

FOREST SERVICE RESPONSE:

Chapter IV of the FEIS includes a more detailed disclosure of the potential impacts of forest non-point source activities on water quality and fish habitat. The Forest-wide Standard and Guideline for Protection of Water Quality has been revised to strengthen and clarify management direction. A new FEIS appendix (Appendix J) has been added which describes Best Management Practices (BMP's) and addresses their relation to water quality standards. In addition, numerous other changes have been made to the Forest-wide Standards and Guidelines that provide direction that promotes the protection of water quality (e.g., the new Forest-wide Standards and Guidelines for Riparian Areas and additions to the Standards and Guidelines for Fish Habitat).

The Environmental Protection Agency recognizes BMP's as the primary mechanism to enable the achievement of water quality standards for non-point source activities. As stated in FEIS Appendix J, water quality standards are used as objectives towards which practices are designed in order to protect the beneficial uses of water. Water quality standards are the yardsticks against which the effectiveness of BMP's is tested.

As a Designated Management Agency, the Forest Service will continue to work cooperatively with the State of Washington and other entities towards the goal of protecting water quality. Management objectives will be directed at meeting both State Water Quality Standards and applicable Federal law. BMPs for the protection of water quality will be more fully developed in area and project level planning to account for site-specific conditions. We recognize that BMP's will not completely eliminate impacts from management activities. The intent of BMP's is to minimize sedimentation, temperature increases and other water quality impacts to levels that adequately protect the beneficial uses of water.

Water Quality Management Process - As described above, the management direction for the protection of water quality has been expanded and clarified in the Final Forest Plan. The Forest-wide Standard and Guideline for Protection of Water Quality has been updated to describe the Forest Service Non-point Source Management System. This System involves a six-step process for the implementation of BMPs necessary for the protection of beneficial uses. This System is described in more detail in FEIS Appendix J and in the document entitled General Water Quality Best Management Practices, Pacific Northwest Region, 11/88.

Drinking Water Quality - Domestic use of water is recognized as a sensitive beneficial use of water. The Forest-wide Standards and Guidelines for management of public supply watersheds and protection of water quality provide direction for protecting beneficial uses, including application of BMP's. In those watersheds in which domestic use is an identified use, water quality management objectives and development of BMP's will reflect this sensitivity.

Groundwater - The potential effects of forest management activities on groundwater is discussed in FEIS Chapter IV. Research on effects of most forest management activities on the water resource does not indicate that groundwater problems, including temperature, are likely to result.

Groundwater can be impacted through the storage and use of fertilizers, pesticides, petroleum products, sewage/solid wastes, and other chemicals (e.g., chemicals used in recovery of minerals). The potential for impacts to water quality from the use or storage of any of these materials would be specifically addressed through more specific NEPA documents as projects are proposed. For example, use and application of forest management chemicals is being addressed through the Regional FEIS on Vegetation Management. Use of a chemical in a mineral recovery process located on Forest would be addressed through a site-specific NEPA analysis of the proposed mining project.

116 MANY REVIEWERS EXPRESSED CONCERN OVER THE EFFECTS OF PROPOSED MANAGEMENT ACTIVITIES ON WATER QUANTITY AND QUESTIONED THE ADEQUACY OF THE ANALYSIS IN THE DEIS OF ENVIRONMENTAL CONSEQUENCES ON WATER YIELD AND TIMING OF FLOW.

COMMENTS INCLUDED:

“A second important issue in the Yakima Valley is water management. You point out very well that timber harvest can be used to temporarily increase water yield. It should be pointed out that *nothing* can be done in non-harvest areas (particularly wilderness) to assist water yield so necessary to the agricultural industry. No mention is made of how forest management fits in with the Yakima Basin Enhancement Plan.”

“We are particularly concerned about the impacts of harvest activities on water yields. Your analysis looks at water yields on a forest-wide basis. We feel there must be analysis performed on a sub-basins where cumulative impacts have a high likelihood. In addition, we feel that mean annual yield has no real meaning. The concerns are high peak flows, which act to destabilize stream channels, and reduction in summer low flows.”

“Varying levels of increased water yield have been calculated for each alternative based on timber harvest, but they do not appear to be correlated to anything. What will be the effect on channel stability, sedimentation loads, and instream uses? In what drainages will these increases have positive impacts and in what drainages will they have negative impacts?”

“We are concerned that increased runoff would likely occur during peak flows, when it is less useful and brings greater risk of stream scouring. Throughout your document, runoff seems to be treated as a benefit, though it may well be highly impacting.”

“Water yield projections predict increased yield with increases in intensive timber management. However the discussion does not adequately address the matter of timing and distribution of runoff. We are concerned that the proposed extensive clearcutting will result in runoff occurring in high flow peaks during the early spring...Changes in runoff distribution and timing may result in hidden costs. Additional water storage may be necessary. County residents using small tributaries for agricultural purposes may find these water sources drying up earlier than usual.”

“The Draft Plan’s assertion that timber harvest in roadless areas will increase runoff to the benefit of irrigation and domestic users is a transparent lie. Increased runoff will occur, but as winter and spring floods that will be followed by water shortages in the summer months. The Draft Plan misunderstands the basic biologic relationship of undisturbed watersheds and water quality.”

“A great deal of emphasis is put upon the value of these trees to the timber industry. But equal emphasis should be placed on the value of these forests, left standing, to another equally important Washington industry, the farmers and orchardists. Old growth forests help maintain adequate summer flows for irrigation and provide flood control in spring. Protection of these watersheds should also be given adequate consideration in the Final Forest Plan.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0064, 0066, 0286, 0487, 0579, 0580, 0582, 0604, 0605, 0731, 0748, 0830, 0832, 0836, 1977, 1978, 2026, 2069, 2070, 2131, 2201, 2273, 2731, 2748, 2752, 2782, 2798, 2802, 2854, 2888, 2897, 2934, 2947, 2981, 2994, 2995, 3004, 3015, 3045, 3060, 3081, 3083, 3100, 3125, 3127, 3134, 3146, 3162, 3163, 3164, 3190, 3205, 3208, 3211, 3212, 3240, 3250, 3255, 3270, 3308, 3323, 3402, 3487, 3514, 3529, 3550, 3572, 3611, 3622, 3632, 3794, 3809, 3813, 3824, 3853, 3862, 3875, 3911, 3912, 3936, 4019, 4061, 4081, 4094, 4104, 4141, 4142, 4143, 4169, 4179, 4186, 4235, 4257, 4269, 4294, 4298, 4400, 4408, 4477, 4485, 4493, 4495, 4496, 4498, 4502, 9003, 9011, 9018

FOREST SERVICE RESPONSE:

Protection of water resources is a primary responsibility of the USDA-Forest Service. In this regard, maintenance of water quality and a favorable streamflow regime are the highest priority goals. Direct augmentation of streamflows is not a primary goal of the Forest Service. Increases in water quantity may result from some forest management activities; however, concerned over the protection of water quality and streamflow regime, The Forest Management Team reviewed the DEIS treatment of water quality, water quantity and timing of flow in light of the public responses. The Team decided that a more detailed, drainage-by-drainage analysis of water yield would not be conducted at the Forest Plan level and that no related changes to alternatives or allocations were warranted at this time. Normally, streamflows within the National Forest Boundary are sufficient to maintain channel condition, and also to provide adequate flows for both resident and anadromous fish, provided that: (1) Best Management Practices are followed, (2) timber harvest in riparian areas on National Forest lands is done over long periods of time with an extended rotations approach, and (3) that cumulative effects are analyzed prior to implementing timber sale activities in drainages in which they are identified as an issue. Irrigation reservoirs tend to negate seasonal fluctuations in water flow.

However, several changes have been made in the final documents that either directly or indirectly address concerns over the water yield issue. FEIS Chapter IV includes a more detailed disclosure of the potential effects of forest management activities on water yield and timing of flows. The Forest Plan now includes a formalized set of general Best Management Practices designed to be refined and applied at the project level. Forest-wide Standards and Guidelines for Riparian Area Management have been developed to clarify the Forest's management direction for these sensitive areas. The monitoring guidance in Chapter V of the Forest Plan has been improved to better define the Forest's monitoring strategy for the major watershed issues. Between the Draft and Final, a more site specific analysis was conducted on more than 30 sub-drainages in which cumulative effects of management activities on soil and water resources was a concern. Harvest was rescheduled in a number of drainages because of a high risk of downstream impacts which could result from cumulative effects of present and predicted management activities both on private and federal lands.

The potential for forest management activities to effect the quantity and timing of flows is recognized. On the small scale, numerous research and administrative studies have been completed on small watersheds (generally less than 100 acres) in which streamflow has been evaluated both before and after timber harvest. The general conclusion is that temporary on-site increases in annual and summer flows normally occur. Effects on peak flows are inconclusive. Increases in annual and low flows are greatest in moist environments and least in arid areas. While initial on-site increases may be substantial, they are generally too small (less than 5%) to be measurable in larger watersheds downstream, where only one to two percent of the area is harvested annually. This is due to vegetation regrowth in harvested areas.

On the large scale, concern exists for the potential cumulative effect of management activities on water yield from the following standpoints: (1) quantity of flow available through augmentation and storage, (2) channel stability impacts from variations in peak flows, (3) maintenance of low flows for channel maintenance and fish habitat, and (4) maintenance of low flows for irrigation. These issues are affected by a large number of interrelated factors such as annual and long-term trends in precipitation, evapotranspiration, groundwater movement, stream channel and riparian conditions, irrigation withdrawals, storage facilities, and water conservation efforts. The Forest Service is only one of the many entities involved in this scale of water resource management. The Forest will fulfill its role in this system through more site specific analysis of the cumulative effects issue at the area and project levels of planning. However, the responsibility for basin wide management of the water resource is shared by all entities.

117 MANY REVIEWERS EXPRESSED CONCERN OVER THE LEVEL OF RESOURCE DATA AVAILABLE ON THE FOREST FROM WHICH TO MAKE MANAGEMENT DECISIONS. IN ADDITION, REVIEWERS REQUESTED THAT A STRATEGY FOR OBTAINING NEEDED INFORMATION BE DISPLAYED IN THE FINAL DOCUMENTS.

COMMENTS INCLUDED:

“The Draft Forest Plan contains an inadequate data base relating to water quality and fisheries. This data base should be available when you choose an alternative. Otherwise, you merely ‘plan to plan’ which is not the intent of NFMA.”

“A process for collection of adequate baseline data in conjunction with project planning should be specifically proposed, so that the next plan will have an appropriate information base.”

“What specific studies have been carried out on the WNF with regards to the contribution of snowpack melt, especially on south facing slopes where clearcut units have increased solar radiation absorption? If no studies have been done, how can the DEIS claim that ‘...this effect is not thought to be significant on the major river basins.’”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0152, 1962, 2201, 2897, 2997, 3187, 3388, 3550, 4035, 4432, 4485, 4495, 4498

FOREST SERVICE RESPONSE:

The environmental consequences of the various alternatives on water resources in both the Draft and Final documents were estimated using available information, professional judgement and local knowledge. The Forest recognizes that the risk associated with management decisions increases for those resources that lack a fully developed data base. The Forest Plan provides direction for both monitoring resource conditions during implementation in response to this risk and for collecting additional information needed to improve future management decisions.

The monitoring guidance in Forest Plan Chapter V has been up-dated. The sections on monitoring soil, water and fish habitat have been improved to better display the Forest’s monitoring strategy for these resources. This guidance provides a framework for developing a Watershed and Fisheries Habitat Monitoring Plan in coordination with State Fish and Water Quality agencies, the Tribes and other interested parties. The monitoring activities identified in this plan will be directed at the most sensitive issues and areas in response to the risk associated with management decisions.

The Information Needs section of the Forest Plan, Chapter II, identifies the major areas in which administrative and/or research effort is needed to fill information gaps. An accelerated stream inventory program began in 1989, with the goal of surveying all fish-bearing streams within 3-5 years. In addition, the Forest is actively pursuing opportunities to work with the research community in filling information needs, such as those identified for the refinement of riparian management standards.

118 MANY REVIEWERS CONSIDERED THE MONITORING GUIDANCE IN THE DRAFT PLAN INADEQUATE AND REQUESTED THAT THE FINAL INCLUDE A BETTER DISPLAY OF THE MONITORING STRATEGY FOR THE FOREST.

COMMENTS INCLUDED:

“The Final Plan should clearly outline how monitoring will be carried out such that mid-course corrections can be made in Forest management.”

“The water monitoring element is the key component of the monitoring plan. This element of the monitoring plan should contain the general policies and procedures upon which the more detailed WNF water quality monitoring plan is based. The emphasis of water quality monitoring should be focused in sensitive or high hazard areas, rather than randomly monitoring 10 percent of the management activities. Monitoring should also focus on the protection of beneficial water uses as identified in the water quality standards for the state of Washington.”

“The water quality monitoring plan does not have enough detail to evaluate it.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0579, 0830, 0860, 2026, 2201, 2941, 3134, 3187, 3255, 3270, 3365, 3638, 4269, 4432, 4485, 4495, 4498

FOREST SERVICE RESPONSE:

The guidance for monitoring soil, water and fish habitat resources in Forest Plan Chapter V has been revised and improved significantly. The goal of these revisions was to better display the monitoring strategy on the Forest for these critical resources. Forest Plan Appendix F includes worksheets that identify the monitoring strategy needed to address the major issues associated with soil, water and fish habitat resources. Information from these worksheets was then used to update the Monitoring Table in Chapter V.

The Forest Plan monitoring guidance provides a framework for developing a coordinated Watershed/ Fish Habitat Monitoring Plan in cooperation with State Fish and Water Quality agencies, the Tribes and other interested parties. The monitoring activities identified in this annually updated plan will be directed at the most sensitive issues and areas in response to the risk associated with management decisions. Plan guidance outlines the major components of the Forest monitoring program including long-term trend monitoring and monitoring the effectiveness of practices and projects.

A major component of the monitoring program will be the evaluation of the application and effectiveness of on-site management practices. Nearly all activities would have a basic level of implementation monitoring through timber sale and contract administrators. A sub-sample of activities will be subject to closer evaluation by individual or groups of other resource specialists. For example, on-site monitoring of slope conditions will be conducted to evaluate the effectiveness of practices in meeting objectives for

the protection of soil productivity. Instream monitoring will emphasize evaluation of reaches within or immediately downstream from projects, rather than committing all efforts to locations far downstream from the point of disturbance. Approved techniques will be employed to assess on-site and instream effects. The goal is to establish and maintain a monitoring network responsive to the most sensitive issues on the Forest so that the need to modify or terminate individual practices or projects can be identified in an open and timely fashion.

119 SEVERAL REVIEWERS REQUESTED THAT THE FOREST DEVELOP WATER QUALITY STANDARDS FOR EACH WATERSHED.

COMMENTS INCLUDED:

“It is essential to proper management of the Forest’s water resources that the Wenatchee develop a system of drainage by drainage water quality standards that will include a proper assessment and effective mitigation program for the impacts that will result from the roading and cutting that is to be conducted in any given drainage.”

“The Forest Service should develop and implement drainage-by-drainage water quality standards which would maintain high-quality watersheds and fisheries.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2074, 2125, 3256, 3989, 4432, 4493, 4498

FOREST SERVICE RESPONSE:

The development of water quality standards is the responsibility of the State of Washington (Washington Administrative Code, Chapter 173-201). The USDA-Forest Service does not have the legal authority to establish water quality standards per se. As a Designated Management Agency, the Forest Service serves as a cooperator with the State in meeting the objectives of the Clean Water Act. In regard to the management of non-point water quality, the Forest Service must conduct practices and projects in a manner that insures the long-term protection of beneficial uses at a level that meets or exceeds State requirements.

In fulfilling its role in protecting water quality, the Forest Service can develop specific management objectives for individual drainages. These management objectives would describe a desired future condition for a drainage in regards to a specific beneficial use. A desired future condition narrative for riparian areas that illustrates this process has been added to the Forest Plan, Chapter IV.

On most of the Wenatchee National Forest, watershed objectives will be based on fish habitat as the primary beneficial use. The Forest-wide Standards and Guidelines for fish habitat provide direction for developing fish habitat management objectives for sub-drainages in cooperation with water quality and fisheries agencies, the Tribes and other entities. This will be accomplished as inventory and monitoring data are obtained for watershed and riparian habitat conditions in drainages on the Forest. Forest-wide Standards and Guidelines for riparian areas provide guidance for planning and interim standards designed to initiate the process of establishing management objectives by sub-drainage.

120 MANY REVIEWERS REQUESTED THAT THE FEIS INCLUDE DETAILED ANALYSIS OF IMPACTS TO WATER RESOURCES ON A SITE-SPECIFIC OR DRAINAGE BASIS.

COMMENTS INCLUDED:

“The consequences of increased water yield needs to be evaluated on a site-specific basis.”

“Site specific project analysis and ‘Best Management Practice Guidelines’ (DEIS III-76) are indeed essential at the ‘micro-management’ level, but are not enough to make up for fundamental deficiencies at the ‘macro-management’, or comprehensive level of the Forest Plan.”

“The Irrigation Districts need specific information as to how the dynamics of the existing hydrologic pattern will be affected both in the short and long term. We are particularly concerned about the net change in discharge magnitude over time and space between existing conditions and conditions per proposed plan.”

“Because approximately 47% of the WNF lies within the Yakima River watershed, a more complete analysis on the Yakima River Basin is needed than is presented on pages III 52-54.”

“Please provide an additional listing showing each sub-watershed, its current water yield, the acreage breakdown between FORWET and FORDRY, and the projected water yield under the proposed alternative for the first, fifth and fifteenth decades.”

“The Forest Service must estimate the flows of major streams on a weekly basis or at least a biweekly basis throughout the year for each of the alternatives.”

“Data presented in the Forest Plan and DEIS provides information on sedimentation levels for the entire Forest and not for specific watersheds. Such data presentation masks what sedimentation levels will occur in specific watersheds as the result of the Plan... The Forest Service must more thoroughly identify and discuss these problem areas, and it must thoroughly evaluate how resources on specific watersheds will be impacted as a result of its proposed plan.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0043, 2125, 2201, 3256, 3323, 4016, 4186, 4298, 4354, 4493, 4495, 4498

FOREST SERVICE RESPONSE:

The Forest Plan and accompanying FEIS serve to document the selection of land allocations and provide broad or general direction for more site-specific planning. The Forest Management Team considered the level of detail in the FEIS adequate to make a reasoned decision among alternative land allocations for this level of planning. As the Forest Plan is implemented, the Forest-wide Standards and Guidelines in Chapter IV provide direction for more detailed analysis and planning at the area and project levels. Refer to the response to comment 116 for additional information on the analysis issue.

121 SEVERAL REVIEWERS CHALLENGED THE RELEVANCY OF THE SEDIMENT YIELD ESTIMATES IN THE DEIS BASED ON THE FACT THAT NO LINK HAS BEEN MADE ON THE FOREST BETWEEN ACCELERATED SEDIMENTATION AND IMPACTS TO FISH HABITAT.

COMMENTS INCLUDED:

“However, the specific [sediment] methodology questions will remain irrelevant unless the Plan develops a quantitative technical link between sedimentation and salmon production.”

“Has any modeling been done for sediment impact on resident and anadromous fish? Models are available from other Forests.”

“Table B-VIII-1 begins to unveil the primary problem in the Draft Plan. Water yields and sediment are really only indices, the former by the plan’s own definition. The anadromous fish commercial harvest shows only a very slight difference between nine alternatives, ranging from 63 to 66 thousand pounds. Alternative E shows the highest level, but this is not linked in any manner to its lowest index value for both increased water yield and sediment.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0152, 0580, 0582, 2131, 2854, 2888, 2901, 2968, 2993, 3015, 3210, 3233, 3255, 3256, 3550, 3621, 3949, 4019, 4094, 4143, 4294, 4455, 4495, 9018

FOREST SERVICE RESPONSE:

The delivered sediment values displayed in Chapter IV of the FEIS are indices used to make relative comparisons between alternatives. A sediment modeling process had to be utilized in order to estimate the impacts of a large number of activities programmed through the analysis period (see Wenatchee NF Delivered Sediment Coefficients, Feb. 1985 - P.D. McColley). For more details regarding sediment modeling in the Forest Plan, please refer to the related response in the soils section.

A quantitative relationship between sediment delivery and fish habitat potential has not been established on the Wenatchee National Forest. The environmental consequences section in the FEIS utilizes the assumption that as development within a watershed increases, the risk of new sediment deposition in fish habitat also increases. This relationship is one of the major items addressed by the monitoring and accelerated stream inventory programs outlined in Chapter V and Appendix A of the Forest Plan. The accelerated stream inventory program began in June, 1989.

122 SEVERAL REVIEWERS EXPRESSED CONCERN OVER THE PROTECTION OF WATER QUALITY IN DOMERIE CREEK, THE MUNICIPAL SUPPLY WATERSHED FOR THE CITY OF ROSLYN.

COMMENTS INCLUDED:

“New amendments to the Safe Drinking Water Act will probably require filtration of surface water supplies. Water filtration plants are quite expensive and the costs go up as water quality goes down. Yet how can we begin to plan or design anything until we know the amount of pollution the USFS will be causing in Domerie Creek through upstream activities. Any supposed balance of net public benefits must include all negative effects.”

“We hereby register our opposition to road-building and logging within the area. While negotiations between the City of Roslyn and the USFS for a mutually acceptable plan for the watershed have not been concluded, this plan and its total failure to consider the City’s interest raise new questions about whether we can have confidence in the USFS to take water quality into consideration and to live up to any plan in which this is a major factor.”

“The Forest Service land in the Domerie Creek drainage was designated ‘General Forest’ under the Alpine Lakes Plan. It was and is our opinion that this is an inappropriate designation for a municipal watershed, especially one as small as Domerie Creek.”

“I find it amazing how the Federal government through the EPA and the Clean Water Act can place demands upon municipalities such as the City of Roslyn to maintain high standards for its drinking water and yet on the other hand allow the USFS to completely undo what Congress had intended to obviate with the Clean Water Act.”

“Allocating this area [Domerie Creek] to GF is nothing but fog. We all know we will never achieve yields off this sensitive piece of land, and to leave it in the timber production areas artificially maintains a higher harvest level than possible given the true management objectives.”

“We the undersigned residents of Roslyn and area, object to your proposal to cut timber on the Roslyn watershed. It cannot help but affect our water supply, and the money gained thereby cannot ever replace the natural conditions necessary for a watershed to function.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0878, 0900, 2125, 2910, 2931, 3391, 4433

FOREST SERVICE RESPONSE:

Between the Draft and Final a Forest-wide Standard and Guideline for municipal watersheds was developed to provide management direction (refer to Chapter IV of the Forest Plan).

In the Preferred Alternative, National Forest lands in Domerie Creek have been allocated to the OG-1 prescription (Old-Growth Management-Dedicated). Lands under this prescription are managed for the benefit of wildlife species dependent upon old-growth habitat. In the case of Domerie Creek, National Forest lands have been designated a Spotted Owl Habitat Area. No timber harvest or related activities are scheduled on National forest lands in this watershed under the Forest Plan. Under this prescription, no significant water quality impacts are expected to occur as a result of Forest Service activities on Domerie Creek.

Timber harvest and related road construction could still occur on the private timber lands in the Domerie Creek drainage. The Forest Service has no control over management activities on private timber lands within the Forest boundary. Under the OG-1 prescription, a collector road could be constructed across National Forest lands in order to access isolated private property. Such an easement proposal would be made by the property owner. A site-specific environmental analysis would then be conducted by the Forest Service to evaluate the consequences of the access proposal.

THREATENED, ENDANGERED AND SENSITIVE SPECIES
SPECIAL INTEREST AREAS AND RESEARCH NATURAL AREAS

123 MANAGE THREATENED, ENDANGERED AND SENSITIVE PLANTS AND ANIMALS IN A MORE CONSERVATIVE FASHION AND AS A HIGHER PRIORITY.

COMMENTS INCLUDED:

“These species should be given the benefit of the doubt by preserving maximum habitat.”

“More attention should be given to maintenance of ... individual species.”

“...wildlife studies ‘WHEN FUNDS BECOME AVAILABLE.’ Instead, THE HIGHEST PRIORITY SHOULD BE GIVEN.”

“Inventories for populations and distribution of threatened, endangered and sensitive species should be conducted as soon as possible.”

“...admitting your lack of data.”

“I am especially concerned about protecting the environment for endangered and other unique plant species.”

“I support increased protections for native plants...”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0150, 0531, 0577, 0582, 0601, 0604, 0608, 0717, 0730, 0741, 0866, 0868, 1947, 1962, 1990, 1997, 2021, 2041, 2059, 2073, 2092, 2126, 2164, 2174, 2179, 2853, 2863, 2932, 2964, 2965, 2983, 2998, 3017, 3033, 3044, 3047, 3048, 3065, 3083, 3085, 3095, 3106, 3116, 3123, 3146, 3175, 3177, 3178, 3179, 3187, 3211, 3215, 3219, 3221, 3225, 3238, 3239, 3240, 3255, 3287, 3298, 3308, 3319, 3323, 3347, 3362, 3383, 3388, 3406, 3500, 3515, 3518, 3519, 3251, 3523, 3531, 3534, 3541, 3552, 3573, 3577, 3605, 3606, 3609, 3610, 3611, 3648, 3680, 3683, 3701, 3731, 3770, 3802, 3809, 3813, 3883, 3899, 3911, 3934, 4048, 4065, 4069, 4104, 4105, 4143, 4206, 4215, 4216, 4222, 4269, 4442, 4477, 4489, 4491, 4496, 4501, 4511, 9007, 9011, 9041, 9058, 9068, 9086, 9094

FOREST SERVICE RESPONSE:

The public is concerned that the Forest Service will not protect Threatened, Endangered and Sensitive species. As a result of input from the public and various agencies (including the Washington Department of Wildlife and Washington Department of Natural Resources) and in consultation with the US Fish and Wildlife Service, the Forest Service has re-written the Threatened, Endangered and Sensitive species sections. Changes have been made in allocation of habitat, prescriptions, goals, and Forest-wide standards and guidelines allowing more proactive management for these species. Some examples of changes draft to final include:

1. The goal of threatened, endangered and sensitive species management has changed from maintaining habitat for recovery to providing habitat to facilitate de-listing of listed species (see the Goal section of Chapter IV of Plan for specific wording).

2. The number of sites to be protected for bald eagle nesting has been increased from one to eight (see the Forest-wide Standards and Guidelines section of Chapter IV of the Forest Plan).
3. Old growth habitat for northern spotted owls is now managed without timber harvest where in the draft EIS management would have allowed some timber harvest (see the old growth prescription in Chapter IV of the Plan).
4. Species Management Guides will be developed to provide management direction and summarize available information for each sensitive species or for each threatened or endangered species for which a recovery plan has been written.
5. A "Plants" section has been added beneath the "ENDANGERED, THREATENED OR SENSITIVE SPECIES" category of the Forest-wide standards and guidelines.

The information available on threatened, endangered and sensitive species has been expanded between the draft EIS and the final EIS (e.g., spotted owl inventories have been done and more information has been gathered to allocate bald eagle nest sites). There is still a major need for research and maps of current and potential habitat and known population locations. Population models, especially for animal species, are also necessary. These have been identified as needs in the FEIS and Forest Plan.

Lack of inventories on species populations and habitat have the potential to cause losses of critical individuals or habitat. However, this should not happen because the standards and guidelines require (Forest-wide Standards and Guidelines, Chapter IV of Plan and Forest Service Regional Manual Direction) that all threatened, endangered and sensitive species be inventoried and assessed for all projects (Environmental Impact Statements, Environmental Assessments, Categorical Exclusions). This guidance helps assure that these species are not overlooked in projects and contributes to the development of a Forest-wide database.

Knowledge of individual species requirements, although currently limited, is recognized as necessary. Research is called for in the Plan and should help to address this need

124 WILL SPECIAL HABITAT AREAS BE SET ASIDE FOR THE PROTECTION OF RARE PLANTS?

COMMENTS INCLUDED:

"I urge preservation of areas where there are endangered species, and a strengthened protective system for them."

"These sensitive endemic plants must be protected in special areas"

"Critical areas must be identified and set aside"

"I also want to see areas in Wenatchee set aside for rare plants."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0376, 0531, 0559, 0601, 0608, 0644, 0726, 0741, 0830, 0831, 0866, 0868, 1955, 1990, 1997, 2011, 2021, 2041, 2071, 2092, 2126, 2174, 2732, 2852, 2879, 2941, 2960, 2964, 2965, 2983, 2995, 3017, 3033, 3044, 3048, 3085, 3116, 3123, 3163, 3179, 3211, 3221, 3225, 3238, 3239, 3241, 3242, 3256, 3298, 3308, 3323,

3362, 3383, 3406, 3500, 3515, 3518, 3519, 3523, 3534, 3577, 3593, 3609, 3680, 3770, 3795, 3809, 3832, 3883, 3899, 3910, 3911, 3947, 4065, 4104, 4105, 4179, 4194, 4215, 4216, 4222, 4269, 4270, 4298, 4311, 4442, 4489, 4491, 4492, 4511, 9031, 9041, 9046, 9068, 2168S

FOREST SERVICE RESPONSE:

Currently there are 50 species of plants on the Wenatchee National Forest sensitive plant list (up from 34 when the draft plan came out). None are federally classified as endangered or threatened although the plant species *Hackelia Venusta* has been proposed for recommendation as endangered or threatened. The Forest is committed to the protection of these species and coordination with appropriate federal and state agencies to assure this end.

The draft and final plans do not include areas specifically set-aside for species protection. There are several reasons for this:

- The location and extent of the populations of most of these species is unknown. Although the Forest actively consults with the Washington Natural Heritage Program on their database for element locations, the database is incomplete. "Completing" the database for a 2 million acre Forest would be a tremendous job and the inventory would be constantly changing as plants are dropped from the list and new plants are added or sighting of listed plants increase.

- Often the lands where the "best" populations of a species are found are not located on National Forest land.

- Species Management Guides are being developed (by priority with most threatened plants first) and these guides will provide an effective method of assuring protection of these species.

- One mechanism for setting aside areas for preservation of a plant is through the Special Interest Area designation. However, this recreational use classification may be inappropriate if it provides less protection to the species than the management guide requires.

In the relatively short time since the draft there has been an effort to delineate areas that are appropriate for Special Interest Area designation. Most of these are areas of old growth forest deemed unique for their aesthetic qualities, wildlife and plant habitat values or place in maintaining biological diversity. As part of this effort, a number of areas were included in several non-scheduled harvest prescriptions including: SI-2, OG-1 or SI-1.

A number of special interest areas including some of those proposed in Alternative F have been added to the preferred alternative either in the SI-2 or OG-1 prescriptions. Alternative F was based on environmental coalition recommendations. There is also the opportunity to include other areas in the future should they be proposed and found necessary. This is also true of Research Natural Areas. If the Research Natural Area Committee proposes an area for inclusion into the RNA system, the Forest will make every effort to fulfill that need.

New special interest areas to be included as a result of recommendations by the public and Forest Service employees include:

Of the proposed botanical and geological areas found in Alternative F, 5 have been added to the preferred alternative (one other-Lake Creek remains in both alternatives). Added to the botanical areas list was Hornet Ridge (for old growth Ponderosa Pine) and added to the geologic areas were all those proposed in Alternative F (Kloochman Rock, Goose Egg Mt., Rimrock and Blue Slide). Note: In some cases the acreage and proposed boundaries for these areas are not the same as those proposed in Alternative F.

The two botanical areas proposed in Alternative F but not added to the preferred alternative were Camas and Gene Creek. Camas (proposed to protect Wenatchee Larkspur) was not added because it was felt that an SI-2 designation, mainly recreational in focus, might not be appropriate for the preservation of that species. Further, the proposed 800 acre area was not all National Forest system land. Finally, it was felt that the Species Management Guide being developed for Wenatchee larkspur would protect the species. Although Gene Creek was proposed, another area, around Rattlesnake Springs, was deemed a better area.

125 WILL THE RESEARCH NATURAL AREAS FROM ALTERNATIVE F BE INCLUDED IN THE PREFERRED ALTERNATIVE? THEY SHOULD RECEIVE MORE EMPHASIS IN THE PLANNING PROCESS.

COMMENTS INCLUDED:

“I...support the Special Botanical Areas and Research Natural Areas provided for in Alternative F.”

“I strongly favor the RNA and Botanical Areas included in this Alternative.” [F]

“Botanical and Research Natural Areas, as outlined in Alt. F, should be established.”

“The Plan should list information needs related to RNA identification, selection and management.”

“I am disappointed that the issue of RNA’s is not given greater scope.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0150, 0392, 0433, 0531, 0553, 0559, 0608, 0644, 0726, 0741, 0830, 0831, 0866, 0870, 1305, 1962, 1997, 2011, 2021, 2023, 2071, 2092, 2174, 2217, 2245, 2714, 2852, 2879, 2941, 2964, 2965, 2994, 2995, 3006, 3017, 3044, 3048, 3085, 3106, 3116, 3123, 3132, 3153, 3163, 3190, 3208, 3221, 3225, 3233, 3238, 3239, 3241, 3242, 3256, 3298, 3308, 3320, 3323, 3362, 3383, 3402, 3406, 3473, 3491, 3500, 3515, 3518, 3519, 3521, 3523, 3534, 3552, 3577, 3580, 3609, 3648, 3680, 3683, 3765, 3809, 3832, 3883, 3899, 3911, 3940, 3989, 4035, 4065, 4094, 4104, 4105, 4112, 4145, 4179, 4194, 4206, 4215, 4216, 4222, 4261, 4269, 4270, 4279, 4298, 4311, 4491, 4492, 4511, 4550, 9031, 9058, 9094, 0082S

FOREST SERVICE RESPONSE:

The public expressed strong support for the RNAs proposed in Alternative F of the Draft Environmental Impact Statement. All of the RNAs proposed in that alternative are also listed in the preferred alternative. The Forest Service intends that all proposed Wenatchee Forest RNAs become established in the preferred alternative.

The Forest Service also fully supports and actively participates in the effort to locate needed cells in the Research Natural Area System on the Wenatchee Forest. These cell needs are determined from the Washington Natural Heritage Plan. Since the Draft Plan and EIS were published a number of changes have been made in those documents to better address the RNA program.

RANGE

126 WILL LIVESTOCK GRAZING INCREASE UNDER THE FOREST PLAN?

COMMENTS INCLUDED:

“The declining demand for beef nationwide, the minute amount of US beef contributed by National Forests at great cost to the taxpayer and ecosystem integrity, the small number of ranchers who benefit from grazing rights on the Wenatchee National Forest, and the breadth of impact of grazing to the Wenatchee National Forest add up to a general inability to justify maintained or increasing permissible AUMs.”

“Following my recommendations for increases in the GF allocation, increases in range outputs should occur. Grazing should be limited for 5-7 years after regeneration harvest, unless needed as a tool to accomplish regeneration goals.”

“Let me add my opposition to any increase in livestock grazing levels.”

“Allowing livestock grazing is fine and could slightly increase.”

“I oppose any increases in the level of livestock grazing.”

“My last suggestion would be to reduce the number of grazing permits allowed on National Forest land.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0040, 0062, 0063, 0124, 0128, 0150, 0151, 0282, 0299, 0376, 0427, 0434, 0491, 0522, 0575, 0579, 0582, 0588, 0597, 0602, 0608, 0626, 0635, 0644, 0663, 0667, 0717, 0726, 0736, 0747, 0831, 0833, 0862, 0877, 0900, 1302, 1305, 1962, 1964, 1977, 1980, 1999, 2011, 2038, 2071, 2079, 2093, 2174, 2179, 2180, 2714, 2718, 2730, 2732, 2743, 2753, 2758, 2759, 2768, 2776, 2789, 2802, 2826, 2852, 2853, 2855, 2863, 2879, 2895, 2898, 2901, 2916, 2932, 2951, 2953, 2957, 2965, 2977, 2992, 2993, 2995, 2997, 3004, 3020, 3056, 3060, 3070, 3116, 3133, 3140, 3141, 3142, 3149, 3163, 3176, 3187, 3190, 3210, 3212, 3215, 3221, 3228, 3231, 3237, 3238, 3239, 3242, 3245, 3255, 3261, 3292, 3335, 3352, 3361, 3362, 3367, 3374, 3381, 3406, 3408, 3429, 3479, 3493, 3504, 3518, 3519, 3542, 3550, 3559, 3565, 3575, 3583, 3625, 3651, 3667, 3669, 3670, 3673, 3678, 3683, 3693, 3705, 3707, 3753, 3769, 3770, 3776, 3785, 3792, 3862, 3873, 3885, 3899, 3906, 3910, 3911, 3921, 3928, 3940, 3947, 3992, 3995, 4020, 4037, 4061, 4067, 4094, 4112, 4128, 4139, 4141, 4145, 4158, 4161, 4172, 4178, 4179, 4194, 4208, 4209, 4233, 4234, 4242, 4260, 4263, 4269, 4270, 4279, 4301, 4302, 4449, 4450, 4452, 4475, 4485, 4497, 4498, 4511, 9031, 9033, 9045, 9046, 9052, 9088, 0183S, 1144S, 2045S

FOREST SERVICE RESPONSE:

The Code of Federal Regulations (36 CFR 222) and Forest Service policy require that Forest Service administered lands that are suitable for livestock grazing be made available for use by qualified livestock operators. The decision to be made in view of regulation and policy is how much of the forage on suitable lands can be allocated to livestock use recognizing the forage needed by wildlife and the biological needs of the forage plants which provide protection for soil and water resources.

The total of 22,000 AUM's per year projected to be permitted in the first planning period is less than ten percent (10%) of the total forage produced on the Forest. The remaining ninety percent (90%) is left for wildlife, plant maintenance, and soil and watershed protection (see Chapter III in the DEIS and Chapter III and IV FEIS). The suitable acreage to be used by livestock is less than ten percent (10%) of the total Forest acres. Existing and expected future forage levels available for wildlife will exceed any expected use by wildlife. Available forage is not and will not become a limiting factor for wildlife using the Wenatchee National Forest.

Because the majority of respondents were concerned with proposed increases in permitted grazing use, the Forest examined the assumptions contained in the DEIS and reduced the use objectives for the Preferred Alternative.

As explained in Chapter III of the DEIS and Chapter III of the FEIS, estimates of the amount of increase in demand varied by source, but all agreed that there will be an increase in demand for livestock forage. Increase in use varies by alternative, but the increase for the life of this Forest Plan and for all alternatives is expected to be 400 AUM's which is approximately a two percent increase over the current use. Due to the uncertainty of demand we are projecting only an additional 1,000 AUM's increase in decades 2 through 5, or about a five percent increase above current levels. This is also expected to be accommodated on existing range allotments.

Some important standards used in the management of livestock forage include:

- Any increases in forage allocated to livestock will be preceded by site specific Range Allotment re-analysis. Forage needed for wildlife will be allocated to wildlife use before livestock increases are granted.

- Structural improvements needed for proper management of existing range areas will be in place and properly maintained before increased allocations are made to livestock.

Increases in grazing on existing allotments will emphasize the use of livestock as a tool for improving vegetation and promoting ecological diversity for a wider variety of uses.

127 GRAZING ADVERSELY AFFECTS WILDLIFE HABITAT, SOILS, WATER QUALITY AND NATIVE PLANT COMMUNITIES.

COMMENTS INCLUDED:

“Levels of livestock grazing must decrease in the interest of multiple use on the Wenatchee. It is critical that the diversity of native plants be maintained and that the invertebrate and vertebrate species which depend on non-grass species be maintained as mandated in the NFMA.”

“I take issue with the contention that grazing improves the habitat for native plants and wildlife. In fact I believe the Forest Service may be in violation of the law by endangering these species by doing so.”

“Grazing devastates the structure and composition of native plant communities.”

“34 species of plants on the Wenatchee are listed as endangered, threatened or sensitive species. The plan basically ignores the negative effects of its management activities.”

“Decrease grazing to allow regeneration of native plants and allocate more forage to wildlife. Livestock grazing at current levels is detrimental to wildlife and native plant species.”

“We oppose any increases in the level of livestock grazing and support increased protection for the native plants, including establishment of all botanical and research natural areas outlined in alternative F.”

“Your plan to increase livestock grazing is highly questionable and I would suggest further study on the impact of grazing on native plants, soils, and stream banks.”

“While we are dubious about the positive effects of cattle grazing on fisheries habitat, we do not see large scale impacts of grazing on fisheries in the forest at this time. However we feel that the amount of grazing (AUM’s) should be held constant.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0009, 0032, 0062, 0063, 0066, 0067, 0128, 0150, 0152, 0243, 0299, 0385, 0427, 0486, 0508, 0528, 0579, 0582, 0586, 0588, 0602, 0661, 0796, 0830, 0868, 1305, 1947, 1950, 1955, 1962, 1980, 2021, 2036, 2119, 2131, 2179, 2180, 2197, 2198, 2715, 2729, 2786, 2789, 2834, 2841, 2876, 2888, 2897, 2898, 2916, 2932, 2953, 2957, 2964, 2981, 2992, 2994, 2996, 2997, 3017, 3020, 3027, 3028, 3031, 3067, 3103, 3110, 3131, 3132, 3134, 3140, 3148, 3153, 3176, 3177, 3178, 3187, 3202, 3205, 3208, 3211, 3212, 3217, 3225, 3228, 3232, 3240, 3256, 3298, 3307, 3319, 3322, 3323, 3352, 3374, 3394, 3402, 3406, 3425, 3429, 3466, 3491, 3504, 3514, 3550, 3552, 3560, 3567, 3572, 3573, 3575, 3577, 3580, 3606, 3610, 3611, 3625, 3634, 3638, 3648, 3670, 3682, 3685, 3698, 3735, 3770, 3792, 3795, 3848, 3867, 3872, 3873, 3899, 3911, 3989, 4035, 4069, 4089, 4094, 4112, 4142, 4169, 4174, 4194, 4218, 4232, 4233, 4257, 4260, 4261, 4263, 4278, 4282, 4302, 4419, 4435, 4437, 4445, 4449, 4452, 4455, 4465, 4477, 4485, 4497, 4498, 4510, 4511, 9003, 9008, 9041, 9062, 9065, 9094, 0018S

FOREST SERVICE RESPONSE:

The previous response also responds to many concerns in these comments. When properly implemented and administered, livestock use of range forage can be not only compatible, but also beneficial to other resource values. As the Forest Plan is implemented we envision a shift in historical practices to better unite range science techniques with grazing, so that livestock use becomes a tool for improving vegetation and promoting a diversity of vegetation for a wider variety of uses. Moreover, livestock grazing will continue to contribute to the social and economic well being of local communities.

There are many standards and guidelines contained in Chapter IV of the Forest Plan which require the protection of other resources. Unique and Sensitive Plants (referred to as Native Plants by many respondents) are required to be protected by law. The Forest Service will protect these plants from any management activities including grazing by livestock. Permitted grazing is coordinated through an Allotment Management Plan. These documents contain the specifics of management intensity and depict the level of outputs and coordinations measures necessary to meet Forest Plan objectives.

128 THERE ARE MANY POTENTIAL SOURCES OF CONFLICT BETWEEN LIVESTOCK AND WILDLIFE FROM DISEASE TRANSMISSION. DOMESTIC SHEEP CAN PASS PARASITES AND DISEASE TO BIGHORN SHEEP, AND CATTLE CAN TRANSMIT BRUCELLOSIS AND BLUE-TONGUE TO DEER

COMMENTS INCLUDED:

“Finally, domestic sheep should not be allowed to graze near bighorn sheep habitat. Diets overlap, and bighorn have no natural defense against diseases and parasites that can be passed.”

“Grazing lowers the water quality and transmits disease and parasites to wildlife.”

“No mention was made in the DEIS of protection of game from livestock diseases”

“Grazing by cattle is often a source of disease to the wild animals..”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0500, 0582, 2021, 2715, 2888, 2964, 3177, 3187, 3225, 3573, 3575, 3606, 3873, 3911, 4263, 4511

FOREST SERVICE RESPONSE:

While the potential for disease and parasite transmission between livestock and big game exists, for the most part, these species have coexisted for decades. Examples of this coexistence are common place on the Wenatchee National Forest as well as on lands of other ownership.

Although there are no known problems with transmission of disease and parasites between livestock and big game on the Wenatchee National Forest we are aware of the possibility of this occurring, particularly between domestic sheep and bighorn sheep. The key concentration areas of bighorn sheep are known on the Forest and we do not plan to expand grazing allotments into these concentration areas.

When properly implemented and administered, livestock use of range forage can be compatible. As explained in chapter III of the FEIS, in certain instances and with proper management grazing can be beneficial to other resources. Chapter IV of the FEIS indicates that some adverse impacts associated with grazing are expected. The Chapter describes the extent and degree of impacts, including those associated with grazing, and describes mitigation measures that will be taken. These mitigation measures are translated into Standards and Guidelines contained in Chapter IV of the Forest Plan. The Forest Plan also contains a monitoring plan to assure that the Standards and Guidelines are being implemented and are effective.

129 GRAZING SHOULD NOT BE ALLOWED TO CONTINUE IF THE FOREST DOES NOT REALIZE A PROFIT. WHY SHOULD THE PUBLIC LANDS BE USED TO SUPPORT THE INDUSTRY BY THE AMERICAN TAXPAYER?

COMMENTS INCLUDED:

“Rather than a small dependence, most grazing on the Wenatchee National Forest is done by rancher’s relying heavily on the Federal subsidy.”

“The values received for AUM’s are not based on market transactions, but are on grazing permit fees. Why is the value for grazing determined in this way rather than like the other resources.”

“Grazing appears to serve an economic need and provide revenue, but dues should approximate private holdings and not serve to subsidize ranchers.”

“...I believe the number of domestic animals using FS lands should not be increased, and a greater fee per animal should be collected to help off set FS expenses.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0062, 0063, 0066, 0147, 0577, 0579, 1950, 2036, 2131, 2715, 2753, 2789, 2856, 2897, 2956, 2996, 3127, 3140, 3177, 3232, 3355, 3374, 3394, 3429, 3462, 3518, 3572, 3803, 3867, 3872, 3873, 3911, 4089, 4142, 4169, 4261, 4302, 4415, 4457, 4465, 4485, 4498, 4511, 0018S

FOREST SERVICE RESPONSE:

Grazing fees on National Forest lands in the 16 Western States are calculated through the formula prescribed in Executive Order (EO) No. 12548 of February 14, 1986. This fee formula, in most respects, is the formula established in the Public Rangelands Improvement Act of 1978 (PRIA). The EO modified the PRIA formula by establishing a floor level of \$1.35 per Animal Unit Month (AUM). For fee purposes, the Forest Service has used Animal Month (AM) as the pricing unit rather than the AUM. Basically, the formula allows for adjustment of fees based on livestock prices and production costs during a given year. The important point to consider, however, is that grazing is a management tool for improving vegetation, promoting other resource objectives (such as site preparation for reforestation or suppression of vegetation which competes with young conifer trees). Administration of livestock grazing is only one of several activities (i.e., range vegetation management, wild horse and burro management, noxious weed inventory and management, and geographic systems inventory and analysis) which is appropriately funded by range management in general. To assess the total cost of the range management activity against the cost to administer livestock grazing is misleading.

130 LIVESTOCK CAN COMPETE FOR THE SAME FOOD SOURCES AS WILDLIFE, PARTICULARLY DURING THE WINTER.

COMMENTS INCLUDED:

“The DEIS states that approximately one half of the Forest’s winter big game range is located within commercial livestock allotments and there is competition in some areas. Big game winter range is very limited and competition in these areas is certainly not advisable.”

“With most winter range being located on private land, it would seem that wildlife would be forced to survive on winter range grazed down by cattle during the summer and fall.”

“We believe that any new grazing should be directed away from big game winter range.”

“I think some of the livestock grazing should be directed toward summer range, so that winter range can be improved to support wildlife increases.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0005, 0582, 2715, 3698, 4263, 4435, 4485

FOREST SERVICE RESPONSE:

In many instances, grazing can and will be used as an important tool in the management of forage vegetation to achieve wildlife habitat objectives. It is important to recognize that forage for livestock is also an important use of rangeland vegetation and in some instances allocation decisions between resource uses will need to be made. In the EW-1 (big game habitat) allocations, which includes winter range, forage will be allocated in favor of big game. Only excess forage would be made available to livestock. (See Chapter IV of the Forest Plan.)

131 THE DRAFT DOCUMENTS LACK QUANTITATIVE DATA CONCERNING THE CONDITIONS OF RANGELANDS ON THE FOREST. IN ORDER TO PROPERLY ASSESS THE PROPOSED FOREST PLAN, THE PUBLIC NEEDS TO HAVE A SITE SPECIFIC ANALYSIS OF RANGE CONDITIONS ON THE VARIOUS ALLOTMENTS.

COMMENTS INCLUDED:

“You are required to determine range condition and trend, 36 CFR 219.20 (a) Yet no information on condition or trend of existing rangelands is provided here.”

“The draft documents should include site-specific analyses of range conditions on the various allotments.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3553, 4511, 4485

FOREST SERVICE RESPONSE:

Site specific data exists in Allotment Management Plans, copies of which are maintained at both Ranger District Offices and the Forest Supervisor's Office. Due to the extensive nature of these documents, it is simply not practical to include them as part of the Forest Plan or Environmental Impact Statement. Allotment planning is prioritized by vegetative condition and management concerns within the allotment, particularly the condition of the riparian zones. A part of this process includes the updating of the data base to insure the plans are based on current and accurate information.

The present condition and trend of existing allotments is summarized in Chapter III of the FEIS. Also Tables II-1 and II-3a in the DEIS and FEIS summarize the Condition and Trend of existing allotments in Alternative A/NFMA. Throughout the Wenatchee National Forest allotments are in fair or better condition. Overall trends are stable or upward.

132 GRAZING SHOULD NOT BE ALLOWED TO CONTINUE ON LANDS WITHIN WILDERNESS AREAS.

COMMENTS INCLUDED:

“It appears that wilderness will be grazed at high to moderate intensity. Why is this allowed? Are there wilderness allotments?”

“In wilderness, we believe it would be appropriate to phase out livestock allotments as they expire.”

“Permitted grazing within dedicated wilderness should be phased out as rapidly as possible, even though legally permitted to continue. Cattle and sheep, and the wilderness experience does not mix well.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0040, 0385, 0484, 0582, 2835, 2966, 2996, 3232, 3621, 4169, 4485, 4494, 4498

FOREST SERVICE RESPONSE:

Section 4(d)(4)(2) of the Wilderness Act states that grazing in wilderness areas, if established prior to designation of the area as wilderness, “shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture.” To clarify any lingering doubts, legislative intent as expressed by the Congressional committee stressed that there would be no curtailment of grazing permits or privileges in an area simply because it is designated as wilderness. As stated in Forest Service regulations (36 CFR 293.7), grazing in wilderness areas ordinarily will be controlled under the general regulations governing grazing of livestock on National Forests. This includes the establishment of normal range allotments and allotment management plans. Within the goals of the Forest Plan, livestock grazing in Wilderness will continue to be a management tool available to meet range vegetation management objectives.

If a wilderness grazing permit is waived back to the government its continuation would be reviewed on its own merits.

133 NOXIOUS WEEDS ARE A PROBLEM CAUSED BY GRAZING, LOGGING, ROAD BUILDING TRAILS AND OTHER PHYSICAL DEVELOPMENTS.

COMMENTS INCLUDED:

“Domestic livestock introduce noxious weeds and carry parasites.”

“Grazing and increased campground development is likely to bring in weeds.”

“So it is prudent to withhold road building for a few years to avoid the problem of weed control with herbicides.”

“The weed species that benefit from logging are already too predominant due to the expansion of disturbed lands.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0063, 1972, 2021, 2073, 2888, 3067, 3177, 3187, 3208, 3210, 3225, 3911, 4511

FOREST SERVICE RESPONSE:

We agree that noxious weeds are a serious problem and the Forest Service is concerned about their proliferation. A programmatic Environmental Impact Statement for Vegetation Management in the Pacific Northwest Region of the Forest Service has recently been completed. Forest Plan directions and site specific projects involving integrated pest management techniques will be tiered to this programmatic document. An important part of our noxious weed control and management program is prevention by ensuring that available sites are occupied with desired native vegetation. Preventive management is critical to an effective control program.

134 HOW ARE PREDATORS AND PREDATION OF LIVESTOCK HANDLED?

COMMENTS INCLUDED:

“Do not allow grazing permittees, or others, to kill any wild animals to control predation of livestock.”

“Predator protection should be practiced as long as hunting continues to take a significant number of animals. Natural predation should not be hindered. Sheep and cattle ranchers should be made to bear the cost of any predation upon their animals.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2353, 2956

FOREST SERVICE RESPONSE:

Control of predators through hunting or by other reduction programs is not under the authority of the Forest Service. Laws and policies concerning control of predators (other than hunting) on federal lands are administered by the U.S. Fish and Wildlife Service. Hunting of predators, and any other animals on National Forest lands, is allowed under the laws and policies of the State Game Departments within the state where the National Forest Lands occur. The Forest Plan Standards and Guidelines and decisions on administration and use of the Forest deal only with those resources and uses where the the Forest Service has been given that authority through Federal Law.

TIMBER AND FIREWOOD

135 WHAT HAS BECOME OF THE “MARGINAL COMPONENT” DEFINITION USED IN EARLIER TIMBER PLANS?

COMMENTS INCLUDED:

“Has the marginal timber component been programmed for harvest on the Wenatchee Forest?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0040, 0112, 4493

FOREST SERVICE RESPONSE:

The marginal component of the Timber Management Plan has been offered for sale in the past. Some “marginal” sales have gone without bid, others were logged successfully. Under the proposed plan “marginal” would be redefined as either “suitable” or “unsuitable” for timber management using the criteria from NFMA and regional guidance.

136 HARVEST LEVELS SHOULD BE LOWERED BECAUSE OF THE VOLUME OF TIMBER AL-READY UNDER CONTRACT.

COMMENTS INCLUDED:

“Immense volumes of Wenatchee National Forest timber already purchased, plus huge volumes being cut on private lands, there is an opportunity to reduce the annual sale volume without devastating impacts on timber companies.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0388, 0528, 0605, 1955, 1970, 1971, 2119, 2134, 2877, 2929, 2953, 3083, 3144, 3162, 3232, 3255, 3308, 3317, 3430, 3579, 3606, 3871, 3872, 4071, 4245, 4425, 4426, 4434, 4465, 4477, 4489, 4496, 4498

FOREST SERVICE RESPONSE:

Volumes under contract have declined from 850 million board feet to 370 million board feet as of October 1, 1988, as a result of increased harvest activity, “buy back,” and defaulted sales. The updated volume under contract was considered in the revised demand analysis for the final Plan and EIS. Volume under contract is continuing to decline as a result of harvest activity exceeding the volume being offered for sale.

The level of timber under contract normally needed by the industry to allow an even and continuous flow of logs is equal to 2 1/2 to 3 years of annual sale. This allows some time for planning and scheduling of harvest activities prior to the actual logging.

137 EXPLANATION OF THE GENERAL FOREST PRESCRIPTION AND HARVEST LEVELS.

COMMENTS INCLUDED:

“The specific degree or amount of timber harvesting under each of the GF-Management prescriptions is not clear. The specific nature and the difference between the prescriptions is difficult to ascertain. Indeed, the text appears to be purposefully vague.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0047, 0069, 0141, 0582, 0738, 0796, 0879, 0896, 1952, 1960, 2729, 2730, 2755, 2787, 2841, 2883, 2912, 3045, 3174, 3207, 3255, 3257, 3305, 3469, 3775, 4418, 4452, 4485, 4497, 4499,

FOREST SERVICE RESPONSE:

We agree that the different General Forest Prescriptions were confusing. Between the draft and final we have combined these into one General Forest Prescription. Variations in intensity will be determined by a site-by-site analysis. General guidelines on the management intensities is based on the ForPlan analysis. The details on the variations of intensity are found under the timber resource narrative in Chapter IV of the Forest Plan.

138 WHAT LEVEL OF HARVESTING SHOULD BE DONE ON THE WENATCHEE.

COMMENTS INCLUDED:

“I say no more cutting of old growth. In fact, let’s stop all logging in the National Forests.”

“Timber is like any other crop; if it becomes too old, it has no value for lumber or as a haven for wildlife. It has been demonstrated that it can be harvested and replanted allowing a suitable compromise for all situations.”

“When specific oriented groups and persons such as the Wenatchee Chamber of Commerce Wenatchee Economic Development Committee, Yakima Chamber of Commerce, Representative Clyde Ballard, Senator George Sellar and many others speak out clearly in favor of supporting the timber industry and our assertion that 138 MM Bd Ft. per year is not adequate, then I think the needs and interests of the general public are being distinctly and dramatically stated.”

“Allowable cut -- I have before me a July 1986 issue of Forest Industries Magazine showing U.S. lumber production and consumption over the last decade... Clearly the U.S. demand for softwood lumber is not being met by U.S. production at present levels.”

“While I cannot support a major reduction in timber harvest, I am also opposed to any increase in harvest. At our current level of harvest the economy & conservation efforts appear to be fairly well balanced.”

“Please don’t reduce the timber cutting if the mills really need it. If they can say timber is scarce--up goes the price of lumber. (We can’t afford to build a new house even at today’s prices.)”

LETTERS WITH COMMENTS OF THIS SUBJECT INCLUDE:

0008, 0017, 0018, 0021, 0023, 0027-0028, 0031, 0034-0035, 0047, 0052-0054, 0056-0057, 0066-0069, 0075, 0079, 0081, 0086-0089, 0094, 0096, 0102-0105, 0109-0110, 0120, 0121, 0129, 0142-0144, 0150, 0153-0155, 0157-0222, 0229-0230, 0233-0237, 0239, 0244-0250, 0252-0258, 0262, 0265-0284, 0288-0291, 0295, 0300-0307, 0319-324, 0326-0341, 0344, 0348, 0350, 0356, 0364-0375, 0397-0405, 0409-0412, 0414, 0434, 0444-0482, 0508, 0510,0513, 0523, 0526-0527, 0529-0530, 0537-0538, 0540, 0543-0544, 0547, 0549, 0561-0562, 0579, 0582-0583, 0586-0588, 0605, 0615, 0628, 0672-0713, 0725, 0742, 0748, 0751-0781, 0783-0786, 0789, 0797-0810, 0841, 0844, 0848-0859, 0884, 0887-0896, 0901-1299, 1303, 1306-1682, 1684-1935, 1956, 1960, 1964, 1972, 1977, 1985, 1989, 1999, 2001, 2003, 2030, 2033, 2042, 2046, 2053, 2069, 2081, 2123, 2127-2128, 2131, 2137, 2141-2142, 2144-2151, 2153-2156, 2160, 2168, 2173, 2186, 2195, 2209-2234, 2237-2712, 2715, 2725, 2728, 2730-2732, 2734-2735, 2739, 2742, 2749, 2751, 2754, 2759, 2769, 2771, 2776, 2780-2781, 2783, 2788, 2798, 2802, 2804, 2809, 2818, 2820, 2822, 2835, 2839, 2842-2843, 2849-2850, 2854-2855, 2861, 2869, 2877-2878, 2888, 2890, 2893, 2896, 2902, 2904-2906, 2908, 2911, 2913, 2917, 2923, 2927-2928, 2932, 2936, 2942-2943, 2955, 2962, 2968, 2975-2976, 3003, 3006, 3009-3011, 3024-3025, 3035, 3040, 3045, 3051, 3056, 3085, 3095-3096, 3098-3099, 3107, 3117, 3124-3125, 3138-3139, 3143-3145, 3150, 3158, 3162, 3177, 3180, 3190, 3203, 3221, 3235, 3243, 3246, 3249, 3254-3257, 3293, 3308-3309, 3311, 3317, 3319, 3330, 3336, 3341, 3345, 3353-3354, 3366, 3374, 3388-3389, 3392, 3394, 3402, 3406, 3424, 3441-3442, 3448-3450, 3452-3459, 3509, 3538, 3546-3547, 3551, 3560, 3563, 3567, 3572, 3579, 3588, 3596, 3601, 3606, 3608, 3621, 3641, 3645, 3652, 3656, 3666, 3677-3678, 3707, 3725-3726, 3742, 3746, 3749, 3754-3755, 3760, 3763, 3772, 3774-3775, 3778, 3804-3805, 3839-3846, 3850-3851, 3854-3857, 3860, 3862, 3865, 3867, 3871-3873, 3876, 3886-3897, 3899, 3902, 3910-3911, 3916-3921, 3923, 3950, 3953, 3989, 3991, 3996, 4009, 4011, 4028-4032, 4049-4050, 4053-4060, 4063, 4069, 4071, 4072-4074, 4094-4096, 4098-4099, 4100-4103, 4107, 4114,

4121, 4127, 4131, 4139, 4144, 4147, 4153, 4167, 4183, 4185, 4188, 4190-4191, 4199, 4205, 4212, 4223-4224, 4226-4227, 4231, 4235-4238, 4240, 4243-4244, 4246, 4259, 4261, 4263-4264, 4281, 4287-4292, 4295-4296, 4298, 4300, 4303, 4312-4403, 4411, 4420, 4422-4424, 4427, 4430-4431, 4433, 4438-4439, 4445, 4447-4448, 4454, 4459, 4464-4465, 4467-4468, 4477, 4483-4484, 4488-4491, 4493, 4496-4497, 4501, 4507, 4511, 4534, 4551, 4676, 9000-9002, 9004-9005, 9009, 9011, 9013-9014, 9022, 9025, 9027, 9034, 9037-9038, 9040, 9045-9046, 9049-9050, 9052, 9054, 9060-9061, 9064-9066, 9070-9073, 9080, 9082, 9088-9089, 9092, 9095, 9102-9105, 9107-9110, 9112, 9520, 9804, 9862, 0005S, 0011S, 0021S, 0042S, 0068S, 0070S, 0074S, 0086S, 0104S, 0176S, 0183S, 0601S, 0663S, 0672S, 0675S, 0695S, 0715S, 0733S-1037S, 1039S-1051S, 1058S, 1144S, 1168S, 1176S-1177S, 1183S-1184S, 1193S, 1195S, 1203S-1204S, 1213S, 1215S-1216S, 1239S-1240S, 1360S-1368S, 1383S-1400S, 1438S-1570S, 1589S-2013S, 2052S, 2103S-2154S, 2202S-2238S, 2254S-2268S, 2278S-2302S, 2321S-2362S, 2368S-2389S, 2391S-2444S, 5000S-5004S, 5006S-5020S, 5022S-5040S, 5044S-5066S, 5111S-5112S

FOREST SERVICE RESPONSE:

Based on the large number of comments on the harvest level and on the "Essential Alternative," a new alternative, J, was added between the draft and final.

Determination of the allowable harvest level is a complex calculation based on biological, economic, and social/political factors.

In simple terms it is a calculation based on the amount of tree growth that can be perpetually sustained under a given set of conditions. This calculation takes into account the amount of volume existing on areas suitable for timber harvest. It subtracts the volume projected for harvest and then adds in the amount of growth expected on existing stands and newly regenerated stands. We propose to increase the level of planting of appropriate species of trees from parents selected for rapid growth and disease resistance.

Using these techniques we will produce more wood per acre managed than under current timber management plans.

A significant portion of the American people want more areas reserved from harvest especially in currently unroaded areas, while others want to either maintain or increase harvest levels. We propose to meet those seemingly opposing desires by increasing the yield per acre of land managed to provide timber production. We propose to increase the number of acres planted with appropriate species. Although the per acre yield will increase, the total harvest per year will be reduced from the current level, but above the preferred level shown in the draft Forest Plan.

In addition we will space and weed young trees so they have room to grow, but with little space wasted. Thinning and weeding to obtain optimum growth is now proposed on 50-70 percent of the new forest stands. This is a considerable increase in management intensity from the DEIS which will be more costly.

139 WHAT IS THE FOREST POLICY AND ACCOMPLISHMENT IN REFORESTATION?

COMMENTS INCLUDED:

"In areas where logging is permitted a program of reforestation should be initiated immediately."

"Please state what the current policy is regarding tree planting, and if it is effective."

↳
“I believe the best interests would be served if the Wenatchee would be reforested, rather than deforested.”

“Replanting and growth management should be high-level management priorities throughout the general Forest.”

“What minimum stocking levels are assumed for various species? What happens if a planted site does not meet minimum levels? Is there an obligation to replant sites on which previous planting efforts have failed? How have data on replanting success been used in scheduling timber harvest on sites on the WNF? That is, are there any combinations of slope, aspect, altitude, soil type, and annual precipitation which dictate special harvest restrictions or deny harvest at all because of regeneration problems?”

“Even subsequent tree planting is not very effective - very few of the young trees survive and weeds take over.”

“I am so angry when I see hillsides clearcut with obviously no attempts at reforestation- and then to find that I am paying subsidies because timber receipts do not cover the cost of building logging access roads!”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0066, 0150, 0415, 0434, 0582, 0748, 1681, 2036, 2120, 2123, 2742, 2842, 3020, 3052, 3100, 3101, 3162, 3267, 3515, 3649, 3746, 3773, 3890, 3991, 4132, 4173, 4174, 4296, 4485, 4497, 9034, 0030S, 0052S, 0342S, 0696S

FOREST SERVICE RESPONSE:

It is obvious from the comments we have not done an adequate job of presenting our policy and accomplishments in reforestation. More than 1 1/2 million seedling trees are planted each year on the Wenatchee National Forest.

As shown in Chapter IV of the Plan, it is the goal of the Forest to “Use silvicultural techniques that insure prompt and adequate regeneration of appropriate species.”

Areas such as north slopes that face away from direct sun, can typically be regenerated by clearcutting and planting. Usually a mix of species is planted to maintain diversity. On some areas, brush species are mixed with the conifers for wildlife use.

We have received ample funding for reforestation for the last several years. Most of the funding comes from deposits required of the timber purchaser to reforest the areas harvested. In addition, Congress has appropriated sufficient funds to plant all suitable burned areas deforested by wildfire.

Survival and growth of replanted seedlings are required the first fall after planting, and are checked again during the third growing season. Results from these examinations are summarized each year. The results for 1988 are:

1ST YEAR SURVIVAL AND GROWTH RESULTS

<u>Acres Planted</u>	<u>Avg. trees per acre planted</u>	<u>% Survival</u>	<u>%Satisfactory growth</u>
4,678	390	85%	89%

3RD YEAR SURVIVAL AND STOCKING RESULTS (Trees planted in 1986)

<u>Acres Planted</u>	<u>Avg. trees per acre planted</u>	<u>% Survival</u>	<u>%Satisfactory growth</u>
3,047	355	84%	93%

To the best of our knowledge all clearcut acres are planted or are reforested naturally five years after harvest. Sometimes these trees are hidden by other vegetation and may not be visible from casual or roadside observation. For this reason we do systematic examinations of our plantations to determine stocking of conifers and any need for replanting after both the first growing season and the third. Additional, less formal checks are made on most areas the 2nd and 4th seasons and periodically thereafter.

Our records show 93% of our three year old planted cutting areas are successfully reforested and the majority of the other 7% will be replanted to assure reforestation within five years of harvest. Any area we do not have reasonable assurance of successful reforestation within five years will not be part of our scheduled harvest base.

The area with existing trees where we do not plan regeneration harvest because we can not assure regeneration of a new forest stand is approximately 200,000 acres. See land suitability table in Chapter II of the Forest Plan.

140 WHAT LEVEL OF HARVEST CAN BE SUSTAINED.

COMMENTS INCLUDED:

“Sustained yield is just not happening. Timber is *slow* growing.”

“The actions proposed in the Wenatchee Draft Forest management Plan are more than a little horrifying. I am in favor of *sustained yield* timber harvesting, but the Draft Plan goes far beyond what would appear reasonable and prudent in terms of forest management.”

“Timber--I strongly maintain that a long-term sustained yield is the only reasonable way to go. To take more timber off an area on an annual basis, than is being replaced by annual growth, is short-sighted and greedy.”

“I do not prefer the accelerated harvest for National Forest lands. I favor sustained yield because I feel current income is not as important as the even flow of income and its effects on the nearby communities as well as National Forest employment levels and related matters involved with these two factors.”

“It is my belief that every forest in the National Forest system should maximize the amount of sawtimber and other tangible forest products within the confines of the theory of sustained yield. The National Forest is a public timber resource which should stabilize.

Under the preferred alternative in the Wenatchee Forest Plan, little regard is given for these principles. On the contrary, the Plan has no regard for its long-term effects on wood supply and community well being in terms of employment and timber receipts to the counties. I implore you to review your Plan with the goal of increasing the harvest to a level of 180 MMBF or greater. This would be within the confines of the sustained yield of 211 MMBF.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0030, 0120, 0164, 0320, 0520, 0540, 0554, 0812, 0842, 0898, 1193, 1304, 1437, 2003, 2123, 2482, 2723, 2725, 2735, 2742, 2826, 2854, 2886, 2887, 2949, 2954, 2956, 2997, 3009, 3010, 3127, 3139, 3150, 3255, 3290, 3359, 3366, 3392, 3531, 3576, 3608, 3611, 3632, 3658, 3746, 3775, 3809, 3814, 3832, 3867, 3951, 3953, 3989, 3996, 4041, 4065, 4110, 4132, 4134, 4239, 4296, 4453, 4454, 4463, 4471, 4485, 4491, 4497, 4510, 4551, 9009, 9060, 0041S, 0070S, 0071S, 0082S, 1184S, 1305S, 2069S, 2168S, 2365S, 5042S, 5071S, 5096S

FOREST SERVICE RESPONSE:

Our timber yield calculations are based on growth and inventory plots scattered over the Forest. We are confident that the yields predicted can be achieved in perpetuity under the management prescriptions we have included in our Plan.

If yield decreases in the future it will be due to restrictions on acres available for timber management or limitations on methods of harvesting, not as a result of the biological growth potential of the Forest.

Our preferred alternative and all others, except Alternative I, are based on non-declining sustained yield. Alternative I describes a procedure for departing from the non-declining sustained yield by allowing timber harvest to remain at historic sell levels for 10 years followed by a reduction after the majority of the old growth stands are harvested. This would depart from the non-declining constraint but not from long-term sustained yield.

The definition of sustained yield of products and services is “The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land.” 36 CFR 219.3

It is our judgement that our proposed harvest level can be sustained in perpetuity without impairment of the productivity of the land.

141 TIMBER SALES BENEFITS SHOULD ALWAYS EXCEED COSTS.

COMMENTS INCLUDED:

“No timber should be sold at a loss. Minimum requirements should be made for profits on all sales. If the timber sale does not meet these profitability requirements it should not be sold.”

“It is far more economical in the long run to promote recreational use of the Forest, rather than artificially supporting the timber industry by building roads that cost more than the value of the timber they lead to.”

“Leave uneconomical areas to the birds. Put extra effort into high yield areas and abandon slopes, rocks, poor soil, high altitude or dry locations.”

“We are not opposed to development of natural resources where that development make economic sense. That means the development must financially support itself without any subsidy. Logging is a business. Its not done as a favor to the Forest Service or the American Public. It’s done for profit! If it’s going to be done, then it should be self-supporting.”

“In most areas currently designated for clearcutting, such as Lake Creek Basin and Devil’s Gulch, the projected cost of road building alone far exceeds the value of the timber produced. Logging and clearcutting is not always justified by the number of board feet of lumber produced in such areas. Great care should be taken by those in authority to ensure a fair deal for our Forests-and its inhabitants.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0028, 0061, 0062, 0141, 0152, 0358, 0363, 0387, 0388, 0389, 0441, 0508, 0557, 0570, 0576, 0577, 0615, 0618, 0624, 0645, 0703, 0717, 0728, 0736, 0743, 0748, 0789, 0835, 0901, 1300, 1964, 1978, 2009, 2016, 2021, 2026, 2047, 2058, 2076, 2092, 2093, 2119, 2120, 2131, 2138, 2177, 2204, 2743, 2772, 2782, 2789, 2815, 2842, 2854, 2855, 2856, 2861, 2868, 2877, 2887, 2888, 2899, 2900, 2909, 2916, 2919, 2939, 2953, 2955, 2956, 2999, 3008, 3009, 3020, 3034, 3058, 3060, 3065, 3070, 3088, 3095, 3102, 3117, 3131, 3140, 3146, 3150, 3155, 3162, 3165, 3171, 3173, 3177, 3195, 3198, 3204, 3208, 3211, 3225, 3228, 3232, 3235, 3267, 3273, 3282, 3308, 3310, 3317, 3323, 3329, 3336, 3350, 3359, 3366, 3374, 3388, 3392, 3394, 3409, 3410, 3464, 3495, 3520, 3541, 3543, 3553, 3563, 3583, 3592, 3606, 3608, 3645, 3648, 3649, 3678, 3683, 3687, 3689, 3704, 3725, 3740, 3742, 3746, 3749, 3756, 3764, 3765, 3769, 3784, 3795, 3802, 3805, 3809, 3811, 3815, 3832, 3835, 3838, 3847, 3872, 3873, 3876, 3896, 3908, 3911, 3915, 3922, 3933, 3949, 3950, 3955, 3988, 3989, 3992, 3995, 4001, 4004, 4009, 4019, 4069, 4083, 4093, 4094, 4112, 4124, 4127, 4142, 4148, 4149, 4150, 4205, 4241, 4245, 4246, 4263, 4266, 4270, 4277, 4295, 4404, 4405, 4408, 4416, 4417, 4423, 4432, 4442, 4455, 4456, 4465, 4468, 4474, 4486, 4493, 4494, 4501, 9007, 9011, 9027, 9034, 9084, 9098, 9115, 0105S, 0118S, 5043S

FOREST SERVICE RESPONSE:

36 CFR Ch II (7-1-87) 219.12 requires a schedule of outputs that will maximize the net public benefits over the area covered by the Forest Plan. There is no requirement that each sale return a profit. However, every sale must collect minimum appraised value rates. For Western White Pine and Ponderosa Pine the minimum base rate is \$20 per mm bd ft. The minimum for Douglas-fir, Western Larch and Cedar is \$10, and other species \$5. These rates must be collected regardless of the costs the timber purchaser may need to expend including roads.

In addition, the purchaser pays for the costs of debris disposals and reforestation. If the sale is appraised above these minimum rates some of the collected money may be used for other resource enhancement projects.

We have provided total timber receipt and total cost figures in Chapter III of the FEIS for the forest as a whole. There are still questions about how this applies to individual sales. Respondent #9007 brought up two specific areas. Perhaps values from Lake Creek and King Bee (Devil’s Gulch) would be helpful to clear up the misconception that roads cost more than the value of the timber produced on sales in these areas.

<u>Sale</u>	<u>Species</u>	<u>Additional Required Stumpage price</u>	<u>Slash Disposal Cost</u>
Lake Creek	Ponderosa Pine & White Pine	146.80	8.26
	Douglas-fir and other species	27.25	8.26
Total Sale Value	\$444,090.00		

The road costs for the timber sale above are \$16.96 per MM. Bd. Ft. or \$142,474.00. Remaining sale value after road costs is \$301,616.00

<u>Sale</u>	<u>Species</u>	<u>Additional Required Stumpage price</u>	<u>Slash Disposal Cost</u>
King Bee Resale	Lodgepole, White and Ponderosa Pine	165.75	5.61
	Douglas-fir and Western larch	109.00	5.61
	Grand fir and other species	112.00	5.61
Total revenue expected	\$1,588,336.00		

All roads were constructed under an earlier contract at a cost of \$544,003.00. This leaves over a million dollars in revenue after road costs from the King Bee Resale. In addition, the original purchaser paid buy-out costs. Some respondents recommend a switch from logging to recreation to reduce subsidy of a few at the expense of many. Wilderness and unroaded recreation currently bring in little revenue but do have costs. This could be considered a subsidy also. Developed campground users pay fees which may or may not cover the cost of a campground.

It is proposed that in the future all resource programs in the Forest Service display both costs and revenues. Currently only timber is required to do this. Values for 1987 and 1988 are on file at the Forest Supervisor's office. For a further discussion of this issue please refer to the timber costs and returns section in Chapter III of the FEIS.

142 THE FOREST HAS NOT CONSIDERED ALL THE FACTORS PRESENT IN DETERMINING WHAT LANDS ARE SUITABLE FOR SUSTAINED HARVEST.

COMMENTS INCLUDED:

“To me the single most important point is: All suitable lands for timber production must be bought under Forest Mgmt. The Forests for tomorrow (future generations) must be started today. I don't believe mature and over mature stands of timber can be `saved' for future Generations. Those stands will (and are now) eventually succumb to insects, disease, and/or fire. Nothing is to be gained by attempting to `save' a forest for the future. It is contrary to wise mgmt and we are losing the growth that those lands could be contributing now. The result of not managing or trying to save the forest is less total wood growth and less total timber production, making future timber supplies unnecessarily scarce and expensive. By reducing timber harvest now (Alt C), you are reducing future growth and timber for the future.”

“High altitude logging: Most areas have unstable slopes and poor soil quality. Logging in these areas is dangerous, very damaging to the plant communities and often unprofitable. Further, regeneration of trees is often difficult and expensive (the cost generally seems to fall on the taxpayer). These areas are worth more as attractions to outdoors users than as low-quality lumber or pulp.”

“Indications are that the new Forest Plans now being formulated are excluding large areas of commercial timberland which can be harvested by helicopter. These excluded lands appear to be in part the results of an outdated method of financial assessment now being used by the Forest Service Planning staff. These excluded lands are commercial timberlands and the use of an updated system of costing would place some, if not all, of these timberlands back into the timber base.”

“Using available resources; both expertise and funds to more intensively manage the good sites that have already been cut over will yield higher returns in a fifty-year time frame than rapping sites with low productivity; low value species; poor soils; extreme slopes and high elevations of their timber.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0008, 0024, 0031, 0052, 0053, 0062, 0066, 0075, 0117, 0228, 0265, 0539, 0574, 0577, 0579, 0582, 0602, 0610, 0611, 0620, 0703, 0734, 0796, 0814, 0844, 0989, 1962, 1977, 2119, 2131, 2134, 2168, 2719, 2750, 2774, 2782, 2796, 2836, 2846, 2851, 2879, 2888, 2893, 2913, 2919, 2939, 3088, 3103, 3134, 3177, 3203, 3206, 3211, 3228, 3232, 3239, 3244, 3256, 3270, 3323, 3327, 3394, 3410, 3437, 3443, 3520, 3550, 3551, 3553, 3587, 3610, 3683, 3717, 3721, 3725, 3731, 3733, 3742, 3746, 3769, 3773, 3775, 3802, 3815, 3865, 3872, 3890, 3924, 3940, 4011, 4044, 4092, 4105, 4112, 4142, 4229, 4263, 4269, 4408, 4419, 4425, 4426, 4429, 4450, 4455, 4472, 4474, 4484, 4485, 4489, 4490, 4493, 4494, 4496, 4497, 4498, 4503, 4510, 4534, 9009, 9012, 9034, 9043, 9082, 9114, 1370S, 1578S, 2168S

FOREST SERVICE RESPONSE:

36 CFR Ch II 219.14 is the basis for determining timber resource land suitability.

Of the allocations that have a scheduled timber harvest, there are approximately 140,000 acres judged to be unsuited for sustained timber production for commercial use. The reasons in order of importance are:

1. Areas where regeneration can not be reasonably assured. These include both low, dry and high elevation and mid-elevation areas where tree regeneration is questionable due to identified vegetative, aspect, elevated slope, and soil conditions.
2. Areas where unstable soils would likely cause irreversible resource damage.
3. Lands not cost efficient over the planning horizon. These are primarily burned over non-stocked unroaded lands where the cost of reforestation would exceed future discounted benefits. Also see the Social/Economic section in Appendix B of the FEIS.

Based on public input, a field review of randomly selected sites to validate the suitability determination was made in 1987 by the Forest Silviculturist. District personnel, the Forest Soil Scientist, interested conservationists and industry representatives were invited to attend.

The review judged the previous suitability calls to be 88 percent correct. Incorrect calls on lands judged to be unsuitable for timber management were offset by incorrect calls on lands judged to be suitable. Therefore, there was no adjustment in acres judged suitable for timber harvest. A record of acres checked for suitability and results, including some photos, are on file and can be viewed at the Forest Supervisor's office in Wenatchee, Washington.

143 HARVESTING RELIES TOO HEAVILY ON CLEARCUTTING.

COMMENTS INCLUDED:

“What logging has to be done, should be done with as little clearcutting as necessary.”

“Small (less than 20 acres) clearcuts are not very detrimental, also shelterwoods hold the character of the land. I've worked in the woods and I know them as a livelihood. I also love this Forest and don't want to see it ruined.”

“I want timber harvesting to be conducted in the following manner: Clear cut in lower elevations not visible from any state or interstate highways, selective cutting only in the higher elevations.”

“I am well pleased with the Forest Service's shelterwood cutting. Not only do I feel that this is a good Forest practice, but such a cut area is aesthetically pleasing.”

“All this clearcutting worries us! What's happening to our wildlife, our streams, and our fish. More important, what are we leaving for our future generations? People have to make a living in such away that a living is provided for coming generations. *Clearcutting isn't doing the job*”

“I applaud the examples of selective logging the Forest has conducted in the Snoqualmie Pass-Cle elum area. More logging in the Forest should be managed that way.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0023, 0040, 0047, 0062, 0069, 0150, 0239, 0262, 0286, 0298, 0386, 0442, 0484, 0541, 0562, 0579, 0601, 0722, 0736, 0744, 0793, 0796, 0869, 0879, 0896, 0901, 1939, 1940, 1960, 2030, 2032, 2037, 2070, 2081, 2131, 2358, 2397, 2729, 2740, 2749, 2765, 2775, 2785, 2787, 2791, 2841, 2845, 2851, 2872, 2879, 2883, 2915, 2916, 2940, 2942, 2956, 2964, 2981, 3010, 3015, 3017, 3032, 3050, 3057, 3065, 3107, 3141, 3156, 3186, 3207, 3209, 3255, 3257, 3305, 3311, 3322, 3347, 3383, 3394, 3408, 3469, 3520, 3521, 3532, 3576, 3588, 3602, 3610, 3632, 3642, 3670, 3704, 3706, 3767, 3768, 3793, 3808, 3814, 3817, 3862, 3876, 3914, 3940, 3950, 3989, 4069, 4149, 4235, 4236, 4271, 4295, 4418, 4421, 4447, 4449, 4452, 4453, 4485, 4488, 4490, 4494, 4497, 4498, 9005, 9065, 0018S, 0026S, 0040S, 0051S, 0054S, 0056S, 0060S, 0062S, 0065S, 0112S, 0176S, 0182S, 0721S, 0723S, 1055S, 1168S, 1176S, 1243S, 1246S, 1380S, 1406S, 1422S, 1585S, 2042S, 2046S, 2055S, 2061S, 2071S, 2240S, 2241S, 5071S

FOREST SERVICE RESPONSE:

Appendix H of the FEIS has a discussion of cutting methods. In general, clearcutting is to be prescribed on a site specific basis and only when it is the optimum method of regeneration to meet multiple use objectives.

Our expected harvesting by harvest type is shown in Appendix A of the Forest Plan. Approximately 60% of the harvested acres are some type of partial or shelterwood cut. The remaining area to be clearcut will have units averaging less than 20 acres in size. Requirements for clearcut harvest size based on National Forest Management Act guidelines and regional interpretation are detailed in Appendix H.

144 INTENSIVE MANAGEMENT SHOULD BE USED TO MAINTAIN OR INCREASE TIMBER HARVEST.

COMMENTS INCLUDED:

“Timber harvesting - where timber harvesting is the primary concern there should be more management of the stands such as commercial thinning, brush control when competing with young trees and tree planting-diversity must also be maintained.”

“I believe it is clear that the allowable harvest level on the Forest has been too high and must come down to comply with the direction and intent of NFMA and other Federal law. However, I think the levels envisioned in Alt. C may be too low. I think the Forest Service should increase harvest levels through intensive management on good growing sites throughout the Forest. I think the agency should plan on spending more money to produce timber from the Forest than a private landowner might because Congress and the administrations have consistently shown a willingness to fund high levels of timber management. They have a high concern for community stability and jobs, and I think we should too, so long as it can be accomplished without slighting other resources. I think these increase in selling should come from commitments to thinning, fertilization, and planting of superior seedlings.”

“GF-4 was chosen for 80% of the prescription for Alternative “C”. That prescription is clearcut - plant - clearcut at age 100 or 110. Such a scenario is ridiculous when viewed with your current on-the-ground management, and the proposed plan inclusion of 3,000 acres annual precommercial thinning. I favor intermediate treatments which accelerate the growth rate on the selected crop trees. Concern for root rots, insect resistance, and fire hazard encourages stand management through regular treatments. Total yield will also be increased and individual tree size will be larger than with the GF-4 scenario. GF-5 and GF-1 will both give better results for both timber and recreation values. There needs to be an injection of common sense into the for-plan process. Closer review by people on the ground should improve your program.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0066, 0409, 0411, 0412, 0577, 0582, 0635, 0724, 0844, 1313, 2123, 2264, 2781, 2785, 2879, 2919, 3228, 3427, 3459, 3462, 3487, 3596, 3742, 3760, 3793, 3991, 4011, 4092, 4156, 4179, 4180, 4181, 4235, 4271, 4450, 4494, 4497, 0074S, 0176S, 1193S, 1195S, 1250S, 2042S, 2055S

FOREST SERVICE RESPONSE:

We agree with your comments for the reasons you give. We have decreased the amount of GF-4 intensity area in the final plan. The clearcut only intensity has application and is being used extensively in some timber types by both private and public landowners. However, on the Wenatchee, the low demand for small diameter trees and the increased values for all resources appears to justify using common sense and increasing precommercial thinning acres.

The amount of commercial thinning that will be economical is uncertain. Our current analysis shows that commercial thinning in previously unmanaged stands often results in blowdown and increased disease, without substantial increase in wood production.

145 WILL PLANTING CLEARCUTS WITH TREE IMPROVEMENT STOCK RESULT IN MONO CULTURES, REDUCTION OF SOME SPECIES, OR TREES TOO WEAK TO STAND UP TO WIND STORMS?

COMMENTS INCLUDED:

“Only 6 of 16 tree species on the Wenatchee National Forest are considered important enough commercially to warrant investment in tree improvement (DEIS-III-60) Even though revegetation will be done by mixed planting, it would seem that with the enormous acreages involved that some tree species which are presently in low densities will become even rarer. Cedars for example are in high demand and were once common in Riparian Zones. How will this and other species fare in the future and how will demand for these trees be met?”

“Silvicultural systems must promote stand structure and species composition which avoids risk of environmental damage (Plan IV-94). Does this mean that in replanting that a diverse mixture of tree species will be used and that selective harvest methods will be favored?”

“Super trees grow fast but research reveals that what you gain in growth you lose in wind damage (trees weaker).”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0577, 0901, 2138, 3622, 3813, 4498, 9018

FOREST SERVICE RESPONSE:

We are planting western redcedar in riparian and other wet areas where they are the best suited species. Natural regeneration is also favored by leaving western redcedar along streams for seed and stream shade.

We plant ponderosa pine, Douglas-fir, noble fir, Pacific silver fir, western larch, lodgepole pine, western red cedar, and engelman spruce every year. We, on occasion, plant grand fir, sub-alpine fir, western hemlock, and black cottonwood. However, these last species are prolific natural seeders, and wherever present tend to increase with fire protection and any type of partial cutting methods. These species also tend to be somewhat less desirable for structural timber and are not favored in high recreation use areas, due to root and stem diseases.

Our cutting methods are designed to encourage natural regeneration. Reforestation emphasizes using a variety of planting stock selected from better than average parent trees. We do not at this time have plans for any clonal seedlings. All of our seed orchards are wind pollinated and resulting progeny are a wide mixture of (adjacent) better than average parent trees. A minimum of 50 different parent trees are used in each seed orchard to insure genetic diversity. In addition, wild pollen from adjacent rogued stands will add even more genetic diversity.

We select seed only from parent trees that are proven wind firm, so our future trees should not be weaker. We have seen some added top damage following fertilization, but that was primarily from feeding by porcupines and wood rats, not wind.

146 WE QUESTION YOUR YIELD PROJECTIONS FOR TIMBER GROWTH.

COMMENTS INCLUDED:

“The process of yield table development for both existing and future stands builds on this uncertain foundation. Empirical yields are no better than the inventory from which they are drawn. This puts them in a questionable light regardless of what technique was used to derive them.”

“Managed stand yield tables on the WNF need additional careful evaluation. The analysis is plagued with unknowns and there is a high potential for bias in the data and the model as used. These tables are extremely difficult to support as they stand.”

“I project the current annual growth for the Wenatchee National Forest may be significantly less than given in the proposed Forest Plan.”

“Yield tables are overly conservative. Initial stocking levels are too high and rings per inch growth is too low for managed stands. GF-1 FORDRY Regime is illogical and should be eliminated. Our intent is to produce sawtimber, so GF-3, 4, and 6 are economically undesirable.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0583, 1127, 3085, 4483, 4484, 4485, 4489, 4490, 4534, 1370S, 1578S, 2042S

FOREST SERVICE RESPONSE:

Yield tables use existing Wenatchee inventory plots for initial trees per acre. These compare very favorably with numbers of trees and overall volume production shown by the timber inventory.

GF-1 Fordry is currently being used to represent north slope dry area sales such as Forest Mountain and Barrett Creek, GF-5 is being used on these same sales on south slopes where suitable ponderosa pine seed or shelterwood trees are available and needed. GF-5 utilizes shelterwood cuttings to encourage natural regeneration but allows for planting on approximately 50 percent of the area to encourage rapid regeneration of preferred species.

Using our best estimation of costs and values, the ForPlan computer model selects mostly GF-3 and GF-4, with some GF-1 and GF-6. We believe that GF-5 has more silvicultural application than indicated by economics alone. GF-5 is an excellent silvicultural practice for many hard to regenerate south slope stands.

147 YIELD TABLES

COMMENTS INCLUDED:

“On the surface it appears that it would be worth treating more land with the GF-1 prescription because in wet Forest, 7 to 9 inch trees are worth \$222 and 19 inch trees are \$535.50. Even larger trees can be worth up to \$613.94. Will local mills be able to retool to handle the much smaller logs and will these logs satisfy the full range of future demand for wood products?”

“Is the low timber production in the EW-2 area compared with GF areas solely a result of the different stand used (110 years for GF-1 and 130 years for SP-2)? What is the growth rate in EW-2 areas at 110 years?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

4483, 4484, 4485, 4496

FOREST SERVICE RESPONSE:

We agree with your comment on increased value for larger trees. Larger trees also provide for increased wildlife, recreation and visual values. For these reasons, we have increased the application of thinning strategies to produce larger tree sizes on a majority of the Forest acres.

The timber production in EW-1 is lower than GF-1 due to longer rotations and no commercial thinning. EW-1 equals GF-3 at 110 years.

148 INVENTORY - THE TIMBER INVENTORY IS OUTDATED AND INSUFFICIENT. STRATIFICATION OF THE FOREST DOES NOT REFLECT THE TRUE VARIETY OF OPPORTUNITIES OR OTHER RESOURCES RELATIONSHIPS ON THE FOREST.

COMMENTS INCLUDED:

“Why evaluate the Alternative NC when it inflates timber outputs by using obsolete inventory data, outdated yield tables and ignores other resource interrelationships?”

“FORDRY and FORWET: These terms refer to ecotypes that are too broad to be lumped together and cannot be incorporated into intensive forest management schemes. A vegetation map of the forest management land base would be a much more powerful planning tool.”

“There has never been assessment of the reliability of the Wenatchee’s inventory data either as a whole or as it was stratified for planning. Suspicion arises from a comparison of measured tree ages on a given plot with the stand age assigned. Discrepancies range above 160 years. Such errors bring into question other data such as timber type.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3241, 4419, 4484, 4497, 4498, 1578S, 2168S

FOREST SERVICE RESPONSE:

The inventory of the timber resource was completed in 1977. We have attempted to update it by subtracting areas harvested or sold up through Dec. 31, 1988.

We have also shown growth of trees for the period from 1977 to 1994, the mid point of the forest plan period. The "growth" is an extension of the growth rate found in 1976 when the trees were measured. Negative impacts such as three years of drought, woodcutting, salvage logging, and areas of more than "normal" mortality are not accounted for.

Positive growth measures are also not accounted for. These include areas fertilized and thinned since the inventory. Areas planted with tree improvement stock are accounted for in the managed yield table.

Because our inventory is outdated, we currently are contracting for a new land satellite mapping system that will be able to map more efficiently. Using computer generated mapping will allow much improved capabilities for stratification of land areas and enhanced ability to measure growth and yield potential on smaller tracts of land. We do not expect much change in overall allowable sale quantity, however, this will allow for a better definition of investment opportunities.

If the allowable sale quantity does change significantly as result of the new inventory, the forest plan will be revised. This would be most likely at the five year check point.

149 EVEN-AGED MANAGEMENT WILL REDUCE THE DIVERSITY OF THIS FOREST.

COMMENTS INCLUDED:

"Even-age management-under the preferred Alt. Most of the Forest would be logged under even age system clear cutting and shelter wood. This will reduce the diversity of the Forest by decreasing the amount of mixed aged Forest which is better for plant and animal diversity and converting the Forest to a vast tree farm. Even age management also has more impact on water quality and temperature wildlife soils and scenery. NFMA and the regulations for NFMA contain numerous requirements for the consideration of impacts caused by the silvicultural system selected and for the maintenance and enhancement of diversity. I do not feel that the DEIS adequately addressed these impacts and concerns as required by law."

"Research seems to be saying that we can't take it all without paying the penalty of long-term debt. In other words, I believe we are going to have to leave a percentage of commercially valuable trees standing in the Forest to be recycled through all stages of the natural process."

"Furthermore the biological diversity in our old growth Forests may be essential if our current practice of replacing clear cuts with single species and single age trees does not work."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0900, 2383, 3204, 3227, 3775, 4271, 4497, 4498, 9018

FOREST SERVICE RESPONSE:

Clearcutting and shelterwoods followed by a combination of planting and natural regeneration can in fact result in a wider diversity of conifer and other species. Some stands of lodgepole pine, or Pacific silver fir for example have very limited species diversity. Harvest can allow for planting additional species including other conifers and browse plants.

Also see Appendix H of the FEIS for a discussion of selection of silvicultural harvest methods. Only about one third of the forest is managed for timber production. Large portions of this area are to be managed with selective harvest and long-term shelterwood harvest. Less emphasis is given to clearcutting in the FEIS than was proposed in the Draft Plan. Beyond this, we recognize the importance of leaving biomass in the forest after harvest. Timber sale planning specifies the volume and distribution of woody debris to be left on the forest floor.

150 THE WENATCHEE CONSTRAINT LIMITING MAXIMUM CLEARCUT IN A DRAINAGE TO 25% AT ANY ONE TIME.

COMMENTS INCLUDED:

“The standards adopted for achievement of harvest dispersion limit clearcuts to 40 acres, require stocking of trees to 4-1/2 feet high prior to adjacent cutting and limit adjacent cutting for a decade. These should be viewed as the maximum standards, certainly not the norm. We agree with the selection of 25% dispersion factor for regeneration cutting. We feel this is the best of the three alternatives because it offers the most limitation on forest fragmentation.”

“We do not think it is appropriate for the Forest Service to incorporate activities on adjoining lands into their harvest dispersion constraint analysis.”

“The over-cutting on private lands on the Forest is well known. We support the 20% alternative for implementing the dispersion MR.”

“With studied timber harvest dispersion, the Marten, Three-toed woodpecker, Pileated woodpecker, and the spotted owl will adapt...if smaller harvest areas are developed in a checkerboard area. Lack of habitat: logging and reforestation would open new range for big game. Riparian zones could be protected by planting shrubs and cottonwoods.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2134, 0030S, 0719S, 1370S, 1380S, 1577S, 2064S, 2240S, 2308S

FOREST SERVICE RESPONSE:

This constraint will continue the dispersal of created openings and insures that a diversity of tree age will be maintained. This policy will apply to areas of mixed ownership and areas of solid National Forest lands.

151 DOES HARVESTING OF TIMBER DAMAGE OTHER RESOURCES AND CAUSE IRREVERSIBLE DAMAGE?

COMMENTS INCLUDED:

“Logging and roads cause siltation and higher water temperatures that destroy native fisheries in the streams, rivers and lakes. The roads also bring in more people, more noise, more cans, more-----.”

“Timber harvesting is good for wildlife regardless of popular belief.”

“On those areas that are logged, constant monitoring should be done to protect fisheries and water quality.”

“Plan omits the effect of logging steep hillsides and valleys in regard to flooding or irrigation and its effect on fish and plant life.”

“Any process which reduces forest cover, either man caused, burning or natural wildfire, will result in increased water yield. According to water/timber interrelationship study conducted by Dr. David Wooldridge continued harvest of the old growth forests in these basins should provide between one-third and one-acre foot per year of increased water yield per acre harvested. Increased yields will diminish over time as young forests are established and grow. Increase will diminish to pre-harvest amounts in 15-20 years as a young forest grows. The increased water yields resulting from the differing Alternatives is truly insignificant. Under Alternative “C” the first decade increase of 13,300 acre feet is only two-tenths of one percent.”

“I think timber companies in the region have shown responsible management in the past regarding timber harvest. Their timber harvesting practices are actually beneficial to the forests and critical to economy locally and across the U.S.”

“Where logging does take place, any trails or trailheads that get destroyed by the logging procedure should be re-established. It must be cheaper to do this than build new trails.”

“I think its ecologically healthy to harvest timber sensibly. It reduces the bad effects from insects an forest fires, and ultimately helps to improve the forest food chain for animal survival.”

“Alternative C would result in much clearcutting. We’ve noticed that clearcuts alter the pattern of snow deposition and melt out fast in the spring. When snow is fresh and snow cover is good, clearcuts provide good skung. However extensive clearcutting can adversely affect water and snow quality. The final Forest Plan should make more use of shelterwood systems where some forest overstory is maintained. This would prolong snow melt, benefit the watershed by reducing flooding and siltation, have favorable effects on the timing of runoff, and of course provide good places to ski where the snow is protected from the sun (and therefore not crusty, icy or wet with surface water).”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0008, 0018, 0021, 0026, 0032, 0035, 0040, 0049, 0051, 0054, 0056, 0060, 0062, 0063, 0065, 0066, 0086, 0112, 0113, 0114, 0150, 0152, 0226, 0262, 0344, 0386, 0389, 0392, 0393, 0394, 0395, 0407, 0415, 0427, 0429, 0439, 0442, 0508, 0520, 0528, 0539, 0553, 0554, 0559, 0562, 0563, 0566, 0579, 0582, 0586, 0587,

0590, 0601, 0605, 0607, 0622, 0624, 0626, 0627, 0635, 0636, 0641, 0645, 0671, 0677, 0703, 0721, 0723, 0726, 0736, 0836, 0862, 0866, 0868, 0869, 0870, 0883, 0898, 1234, 1380, 1488, 1504, 1876, 1947, 1948, 1952, 1964, 1967, 1970, 1971, 1972, 1978, 1980, 1981, 1983, 1988, 1989, 1991, 1997, 1998, 2009, 2018, 2021, 2023, 2026, 2037, 2053, 2055, 2058, 2061, 2064, 2069, 2071, 2072, 2073, 2086, 2093, 2119, 2121, 2131, 2132, 2137, 2138, 2164, 2167, 2174, 2179, 2182, 2184, 2197, 2201, 2204, 2205, 2207, 2236, 2240, 2241, 2397, 2434, 2719, 2720, 2723, 2725, 2731, 2732, 2735, 2739, 2743, 2762, 2763, 2765, 2769, 2786, 2791, 2798, 2805, 2817, 2818, 2820, 2833, 2838, 2839, 2850, 2851, 2853, 2868, 2872, 2879, 2880, 2882, 2886, 2887, 2888, 2889, 2892, 2899, 2900, 2906, 2915, 2916, 2919, 2923, 2933, 2935, 2946, 2947, 2953, 2956, 2967, 2969, 2975, 2980, 2981, 2982, 2988, 2990, 2993, 2994, 2995, 2999, 3000, 3008, 3009, 3011, 3015, 3018, 3020, 3027, 3028, 3029, 3031, 3037, 3040, 3050, 3052, 3063, 3070, 3077, 3080, 3082, 3083, 3091, 3105, 3113, 3124, 3125, 3127, 3130, 3132, 3138, 3141, 3143, 3146, 3150, 3157, 3161, 3163, 3165, 3172, 3174, 3175, 3176, 3177, 3179, 3186, 3187, 3190, 3198, 3202, 3203, 3204, 3205, 3216, 3217, 3223, 3225, 3228, 3232, 3233, 3235, 3237, 3238, 3239, 3240, 3252, 3255, 3256, 3259, 3260, 3262, 3267, 3268, 3280, 3287, 3288, 3293, 3294, 3295, 3296, 3298, 3303, 3319, 3320, 3321, 3322, 3324, 3328, 3333, 3335, 3346, 3350, 3353, 3359, 3364, 3366, 3374, 3375, 3377, 3378, 3383, 3388, 3391, 3394, 3401, 3409, 3410, 3422, 3436, 3439, 3446, 3448, 3449, 3463, 3469, 3493, 3499, 3511, 3513, 3515, 3529, 3531, 3539, 3540, 3541, 3542, 3543, 3549, 3557, 3561, 3563, 3567, 3576, 3577, 3579, 3580, 3582, 3583, 3592, 3595, 3599, 3606, 3608, 3620, 3627, 3632, 3640, 3641, 3647, 3648, 3661, 3669, 3670, 3678, 3682, 3683, 3709, 3720, 3725, 3726, 3733, 3754, 3758, 3766, 3775, 3794, 3795, 3803, 3819, 3822, 3832, 3862, 3865, 3871, 3872, 3875, 3876, 3898, 3899, 3903, 3906, 3911, 3913, 3915, 3923, 3930, 3938, 3949, 3995, 3998, 4001, 4005, 4010, 4013, 4015, 4019, 4027, 4042, 4049, 4050, 4064, 4065, 4072, 4080, 4087, 4088, 4092, 4094, 4105, 4107, 4110, 4112, 4123, 4142, 4143, 4147, 4159, 4169, 4200, 4215, 4218, 4222, 4228, 4229, 4232, 4233, 4235, 4244, 4257, 4261, 4269, 4270, 4277, 4294, 4295, 4299, 4302, 4305, 4400, 4404, 4415, 4417, 4420, 4423, 4434, 4439, 4442, 4444, 4449, 4450, 4451, 4452, 4454, 4460, 4467, 4474, 4477, 4485, 4493, 4494, 4496, 4497, 4498, 4499, 4500, 4501, 4507, 4511, 9004, 9007, 9012, 9024, 9045, 9049, 9065, 9067, 9068, 9094, 9115, 0011S, 0042S, 1243S, 2055S, 2923S, 3143S, 3293S, 3294S, 3295S, 3296S, 3449S, 3641S, 3661S, 4107S

FOREST SERVICE RESPONSE:

When planning a timber sale, specialists (wildlife and fish biologists, hydrologists, archeologists, economists, etc.) analyze the predicted effects and advise the Forest managers on what, if any, mitigation measures are necessary and available to reduce the impacts to other resources.

The Forest Plan significantly increases the budget for resource coordination and specialists support to the timber program, particularly, for soil and water, recreation, fisheries and wildlife. However, the amount of coordination that is funded varies by the way in which the Forest prepares its annual budget and how Congress funds the Forest Service.

Whether or not increased funding is received, some impacts of timber management are unavoidable and can result in irretrievable or irreversible losses, such as loss of wilderness characteristics. For a description of these impacts, see FEIS Chapter IV and Appendices B and C.

Management indicator species are selected to portray the effects of management activities. The overall objectives for these species are to maintain or improve their habitat; however, some specific areas of habitat may be altered in achieving the Forest-wide objectives.

Meeting other resource objectives, such as improvement of elk habitat, anadromous fish habitat or riparian areas, and maintenance of visual quality, may prevent some timber harvest from being accomplished or result in modification of a timber sale. This may lead to reduced volume or smaller cutting units. Achieving multiple-resource objectives in this manner is more costly than managing solely for any individual resource benefit.

Fewer acres are proposed for harvest and roading under the FEIS as compared to the draft. See old growth and roadless area discussions for acreage and rationale for the decreases in harvest areas.

152 TIMBER HARVEST EFFECTS ON SUMMER STREAM FLOWS.

COMMENTS INCLUDED:

“The DEIS seems to claim that the effect of earlier runoff in logged-off areas is offset by overall greater runoff in those areas.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0389, 0579, 1970, 1997, 2201, 3011, 3175, 3240, 3576, 3819, 3875, 4434, 4494, 4497, 4501

FOREST SERVICE RESPONSE:

Complete removal of trees from a study area in Lake Creek basin on the Wenatchee National Forest resulted in an increase of 5.4 inches of summer moisture within the soil profile over uncut plots. (Herring 1968.)

“Clearcutting frequently increases base flows during period of low flow...” (Harr 1982.) A more definitive study in north Idaho found the following. “Creating larger openings on the north aspect will develop a high potential for increasing total water yield. On the south aspect this will have a minimal or even a negative effect on water yield increases.”

As clearcutting is most commonly used on northerly aspects on the Wenatchee, a net increase in stream flow is expected. For additional information refer to the response to comment 116 regarding water quality.

153 WHAT WILL BE THE EFFECT OF WILD AND SCENIC RIVER DESIGNATION ON ALLOWABLE SALE QUANTITY?

COMMENTS INCLUDED:

“Concerned about the effects on 10,000 acres of commercial timber land within the lower segments of the American and Cle Elum rivers where river designation could result in reduced tree vegetation management. Will this flexible management deviate from current management practices used near streams of this class type? If the nine rivers are put under Wild and Scenic River management how accurate a figure can be derived as to how this will impact the ASQ under flexible management?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2195S

FOREST SERVICE RESPONSE:

Regulations for management of rivers classified as Recreational or Scenic under the Act seems comparable to management direction for scenic travel and riparian allocations under the Forest Plan. Virtually all of the rivers will be placed under these two allocations until they are considered for Wild and Scenic River allocation by Congress. However, we would expect that there would additional costs for consultation with other agencies and the public if projects are proposed in Wild and Scenic River zones. In summary, we expect a very slight falldown in the ASQ but some increase in costs to the government as a result of river classification.

154 WHAT IS THE FUTURE FIREWOOD POLICY FOR THE FOREST?

COMMENTS INCLUDED:

“Moderation has been the byword of the Naches Ranger District so far, in its management of wood cutting and other uses of the Forest.”

“I would like to see this philosophy of moderation and respect for the natural life, continued.”

“Since Holden Village strives to use renewable resources, the future harvesting of fire wood for village heat is of prime importance.”

“The wood cutting was not addressed. This is very important to many local residents. Are firewood gathering policies going to be changed in the near future? Are resources adequate to meet demand without affecting wildlife or causing other damage.”

“Let public cut firewood before burning brush.”

“Before useable firewood is consumed in slash burn, **please** make a greater effort to make it accessible.”

“I would like to know why the lumber industry has all kind of fire wood in the slash piles This makes the Forest look like hell. Why can't the people that need the wood go pick it up. I personally think the system is in dire need of better options.”

“All slash should be windrowed and burned, followed by immediate diversified replanting.”

“Firewood cutters are stealing thousands of cords of green logs from the Wenatchee Forest each summer. I believe this problem is much bigger than anyone realizes. Since dead and down wood is all but used up on existing road systems - wood cutters are cutting green trees back away from the roads, and using them for wood. This needs to be looked at.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0296, 0297, 0308, 0349, 0352, 0353, 0355, 0391, 0425, 0492, 0494, 0495, 0498, 0499, 0505, 0506, 0546, 0582, 0603, 0642, 0648, 0651, 2699, 0793, 1741, 1963, 1986, 1987, 2066, 2493, 2832, 2847, 2962, 3009, 3083, 3297, 3572, 3862, 4466, 9065, 9114, 0068S, 2240S

FOREST SERVICE RESPONSE:

It is forest policy that utilization of logging residue for firewood and other uses will be the favored method of reducing fire hazard where ever practical. We expect firewood will continue to be readily available on the forest. Distance to quality firewood may increase. Increased restrictions on snag removal may also be needed to maintain wildlife perch and nesting trees for birds and other wildlife. Some standing trees, especially western larch, are cut for firewood while still useable for sawlogs. We expect additional tree cutting restrictions and enforcement may be necessary to limit this in the future.

155 INSECTS AND DISEASES OF TREES CAN BE SEEN FROM DIFFERENT POINTS OR VIEW.

COMMENTS INCLUDED:

“The National Forest Management Act directs the Forest Service to recognize that the National Forests are ecosystems (Norse Et Al., 1986). Timber harvests are justified on many roadless areas for the management of insect, fungal, and parasitic plant populations. With these proposals, there is no consideration of the contribution of these organisms to the natural, ecological processes occurring on the forest. While these organisms may act to reduce the timber resource available for harvest, they effectively enhance other resource values of the Forest (the availability of which is mandated by the multiple use sustained yield act) such as, scenery, forage and snag habitat.”

“How about such issues as blow down or diseased timber. Should this timber just sit there and rot & perhaps infest more of our Forest? Without roads, it will.”

“Mixed stands satisfy lots of problems. Mono stands encourage bug infestation, and are visually boring. More emphasis on lodge pole pine, cedar, larch.”

“Your concern for the high mortality of trees and insect infestation again is not a reason, it is a justification. You provide all kinds of reasons for doing this or that piece of destruction, but they are not real reasons; they are justifications. They are not persuasive.”

“New Alt.: In due consideration to the problem of disease, a mono culture forest system should be replaced with a multiple cultured forest.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0605, 0577, 3239, 3398, 4450, 1058S

FOREST SERVICE RESPONSE:

NFMA states that, “silvicultural methods shall not be applied where such treatments would make stands susceptible to pest-caused damage levels inconsistent with management objectives.”

We believe that in many cases clearcutting can replace natural fire in removing diseased stands and replacing them with new mixed species stands of more disease and insect resistant species. A good example is a root rot and spruce budworm prone grand fir, Douglas-fir climax stand that has replaced a ponderosa pine or Western larch stand. By harvest and replanting, a more disease and insect resistant stand can be established.

156 PESTICIDE USE AND DISPOSAL IS A CONCERN.

COMMENTS INCLUDED:

“Less spraying of brush and road side weeds mean more wildlife.”

“I have always opposed broadcast spraying of chemical pesticides and herbicides. Along with air pollution, I blame the spraying of our fields and forests with the rapid decline of the birds and small mammals.”

“Spraying trees is a good idea if trees are infested with insects. We may lose a few birds but they will be back. Our trees in our yard are sprayed regularly, we still have birds in our yard & they raise their young here too.”

“More focus on bird habitat might decrease spruce budworm and associated insect infestation.”

“Herbicide sprays are destroying mulch and soil building.”

“I urge that the use of herbicides be eliminated, as they destroy many species of native vegetation, regardless of their desirability from a commercial timber standpoint.”

“The DEIS does not state whether there are any hazardous waste disposal sites on the Forest and describe how these are to be managed.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0063, 0540, 0577, 0579, 0582, 2785, 3270, 3588, 3911, 3991, 0018S, 2242S

FOREST SERVICE RESPONSE:

Any pesticide use will be subject to a forest environmental analysis tiered under the Regional Vegetation Management EIS and program. We have no evidence of any damage to wildlife or birds with any of the pesticides proposed for future use. There has been no herbicide use on the forest for several years pending completion of the Regional Environmental Impact Statement on the topic. Proposed herbicide use on this forest would be on a very small acreage to deal with competing vegetation in a few selected timber harvest units and with noxious weed infestations.

We know of no toxic waste disposal sites on the forest. If anyone knows of one we would like that information so we can take action to properly dispose of the material.

SOILS

157 THE ALTERNATIVES WILL REDUCE SOIL PRODUCTIVITY AND INCREASE EROSION.

COMMENTS INCLUDED:

“The Chelan, Entiat, and Wenatchee basins are described as having very thin “A” soil horizons. Because this soil layer is so thin, any additional surface erosion above background could constitute a serious loss of nutrients and reduction of site productivity.”

“My major recommendation is that specific remedial and regulatory actions be incorporated in all alt. to commence immediately. Almost every other mistake can be corrected within a 100 years or so. But with top soil it is a case of ‘he who hesitates is lost’ and irretrievably lost for a very long time.”

“If more than twenty percent of an activity area is compacted, reevaluation will be necessary. What degree of compaction is required? Will actual measurements of degree of compaction be made or will it be assumed that any paths of heavy machinery will cause compaction? Are cumulative effects of past management accounted for in these areas.”

“Is there a management requirement for soil erosion?”

“See page II-51, Delivered Sediment Levels: I am opposed to all increasing rates of erosion.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0066, 0076, 0579, 0882, 1681, 1952, 1981, 2026, 2132, 2723, 2725, 2731, 2820, 2836, 2876, 2879, 3045, 3067, 3083, 3103, 3239, 3250, 3750, 3911, 3913, 4235, 4298, 4410, 4453, 4485, 4493, 0084S

FOREST SERVICE RESPONSE:

No alternative considered will intentionally reduce soil productivity. The National Forest Management Act (NFMA - sec. 6C) requires plans be developed in accord with the Multiple-Use Sustained Yield Act of 1960. The NFMA further requires regulations be developed to ensure there will not be “substantial and permanent impairment of the productivity of the land” (sec. 6g. 3c). These requirements are specified in the Regulations (219.14 b1). Standards and Guidelines apply Forest-wide and have been developed to maintain soil productivity and minimize erosion. The Forest-wide Standards and Guidelines are located in Chapter IV of the Forest Plan. In addition to the Forest-wide Standards and Guidelines the Forest also uses the Regional Guidelines for Best Management Practices (BMP’s - and this information is included in Appendix J of the FEIS.)

Activities that create impacts which exceed the Forest-wide Standards and Guidelines will require development and implementation of a rehabilitation plan that will restore the site to a satisfactory condition. Past management activities can cause cumulative impacts, (e.g., soil compaction) so additional monitoring may be needed to identify these areas to avoid or prevent unacceptable soil degradation

158 CONCERN WAS EXPRESSED ABOUT USING THE UNIVERSAL SOIL LOSS EQUATION (USLE) TO DETERMINE SEDIMENT YIELDS. THE EQUATION MAY NOT GIVE ACCURATE SEDIMENT PREDICTIONS BECAUSE IT WAS DEVELOPED ON AGRICULTURAL LANDS AND USED ON MOUNTAINOUS LANDS.

COMMENTS INCLUDED:

“The amount of siltation estimated for the various alternatives is highly questionable from the agricultural soil loss model used. I could find no experimental verification of the modified agricultural model in the DEIS, yet the timber management and road-building prescriptions of the final plan should rely upon an accurate siltation model if they are to minimize damage to fish habitat. For this reason the Forest Service must begin studies of the accuracy of its modeling methods, estimating the error statistics of the methods, and should set a deadline (preferably before the release of the final plan) by which a final modeling method must be chosen and documented.”

“*Inaccurate sedimentation estimates* The Forest Service used the universal soil loss equation (USLE) as its model for predicting sedimentation resulting from the proposed forest plan.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0342, 0579, 0580, 0582, 2201, 3085, 3750, 4485, 4493, 4495, 4498

FOREST SERVICE RESPONSE:

Several equations and models were used to predict soil erosion. Each one has some limitation depending on the amount and quality of data available. It was not the intent of the models to show exact amounts of soil loss or sediment delivery. But they were designed to make comparisons between one alternative and another, so that relative risks of implementing different practices could be evaluated. The process used by this Forest are described in a separate document titled “Delivered Sediment Coefficients”, which was prepared by Phillip McColley, Forest Soil Scientist (February 1985).

The models that were used are based on certain principles that affect soil erosion. The principles can be applied to a variety of conditions. The magnitude of any of the variables depends upon local conditions. Knowledge of the local conditions is more critical for predicting erosion and sedimentation than the model per se.

Soil erosion is only one part of predicting sedimentation. The erosion models are used for that part. Sedimentation depends upon the amount of eroded material that is delivered to the streams. Estimating the delivery factor requires additional knowledge and assumptions. The assumptions used are on file at the Supervisor’s Office in Wenatchee, Washington. (Also refer to Appendix B of the FEIS for a summary of the sediment yield analysis process used in Forest planning.)

159 THERE WAS CONCERN THAT LANDS UNSUITABLE FOR TIMBER REMOVAL ARE NOT IDENTIFIED.

COMMENTS INCLUDED:

“DEIS, page III-80, soils. Maps depicting locations of special concern soils areas (i.e. mass wasting areas, degraded areas) would be helpful in comparing past management with current and proposed conditions.”

“Detailed soil surveys will be used “where available” in project planning (plan IV-98). Since the general soil surveys were stated not to be adequate for project planning, what soil analysis will be used for project planning until detailed surveys can be made available.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0616, 2774, 2820, 2888, 3191, 3239, 3256, 3710, 3911, 4485, 4495, 9034, 9093

FOREST SERVICE RESPONSE:

Lands unsuitable for timber harvest because of stability problems (Class V stability hazard) are identified and shown on maps (in the Supervisor’s Office). A total of 18,700 acres of forested land were identified on the Wenatchee Forest. Other lands that are unsuitable for other reasons are also mapped. These maps are also located in the Forest Supervisor’s office in Wenatchee, Washington.

The acreages of unsuitable lands are shown in tables, in Chapters II and IV of the Forest Plan, and in Chapter III of the FEIS.

Some areas are very small, less than 5 to 10 acres, and are not shown on a map. In such cases, their features are described so they can be located and excluded from specific timber sale projects by an interdisciplinary team. Two physical conditions of the land are used for determining unsuitability for timber harvest. These are: lands where there is not reasonable assurance of successful reforestation in five years, and lands where technology is not available that will ensure timber production without irreversible damage to soils, productivity, or watershed conditions (National Forest Management Act (NFMA) sec. 6g. Ei and ii; Regulation 219.13b (1) iii and iv). Only lands with a high probability of significantly increasing landslides are considered unsuited because of the potential for irreversible damage.

***160 CONCERN WAS EXPRESSED ABOUT THE AMOUNT OF DELIVERED SEDIMENT PRODUCED BY SOME OF THE DIFFERENT ALTERNATIVES. AND SOME WERE CONCERNED ABOUT THE AMOUNT OF DELIVERED SEDIMENT PRODUCED IN THE DIFFERENT DEC-
ADES FOR THE PREFERRED ALTERNATIVE.***

COMMENTS INCLUDED:

“DEIS, table S-2, page S-8, summary of results relating to planning problems, the sediment increase index shows increases in all alternatives. Please explain why the planning premise is not the reduction/elimination of water quality degradation. It seems that with better technology and management techniques that land managers would be able to reduce sedimentation.”

“The preferred alternative has a nearly five % increase in sedimentation over natural levels for the first five decades, yet it is stated that state class AA water quality standards will be met. The anti-degradation policy of Wash. State (chapter 173-201-035 (8) WAC) provides that beneficial uses shall be protected allowing no water quality degradation which would interfere with existing beneficial uses.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0061, 0342, 0579, 0580, 0582, 2026, 2073, 2078, 2132, 2201, 2723, 2731, 2772, 2820, 2945, 3085, 3103, 3205, 3256, 3550, 3632, 3750, 3862, 3911, 4242, 4471, 4485, 4493, 4495, 4498, 4511

FOREST SERVICE RESPONSE:

It is difficult to predict with certainty how activities carried out under each alternative will affect local water quality conditions. Water quality conditions include many factors, most of which interact, including such parameters as sediment, temperature, dissolved oxygen, biochemical oxygen demand and pH. Natural systems are too complex for completely accurate predictions given our present state of knowledge. Another complicating factor is that the Forest planning process requires analysis of relatively large land units and complex treatments for decade-long periods. The ForPlan level of analysis tends to mask site-specific effects encountered for individual watersheds.

In the case of sediment, yield estimates were developed as part of the information used to determine the relative risk between alternatives. A systematic approach was used to develop estimates of increased sediment yield from management activities (timber harvest activities and associated road construction) in order to indicate trends and to compare alternatives. These yield estimates do not represent absolute quantities of sediment. This modeling effort was just one of the tools the Forest used in the analysis leading to a reasoned choice among alternatives. Additional information on the sediment modeling process may be found in Appendix B of the FEIS.

As stated in Chapter IV, a basic goal of the Forest Plan is to manage watersheds in a manner that maintains or improves overall water quality and fish habitat conditions on the Forest. The FEIS recognizes that, on a site-specific basis, these values are subject to risk due to management activities. In the Final Forest Plan, the Forest-wide Standards and Guidelines for protection of water quality, including Best Management Practices (see Appendix J of the FEIS), have been revised to strengthen and clarify management direction. A set of Forest-wide Standards and Guidelines for riparian area management has been developed, which include measurable standards for sediment. Forest-wide direction for monitoring water quality and fish habitat in Chapter V of the Plan has been improved.

Since analysis at the Forest planning level tends to mask the site specific effects encountered for individual watersheds, more detailed analyses of significant parameters will be conducted at the project level using the Standards and Guidelines in Chapter IV of the Forest Plan. Such analyses will include modeling on a watershed basis using project-specific information such as land types, project location, road design features, and mitigation measures. Past management activities within the watershed will be considered as well as proposed activities. These analyses will more closely predict the effects of activities on individual watersheds, providing information needed to evaluate project effects in regard to water quality standards and fish habitat objectives. The more detailed analysis performed at the project level will help to identify activity timing, location, and mitigation needs which will limit sediment increases to acceptable levels.

161 CONCERN WAS EXPRESSED THAT REHABILITATION OF DEGRADED SITES WAS NOT BEING DONE RAPIDLY ENOUGH, AND THAT SOME ACTIVITIES WERE NOT BEING CONSIDERED THAT CONTRIBUTED TO SITE DEGRADATION.

COMMENTS INCLUDED:

“I found it interesting the amount of trails open did not seem to effect your figures on erosion, moreover, they seem to be affected by timber activity.”

“In the course of an inventory (1978-1979) of degraded acres on the WNF, 143 sites were listed as needing rehabilitation. These sites were termed significantly damaged and eroding. Can rehabilitation really be accomplished on these sites? Since this survey was not completed, one wonders how extensive are the acres of degraded sites. How soon will the survey of degraded sites be restarted and what progress can be made on rehabilitation of all presently degraded sites in the next 10 years.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

1952, 4410, 4485

FOREST RESPONSE:

The amount of soil erosion from the trail systems locally can be very significant, however, Forest-wide it is really not significant when compared to the amount of ground disturbance created by road construction or timber harvest. Also, when translated to total acres affected, all the trails on the Forest account for a very small percentage of the entire Forest.

Part of the degraded site inventory is more than ten years old now, so it is appropriate that the listed sites (but non-rehabilitated sites) be reviewed to see if they are still creating problems, or if the sites have rehabilitated naturally over time. This work began in the 1989 field season. Furthermore, field crews are being instructed to identify and record on a WIN form (watershed inventory needs) any sites that they feel need to be rehabilitated. Some of the sites identified in the 1978-79 inventory have recovered naturally and were taken off the degraded inventory listing. Rehabilitation work can be very expensive, and the progress of this work has been limited because of the availability of funds.

AIR

162 AIR QUALITY IS AN IMPORTANT RESOURCE FOR WHICH THE FOREST SERVICE HAS MANAGEMENT RESPONSIBILITY BUT THIS IS NOT EMPHASIZED IN YOUR PLANNING PROCESS. WE WANT YOU TO ENSURE THAT MANAGEMENT OF THIS RESOURCE RECEIVES APPROPRIATE ATTENTION. WE WANT YOU TO MAINTAIN OR IMPROVE THE QUALITY OF THE AIR AFFECTED BY THE MANAGEMENT OF THE WENATCHEE NATIONAL FOREST.

COMMENTS INCLUDED:

“In general, the discussion included in the DEIS and the plan adequately cover the state concerns”

“Finally, with the worldwide destruction of our forests, the level of global air pollution can only get worse.”

“The final and most basic point that the DEIS did not address was the very fundamental issue of how the loss of our trees effects the air.”

“The plan should address the problem of population control if it is to keep the air clean here. The amount of particulate matter and carbon dioxide released by slash burning is gross and unhealthy in a world where we must all share the same air.”

“The Health effects of wood smoke appear not to have been considered.”

“Another thing that greatly disturbs me is the eventual mortality of our forests from air pollution.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0286, 0424, 0579, 2791, 3067, 3088, 3588, 3911, 4494, 4495

FOREST SERVICE RESPONSE:

We have substantially revised and updated Chapter III, the Affected Environment, of the FEIS as it relates to the management of air as a resource.

There has been a significant change within the Forest Service in the direction for management of this resource since the release of the DEIS. The issuance of an Air Resource Management Handbook (FSH 2509.19) and a revision of the Forest Service Manual have emphasized the requirement for all Federal Land Managers to ensure they consider and manage air as a primary resource.

Statewide, PM-10 emissions from Forest Service prescribed burning are being reduced. This reduction occurs from a combination of fewer acres being burned and employing techniques to reduce emissions. On this Forest we are emphasizing increased utilization of wood fiber and decreasing consumption of large woody debris in prescribed fires by burning in the spring and burning under more moist conditions.

The Forest is concerned about the impacts of smoke produced by prescribed fires on human health. All applications of prescribed fire are conducted in compliance with the State Smoke and Visibility Management Plans in an attempt to avoid and minimize the impact on the public. Currently the Forest is participating in research on the effects of smoke on both fire management personnel and the public. Implementation of appropriate management practices as defined by this research, and other applicable research, will occur during the life of this plan.

The Forest objective is to manage our air resource in a manner that maintains or improves the quality of this resource. This will include compliance with the statutes included in the Clean Air Act, compliance with the guidance provided by the State of Washington, and compliance with the regulations issued by Local Air Regulatory Authorities. Our immediate priority is to develop a better data base on which to base our decisions, and to improve our interaction with all agencies and individuals involved in the management of our air resource.

LAND STATUS

163 CONCERN ABOUT THE "CHECKERBOARD" OWNERSHIP AND LAND MANAGEMENT IN THE CLE ELUM AND LITTLE NACHES AREAS.

COMMENTS INCLUDED:

"The Little Naches area is a very poor example of Forest Management. It is a disaster area. Thanks to our "good" neighbors-Burlington Northern et al."

"I believe that the checker board ownership presents a particularly serious problem. Plum Creek Timber company land is a particularly distressing case at present."

"Somehow I believe the FS should resist activities on private land that are clearly out of line with their management goals, for example, in granting of easements for road construction or pursuing land exchanges."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

1, 2819, 4298

FOREST SERVICE RESPONSE:

The intermingled private lands in the subject areas might be best described as industrial forest lands. As such, their management is quite different than the management of National Forest System lands, which are managed for a variety of public benefits. While offensive to some, the management practices on these private lands are within the limits set by the Washington State Forest Practices Act and the State Shorelines Management Act.

Land exchanges are discretionary and depend on willing partners on each side as well as public support. The pros and cons are examined carefully before making the decision to proceed. There must be a clear indication that an exchange is in the public interest before it is made. Typically it is much easier to identify lands which seem desirable additions to public ownership than it is to identify public lands which should be traded to private ownerships.

Private land access across National Forest System Lands is guaranteed in federal law. When other reasonable access is not available, it is not within the discretion of the Forest Service to withhold access.

164 ROLE OF THE FOREST SERVICE IN HYDROELECTRIC PROJECT LICENSING.

COMMENTS INCLUDED:

"It is the Forest Service's duty to impose terms and conditions that will assure adequate protection for National Forest land from the harms resulting from hydroelectric development. *See Escondido Mutual Water Company V. La Jolla and Rincon Bands of Mission Indians*, 104 S. CT. 2105, 2114-15(1983). It is also part of the Forest Service's trust responsibility to the tribes to ensure that it exercises its duty to impose terms and conditions so that the tribes' treaty rights are protected. The Northwest Power Planning Council is in the process of developing a list of potential hydro sites with the least potential for

adverse impacts on other resources. Forest Service activities related to hydroelectric power should be coordinated with these efforts, p.III-6.”

“Please amend the section on hydroelectric energy development to include a statement regarding the U.S. Forest Service affirmative obligation to condition (approval of) hydroelectric projects on the adequate protection and utilization of the National Forest under section 4 (E) of the Federal Power Act. (See *Escondido Mutual Water Co. V. La Jolla Band of Mission Indians*, 104 S. CT. 2105” (1984)).”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0296, 0297, 0308, 0349, 0352, 0353, 0355, 0391, 0425, 0492, 0495, 0498, 0499, 0505, 0506, 0642, 0648, 0651, 0828, 0901, 1963, 1986, 1987, 2053, 2066, 2131, 2201, 2835, 2849, 3297, 3323, 3394, 3621, 3862, 4408, 4445, 4454, 4485,

FOREST SERVICE RESPONSE:

The Forest Service is aware of both the responsibility and the authority placed upon it by Section 4(e) of the Federal Power Act. The Wenatchee Forest’s District Rangers work directly with the Federal Energy Regulatory Commission, and the hydroelectric project applicant in assessing the impacts of each proposed project. They also work together in developing the terms and conditions identified in the 4(e) report for incorporation in the project licenses.

A statement identifying this part of the Forest Service’s role in processing hydroelectric license applications has been added to Chapter III of the FEIS.

165 DISPLAY OF EXISTING AND PROPOSED UTILITY CORRIDORS IN THE LITTLE NACHES/NACHES RIVER AREA

COMMENTS INCLUDED:

“We do not understand the “existing” corridor up the Little Naches Valley crossing the crest somewhere near Green Pass as shown on the map on p. III-5 of DEIS. Neither can we figure out the outrageous north-south segment in the vicinity of Chinook Pass that would presumably go through the William O. Douglas Wilderness and Mt., Rainier National Park.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

4477

FOREST SERVICE RESPONSE:

The map on page III-5 of the DEIS is in error. It reflects erroneous information from the 1986 Western Regional Corridor Study by the Western Utility Group. We have informed the group of the error. The map has been corrected in the FEIS.

166 CONCERN FOR COORDINATION OF THE ALPINE LAKES AREA LAND MANAGEMENT PLAN LANDOWNERSHIP DIRECTION WITH THE FOREST PLAN.

COMMENTS INCLUDED:

“The Alpine Lakes Plan contains a land ownership adjustment map. This map should be eliminated from the plan or changed to reflect the actual current situation.”

“The Forest should acquire all lands in the Icicle drainage. Did someone drop the ball on this one? I thought that the Icicle was going to be managed for recreational use, not sold for cabins. If the Alpine Lake Plan does not call for Forest purchase of the lands in the area, then it should be amended to do so.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3879, 4266

FOREST SERVICE RESPONSE:

The Forest Plan incorporates the Alpine Lakes Area Land Management Plan (ALALMP). Therefore, the land ownership classifications and mapping in the ALALMP are carried forward in the Forest Plan intact. At this time, there is no basis for making changes.

The portion of the ALALMP which deals with landownership direction for the Icicle Creek drainage is supplemented by the Icicle Creek Composite. The composite gives project level direction for land acquisition in the Icicle Creek bottomlands. This includes the direction to acquire 867 acres of private land along Icicle Creek. The long term goal is to manage the existing National Forest lands, plus such private lands as may be acquired, primarily for public recreation. There is no intent that all private lands within the drainage be acquired or that the private land owners be prevented from developing their lands.

167 CONCERN FOR THE LANDOWNERSHIP CATEGORIES ASSIGNED FOR THE CHIWAWA RIVER, LAKE CHELAN, BUMPING AND TIETON VALLEYS.

COMMENTS INCLUDED:

“We were dismayed to review your map in the plan (P B-2) on land ownership adjustments especially the planned disposal of some of the finest low elevation forest lands. Why is Chiwawa River corridor in category V needing more study? This is not checkerboard, or on the edge of the Forest. It has significant public resources of old growth, W/S river potential, and fisheries. The shores of Lake Chelan, that are presently federal are termed “best” in private ownership, the same for areas in the Bumping, Rattlesnake and Tieton Valleys. What is the rationale for this? Much of remainder of the forest is in a “case by case” category including areas the preferred Alt has in roadless recreation status. Have you no sense of the tremendous public values on these lands? While lands fall into each category far more should be in II much less in IV and different lands in V.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

4477

FOREST SERVICE RESPONSE:

The Chiwawa River Corridor is covered by management prescription WS-1. This is the prescription for a Scenic River designation (Proposed). The landownership portion of the prescription requires a review of all possible ownership needs for meeting the goal of the prescription, hence the Category V classification. In the case of the Chiwawa, this would probably be a very simple and straight forward matter. It should not be inferred that any existing National Forest system land would become private. At the same time there would probably be no need to acquire the private lands in the drainage.

The lands along Lake Chelan, and the Bumping, Rattlesnake and Tieton Valleys which are in Category IV are those that are mostly other than National Forest ownership and/or are big game winter range areas which could be as well managed by the Department of Wildlife.

Much of the forest falls into Category III because it is compatible with the management prescriptions applied to these areas. This classification provides the flexibility to meet the resource management goals in these areas. This includes those portions of roadless recreation areas which are in a "checkerboard" land ownership pattern. Any potential exchange of land is preceded by extensive public involvement to ensure that public values and concerns are not overlooked. See Appendix B of the Plan for a complete description of the land categories.

***168 FEASIBILITY OF THE FOREST SERVICE ACQUIRING INTERMINGLED LAND.
DESIRABILITY OF ACQUIRING MINERAL RIGHTS WITH LANDS.***

COMMENTS INCLUDED:

"A discussion should also cover the feasibility of the FS acquiring intermingled land. This discussion should include FS policy on securing all mineral rights to any land acquired by purchaser in fee title -- or trade."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0062, 0147, 0415, 0577, 0901, 1955, 2097, 2198, 2753, 2735, 2888, 3244, 3483, 4110, 4259, 4266, 4471, 9094

FOREST SERVICE RESPONSE:

The level of land adjustment planning in the forest plan process is described in the Land Ownership Classification Plan incorporated into the Forest Plan. This classification plan provides broad direction for the long term preferred ownership of lands within the forest. It does not attempt to define or direct specific changes of ownership by owner, priority, or means of making the adjustment.

It is not believed to be feasible or desirable for the Federal Government to acquire all privately owned lands within the Wenatchee National Forest boundary. Instead, the Forest Service will review opportunities for ownership adjustment on a case by case basis with full public involvement under the general direction set down in the Forest Plan. Most ownership changes are likely to be through land exchange.

Those owners with whom there are ongoing land exchange efforts are identified in the plan. These are the ownerships which presently, and in the immediate future, have the greatest likelihood of successful ownership adjustments. It is Forest Service policy of long standing to acquire the mineral rights in any fee title acquisition. If a landowner does not have the mineral rights, they are encouraged to acquire them and pass them to the United States with fee title to the land. Recent examples of this are the Pack River Co. acquisition in the then "Intended Wilderness" portion of the ALpine Lakes area and the ongoing exchanges with the Longview Fiber Co. In both cases the private landowner purchased the mineral rights in order to pass them on to the United States with the fee title.

As this is a national policy of long standing and the Wenatchee National Forest plan does not propose deviating from it, it was not felt necessary to discuss it in the plan.

169 NO MENTION OF LANDS MANAGED BY THE NATIONAL PARK SERVICE AND THE BUREAU OF LAND MANAGEMENT.

COMMENTS INCLUDED:

“This (land adjustment discussion) describes state and private inholdings but not intermingled and adjacent Federal lands. We believe it would be appropriate, to clarify the land patterns, to mention land managed by the National Park Service and the Bureau of Land Management.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

9094

FOREST SERVICE RESPONSE:

Our discussion and planning effort was limited to the intermingled and adjacent non-federal lands because their management has the most potential for creating cumulative environmental impacts which affect adjacent National Forest land, the occurrence of non-conforming uses, and increased management costs. The National Park Service and Bureau of Land Management lands are adjacent to, but not intermingled with the Wenatchee National Forest lands. They are federally owned, the management activities on them are compatible with the management of the adjacent National Forest lands, and there are no transfers of these ownerships in the offing. Therefore, we see no need to address these federal lands in the land adjustment discussion.

170 UTILITY CORRIDORS - ARE RESEARCH NATURAL AREAS EXCLUSION AREAS OR AVOIDANCE AREAS.

COMMENTS INCLUDED:

“In our review, we noted that the Wenatchee National Forest has designated Research Natural Areas as corridor exclusion areas. It is our understanding that the only types of areas that can be called exclusion areas are those having a statutory prohibition to rights-of-way for lineal facilities or corridor designation...we believe Research Natural Areas should be identified in the EIS as avoidance areas rather than exclusion areas.

LETTERS WITH COMMENTS ON THE SUBJECT INCLUDE:

4509

FOREST SERVICE RESPONSE:

We agree. We have changed the Standards in the RN-1 (Research Natural Area) prescription from exclusion to avoidance.

171 ENERGY - SMALL HYDROELECTRIC SITES:

COMMENTS INCLUDED:

“An explanation of the proposed small hydro-electric sites is warranted.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0579, 0828

FOREST SERVICE RESPONSE:

Detailed descriptions of project level activities are beyond the scope of this plan. However, for a brief description of these proposal see Chapter III of the FEIS.

MINERALS

172 THE PLAN DOESN'T APPROPRIATELY RECOGNIZE THE IMPORTANCE OF MINERAL RESOURCES, NOR DOES IT APPEAR THAT MANAGEMENT UNDER THE PLAN WILL ENCOURAGE AND FACILITATE MINERAL EXPLORATION AND DEVELOPMENT ACTIVITIES; AND, IN FACT, IT APPEARS THAT BECAUSE OF THE PLAN'S HIGHLY RESTRICTIVE MANAGEMENT APPROACH IT MAY ACTUALLY DISCOURAGE ANY INTEREST IN EXPLORING FOR OR DEVELOPING THE MINERAL RESOURCES ON THE FOREST.

COMMENTS INCLUDED:

“However, the document does not consider minerals as a valuable resource to be treated on par with other resources in the development of the forest plan, and ultimately on the land allocations.”

“An important issue to the Department (Washington State Department of Natural Resources) is access to land for mineral exploration and mine development. The Department is in support of protecting and improving the opportunities for mineral exploration when consistent with the protection of other resource objectives.”

“The information contained in the mineral section says claims would be withdrawn and acreage closed--why? Is it permissible to do this? We hope further consideration to the mineral areas will be given and allow “rockhounds” to continue their hobby. I don't understand the recurrent comment that access to locatable minerals will be restricted. The mining laws guarantee to right of reasonable access to mining claims.”

“Alternative E and F are anti-mining, and the other alternatives are not generous to the minerals category either.”

“You are ignoring or playing down one of the assets of the lands - the minerals.”

“The proposed plan will seriously suppress mineral exploration and development in those areas of highly restrictive management. We believe this is not, and should not be, the goal of the Forest Service.”

“While the plan acknowledges the right of access to Federal lands that have not been formally withdrawn from mineral entry under the mining laws, it, in fact, will create a tacit withdrawal by making access and operations excessively costly.”

“The Forest Service is not building encouragement for mineral discoveries into its plans. Instead of encouraging mineral activity, each alternative has emphasized highly restrictive management adjacent to wilderness areas. This is neither sound management nor in our National interest. Reopen wilderness areas to mining development.”

“We, the undersigned, strongly protest your proposal to withdraw 2,547 acres and to highly restrict 436,915 acres. We say enough is enough.”

“It is imperative that Forest Service policy is to protect the rights of miners, and to assist and encourage careful development.”

“In general, I oppose further restriction and withdrawals. Reopen closed areas. We enjoy prospecting, so please don't take away our rights. We are tired of more and more land going into wilderness, roads being closed, etc., and in general being harassed by the government. The proposed withdrawals are too drastic. We feel mining should even be permitted in wild rivers if justified. Swauk Pass highway will be highly restricted, but the public actually likes to watch the mining activity. I very much object to your proposed closures. The plan should allow and provide incentives to explore closed areas for minerals because the nation's well-being is vulnerable to the foreign control of non-domestic sources of minerals. The Wenatchee NF has mineral potential which has not been thoroughly explored, and that potential needs to be recognized. Only maximum land availability will give our nation a chance to minimize our critical mineral dependence on off-shore sources. We urge that you not apply highly restrictive management practices to mineral access. The Forest Service is not building encouragement for mineral discoveries into its plans. It appears there has been little consideration for the mining industry. We are dependent on foreign supplies of minerals; lets develop our own.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0047, 0232, 0287, 0296, 0297, 0299, 0308, 0342, 0349, 0352, 0355, 0391, 0425, 0492, 0495, 0498, 0505, 0506, 0543, 0546, 0582, 0642, 0648, 0651, 0829, 1303, 1950, 1963, 1986, 1987, 2066, 2098-2118, 2124, 2129, 2152, 2198, 2724, 2736, 2758, 2764, 2795, 2796, 2811, 2991, 2996, 3064, 3071, 3072, 3086, 3087, 3089, 3092, 3093, 3094, 3196, 3297, 3373, 3447, 3452, 3453, 3455, 3456, 3457, 3458, 3476, 3477, 3494, 3517, 3525, 3526, 3527, 3528, 3536, 3537, 3578, 3581, 3594, 3597, 3598, 3612, 3613, 3618, 3637, 3664, 3665, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3848, 3860, 3929, 3997, 3999, 4006, 4062, 4076, 4077, 4078, 4135, 4137, 4182, 4201, 4249, 4250, 4251, 4252, 4253, 4254, 4255, 4256, 4280, 4284, 4428, 4445, 4478, 4479, 4480, 4481, 4482, 4514, 4515, 4516, 4517, 4518, 4519, 4520, 4521, 4522, 4523, 4524, 4525, 4526, 4527, 4528, 4529, 4530, 4531, 4532, 4533, 4535, 4536, 4537, 4538, 4539, 4540, 4541, 4542, 4543, 4544, 4545, 4546, 4547, 9053, 9083, 9094

FOREST SERVICE RESPONSE:

Mineral resources received equal consideration with other resources in the development of this plan. The plan clearly recognizes the right of reasonable access to mining claims, mineral leases, and mineral permit areas. None of the alternatives call for a substantial amount of land to be withdrawn from entry under the mining and mineral leasing laws. The preferred alternative recommends 2,247 additional acres, or approximately 0.1% of the forest, be considered for withdrawal. Except for the existing withdrawals including wilderness, all other areas on the Forest are considered to be available for mineral exploration, and are available for development should valuable mineral resources be discovered. Our policy is to encourage and facilitate those activities even when such activities are being proposed in areas managed primarily for other resource uses.

The decision to manage lands as semi-primitive, roadless, non-motorized areas, or as other relatively protected areas, was made with a clear understanding that those areas will remain available for mineral exploration and development in an environmentally sensitive manner. If site specific environmental analysis shows a road in an unroaded area or motorized equipment in non-motorized areas is necessary for mineral exploration and development activities, such activity will be approved. The cost of operating in environmentally sensitive areas like those designated as semi-primitive non-motorized areas will probably be higher than it would be in those areas identified for a "general forest" management approach. Those higher cost are mostly due to the environmental sensitivity of the area, and are not due solely to the prescription under which the area will be managed. In addition, the cost of meeting the environmental restrictions attached to approved operating plans will be considered when determining if those restrictions are technologically, environmentally and economically reasonable (36 CFR 228.5 (a)).

Mineral resources have been recognized as a very valuable resource in our planning process. The Forest Plan gives more emphasis to the need for mining access and the need to minimize the number of new withdrawals proposed (see Chapter IV of the Plan). In this way, the plan better reflects our policy of encouraging and facilitating, in an environmentally sensitive manner, mineral exploration and development activities proposed for lands open to such activities.

173 MINERAL EVALUATION PROCESS AND TERMINOLOGY CONCERNS.

COMMENTS INCLUDED:

"Treatment of mineral potential is confusing due to a lack of clear statement of the terms and the methodology used."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

9094

FOREST SERVICE RESPONSE:

The assessment of the mineral potential in Chapter III of the FEIS has been changed to more accurately reflect the mineral potential evaluation process. This not only should clarify the terms and methodology used, but also incorporated some of the public and agency suggestions.

174 COAL RESOURCE CONCERNS.

COMMENTS INCLUDED:

“The KCRA should be shown on Figure III-12”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

9094

FOREST SERVICE RESPONSE:

We did attempt to show the “known coal resource areas” here. Because there are only 106 acres of Forest land classified in this manner, it does not show up on the scale of map used in Figure III-12. However, this information is available for review on the leasable mineral classification maps available in either the Wenatchee Forest headquarters at Wenatchee or in the local BLM offices.

175 CONCERNS ABOUT DISPOSING OF THE MINERAL ESTATE THROUGH EXCHANGE OR SALES.

COMMENTS INCLUDED:

Areas identified for land disposal include much land which is valuable for coal, oil, and gas, geothermal, and hardrock leaseables.”

“An explanation as to how the determination that it would be in the best interest of the public to dispose of lands and whether the mineral estate would be reserved to the Federal Government would be useful to reviewers.”

“Future land swapping (trading of our mineral rights) is a concern.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3860, 9094

FOREST SERVICE RESPONSE:

A statement about public interest and mineral resource evaluations for land exchange actions may be beneficial to those reviewing this plan. We have attempted to provide some information under the Minerals section in Chapter III of the FEIS. This information does not go into much detail about the evaluation process, but the evaluation is detailed and very comprehensive. This section does provide the appropriate references to be consulted for further information about the process. In any case, thorough evaluation of the mineral resources is done when a land exchange is proposed. The results of that evaluation along with the surface values and other objectives of the exchange are considered in determining whether the exchange is in the public interest and/or whether the mineral estate should be reserved. If land is exchanged out of public ownership, mineral rights are exchanged with it, just as mineral rights are acquired with the new land being added to the National Forest.

176 SUGGESTED MODIFICATION OF MINERAL TABLES IN CHAPTER IV OF THE DEIS.

COMMENTS INCLUDED:

“The tables on pages IV-79 through IV-85 are excellent; however, we feel they could be substituted by a table used by the Wallowa-Whitman National Forest and by adding the access categories used by the Beaverhead National Forest.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0596, 9094

FOREST SERVICE RESPONSE:

We have modified the Tables in Chapter IV of the FEIS. As you will note, we have not used exactly the same format as was suggested (the Wallowa-Whitman). However, our tables provide some additional information, which we feel will be useful for any reviewer’s analysis.

177 A SUGGESTION TO INCLUDE THE MINERAL RESOURCE POTENTIAL MAPS IN THE DOCUMENT ITSELF.

COMMENTS INCLUDED:

“The Mineral Potential Map located on Page III-89 of the DEIS should be enlarged to the same scale as the color alternative maps. The maps attached to your letter of July 18, 1986 were excellent. Maps of this kind included in the EIS are essential for those readers who wish to understand mineral resource potential, how these resources will be managed, and how this management is related to the management of other resources.”

“We request that the computer-generated maps which demonstrated proposed management practice on areas of mineral potential be included in the report. Mineral potential maps for each one of the Roadless areas would also be beneficial.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0596, 9094

FOREST SERVICE RESPONSE:

The referenced maps would be especially useful to those reviewing the plan, and we would like to be able to include such maps as part of the public documents. However, including this scale of map for all the resources of interest is cost prohibitive and, therefore, a decision has been made not to do so. They are available for use in the Forest Supervisor’s office in Wenatchee, Washington, and they can be generated at cost for those members of the public who request a copy.

178 OFFERS TO PROVIDE MINERAL RESOURCE DATA.

COMMENTS INCLUDED:

“We cannot provide input with regard to areas of mineral resource potential at this time. We are planning to provide you with this data in the future and hopefully will be able to compensate with quality” (U.S. Bureau of Mines).”

“Our Geology and Earth Resources Division Staff may have information on specific areas in the Wenatchee National Forest of mineral interest. Feel free to call Ray Lasmanis.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0342, 0596

FOREST SERVICE RESPONSE:

We appreciate the offers to assist us with mineral resource potential data, and it would have been especially nice to have that input for use in this FEIS. However, we also realize how limits on budgets and manpower can affect the ability to provide such input. Our planning process is a dynamic process, and we look forward to your input for use in amending, revising or updating this Forest Plan in the future.

179 CONCERNS ABOUT ENVIRONMENTAL IMPACTS OF MINING, THE GENERATION OF DANGEROUS MINING WASTE AND STATE REGULATORY AUTHORITY.

COMMENTS INCLUDED:

“Mine spoils may contain heavy metals. These potential sources of hazardous materials need to be identified and evaluated. If the evaluation determines there are solid or dangerous wastes present at these mining sites, disposal shall be in compliance with Chapter 173-303 and 304 (WAC).”

“Toxic materials commonly released by mining are arsenic, cadmium, cobalt, copper, iron, lead, manganese, mercury, nickel and zinc. Fish mortality can result from exposure to these metals in high concentrations, continuous exposure to low levels of the metals may produce chronic effects. You should require halting of any management activity that leads to violations of State water quality standards.”

“Page III-86 --As mentioned earlier, Hydraulic Project approval is required for any in stream prospecting activity. The Forest Service should recognize State authority to manage mineral activities in rivers.”

“Under mining activities, only past mining is discussed with no discussion of future activities such as road building and site disturbance for exploration or extraction. Even through these topics may be covered in separate, project-specific environmental documents, some generic impacts should be covered.”

“Page IV-128--The riparian zone is not appropriate for disposal of toxic mine tailing. Page IV-106--Impacts are described as temporary, however, coal mining operations often last for decades’. There is no discussion of what happens to the environment if a major portion of

the mineral potential areas are developed. This oversight violates NEPA, which requires a consideration of cumulative impacts. Impacts to lakes and ponds from mining activities are not address. Mining and cattle pollute our waters more than any other use.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0032, 0579, 0582, 2736, 2829, 3553, 3862, 9094, 0018S, 0183S, 1144S

FOREST SERVICE RESPONSE:

As noted in Chapter IV of the FEIS, mining can have environmental effects, but the Forest Plan is not designed to evaluate site-specific and project-level impacts. Mining-related activities are usually initiated by the mining industry, and industry’s interest in conducting such activities is highly dependent upon the supply/demand situation, the results of exploration and other factors. As a result we do not know specifically where, when or what type of mineral activities will be conducted. However, as specified by federal surface management regulations (36 CFR 228 regulations) the impacts of mining and using and/or generating hazardous or toxic materials in a proposed mining operation will be evaluated in an environmental analysis/environmental impact statement. This is completed when a plan of operation is received. Any approved plan will include a requirement to minimize impacts and protect the environment from any use or generation of hazardous or toxic materials. In addition, any operator who uses or generates such materials is required by law to meet all applicable federal and state requirements concerning such substances. Mining activities must also comply with the State water quality requirements and miners must secure a hydraulic permit from the State before operating within the high water line of streams and rivers.

180 A DISCREPANCY IN ACREAGE FIGURES.

COMMENTS INCLUDED:

“Page II-48--Withdrawal figure of 12,826 acres disagrees with numbers given in the accompanying table.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582

FOREST SERVICE RESPONSE:

The apparent discrepancy is due to two factors. First, the 12,826 acres includes the total withdrawn area. However, the acreages reflected in the table are only those areas which have been identified as having a potential for the occurrence of locatable minerals, oil & gas, geothermal resources and coal. Secondly, the area identified as having potential for the occurrence of specific mineral resources can overlap, and that overlap is not identified in the table and narrative figures.

181 CONCERN ABOUT WATER QUALITY STANDARDS AND MONITORING AND EVALUATION OF THE PLAN.

COMMENTS INCLUDED:

“What are the standards for instream compliance; what will be measured? It would seem that this type of monitoring is superficial at the cost and using the methods listed. How much water quality monitoring is the mining company responsible for? Within what time period will a 10% increase in activity on active claims be evaluated. Is there a threshold level of surface disturbance in terms of area or magnitude or delivered sediment which should not be exceeded?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0579, 3553, 4485

FOREST SERVICE RESPONSE:

Mining operators are required by law to meet all State and Federal water quality standards, and are required to obtain any appropriate Federal and State hydraulic and discharge permits. The standards to be met, the monitoring and compliance requirements, and the parties responsible for ensuring the appropriate standards are met are established at the time mineral-related activity is proposed and evaluated but before it is approved. In most cases, the mining company is responsible for conducting the monitoring activities, while the administering agency is responsible for ensuring that monitoring is conducted in the appropriate manner. The monitoring and evaluation program in Chapter V of the Forest Plan is designed to ensure that on-the-ground administrators perform the appropriate compliance checks as required by 36 CFR 228.7 and other regulations. Those compliance checks should ensure the objectives of the Forest Plan are met. This plan has no established threshold level of surface disturbance in terms of areas or delivered sediment. Any such standards will be established as part of the approval process for the plan of operation. It is intended that if the mining-related activity within a management area increases more than 10% in any one year, the effects of that activity will be evaluated to ensure the activity being conducted is in compliance with the objectives of this plan.

182 CONSIDERING THE COST OF ENVIRONMENTAL PROTECTION IN MINING PLAN APPROVAL.

COMMENTS INCLUDED:

“Should the cost of reclamation or environmental protection be an important factor in approving mining-related activities.”

“Although costs of operating must be considered by mining companies before undertaking an operation, why is it the responsibility of the Forest Service to assure them that any activity may be conducted at a profit. If safeguarding the environment costs a certain amount, why must an operating plan be watered down so that costs to the operator are less than costs to the environment?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

4485

FOREST SERVICE RESPONSE:

36 CFR Part 228.5 (a) requires the authorized officer to “analyze the proposal, considering the economics of the operation along with the other factors in determining the reasonableness of the requirements for surface resource protection”. It further states that “all operations shall be conducted so as, where feasible, to minimize adverse environmental impacts” (36 CFR 228.8). The importance of protecting the environment and the cost of providing that protection are aspects of operating that both the Forest Service and the mining industry well recognize. However, we also recognize that mineral resources are very important to the well-being of our nation and, therefore, we have the responsibility for encouraging and facilitating mineral activities. We have the responsibility of balancing the nation’s need for minerals with the need to protect the environment. To do this we must be technologically, economically, and environmentally sensitive when determining the reasonableness and the extent of environmental protection requirements to be required when approving operating plans.

183 MINING MAY BE NECESSARY, BUT IT SHOULD BE STRINGENTLY CONTROLLED AND HEAVILY CONSTRAINED.

COMMENTS INCLUDED:

“Mineral development would be possible if it doesn’t impact any other use.”

“Mining activities need to have heavy constraints applied to protect soils and aesthetics.”

“Mining should be prohibited, and our resources should be saved for the future.”

“Mineral exploitation represents a blatantly, inherently unsustainable industry and the practice should not be allowed.”

“Are you allowing a lot of mineral activity because it gives dollars to the Federal Government, or because the nation needs the resources.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0040, 0062, 0147, 0185, 0561, 0577, 2131, 2156, 2724, 2729, 2732, 2798, 2849, 2996, 3394, 3989, 4449, 4454, 9092

FOREST SERVICE RESPONSE:

The availability of mineral and energy resources within the National Forests affects the development, economic growth and defense of the Nation. Because of this importance and several laws, it is the policy of the Forest Service to encourage and facilitate the orderly exploration, development and production of mineral resources. As stated in Chapter IV of the Forest Plan the objective is that new mineral resources be discovered and a viable and healthy minerals industry is maintained. Over-restriction could discourage interest in conducting mineral exploration and development activities. However, it is also Forest Service policy to ensure that mineral activities are conducted in an environmentally sound manner, and to ensure that lands disturbed by mining activity are appropriately reclaimed for other productive uses.

184 NO MINING IN WILDERNESS SHOULD BE ALLOWED.

COMMENTS INCLUDED:

“Any mineral development in wilderness areas should be categorically forbidden.”

“We would prefer that mining not be allowed in wilderness.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0047, 2732, 2996

FOREST SERVICE RESPONSE:

Mining in designated wilderness areas is permitted only when valid existing rights to mine have been established prior to December 31, 1983 or prior to the date an area was designated as wilderness under a subsequent wilderness bill. This would occur when a valuable mineral deposit had been discovered and claims were located prior to the date of withdrawal, or when a mineral lease or mineral permit had been issued prior to the withdrawal as wilderness. Prior to approval of any mining activities, however, valid existing rights to mine will have to be confirmed. If valid rights exist, to not allow such activity would be contrary to the law and a form of “taking” of one’s legal rights.

Even though mining occurs only when prior existing rights exist, the Wilderness Act does provide for prospecting activities, and actually directs the U.S. Geological Service and U.S. Bureau of Mines to determine the mineral values in wilderness areas by conducting planned and recurring mineral surveys. Refer to Appendix E, Wilderness Management, of the Forest Plan for a discussion of mining related activities within Wilderness areas.

185 WE SHOULD PROVIDE FOR RECREATIONAL MINERAL COLLECTING, PANNING, SLUICING, AND DREDGING.

COMMENTS INCLUDED:

“Gemstone and specimen crystal areas should be withdrawn from mineral entry, but managed for public recreation use.”

“We would support alternative A or C provided further attention is given to assuring road access is maintained to the rock and mineral collecting localities. Many members are elderly or physically unable to hike long distances.”

“If there is an agreement to further study and possibly change Alternative C to ensure access to collecting areas, then we will support Alternative C.”

“If you are going to withdraw parts of the forest, I suggest gold placer areas be set aside for everyone to use.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0225, 0239, 0240, 0606, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2124, 2152, 2198, 2736, 2811, 2821, 2991, 3064, 3071, 3072, 3086, 3087, 3089, 3092, 3093, 3094, 3196, 3372, 3447, 3451, 3452, 3453, 3454, 3455, 3456, 3457,

3458, 3476, 3477, 3494, 3506, 3517, 3525, 3526, 3527, 3528, 3536, 3537, 3578, 3594, 3597, 3598, 3612, 3613, 3618, 3637, 3664, 3665, 3746, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3848, 3881, 3929, 3997, 3999, 4006, 4033, 4062, 4076, 4077, 4078, 4135, 4137, 4182, 4201, 4249, 4250, 4251, 4252, 4253, 4254, 4255, 4256, 4280, 4284, 4302, 4428, 4465, 4478, 4479, 4480, 4481, 4482, 4514, 4515, 4516, 4517, 4518, 4519, 4520, 4521, 4522, 4523, 4524, 4525, 4526, 4527, 4528, 4529, 4530, 4531, 4532, 4533, 4535, 4536, 4537, 4538, 4539, 4540, 4541, 4542, 4543, 4544, 4545, 4546, 4547, 9053, 9083, 9090

FOREST SERVICE RESPONSE:

The plan does not propose that any specific areas be withdrawn for recreational mineral collecting, panning, sluicing and dredging activities. It is recognized that there is a demand for such activities, and the Forest-wide Standard and Guideline for minerals provides for such opportunities (see Chapter IV of the Forest Plan). This Standard and Guideline does not, however, require that areas be withdrawn for such purposes. If after the plan is implemented specific problem areas are identified and the demand justifies a withdrawal for such purposes, there are provisions for amending or supplementing the plan to accommodate such proposals.

186 THERE ARE CONCERNS THAT THE MINERAL RESOURCES HAVE NOT BEEN ADEQUATELY INVENTORIED FOR THIS PLANNING EFFORT.

COMMENTS INCLUDED:

“In congressional instruction all lands were to first have a mineral survey, and this was not done. If lands have history of mining, they were to be set aside for minerals and, therefore, the proposals are without legal justification.”

“A real mineral survey of the whole area has not yet been done and you show that there is not significant amounts of minerals. Things should be left as they area until more mineral study has been done.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0047, 0666, 3778

FOREST SERVICE RESPONSE:

It is true that on-the-ground mineral surveys supplemented by surface and subsurface sampling were not done. We have neither the money nor the man-power to conduct such surveys. Normally, exploration is conducted by the mining industry, and our objective is to encourage such activities, not to conduct the mineral resource data gathering activities ourselves. Ultimately, we believe that the exact nature, extent, and location of any new resources will be determined by industry through exploration under the 1872 Mining Laws. We, however, have completed a mineral evaluation using all available pertinent mineral resource occurrence and geologic data, this included U.S. Geological Survey, U.S. Bureau of Mines and State sources of information. Through that evaluation areas having a potential for the occurrence of locatable mineral resources have been identified. In addition to the locatable mineral resource areas, the BLM has identified areas having potential for the occurrence of leasable mineral resources (coal, oil and gas, geothermal). The Forest has completed a minerals materials inventory which identifies where those resources occur. We feel that these evaluations adequately serve our needs for this planning effort, and our evaluation meets the land management planning requirements for mineral evaluations.

Chapter II of the Forest Plan addresses the information needs for mineral resources. As new mineral information becomes available through our own efforts or the efforts of the mining industry, it can be used to supplement or amend our land management plan appropriately. Under this Forest Plan very little new area would be withdrawn from mineral exploration and development activities. It is our intention to encourage those interested in conducting mineral information gathering activities.

187 HOLDEN TAILINGS ARE OF CONCERN.

COMMENTS INCLUDED:

“Holden tailings are an eyesore and a source of air pollution, and I would encourage reclamation without restricting mineral rights.”

“Reclaim and reforest Holden tailings. I would favor any plan that would stabilize Holden tailings.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0293, 0494, 2795, 3297

FOREST SERVICE RESPONSE:

Money has been appropriated from the Department of Agriculture fund for hazardous waste cleanup. The reclamation of the area is already underway and is to be completed within the next 3 years.

188 T & E SPECIES HABITAT SHOULD BE PROTECTED FROM THE IMPACTS OF MINING.

COMMENTS INCLUDED:

“Threatened species habitat should be withdrawn, or no surface occupancy should be allowed. We suggest that operating plans definitely be rejected if there is an unavoidable conflict with endangered species habitat.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582, 4477

FOREST SERVICE RESPONSE:

By law, threatened and endangered species are to be protected. A withdrawal is not necessary to ensure appropriate protection is provided. If mining activities are proposed and a threatened or endangered species will be affected, the impacts on the species will be analyzed. A U.S. Fish and Wildlife Service consultation process will be completed, and a decision will be made on whether the activity should be approved. If approved, stipulations and reclamation requirements will be made part of the approved operating plan to ensure appropriate protection is provided. If impacts to a threatened or endangered species or its habitat cannot not be prevented or appropriately mitigated, the mining activity would not be approved.

189 EXPLORATION ACTIVITIES COMMENTS

COMMENTS INCLUDED:

“Exploration is not destructive.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0287, 2129

FOREST SERVICE RESPONSE:

Most mineral exploration activities can be conducted in an environmentally sound and safe manner. The mining industry is willing to take extra precautions to ensure the environment is appropriately protected. We appreciate comments that recognize this fact, and recognize the important role that exploration plays in our efforts to know where and what type of minerals occur on our public lands.

190 POSITIVE COMMENTS.

COMMENTS INCLUDED:

“I feel it addresses the mineral rights and claims well. The Interaction With Other Resources section of the DEIS (page III-153) was especially useful.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2756, 9094

FOREST SERVICE RESPONSE:

We appreciate positive comments which identify especially useful or beneficial parts of this document

191 SUGGESTED MITIGATING MEASURE

COMMENTS INCLUDED:

“Page III-138, paragraph 1. Another mitigation possibility is to restrict permitted mining to certain seasons.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582

FOREST SERVICE RESPONSE:

We appreciate the suggestion, and we will be using such a mitigating measure when a seasonal restriction is reasonable and necessary. Mitigating measures are discussed in Chapter IV of the FEIS.

192 THE FOREST SERVICE DOES NOT HAVE THE AUTHORITY TO WITHDRAW LANDS.

COMMENTS INCLUDED:

“The National Forest Management Act of 1976 does not give the Forest Service authority to withdraw mining rights from NF lands. It takes an Act of Congress to withdraw those rights. I understand that the USFS only has jurisdiction on surface rights and not mineral rights as far as management goes.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3881

FOREST SERVICE RESPONSE:

Withdrawals of public lands are made through the Secretary of Interior who has the authority to withdraw public lands from entry under the mining and mineral leasing laws. The Forest Service has the responsibility to manage the surface resources. If existing laws and regulations will not provide appropriate protection for sensitive resources, the agency may decide that a withdrawal is in the public's interest and would recommend the Secretary of Interior establish a withdrawal. This Forest Plan will not, by itself, result in the establishment of any withdrawals.

193 CONCERN ABOUT THE EFFECTS THAT MINING MAY HAVE ON THE LITTLE WENATCHEE AND WENATCHEE RIVERS, AND ON LAKE WENATCHEE.

COMMENTS INCLUDED:

“I believe mining on the Little Wenatchee would have a disastrous effect on the water quality of the river as well as on Lake Wenatchee and possibly the Wenatchee River as well. There are numerous examples where mining, leaching and refuse have destroyed the local environment as well as the aquatic and plant life.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0059S

FOREST SERVICE RESPONSE:

Mining operators are required by law to meet all Federal and State water quality standards, and any approved operating plan will include provisions to ensure those water quality standards are met. (Refer to Chapter IV of the FEIS and to Chapter V of the Forest Plan.)

ROADS

194 THERE IS CONCERN ABOUT THE EFFECTS OF ROAD CLOSURES.

COMMENTS INCLUDED:

“What we don’t like to see are iron gates and the humps in the roads that keep us out.”

“The Forest-wide Standards and Guidelines for road development and management do not adequately recognize and protect wildlife values.”

“Road mileage should be minimized, with all roads closed to public access.”

“Get rid of those.....gates unless they restrict everyone, including the FS. No one (private individual or concern) should be able to control access by the general public over public land over roads or trails constructed wholly or in part with public funds.”

“I’m sure the public i.e. hunters, fishermen recreationists wouldn’t mind the road construction so much if the powers that be would also develop a plan to bar road accessibility after the timber harvest is complete.”

“Keep the roads open to rock collecting sites. The closing of roads would create a problem for a lot of people who are not able to get out and hike miles to some areas.”

“We strongly object to the proposal to leave unused roads open except where clear resource conflict can be proven. We suggest that the reverse should be true. All roads should be closed unless no conflict can be proven.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0049, 0062, 0143, 0232, 0325, 0363, 0386, 0429, 0582, 0588, 0610, 0748, 0789, 0896, 1118, 1300, 1504, 1939, 1940, 1960, 2054, 2114, 2124, 2131, 2530, 2753, 2779, 2782, 2900, 2913, 2961, 3158, 3255, 3256, 3363, 3371, 3372, 3375, 3398, 3642, 3686, 3746, 3796, 3860, 3936, 3991, 4104, 4153, 4186, 4263, 4271, 4280, 4406, 4423, 4425, 4434, 4435, 4475, 4485, 4503, 9084,

FOREST SERVICE RESPONSE:

In response to the public comments, the road closure statement in the Forest-wide Standards and Guidelines has been changed. All new roads constructed will be closed unless the project analysis documents the need for continued public motor vehicle access. Unless there is a reason to close them, existing roads open to the public will remain open. The implementation of this standard and guideline is expected to result in about the same amount of public access by automobile as is currently available. Timber sale roads will remain open for firewood removal as appropriate. Nothing in this policy is intended to abridge the access rights of miners that are provided for under law. See Chapter IV, Standards and Guidelines, of the Forest Plan for a detailed discussion.

“Several of the alternatives should have shown a non construction option for the road. By having only one alternative which does not allow the road to be built, the outcome is heavily weighted in favor of construction. This is in violation of NEPA.”

“In another ill-advised provision of the Draft Plan, the Wenatchee National Forest proposes to build a logging road over Naches Pass. In view of the natural and historical values in Naches Pass, we are also proposing to Congress the designation of a Naches Pass National Monument to be administered by the National Park Service.”

“No log haul road should be built in Naches Pass. Such a road would not only damage this old pioneer trail, but would also hurt the Pacific Crest Trail..”

“I am categorically against the construction of Naches Pass road in any form and definitely against the Forest Service sharing in the cost of construction.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0071, 0076, 0078, 0091, 0107, 0114, 0115, 0343, 0363, 0429, 0438, 0441, 0519, 0582, 0602, 0609, 0632, 0635, 0661, 0667, 0717, 0748, 0790, 0820, 0830, 0836, 0862, 0901, 1009, 1302, 1941, 1947, 1955, 1999, 2004, 2020, 2021, 2038, 2168, 2174, 2714, 2718, 2723, 2776, 2789, 2800, 2804, 2850, 2852, 2855, 2863, 2887, 2893, 2895, 2907, 2932, 2951, 2957, 2959, 2980, 2988, 2997, 3002, 3004, 3008, 3056, 3060, 3091, 3103, 3106, 3107, 3140, 3141, 3148, 3149, 3163, 3177, 3179, 3186, 3187, 3193, 3206, 3215, 3228, 3243, 3253, 3271, 3292, 3315, 3319, 3352, 3360, 3362, 3367, 3374, 3399, 3406, 3429, 3437, 3446, 3460, 3480, 3493, 3504, 3509, 3515, 3520, 3542, 3579, 3583, 3593, 3599, 3606, 3639, 3657, 3673, 3678, 3683, 3685, 3693, 3707, 3753, 3769, 3770, 3792, 3795, 3834, 3838, 3867, 3885, 3947, 3992, 4004, 4020, 4037, 4061, 4065, 4067, 4105, 4112, 4139, 4157, 4158, 4161, 4170, 4178, 4194, 4233, 4234, 4242, 4257, 4260, 4261, 4277, 4279, 4282, 4301, 4437, 4439, 4449, 4452, 4460, 4474, 4477, 4491, 4492, 4493, 4498, 4507, 4511, 9017, 9032, 9041, 9046, 9091

FOREST SERVICE RESPONSE:

Public comment on this potential project was heavily opposed. The Forest Service sees no need for the construction of the Naches Pass Road so there is no proposal in the Forest Plan or FEIS for the project.

In 1982 in response to a request by Burlington Northern to build a log haul road near Naches Pass, the Forest Service Prepared the Naches Pass Final Environmental Impact Statement (FEIS). At that time, the Regional Forester selected Alternative # 1. See Page 13 of The Naches Pass FEIS.

“The decision on the need for a tie road, as well as the decision concerning Forest Service sharing in the road for commercial haul and public use, would be deferred until the National Forest Plans for the respective areas are completed. These plans would make the land allocation decisions for the areas involved in the proposed project. A decision would then be made on the Naches Pass Road proposal based on the land allocations.”

With the approval of the Forest Plans for the Wenatchee and Mt. Baker Snoqualmie National Forests, the Forest Service will have allocated the lands in this area. Those land allocations would not prohibit the construction of the Naches Pass road. However, the Forest Service has no need for the road and does not plan to construct such a facility for management purposes. There is no current proposal to construct the road over Naches Pass by any of the private property owners. If and when there is one, the

project would be subject to the appropriate site specific environmental analysis. That analysis would consider a full range of alternatives from no road to one that is suitable for mixed public traffic. At that time, the public would have an additional opportunity to comment.

196 THERE IS CONCERN ABOUT ROAD CONSTRUCTION AND EFFECTS ON FOREST RESOURCES

COMMENTS INCLUDED:

“I am concerned in general about increased roading and a potential increase in timber harvest. The analysis itself states that “Roads generate most of the negative effects on water, soil, fish, and wildlife.”

“There should be access for personal recreation and logging. Road access is the only way for people who could not otherwise enjoy forest recreation.”

“We are particularly concerned about the increase in road construction proposed. These additional roads will reduce trail mileage, increase fishing pressure on fragile mountain lakes, increase sedimentation and eliminate the lower forested trails.”

“Private transportation, highly consumptive and wasteful, is to be phased out within the first two decades. By the end of the fifth decade, the public system will consist of the two shuttles, one each on Highways 2 and 97.”

“Of all forest management tools, roads are the most impacting. Each mile of road requires the destruction of four acres of wildlife habitat.”

“In reference to the pending plan, no new roads are needed, unless we are going to use these roads to destroy the forest.”

“The local residents see the danger of locked gates and roadless areas where only a few could ever see the land we use and enjoy so freely today.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0001, 0009, 0032, 0036, 0040, 0062, 0067, 0071, 0076-0078, 0108, 0116, 0147, 0202, 0232, 0286-0297, 0308, 0349, 0352-0353, 0355, 0358, 0363, 0386, 0391, 0395, 0425, 0429, 0433, 0441, 0484, 0492, 0495, 0498-0499, 0502, 0505-0508, 0521, 0545-0546, 0549, 0552-0553, 0566, 0572, 0575, 0577, 0582, 0586, 0605, 0609, 0610, 0616, 0635-0636, 0642, 0648, 0651, 0713, 0715, 0744, 0749, 0789, 0790, 0882, 0896, 0898, 1300, 1304, 1700, 1940, 1963, 1986, 1987, 1995, 1997, 2001, 2019, 2036, 2053, 2054, 2066, 2074, 2078, 2096, 2120, 2131, 2132, 2138, 2141, 2173, 2174, 2208, 2729, 2732, 2734, 2768, 2776, 2782, 2785, 2789, 2815, 2825, 2826, 2831, 2833, 2838, 2846, 2849, 2850, 2854, 2862, 2877, 2880, 2888, 2899, 2900, 2911, 2913, 2916, 2943, 2951, 2956, 2961, 2965, 2968, 2977, 2981, 2992, 2999, 3006, 3007, 3008, 3017, 3030, 3031, 3039, 3065, 3067, 3083, 3091, 3095, 3099, 3102, 3103, 3118, 3129, 3131, 3133, 3134, 3137, 3158, 3191, 3195, 3198, 3205, 3206, 3212, 3223, 3225, 3233, 3234, 3235, 3237, 3249, 3253, 3255, 3256, 3260, 3263, 3284, 3287, 3297, 3314, 3318, 3319, 3330, 3333, 3363, 3367, 3370, 3373, 3374, 3389, 3392, 3394, 3398, 3406, 3429, 3433, 3439, 3440, 3446, 3464, 3470, 3472, 3475, 3501, 3515, 3529, 3539, 3543, 3550, 3553, 3563, 3571, 3577, 3579, 3583, 3592, 3593, 3606, 3607, 3610, 3611, 3621, 3625, 3632, 3639, 3649, 3652, 3659, 3673, 3710, 3740, 3742, 3743, 3746, 3756, 3763, 3764, 3765, 3767, 3774, 3775, 3777, 3795, 3797, 3799, 3804, 3811, 3835, 3862, 3868, 3873, 3876, 3889, 3906, 3910, 3911, 3936, 3951, 3955,

3992, 4061, 4069, 4074, 4081, 4133, 4145, 4149, 4150, 4153, 4154, 4170, 4181, 4186, 4200, 4205, 4208, 4210, 4213, 4214, 4241, 4242, 4243, 4245, 4257, 4263, 4264, 4270, 4293, 4296, 4312, 4416, 4417, 4418, 4425, 4427, 4434, 4444, 4445, 4446, 4447, 4449, 4453, 4455, 4465, 4466, 4471, 4474, 4477, 4485, 4493, 4494, 4496, 4498, 4501, 4503, 4510, 4534, 9004, 9022, 9034, 9065, 9074, 9091, 9092, 9094, 0091S, 0176S

FOREST SERVICE RESPONSE:

Many respondents to the Plan are concerned about the construction of additional roads on the Forest. There will be no program of road construction for roads construction's sake on the Forest. Two-thirds of the Forest is unroaded today and under the Forest Plan more than 50 percent of the Forest would be managed in an unroaded condition forever. All but an insignificant amount of the expected road construction will be to facilitate logging, which by law is one of the established uses of the National Forests. Helicopter and long-span cable yarding systems may be used in areas of the forest where roading impacts are unacceptable because of steepness of terrain, unstable soils, or very high scenic values. However, new road systems will continue to be needed to provide access for more economical logging methods in many areas of commercial forest land.

Approximately 75 percent of the total expected road mileage already has been built on the Wenatchee Forest. Road building practices employed for the last 30 years have had some impact on forest resources. However, Chapter III of the FEIS shows that, with some local exceptions, the Forest is in very good condition. Within budget limitations, the Forest Service is identifying and correcting those undesirable road-related impacts that have occurred because of past practices. The Standards and Guidelines and Monitoring Plan in Chapters IV and V of the Forest Plan have been developed with the intent of preventing future adverse environmental impacts and mitigating those that cannot be avoided. With this direction we believe that the remaining 25 percent of necessary roads can be constructed with much less impact.

It is an objective of the Plan to build the least amount of road necessary to accomplish resource objectives. Roads will be built at the lowest practical standard to minimize impacts on forest resources. All proposed road projects will be subject to the appropriate site specific environmental analysis with the opportunity for public review and comment.

197 THERE IS CONCERN ABOUT THE AMOUNT OF ROAD PER SECTION.

COMMENTS INCLUDED:

“Road density in the past has averaged 4 MI/SQ MI. Current roading practices will reduce this to 3MI/SQ MI on newly roaded lands (DEIS IV-92). However, because the remaining timber base will be on those lands of greater than average steepness, this reduction in road density may reflect a change in harvest method rather than roading method.....If by closing 50% of the roads we arrive at a road density of 3MI/SQ MI, then the road density just after logging is 6MI/SQ MI....Where is the error in these calculations ? Possible actual road densities are really higher than stated or the degree of road closure is not as high as stated.”

“We strongly recommend maximums of 0.2 MI/SQ MI in important wildlife areas and 1 MI/SQ MI elsewhere. On the next page, typical road densities proposed for currently unroaded areas are also high. In addition, even these numbers understate impacts if spur and dead end road mileage is not counted.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0582, 3205, 3255, 3963, 4485, 4493

FOREST SERVICE RESPONSE:

Logging road densities are for the most part determined by the location of the timber to be harvested and the yarding method to be used. The anticipated reduction in the existing road density of 3.75 to 3.00 miles per square mile is the result of the use of more advanced logging systems that can yard the timber (pull felled trees) for greater distances and therefore require fewer roads. All the road densities in the DEIS included both open and closed roads and included all permanent roads (including "spur" roads and "dead end" roads). Temporary roads built during a timber sale are required by law to be revegetated and returned to production.

It is our opinion that road density figures are useful for estimating potential environmental effects in a programmatic analysis such as a Forest Plan but that a site specific project analysis is a more appropriate method for making decisions on road management in a given area. Such analysis can consider other important factors including thermal and hiding cover, forage, species sensitivity, wildlife populations and habitat quality. It may be that 0.2 mile of open road is intolerable in key wildlife areas while more than 1.0 mile of primitive road would have no effect on habitat effectiveness in other areas. To reduce the open road density on the Forest to 1.0 mile per square mile would require the closure of 73% of the existing roads. Such a substantial reduction of public access seems unwarranted.

Road densities will be maintained at the minimum levels necessary to permit management of resources and to allow desired public access for appropriate multiple uses. New roads constructed for timber management will be closed after the project unless the environmental analysis shows a need for long-term public access. Wildlife needs will be carefully considered in that process.

FIRE

198 FIRE MANAGEMENT ACTIVITIES NEED TO BE SUITED TO THE THE SPECIFIC AREA ON WHICH THEY ARE BEING IMPLEMENTED. IN SOME INSTANCES PRESCRIBED FIRE NEEDS TO BE APPLIED AND IN OTHER SITUATIONS THE SUPPRESSION OF WILDFIRES IS NECESSARY.

COMMENTS INCLUDED:

"We ask that you add: "which maintain multi-layered, uneven-aged stands."

"These figures are very close to your current program. This appears to conflict with the statement on page IV-22, par. 3 that burning of forest residues will be discouraged."

"You are now burning slash on soil types that the D.N.R. has classified hazardous for slash burning. You may need to be more specific in prohibiting this."

"A very specific fire management plan must be developed, giving clear management direction. Otherwise we will continue to fight Wilderness Fires inappropriately."

"Prescribed fires in Wilderness should not be allowed- Why waste the money?"

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0024, 0049, 0062, 0150, 0243, 0400, 0577, 0582, 0793, 0796, 0823, 2102, 2758, 2819, 2878, 2879, 2968, 3256, 3642, 3746, 3775, 3911, 4403, 4428, 4497, 4498, 4503, 9014, 0030S, 0038S, 0118S, 2061S

FOREST SERVICE RESPONSE:

The reader should review Chapter III, the Affected Environment, and Chapter IV, the Environmental Consequences, of the FEIS. In these sections an overview of the fire management strategies proposed for the Wenatchee National Forest can be found.

The Forest Service recognizes two types of fires: Wildfires and Prescribed Fires. They are managed differently.

Wildfires are managed to minimize suppression costs and resource losses, while prescribed fires are utilized to meet resource management objectives.

Wildfires are managed using a wide spectrum of suppression strategies in an attempt to minimize over all cost and resource loss. For example, some fires are limited in their spread by natural features like rock slides or creeks may only need surveillance, while fires that threaten life, property, or other high value resources will require immediate initial attack. However, the Fire Management objective remains the same-to minimize total cost and resource loss.

The Forest Service uses Prescribed Fire to meet resource management objectives. Prescribed Fires may be started by either a planned or unplanned ignition (e.g. lightning). In either case it is required that an appropriate burn plan has been developed and approved by the District Ranger or Forest Supervisor prior to implementing any prescribed fire activity. Prior to the management of any unplanned ignition in Wilderness a Fire Management Action Plan will be developed. This plan will contain a very specific outline of the conditions which must be met for an unplanned ignition to be considered a prescribed fire. If the fire does not meet all of these conditions it will be managed as a wildfire and appropriate suppression action implemented. All fires which threaten life, property, or important natural resources will be aggressively attacked.

SOCIAL AND ECONOMIC

199 MORE COSTS SHOULD BE INCLUDED IN THE FORPLAN MODEL; THE SOURCE OF SOME OF THE COST ESTIMATES ARE QUESTIONABLE.

COMMENTS INCLUDED:

“We are dismayed that of the 102 cost items, only 18 are tracked inside FORPLAN. Ten of those factors are listed as having a “significant variation” on the alternatives. We question the validity of the economic analysis ... given that the main costs such as arterial roads, collector roads, trails, and bridge and culvert construction are left out of the FORPLAN model. ... We recommend these major costs be included and all FORPLAN runs be rerun.”

“The averaging of different time series of data to derive values and costs which will be compared in future time periods in FORPLAN, is not an analytically sound procedure. ...costs derived from sold sales are probably higher than average operating costs.”

“The costs of the alternatives needs to be discussed and displayed. Virtually anything can be done, but the costs need to be shown. For example, it is technologically possible to remove all sediment from a stream downstream from a sloughed-out trail, but the costs incurred to do that would not be commensurate with the benefits.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0579, 4489, 4494, 4511, 0077S, 2042S, 2308S, 2445S

FOREST SERVICE RESPONSE:

The Forest managers developed the land allocations for each alternative. The FORPLAN model was used to estimate the timber harvest levels and management intensities. All of the unit costs affecting this decision, including local road construction costs, were used in FORPLAN. However, the model was not designed to include all National Forest budget costs for each resource area.

The timber management costs estimated from Wenatchee National Forest data are are discussed in Appendix B of the FEIS, “Costs Considered for Economic Efficiency Analysis”. All costs have been extensively reviewed for their accuracy. Some cost estimates for National forest lands may be higher than that experienced by industry, but we have no substantive grounds to change the cost estimates. The Plan also includes unit costs as items to be monitored.

All of the costs for each alternative are displayed in Chapter II of the FEIS. These costs reflect implementation of the resource standards and guidelines and the management prescriptions as described in Chapter IV of the Plan.

200 THE VARYING BUDGET FOR FISHERIES ENHANCEMENT IS NOT CONSISTENT BETWEEN ALTERNATIVES AND THE PLAN DOES NOT DESCRIBE HOW BUDGET CUTS WOULD BE DISTRIBUTED AMONG THE RESOURCE AREAS. CONCERNS WERE ALSO EXPRESSED ON THE USE OF KV FUNDING FOR FISH AND WILDLIFE PROJECTS.

COMMENTS INCLUDED:

“Budget increases are unlikely under Gramm-Rudman. Budget cuts are generally the rule. How would budget cuts be distributed among the resource areas?”

“Alternative E ... has the distinct negative features of lowest timber harvest, least mineral resource area activity, least payments to counties, lowest employment and lowest income. This makes it an especially poor place to coincidentally propose the highest level of appropriated funds for fisheries enhancement (which is the only reason for Alt. E’s highest ranking for anadromous fish production).”

“The figures for appropriated funds (in fisheries enhancement) do not appear to have any direct relationship to components of the nine alt. It appears that the peak amount of \$200,000 in Alt E could just as easily be included with the preferred alt (C).”

“Several alt would include the diversion of K-V funds to provide fishing access. This would further diminish the availability of these relatively modest funds for correcting past environmental damage on the Forest and fulfilling newly emerging needs in a timely manner.”

“... use KV monies you have collected from the timber sales on the study of old growth ecosystems and the wildlife. Can you account for all the KV Wildlife money that has been collected so far?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0299, 0579, 0580, 0896, 0901, 1300, 2032, 2999, 3162, 3256, 4169, 4455, 4485, 4490, 4492

FOREST SERVICE RESPONSE:

The Wenatchee National Forest annually prepares an outyear budget request. See Chapter II of the FEIS for the budget for the preferred alternative. It should be recognized that actual funding received in response to the submitted budget may not be the same as requested. Since Congress has the ultimate budget authority, the situation cannot be resolved through the Forest Planning process.

The Plan does describe resource management practices as well as levels of resource production from which the annual budget proposals are prepared. The standards and guidelines contained in the Plan specify the manner in which management activities will be carried out to achieve the goals and objectives in the Plan. In the event adequate funding is not available to achieve the identified outputs in a manner which meet the standards and guidelines, then outputs will be reduced to a level that does. Outputs and activities may be different than shown in the plan, however measures identified in the standards and guidelines must be met whenever the activities are undertaken.

The costs for fishery improvement projects have been reviewed and substantially changed for all alternatives. In general, fishery habitat improvement budgets were increased. More information on the fishery emphasis and budget by alternative is included in the FEIS, Chapter II.

This FEIS does not address specific KV funding projects, as that is a separate decision process. However, to address this concern the following is provided:

The Knutson-Vandenberg (KV) Act as amended by the National Forest Management Act of 1976 enables the collection of money for costs beyond the value of the timber in a timber sale. Among other things, money may be collected for activities relating to reforestation, and protecting and improving the future productivity of renewable resources including wildlife habitat management within the sale area. During a timber sale's preparation, its effects on other forest resources and enhancement opportunities are examined. These are compiled in a comprehensive sale area improvement plan for that timber sale. Money is withdrawn from the fund as the planned work is performed. Records documenting all of the KV funds collected and spent can be found at the Forest Supervisor's office in Wenatchee, Washington.

201 NON-MARKET VALUES SHOULD NOT BE ADDED TO MARKET DERIVED DOLLAR VALUES; THE VALUES OF CERTAIN RESOURCES, SUCH AS FISH, WILDLIFE, RECREATION, NATURAL SCENERY AND OTHER AMENITIES ARE UNDERESTIMATED. THE VALUE OF GRAZING IS OVERESTIMATED. TIMBER VALUES ARE PROBABLY LOWER THAN AVERAGE. IT IS INCONSISTENT TO TREND ONLY THE TIMBER PRICES AND NOT OTHER RESOURCE VALUES.

COMMENTS INCLUDED:

“When these market and non-market values are used in a forest planning model, one is conceptually comparing “apples and oranges”, which gives distorted and incorrect economic conclusions.”

“Only the commodity goods should have dollars assigned to them. For maximization of social net benefits, implicit dollar values should not be added to market-derived dollar values. ... alternatives can be assessed against the economic efficiency alternative to determine the value of market goods given up. ... Non-market values should be arrayed separately ...”

“... (timber) values derived from cut sales are probably lower than average.”

“The economic techniques for salmon resources are difficult to understand. ... priced values are limited to recreational uses on the forest and ex-vessel commercial fishery values. ... Modification will be necessary to reflect true national values.”

“... your economic efficiency calculations seriously underestimate the value of fish and wildlife. ... an arbitrary reduction of 37.5% was made from the ... 1985 RPA documents. We strongly believe the justification for that reduction ... is not correct. ... no attempt is made to incorporate fish and wildlife losses as costs in PNV calculations... losses should be measured from current conditions, not current direction.”

“... discounted costs and benefits for wildlife and fish ... remain deceptively constant throughout the alternatives. Please explain why ...”

“The economic value of recreation and forest amenities is under-estimated,”

“FORPLAN assumed natural scenery is of no economic value to North Central Washington.”

“Your grazing value of \$7.31/AUM is substantially higher than the fair market value for Region 6 of \$5.31/AUM given in the USFS/BLM grazing fee and evaluation report.”

“... bias is introduced through attributing a 1% real growth rate in timber prices, while holding other resource values constant over time.”

“Absence of a sensitivity analysis for real price appreciation of timber and not evaluating the consequences on the alternatives is inconsistent with regard to regional direction and NEPA.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0307, 0342, 0579, 0580, 0582, 0716, 0733, 0882, 2053, 2131, 2796, 2861, 2871, 2946, 3115, 3255, 3366, 3551, 3553, 3579, 3645, 3677, 3911, 3954, 3992, 4236, 4407, 4489, 4494, 4498, 9065, 0011S, 0092S, 0110S, 0361S, 0525S, 0535S, 0607S, 1062S, 2042S, 4645S

FOREST SERVICE RESPONSE:

The economic efficiency analysis considers the economic value related to recreation, wildlife and other amenities through the use of assigned dollar values that reflect the average user's willingness to pay. The Secretary of Agriculture Regulations require assigning value to nonmarket outputs to the extent possible. These values are based on the 1985 RPA figures and have been reviewed for their applicability to the Wenatchee National Forest, as described in Appendix B of the FEIS, “Economic Efficiency Analysis”.

These assigned values are used to determine the Present Net Value of the alternatives. There are, however, aspects of recreation and wildlife that cannot be expressed in quantitative terms. The non-quantitative aspects are considered in determining the overall Net Public Benefit of the alternatives. It is important to note that the preferred alternative maximizes the combination of PNV and net subjective values of non-priced outputs for all the alternatives considered.

The timber market is a cyclic market with periodic robust times and hard times. Timber values in the FORPLAN model reflect prices paid for timber sales which cover one full timber cycle. This period includes both the high and low markets for timber.

The economic techniques for fishery resources are described in Appendix B of the FEIS. Fish and wildlife costs and benefits have been changed to reflect greater differences between alternatives. These changes are described in the final EIS.

Not all aspects of recreation, natural scenery, or amenities can be expressed in dollar terms. However, these values are reflected in the land allocations and also as constraints in the FORPLAN model. In this respect, many of these amenity resource "constraints" have greater values than other resources.

The grazing value of \$7.31 is based on Economic Research Service market price estimations of the contribution of Wenatchee National Forest grazing to the net income of ranchers. There is National direction to use this source for grazing values.

The one percent real price trend for timber products is based on observed increases over the past 50 years. A sensitivity analysis for the real price appreciation of timber was conducted and is documented in Appendix B of the FEIS. In accordance with Washington (D.C.) Office Forest Service information and direction, the value of other resources, such as recreation use, can be assumed to not increase relative to other values (see discussion on demand curves in Appendix B of the FEIS).

202 MANY COMMENTS WERE MADE ABOUT THE ECONOMIC IMPACTS OF ALTERNATIVES AND THE POSSIBLE EFFECTS ON COMMUNITY STABILITY.

COMMENTS INCLUDED:

"The economic analysis needs to be expanded and updated. Employment numbers are from 1977 and are incomparable to the modern timber industry of 1986."

"All the enabling legislation from the Organic Act through the National Forest Management Act speaks to community stability. It is your responsibility to provide commodities which will ... provide for their families, their schools, and their communities."

"Through the efforts of the Yakima County Development Association and the Forestry Task Force of the greater Yakima Chamber of Commerce, an independent economic analysis of the impacts of preferred Alt. C has been conducted. The findings of this analysis indicate an actual job loss of 936 jobs and a loss of \$29.5 million in total income should Alt. C go into effect. This severe impact is totally unacceptable ..."

"The baseline timber harvest level being used to estimate job changes from variations in forest timber output should be based upon a recent 5 year average (about 136 MMBF) rather than the 10 year average (146 MMBF)."

“... the “Current Direction” Alt. ... is meaningless as a reference for determining job impacts of the proposed plan. ... We believe a fair and consistent comparison is the 171 MMBF/yr of sawtimber planned for sale in the existing timber management plan ...”

“The Forest should clearly describe the economic impacts of providing spotted old habitat ...”

“... impacts beyond the first decade should be considered.”

“The Forest is overstating the negative effects of Alt. E, F and G on general local economic activity, since the overall timber dependence in the EIS is relatively low when compared to Wash. State as a whole.”

“More emphasis, therefore, should be placed on such areas as recreation, and tourism.”

“The Forest is the sixth most heavily visited National Forest because of its primitive character, unsurpassed scenery, and clear clean waters to name just a few of the amenity values that are in the preferred alt. Implementation of the more destructive alt. will certainly cost local recreation based jobs and income.”

“We also believe that the alternatives would vary in their effects on recreation and that the local economy would reflect these differences. Fish and wildlife oriented recreation supports a significant amount of economic activity statewide ...”

“The economic effects of this reduction can be offset by harvesting of other commercial forests and by cutting the enormous amount of timber that has been already purchased but not cut by timber companies.”

“I don’t believe that the Plan’s economic impact figures are correct. It does not consider the fact that there is a huge surplus of logs from private lands that is currently shipped overseas.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0002, 0010, 0023, 0025, 0027, 0030, 0031, 0034, 0035, 0036, 0047, 0049, 0051, 0052, 0053, 0061, 0062, 0066, 0067, 0075, 0079, 0083, 0085, 0112, 0114, 0119, 0121, 0122, 0146, 0147, 0149, 0150, 0154, 0176, 0201, 0217, 0220, 0227, 0228, 0246, 0248, 0249, 0258, 0260, 0262, 0271, 0286, 0290, 0294, 0295, 0319, 0341, 0342, 0344, 0348, 0388, 0394, 0409, 0419, 0422, 0424, 0427, 0469, 0483, 0490, 0503, 0523, 0525, 0528, 0530, 0534, 0540, 0552, 0561, 0562, 0570, 0576, 0577, 0579, 0582, 0583, 0595, 0605, 0628, 0639, 0640, 0643, 0653, 0655, 0711, 0718, 0720, 0725, 0726, 0730, 0742, 0748, 0777, 0786, 0789, 0799, 0808, 0812, 0818, 0821, 0822, 0826, 0865, 0868, 0869, 0870, 0899, 0901, 0946, 0949, 0999, 1011, 1110, 1111, 1114, 1121, 1122, 1123, 1126, 1142, 1170, 1280, 1284, 1301, 1324, 1377, 1404, 1413, 1414, 1441, 1457, 1517, 1525, 1562, 1563, 1580, 1606, 1641, 1648, 1653, 1671, 1682, 1686, 1708, 1710, 1718, 1727, 1753, 1758, 1774, 1777, 1786, 1795, 1851, 1874, 1875, 1879, 1880, 1892, 1917, 1924, 1933, 1948, 1949, 1952, 1955, 1956, 1957, 1960, 1976, 1980, 1992, 1997, 2003, 2009, 2016, 2018, 2021, 2024, 2035, 2053, 2054, 2069, 2072, 2119, 2122, 2123, 2131, 2137, 2138, 2141, 2158, 2163, 2166, 2179, 2188, 2205, 2209, 2227, 2251, 2259, 2272, 2278, 2305, 2330, 2331, 2334, 2348, 2382, 2400, 2441, 2444, 2451, 2457, 2478, 2572, 2589, 2595, 2598, 2601, 2613, 2614, 2615, 2616, 2675, 2688, 2691, 2723, 2723, 2727, 2730, 2731, 2732, 2733, 2735, 2742, 2750, 2752, 2756, 2768, 2772, 2776, 2777, 2779, 2783, 2788, 2789, 2791, 2815, 2820, 2822, 2829, 2830, 2831, 2842, 2843, 2846, 2855, 2864, 2868, 2869, 2876, 2878, 2879, 2880, 2882, 2887, 2888, 2906, 2908, 2913, 2914, 2916, 2929, 2934, 2943, 2947, 2949, 2954, 2963, 2969, 2971, 2983, 3010, 3013, 3015, 3016, 3024, 3029, 3032, 3047, 3052, 3053, 3055, 3058, 3065, 3068,

3079, 3081, 3082, 3098, 3100, 3105, 3123, 3126, 3127, 3131, 3133, 3135, 3147, 3152, 3153, 3163, 3170, 3173, 3174, 3185, 3186, 3187, 3193, 3198, 3208, 3209, 3211, 3224, 3237, 3244, 3246, 3247, 3250, 3254, 3255, 3256, 3260, 3261, 3266, 3274, 3278, 3283, 3308, 3310, 3314, 3317, 3320, 3323, 3325, 3330, 3338, 3353, 3361, 3373, 3374, 3382, 3390, 3394, 3395, 3401, 3421, 3424, 3427, 3430, 3441, 3465, 3466, 3475, 3487, 3516, 3518, 3520, 3533, 3551, 3580, 3582, 3592, 3593, 3601, 3602, 3606, 3608, 3610, 3611, 3615, 3619, 3621, 3622, 3630, 3642, 3644, 3652, 3655, 3679, 3690, 3717, 3722, 3725, 3729, 3746, 3749, 3756, 3759, 3767, 3774, 3775, 3776, 3780, 3804, 3811, 3813, 3818, 3821, 3832, 3833, 3835, 3847, 3849, 3861, 3862, 3868, 3871, 3880, 3898, 3902, 3904, 3916, 3917, 3926, 3928, 3936, 3936, 3937, 3939, 3942, 3944, 3948, 3988, 3989, 3989, 4005, 4011, 4019, 4028, 4029, 4030, 4031, 4035, 4043, 4051, 4053, 4054, 4055, 4056, 4057, 4058, 4059, 4060, 4063, 4068, 4069, 4071, 4082, 4089, 4095, 4099, 4100, 4101, 4102, 4103, 4104, 4106, 4114, 4121, 4124, 4139, 4144, 4148, 4166, 4169, 4175, 4176, 4177, 4183, 4184, 4185, 4186, 4188, 4190, 4210, 4212, 4212, 4214, 4223, 4225, 4226, 4227, 4231, 4237, 4238, 4240, 4246, 4257, 4259, 4270, 4286, 4287, 4288, 4289, 4290, 4291, 4293, 4294, 4295, 4296, 4298, 4300, 4303, 4342, 4343, 4345, 4347, 4357, 4358, 4368, 4374, 4375, 4379, 4381, 4392, 4393, 4394, 4395, 4397, 4399, 4401, 4403, 4404, 4405, 4415, 4417, 4421, 4425, 4426, 4429, 4430, 4433, 4447, 4450, 4455, 4466, 4467, 4468, 4471, 4477, 4484, 4485, 4486, 4489, 4490, 4494, 4496, 4498, 4501, 4502, 4503, 4510, 4534, 9003, 9006, 9013, 9022, 9028, 9030, 9033, 9034, 9038, 9043, 9045, 9060, 9082, 9098, 9108, 0007S, 0011S, 0020S, 0028S, 0042S, 0068S, 0159S, 0176S, 0213S, 0672S, 0675S, 0695S, 0825S, 1159S, 1177S, 1183S, 1184S, 1193S, 1195S, 1203S, 1213S, 1215S, 1216S, 1250S, 1360S, 1368S, 1370S, 1413S, 1420S, 1430S, 1578S, 1583S, 1586S, 2042S, 2045S, 2095S, 2178S, 2199S, 2248S, 2249S, 2252S, 2269S, 2272S, 2318S, 2365S, 2390S, 5094S, 5103S

FOREST SERVICE RESPONSE:

Several major changes were made in the economic impact analysis since the DEIS. The most current data from 1982 were used in the economic model (IMPLAN). Local economic indicators, including timber-related employment and income, were derived from estimated changes in planned forest outputs. The reference point for timber harvest related comparisons is now the 5 year average Wenatchee National Forest actual harvest level from 1980 to 1985. Also, Douglas County is included in the model. The resulting figures are relative, not absolute, and are intended to provide a comparison among the alternatives and not absolute numbers for predicting employment and income.

Differences between the DEIS figures and the Yakima County Development Association study are due to several factors. The economic analysis by the Yakima County Development Association had a basic conceptual inconsistency, since the timber harvest data from the Washington State Department of Natural Resources (DNR) was from 1983-85, but model relationships were in 1977 terms. Also, it was discovered that the DNR data base had several incorrect figures. The updated IMPLAN analysis in the final EIS is based on the most accurate information currently available to estimate the relative economic impacts between alternatives.

Only the estimated economic effects for the first decade of Plan implementation are shown, since the economy is so dynamic and changes quickly. Provisions in the National Forest Management Act require Forest Plans to be revised every 10 to 15 years, so new economic conditions can be reflected in future plan revisions.

The various pieces of legislation cited by some respondents do direct the Forest Service to provide continuous flows of wood products for the use and necessities of the public. However, these same pieces of legislation charge the National Forest managers to make the most judicious use of all renewable resources which in combination best meet the needs of the American public. The impact on the local community is an important consideration, but the preferred alternative must maximize the benefit derived from all renewable resources, including outdoor recreation, range, timber, water, wildlife and fish. In establishing the timber harvest level, Forest managers considered, along with many other factors, the impact of National Forest timber supplies on local and regional economies.

Since the DEIS was printed, the amount of timber already purchased but not cut has been reduced significantly due to increased market demand. The FEIS has been updated to reflect these changes.

It is not within the scope of the Forest Plan to address the export of logs overseas. By law, most National Forest logs are not available for export.

See Appendix B in the FEIS, "Social and Economic Impact Analysis", for more information.

203 TIMBER SUPPLY AND DEMAND PROJECTIONS WERE NOT ADEQUATELY ADDRESSED IN THE ANALYSIS.

COMMENTS INCLUDED:

"The timber demand analysis in the Wenatchee Plan is abysmal. Though the Wenatchee area mills sell into competitive national markets where their individual output cannot affect price, the fixed mill locations and dominance of National Forest timber, gives the Forest Service virtual monopoly power over the mills. In assessing timber demand, the Wenatchee did not consider the sawtimber needs nor the increased pressures for timber from outside the traditional market area."

"The Forest has overstated the dependence of local mills on WNF timber ... The mills in the EIS are currently only about 40% dependent upon WNF logs. Therefore, a 25% reduction in existing WNF harvest levels (from about 136 MMBF) would result in about an 8% reduction in local timber supply. ... The Forest has attempted to make the case that the liquidation of major private timberland in the EIS will result in increased demands for WNF logs. However, the DEIS has presented no evidence to show the dependence of local mills ... for timber, furthermore, the Forest has presented little more than speculation that the timber outputs of these private owners will actually fall to zero in 10 to 20 years. Consequently, it is unclear that local mills will be looking for substitute logs for future operations."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0035, 0243, 0519, 2003, 2053, 2087, 2842, 2913, 3551, 3652, 3684, 3862, 3989, 4246, 4426, 4450, 4477, 4484, 4489, 4496, 4501, 4507, 9037, 9060, 0011S, 2042S

FOREST SERVICE RESPONSE:

The timber supply and demand analysis was substantially expanded and updated to include more information from State of Washington analyses and from the Pacific Northwest Region. This discussion can be found in Chapter III of the FEIS.

The assumption about the relationship between Wenatchee National Forest timber demand and price is reflected in the horizontal demand curve used in the FORPLAN model. There is not presently enough information available to develop reasonable estimates of the demand functions for the timber resources offered by the Wenatchee National Forest. The use of a horizontal demand curve for timber is consistent with direction from the Washington D.C. Office of the Forest Service. See Appendix B of the FEIS, "Economic Efficiency Analysis", for more information on timber demand and price relationships.

204 NOT ENOUGH INFORMATION IS DISPLAYED TO SHOW WHICH AREAS ARE ECONOMICALLY EFFICIENT FOR TIMBER HARVEST AND THE PLAN WOULD CONTINUE TO EXPAND THE PRACTICE OF BELOW-COST TIMBER SALES. IN ADDITION, MORE INFORMATION IS NEEDED TO SHOW THE EXTENT TO WHICH AMENITY RESOURCES ARE BEING SUBSIDIZED.

COMMENTS INCLUDED:

“The Wenatchee planning staff .. has undertaken no economic screen to remove low-site lands where timber mgmt can only be practiced at an economical loss. As a result, the Plan would continue and expand the practice of below-cost timber sales, to the detriment of our forest resources. Many of the currently unroaded areas on the Wenatchee that are proposed for road construction and harvest are such low-site lands where road and sale costs will exceed timber receipts; ...”

“... no information is provided on the economic efficiency of timber harvest for those individual areas [analysis areas].”

“It is not now clear to what extent the Forest subsidizes amenities, or produces commodities where revenues exceed or are less than total production costs.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0262, 0562, 0577, 0659, 0789, 0841, 0896, 1952, 2743, 2772, 2776, 2790, 2846, 2919, 2922, 3227, 3261, 3270, 3327, 3553, 3710, 4210, 4224, 4417, 4433, 4455, 9114, 0011S, 0118S

FOREST SERVICE RESPONSE:

As a general rule, the Forest Service manages the Wenatchee Forest timber sale program so that the total benefits equal or exceed the costs over time. While economics is one of the important considerations in both choosing among alternatives and in individual timber sale design, it is not the only consideration. Timber sales are not necessarily designed solely for volume objectives. They may be designed to meet management objectives for other resources or the management of insect and disease problems. Thinning sales, needed to achieve growth of crop trees, frequently have costs exceeding revenues. However, the future value of crop trees is enhanced and both operations, considered together, are economically sound. While a “profit” may not be the deciding factor, an informed decision by Forest managers does necessitate consideration of perceived benefits and their cost.

This same principle is applied in choosing among alternatives. Here, the consideration of economics, other resources, and uses are contained in the concept of Net Public Benefit. Public benefit needs to be considered in terms of the issues, management concerns, and resource opportunities identified in the planning process. Use of the word Net denotes the underlying concept that a benefit with regard to one aspect of an issue may be detrimental from another aspect. Similarly, a response to one issue, for instance, timber supply, may adversely affect another issue such as wildlife habitat protection. Economic efficiency needs to be applied to an alternative as a whole.

The amenity resource values, referred to as “subsidies” by some respondents, are displayed as non-cash benefits to users in Chapter II of the FEIS.

205 THE CUMULATIVE ECONOMIC EFFECTS FROM ADJACENT NATIONAL FORESTS AND PRIVATE LAND ARE NOT ADEQUATELY ADDRESSED.

COMMENTS INCLUDED:

“Cumulative economic effects of declining timber harvest from adjacent National Forests and private land must be displayed in the EIS and should influence selection of the preferred alternative.”

“... wildlife and recreation values on private and State lands adjacent to WNF (e.g. L.T. Murray HMA) are directly dependent upon seasonal wildlife ranges within the WNF and should be taken into consideration.”

“the Forests ... are directed ... to evaluate, understand and be responsive to the cumulative impact of timber sale levels upon the economies of local dependent communities. The WNF has not made this evaluation ...”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

2849, 3992, 0032S, 0039S, 0040S, 0067S, 0069S, 0085S, 0087S, 0115S, 0706S, 1056S, 1243S, 1307S, 1371S, 1377S, 2042S, 2065S, 2249S, 2251S, 2308S, 2316S, 5075S

FOREST SERVICE RESPONSE:

The Pacific Northwest Region of the Forest Service conducted a more extensive analysis concerning the potential cumulative economic effects of Forest Plans in this Region. This information is discussed in the FEIS, Chapters II, III and IV. In addition, the Forest updated its analysis to include State of Washington projections for private timber supply.

The economic impact analysis was also expanded by including Douglas County in the study area and in the new IMPLAN model.

Wildlife and recreation values on private and State lands, to the extent they would maximize net public benefits, have been considered in the development of land allocations by alternatives.

206 THE SOCIAL EFFECTS ON PEOPLE'S ATTITUDES, BELIEFS AND VALUES NEEDS TO BE EXPLAINED.

COMMENTS INCLUDED:

“The basis of how, when, where, and to what extent attitudes, beliefs and values would be impacted needs to be explained. From the information presented in the table, there is no way to see how the inherent conclusions were derived. [DEIS, page II-134]”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

FOREST SERVICE RESPONSE:

The estimated social impacts of the alternatives are qualitative in nature and are based on professional judgement. Some of the information for the analysis comes from a socio-economic overview of the Wenatchee National Forest, which was updated in 1984 (available at the Supervisor's Office). The social impact analysis is described in Appendix B of the FEIS.

207 PEOPLE QUESTIONED THE VALUE OF THE OPPORTUNITY COST ANALYSIS FOR THE MANAGEMENT REQUIREMENTS IN THE SUPPLEMENT TO THE DEIS; SOME PEOPLE THOUGHT THE OPPORTUNITY COSTS WERE OVERESTIMATED, WHILE OTHERS THOUGHT THEY WERE UNDERESTIMATED.

COMMENTS INCLUDED:

"It isn't the diverse opportunities that cost. Cost are the result of management requirements for commodity uses that interfere with other opportunities: logging, mining, road building, grazing, ORV's. These should pay the entire cost of increased management requirements."

"I think the "opportunity costs" shown in Appendix I would indicate a fairly minor reduction from present plan and I would favor more severe reductions consistent with the objectives of other alternatives."

"MR's are rather confusing, especially the term opportunity cost. Why doesn't the FS say - this is how much timber we will be able to harvest under each MR. All your computer models seem to be based on timber revenues. How much money will be made off the increased recreational values that would be lost if these areas are clear cut. How much money would be saved in terms of road building? ... "

"The pileated / 3 toed / marten areas ... the opportunity cost is much lower than presented in the charts, as there will be considerable overlap with other management constraints."

"Re' opportunity costs - spotted owls. The bottom line is cash flow, near and long term. Do what you can for wildlife but meet the needs of our nation, near and long term."

"CHEC and other forest planning consulting groups have rightly criticized MR's and formulas used to adjust or determine opportunity costs. Wildlife and forest diversity suffers the most and so does primitive and semi-primitive ROS areas. Timber, roaded recreation and other utilitarian uses that yield high \$ figures win nearly every time. MR's for timber are based on local demands, and recent harvest levels."

"Costs for management requirements are already being experienced through increased sale preparation costs and reduced timber receipts due to contract protection requirements. The opportunity costs have never before been expressed. Since you are comparing to an existing base the true opportunity cost is understated."

"More representative opportunity costs might have been generated if the NC [No Change] Alternative was used as the baseline."

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0032S, 0039S, 0040S, 0067S, 0069S, 0082S, 0085S, 0087S, 0115S, 0158S, 0706S, 1056S, 1058S, 1062S, 1243S, 1305S, 1307S, 1308S, 1371S, 1377S, 2042S, 2065S, 2249S, 2251S, 2308S, 2316S, 2445S, 5075S

FOREST SERVICE RESPONSE:

The opportunity cost analysis is an accepted analytical technique to estimate the effects of the management requirements. The process is explained in more detail in Appendix I of the FEIS. Costs and values used in the analysis were extensively reviewed for their applicability to the Wenatchee National Forest. All opportunity costs are shown as changes from the Maximize PNV Benchmark, based on Regional Office direction.

208 THE JOBS AND INCOME EFFECTS OF THE NO CHANGE ALTERNATIVE ARE NOT REALISTIC; ALSO, THE TIMBER MARKET ASSUMPTIONS ARE QUESTIONABLE. THESE COMMENTS WERE IN REFERENCE TO THE SUPPLEMENT TO THE DEIS.

COMMENTS INCLUDED:

“We are highly skeptical that the NC Alternative would result in an increase in jobs and income at all when the timber industry is using ever fewer employees to process each board foot of timber as it improves mill efficiency. Tables IV-38 and IV-39 are very unclear ... Are the numbers displayed for direct jobs only, or do they include indirect jobs? If the job numbers in the table include indirect jobs, what economic multipliers did you use?”

“The social/economic comparison of the effects of the alternatives in Table S-1 is based on the assumption that the quantity of timber put up for sale controls economic outcomes. The amount of timber cut and lumber milled depend on what the market will take not the amount of stumpage offered.”

“It shows us what would happen if industry has its way. Short term profits not long term perpetual forests are their goals.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0020S, 1196S, 2318S

FOREST SERVICE RESPONSE:

The figures shown in the SEIS are changes from the 1977 employment levels. The entire economic impact analysis has been updated to the 1982 data base in the IMPLAN model and the new estimates are shown in Chapter II of the FEIS. These figures are meant to show relative changes, not absolute figures, and are intended to provide a comparison among the alternatives.

209 THE WENATCHEE NATIONAL FOREST SHOULD BE MANAGED FOR MULTIPLE USE.

COMMENTS INCLUDED:

“The Wenatchee National Forest should be managed in all of its areas for the best preservation of the land and the ecology, and also have sufficient areas for recreation to the general public, without further acquisition of land from private ownership.”

“We feel that there is already more Federal and State land designated for preservation and recreation than what is feasible to financially and efficiently manage.”

“The Wenatchee currently has over 841,000 acres of formally designated Wilderness areas (roughly 40% of the Forest). The remainder of the forest should be available for multiple-use management, including timber production.”

“Multiple use is a great concept until one group takes more than their share. If we set the forests aside for hikers, bikers, snowmobilers and other sportsmen and tourists the forests are still available later for harvest.”

“The National Forest should be maintained for all to use and enjoy, and if managed properly this can be achieved without a detrimental effect to those who depend on the forest for their livelihood or personal use.”

The Wenatchee National Forest must move into the 21st Century by recognizing “all” of the “other” values there besides wood fiber. The administrators of this Forest need courage and insight to see the right course, the protection of the whole resource, and to say no to those who would abuse it.

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDED:

0002, 0005, 0031, 0044, 0052, 0066, 0067, 0068, 0079, 0089, 0124, 0251, 0258, 0261, 0263, 0264, 0363, 0389, 0390, 0394, 0395, 0453, 0484, 0531, 0532, 0579, 0595, 0616, 0635, 0664, 0743, 0750, 0991, 0996, 1084, 1258, 1300, 1301, 1305, 1638, 1789, 1811, 1825, 1839, 1920, 1938, 1942, 1961, 1970, 1977, 1981, 1989, 2004, 2010, 2018, 2023, 2053, 2069, 2120, 2127, 2135, 2137, 2159, 2186, 2201, 2207, 2226, 2247, 2280, 2398, 2592, 2601, 2723, 2724, 2725, 2732, 2741, 2742, 2787, 2809, 2816, 2820, 2825, 2826, 2831, 2833, 2835, 2854, 2855, 2864, 2866, 2879, 2881, 2911, 2918, 2934, 2937, 2939, 2945, 2946, 2958, 2983, 2993, 2994, 2995, 3006, 3010, 3040, 3042, 3054, 3055, 3058, 3060, 3068, 3075, 3083, 3095, 3096, 3099, 3113, 3116, 3127, 3149, 3158, 3165, 3173, 3217, 3227, 3228, 3242, 3256, 3261, 3323, 3330, 3335, 3337, 3339, 3341, 3379, 3380, 3398, 3408, 3425, 3440, 3443, 3459, 3465, 3482, 3499, 3511, 3515, 3519, 3524, 3533, 3535, 3542, 3570, 3575, 3582, 3589, 3604, 3606, 3607, 3621, 3622, 3623, 3648, 3667, 3669, 3671, 3672, 3674, 3680, 3690, 3693, 3700, 3717, 3725, 3728, 3733, 3737, 3739, 3760, 3761, 3765, 3777, 3781, 3793, 3794, 3799, 3800, 3802, 3805, 3807, 3809, 3812, 3816, 3821, 3823, 3832, 3833, 3839, 3840, 3847, 3901, 3935, 3939, 3954, 3995, 4005, 4009, 4011, 4015, 4044, 4067, 4068, 4069, 4071, 4079, 4088, 4089, 4091, 4098, 4105, 4109, 4120, 4132, 4139, 4162, 4163, 4167, 4171, 4173, 4175, 4177, 4183, 4194, 4214, 4231, 4233, 4247, 4262, 4269, 4274, 4277, 4297, 4301, 4353, 4416, 4417, 4418, 4425, 4426, 4432, 4433, 4434, 4437, 4438, 4440, 4447, 4450, 4453, 4454, 4456, 4470, 4474, 4492, 4493, 4494, 4500, 4504, 4508, 4511, 9004, 9007, 9014, 9017, 9021, 9027, 9032, 9033, 9041, 9046, 9047, 9065, 9066, 9067, 9082, 9092, 0019S, 0034S, 0038S, 0074S, 0106S, 0176S, 0317S, 0662S, 0672S, 0695S, 0696S, 0720S, 1100S, 1105S, 1136S, 1176S, 1200S, 1215S, 1216S, 1239S, 1305S, 1359S, 1370S, 1380S, 1420S, 2045S, 2046S, 2061S, 2199S, 2272S, 2365S, 2445S, 3428S, 5043S, 5071S, 5094S, 5096S

FOREST SERVICE RESPONSE:

Forest managers must carefully weigh and consider all impacts of major Federal actions prior to and during implementation of a Forest Plan. The Forest's task is to balance the different uses of the Forest, including timber, wildlife, fisheries, recreation, range, watershed and Wilderness. The range of alternatives addresses public concerns about multiple use management, as well as many other concerns. The preferred alternative maximizes the net public benefits.

PLANNING

210 SOME INFORMATION IS NOT CONSISTENT WITH OTHER PLANS, INCLUDING THE BUREAU OF LAND MANAGEMENT SPOKANE DISTRICT PLAN.

COMMENTS INCLUDED:

“Forest Service land Allocations in Numbers 1 and 2 Canyon appear inconsistent with adjacent BLM lands managed primarily for watershed. BLM lands in Entiat Valley and north of Lake Chelan are primarily managed for range and wildlife....”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

9094

FOREST SERVICE RESPONSE:

While some alternatives may have allocations which appear inconsistent with the BLM, Spokane District Resource Management Plan, most alternatives are consistent. The preferred alternative has EW-1, Key deer and Elk Habitat, allocations on lands adjacent to BLM and State of Washington wildlife lands (refer to alternative C & I allocation map). All Forest Service alternatives have EW-2, Riparian-Aquatic habitat protection zone, allocations along all streams, lakes and wetlands. Due to the narrow width of the allocation it does not show on maps. Also for watershed protection the Forest-wide Standards and Guidelines apply to all Forest Service lands, (refer to Chapter IV of the Forest Plan and Appendix D of the FEIS).

211 QUESTION THE LEGALITY OF INCORPORATING THE ALPINE LAKES MANAGEMENT PLAN INTO THE FOREST PLAN.

COMMENTS INCLUDED:

“We reserve all objections about the legality of incorporating part of the Alpine Lakes Management Plan into this Forest Plan....”

“We agree with the Forest position that the Alpine Lakes Management Plan ought not to be amended at this time. A date should be set for a review of the entire Alpine Lakes Plan at some point in the future.”

“The Forest Plan proposes that the land allocations and management as presented in the Alpine Lakes Management Plan be held constant. Both the imposition of management

requirements and new timber yield expectations as part of this proposed plan do change those land allocations and management. We feel this opens the opportunity for further review and consequently we have included allocation revisions for Alpine Lakes in the map.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0416, 0594, 2132, 2719, 2751, 2795, 3233, 3483, 3487, 3746, 3879, 4110, 4186, 4484, 4534

FOREST SERVICE RESPONSE:

The incorporation of the Alpine Lakes Management Plan into all alternatives was a decision made by both Forests (Wenatchee and Mt. Baker-Snoqualmie) to allow the eight year old plan stand the test of time, and is in accordance with 36 CFR 219.2 (b). The Plan and FEIS state that some modification was done to update the Plan to meet management requirements contained in NEPA. This is also in accordance with direction in the Alpine Lakes Management Plan (page 153 under Plan Revision), “The Alpine Lakes Area Management Plan will maintain its identity in the forest-wide plans now being developed by the Wenatchee and Mt. Baker-Snoqualmie National Forests. Minor revisions of the Alpine Lakes Plan may occur in the forest plans.”

Another revision made in the Alpine Lakes Plan is the preliminary administrative recommendations on Wild and Scenic Rivers. This is also covered in the Alpine Lakes Management Plan (page 14), “This FEIS makes no evaluation of these rivers for their qualifications as Wild and Scenic Rivers but each alternative preserves, for the future, the option to so designate.”

Because it is incorporated by reference, review and amendment of the Alpine Lakes Management Plan will be accomplished in the same way the remainder of the Forest Plan will be amended and revised. This is described in Chapter V, Section D, of the Forest Plan.

212 THE DEIS DOES NOT PRESENT A FULL RANGE OF ALTERNATIVES.

COMMENTS INCLUDED:

“The Wenatchee National Forest needs to consider a full range of management alternatives including the following: 1. Substantially reduce livestock grazing allotment and no grazing alternatives. 2. Substantially reduce ORV allocation and no ORV use alternatives. 3. Alternatives that prohibit timber harvest in all naturally evolved Old Growth forests. 4. Alternatives which do not include construction of the proposed Naches Pass road.”

“Likewise, no alternative provides for less than 1000 miles of new road to be constructed, also a violation of 36 CFR 219.12 (F)(1).”

“No alternative withdraws any part of the Forest from leasable mineral development outside of existing wilderness. This violates NFMA regulations (36 CFR 219.12 (f)).”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0044, 0065, 0067, 0224, 0528, 0579, 0579, 0582, 1947, 2053, 2053, 2132, 2779, 2832, 2930, 3068, 3190, 3256, 3551, 3553, 3593, 3771, 3878, 3911, 4186, 4484, 4486, 4510, 9094

FOREST SERVICE RESPONSE:

The FEIS contains modified alternatives which address the major concerns expressed by a majority of the public. These are in addition to alternatives displayed in the DEIS, which are designed to provide a reasonable range of opportunities for resource use and management across the Forest.

The number of alternatives which could be developed are unlimited, but a reasonable range of alternatives was developed based on the original scoping of alternatives, public responses to the DEIS, and existing federal laws. Existing federal laws require the Forest Service to make forage, timber and recreational opportunities such as ORV use available to the public.

Changes made in the FEIS include grazing allocations, ORV allocations, and harvesting of Old Growth. Alternative F in both the DEIS and FEIS allocate all roadless areas to an unroaded management. The road construction included in alternative F is necessary to harvest timber and conduct other management activities in existing roaded portions of the Forest.

213 THE DEIS DOES NOT INCLUDE A WORST CASE ANALYSIS WHEN THERE IS INCOMPLETE AND UNAVAILABLE INFORMATION.

COMMENTS INCLUDED:

“A footnote to Table II-3a states that no population data are available for several management indicator species..... NEPA requires that it be obtained and included in the EIS; if not obtainable at reasonable cost, its lack must be acknowledged. (40 CFR 1502.22a).”

“The Wenatchee National Forest admits a clear lack of information on a variety of resource issues that would be affected, yet no worst case analyses are presented.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

3239, 3256, 3493, 3553, 3866, 9094

FOREST SERVICE RESPONSE:

NEPA regulations (40 CFR 150.22, July 1,1986) have been changed to direct agencies, which are “evaluating reasonably foreseeable significant adverse effects on the human environment in an EIS and there is incomplete or unavailable information” to make clear that such information is lacking.

In many cases lack of information, including information on existing animal populations, does not necessarily mean that an evaluation of reasonably foreseeable significant adverse effects on the human environment can not be made, or that the information is essential to a reasoned choice among Alternatives in the FEIS. Very often the specialist was making the disclosure that information needed to display an accurate number was not available, and that highly accurate numbers for wildlife species and/or similar information could not be obtained. In other cases the information may have improved the evaluation. Disclosures of this nature has been done throughout the FEIS, Appendices and Forest Plan.

The Forest has determined that there are no reasonable, foreseeable, significant impacts to the resources referenced in the documents with the application of mitigation measures in the management prescriptions and Forest-wide Standards and Guidelines (refer to Chapter IV of the FEIS). The monitoring plan in Chapter V of the Forest Plan will be implemented to help detect and control adverse impacts. This plan will serve as a means for collecting relevant information about presently unknown adverse effects.

214 THERE ARE PROBLEMS WITH THE PROPOSED MONITORING PLAN AND REVISIONS ARE NECESSARY.

COMMENTS INCLUDED:

“We request that you prepare a monitoring plan, with budget, which reflects monitoring, and evaluation on an ongoing basis.”

“Connected to any such standards should be monitoring elements designed specifically to address the adequacy or effectiveness of the values chosen.”

“Your monitoring program should also rely on public comment. Example - if I find an inconsistency in the field with the adopted Forest Plan, there should be a procedure for my comments....”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0582, 1952, 2135, 2201, 2879, 3138, 3235, 3255, 3256, 3343, 3550, 3553, 3725, 3731, 3746, 3871, 3877, 3992, 4298, 4446, 4485, 4495, 9094

FOREST SERVICE RESPONSE:

The implementation and monitoring section (Chapter V) of the Forest Plan has been rewritten and expanded. Monitoring worksheets which go into much more detail than contained in the Monitoring Plan Table in Chapter V, are displayed in Appendix F of the Forest Plan. Chapter V discusses public involvement during the Environmental Analysis stage of implementation of the Plan. The public will have the opportunity to get involved for comment on projects and activities permitted through the Forest Plan during the Environmental Analysis process to assure compliance with the National Environmental Policy Act, and other Forest Service Regulations including the Forest Service Appeal process.

215 EXISTING UNIT PLANS AND OTHER RESOURCE GUIDELINES WERE IGNORED IN THE NO CHANGE ALTERNATIVE.

COMMENTS INCLUDED:

“The supplement also states that, “no adjustments have been made to reflect new information for resources other than timber. These include such things as soil, cultural, riparian, and wildlife resources; (pg II-6). It is not clear to us why the Forest’s planning team chose to ignore the unit plans in their development of the No Change alternative. By ignoring the existence and role of its unit plans, the Wenatchee has still not prepared a true No Action Alternative as required by NEPA.”

“The text gives the impression that what has been conducted since the inception of NFMA is totally out of compliance with the act. The adoption of unit plans prior to NFMA, completion and incorporation of The TRI system, EA completion for each timber sale, increased deposits for wildlife and fisheries work, and revisions to the timber sale contract all provide emphasis on other resources. You have been incorporating the concepts and spirit of NFMA for years and doing an excellent job of it! In other words management requirements (MR’s) have been in place under other names and without their being acknowledged. For this reason “No Change” can be a viable alternative and should be given the full financial and modeling examination of any other alternative.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0002S, 0005S, 0024S, 0037S, 0088S, 0119S, 0215S, 0423S, 0696S, 1158S, 1187S, 1243S, 1370S, 1379S, 1574S, 1577S, 1578S, 1579S, 2042S, 2178S, 2195S, 2244S, 2278S, 2308S, 3648S

FOREST SERVICE RESPONSE:

Existing Unit plans were incorporated into the No Change alternative to the extent that the Timber Management Plan amendments reflected the direction and corresponding timber yields adjustments reflected by the Unit Plan direction. An example would be that the roadless areas in the Chelan Unit plan are reflected in the NC alternative as amended by the Washington State Wilderness Act because adjustments were made in the Timber Management Plan to reflect this direction.

It is also correct that we have been incorporating the concepts and spirit of NFMA for years into our projects and activities occurring on the Wenatchee Forest Lands. However, the problem that exists with the No Action is that no adjustments or amendments have been made to the Timber Management Plans to reflect the reduction in timber yields required to fully incorporate the concepts into a viable forest-wide comprehensive plan. An example of this is the Alpine Lakes Management Plan deferred adjustments to the timber base until the pending revision of the timber management plans.

The in context wording of the supplement (pg II-6) is; "Adjustments in the TM plans were made only to the acres available for harvest and the subsequent Potential Yield. No adjustments have been made to reflect soil, cultural riparian, and wildlife resources. The management requirements (MR's) are also not applicable in this alternative." This is a statement of fact concerning the amendments to the TM Plans and does not mean that some of the direction in unit plans were not included in the No Action alternative. However, when the Timber management plans are not amended to reflect the direction in Unit plans which require adjustments in potential timber yield, it would be inconsistent to ignore the consequences to other resources and also maintain the No Action potential yield. In fact, when all of the concepts and direction from Unit Plans and various laws (T&E Species Act, NFMA and others) are incorporated into the No Action alternative, the result is Alternative A/NFMA with the corresponding annual sale quantity of 121.4 million board feet, instead of the 176.8 million board feet potential yield in the No Change Alternative.

MANAGEMENT REQUIREMENTS

216 ALTERNATIVE HABITAT SIZES AND DISPERSAL DISTANCES FOR WILDLIFE MANAGEMENT REQUIREMENTS WERE NOT CONSIDERED.

COMMENTS INCLUDED:

"The Forest Service has not analyzed all reasonable ways to achieve Management Requirements."

"The discussion in the Management Requirements Analysis Appendix is merely an after-the-fact justification of the Forest's choice of a particular method. This doesn't comply with the requirements of NFMA or NEPA."

“The 2000 acre size of SOHA’s and the assigned large distances between SOHA’s are woefully inadequate to preserve the distribution and viability of these species.”

“Providing a minimum number of sites and acreages in areas where timber harvest will occur will result in fragmentation of Marten and Three-Toed Woodpecker populations.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0030S, 1062S, 1370S, 1578S, 2064S, 2308S, 2316S

FOREST SERVICE RESPONSE:

Although the Forest has not analyzed all alternatives, it has analyzed a reasonable range of alternatives based on scientific information available for each wildlife species. As a result of the MR analysis, comments to the Supplement and new information and direction, including the Spotted Owl FSEIS to the Regional Guide, changes have been made to the preferred alternative for Spotted Owls, Marten, Three-Toed Woodpecker and Pileated Woodpeckers. These changes affect sizes of habitats, and/or dispersal distances and/or habitat characteristics for these species. In addition, Spotted Owl habitat areas will be managed in a “dedicated” strategy.

217 TREATMENT OF SPOTTED OWLS IN MANAGEMENT REQUIREMENTS ANALYSIS

COMMENTS INCLUDED:

“Spotted Owls have survived well without Management Requirements.”

“The overwhelming majority of public is against massive set-asides for Spotted Owls.”

“Your proposed Spotted Owl management areas are much too large. Five or ten acres should be plenty for any kind of bird. Spotted Owls have been documented on virtually every timber type known in the Pacific Northwest.”

“The Washington Wilderness Coalition supports the strongest, most stringent protection for wildlife and habitat in Management Requirements.”

“We fully support dedication of habitat areas.”

“Fragmentation is one of the main threats posed by proposed timber cutting on the Northern Spotted Owl.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0002S, 0068S, 0342S, 1062S, 1067S, 1305S, 2053S, 2199S, 2308S, 2316S, 2319S

FOREST SERVICE RESPONSE:

The Spotted Owl Final Supplement to the Environmental Impact Statement (FSEIS) for amendment to the Pacific Northwest Regional Guide was published after the Forest’s Supplement, including the Management Requirements analysis, was released to the public in October, 1988. The Spotted Owl FSEIS disclosed the consequences of a number of alternatives and selects a course of action for the Forest to follow in managing Spotted Owls. The selected alternative is intended to provide for a viable Spotted Owl population. It provides specific direction for managing Spotted Owls on the Wenatchee National Forest.

218 MANAGEMENT REQUIREMENTS WERE NOT SUBJECT TO PUBLIC REVIEW.

COMMENTS INCLUDED:

“The Forest Service should immediately withdraw their implementation of Management Requirements until they are subject to public review.”

“The Forest and its users would be better served by a public review of Management Requirements.”

“The assumptions the Forest made toward the wildlife requirements and the dispersal distance between habitats has had no public involvement nor has the Forest engaged in any legal rule making process.”

“We question the right of the Forest Service to establish the rule making process without due process of public involvement.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

2137, 3487, 4483, 4484, 4489, 0005S, 2318S

FOREST SERVICE RESPONSE:

As explained in the introduction to the Supplement, one of the purposes of the Supplement was to gain further public involvement.

Management Requirements are listed in 36 C.F.R. 219.27. The ways or means to implement these Management Requirements are analyzed in the Supplement. The Supplement provides opportunities for the public to comment on all aspects of the ways or means to implement Management Requirements. Comments from the public are considered in the development of the Final EIS. Prior to the development of the DEIS, considerable effort was spent by the Forest and others in developing and reviewing the biological habitat requirements for wildlife. Consultations were made with agencies or others who had scientific knowledge regarding wildlife management. In addition to that information contained in the Management Requirement appendix, the Draft EIS included discussions of Management Requirements in Chapter II and Appendix B.

The specific ways or means of meeting Management Requirements can be viewed as the Forest’s specific expression to meet the congressional mandate in Section 6 of the NFMA. The Management Requirements and the ways to meet them constitute the agency’s scientific determination of the minimum resource protection standards necessary to comply with the law.

219 THE RANGE OF SCIENTIFIC OPINION AND UNCERTAINTY REGARDING MANAGEMENT REQUIREMENTS HAS NOT BEEN DISCLOSED.

COMMENTS INCLUDED:

“The Forest must discuss the extent the means to meet legal requirements are based on scientific research, field experience or professional judgement.”

“Where contrary scientific research exists, it must be noted and its implications discussed.”

“The Wenatchee’s Supplement failed to fully discuss the scientific uncertainty involved in its Management Requirement analysis.”

“Even if there are some areas of imprecision in the Management Requirements, it would appear that management above minimum levels is more cost effective in the long run.”

“The assumption of 100% occupancy rates in Management Indicator Species is extremely unrealistic and underestimates the required habitat.”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0018S, 0052S, 0053S, 0054S, 0059S, 0073S, 0078S, 0083S, 0089S, 0173S, 0183S, 0225S, 0227S, 0461S, 0467S, 0469S, 0607S, 0619S, 1055S, 1056S, 1057S, 1155S, 1158S, 1159S, 1215S, 1241S, 1307S, 1370S, 1574S, 2063S, 2067S, 2068S, 2239S, 2243S, 2250S, 2308S, 2313S, 2314S, 5075S

FOREST SERVICE RESPONSE:

Appendix I was amended to include the following kinds of statements. “There are a range of scientific opinions as to what the habitat requirements - in contrast to desirable habitat - are. These differences of opinion are disclosed.

Often, the pool of scientific knowledge is insufficient to provide the entire basis for defining the specific conditions or standards that will satisfy or meet a management requirement. When this happens it is necessary to rely on the field experience and the professional judgement of knowledgeable professionals and to establish monitoring and research that will provide better information for future planning efforts.

CUMULATIVE EFFECTS

220 SEVERAL INDIVIDUALS AND GROUPS EXPRESSED CONCERN ABOUT THE TREATMENT OF CUMULATIVE EFFECTS IN THE DRAFT DOCUMENT. SOME WERE UNCLEAR AS TO WHAT THE OFFICIAL DEFINITION WAS FOR CUMULATIVE EFFECTS. OTHERS COMMENTED THAT THE CUMULATIVE EFFECTS ISSUE DID NOT ADDRESS ALL RESOURCES, AND WAS FOCUSED TOO NARROWLY. SEVERAL REVIEWERS EXPRESSED CONCERN ABOUT THE MANAGEMENT OF INTERMINGLED LANDS.

COMMENTS INCLUDED:

“Page IV-30, recreation setting. Have cumulative effects of more roads and recreation been included in big game output models?”

“Land patterns - The past 15-20 years has seen the pattern of forested stands on the Cle Elum RD greatly change. Two-thirds or more of most watersheds have been converted to plantations. This is and will continue to cause problems with meeting visual, watershed and wildlife needs. For instance, water yields to the Yakima drainage are probably near the peak level for the next rotation period. Or take the elk population, with an abundance of forage now, in a few years as plantations close, cover will be over abundant and forage limited, with the area dominated by sub-merchantable stands.”

“Mixed ownership management - this issue has not been adequately addressed in any of the planning documents, despite attempts by ranger district personnel to draw attention to it. The plan’s projected yields of timber for all alternatives are unrealistically high in checkerboard areas due to considerations the FS gives to what is happening on private land. Impacts on watersheds, wildlife habitat (including spotted owls) and creation of large man-made openings, all serve to limit and preclude NF options for management. This is not recognized. All cumulative effects should be identified, addressed, and yield outputs adjusted accordingly. This is not currently being done and projected outputs are too high, given the cumulative effects expected and associated restrictions.”

“The issue of cumulative effects was also simplified. It is assumed that basins with more timber harvesting scheduled and having a larger proportion of area in private ownership have a greater risk of cumulative effects. Further discussion of what cumulative effects are and how they occur would provide a better insight about their significance when comparing alternatives.”

“It is here in Kittitas County and largely within the boundaries of the Cle Elum R.D. of the WNF that the enormous acceleration of Burlington Northern’s logging activity has its greatest impact. The cumulative effects resulting from BN’s logging are severe in all alt., they would be very severe considering the prescriptions proposed in your preferred alt. C How can the WNF competently address wildlife and watershed issues within the parameters of the multiple use concept and the 1976 NFMA in a situation where every other section will be a clearcut--As will be the situation in about ten years. The Alpine Lakes Plan was placed intact as a part of all alts. It was developed well before the cutting level of Burlington Northern made its impact. Dare I ask if it might be appropriate to consider changes in the ALAMP for the purpose of reducing the Level of impacts to wildlife, watershed, scenic, and other values?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0055, 0062, 0342, 0577, 0579, 0582, 0716, 0900, 1952, 2201, 2319, 2719, 2735, 2849, 2854, 3015, 3085, 3205, 3223, 3229, 3255, 3256, 3439, 3520, 3550, 3553, 3621, 3870, 4142, 4286, 4298, 4420, 4426, 4460, 4477, 4485, 4494, 4493, 4495, 9041, 9094, 0001S, 0719S, 1243S, 1380S, 1577S, 2240S, 2316S

FOREST SERVICE RESPONSE:

NEPA regulations require an assessment of cumulative effects of management activities on all resources (40 CFR 1500-1508). The basic definition of “cumulative effects” is “the impact on the environment which results from the incremental impact of the actions when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.0). The application of this concept can range from a local to a global basis; however, for the purposes of this analysis, the effects have been discussed on a Forest-wide level. It is also important to recognize that “cumulative effects” can be positive, neutral, or negative. Most of the time, people tend to focus on just the negative effects.

During the scoping process for the Wenatchee Forest planning effort, the principal areas of concern in regard to cumulative effects were the potential impacts of timber harvest and associated road construction on watershed condition (soil, water quality, quantity) and on fish and wildlife (habitat diversity and numbers). Other areas of concern were cumulative impacts on scenery and recreational resources.

During the preparation of the final documents, the assessment of direct, indirect and cumulative effects for all resources has been revised. More detailed discussions of the potential cumulative effects of management activities on the various resources have been include in Chapter IV of the FEIS.

For example, the environmental consequences section on wildlife now addresses potential cumulative effects on wildlife habitat in areas of the Forest with intermingled ownership. In another example, in between the Draft and Final, an analysis was conducted on several drainages in which concern existed for the potential for cumulative effects on soil and water resources from management on private and National forest lands. This study included twenty-six sub-drainages on the Cle Elum Ranger District and four sub-drainages on the Naches Ranger District. As a result of this analysis, timber harvest on National Forest lands in two sub-drainages was deferred until a more acceptable hydrologic condition exists.

As noted above, intermingled lands are common to some parts of the Forest. Management of these lands was identified as a major issue during the scoping process. Concern exists for the potential for cumulative effects from management activities on the various ownerships on numerous resources. The management of National Forest System Lands in these areas is complex and opportunities include reduction in impacts through deferral, unilateral activity scheduling, coordinated activity scheduling and land exchange. The Forest Service is only one of the many entities involved in watershed management in these areas. The Forest will fulfill its role in this system through more site specific analysis of the cumulative effects issue during project level planning. However, the responsibility for coordinated management in these watersheds is shared by all entities.

221 SEVERAL REVIEWERS CHALLENGED THE ADEQUACY OF THE 40% CUTOVER LEVEL AS A TRIGGER TO MANDATE A CUMULATIVE EFFECTS ANALYSIS.

COMMENTS INCLUDED:

“We also question whether 40% of a watershed in created openings with trees less than 15 feet tall will adequately avoid cumulative effects of increased sediment loading. There is no discussion of the basis for this strategy, or whether this is too much or too little for a particular sub-basin.”

“In addition, as stated above, there is no discussion of why 40% created openings, or 1,000 acres is used as a guideline to reduce impacts.”

“One of the Forest’s tools for mitigation is to restrict forested openings (openings less than 15 feet tall) to less than 40% in any watershed greater than 1,000 acres Has this 40% limit been shown to be adequate? Is it based on research or otherwise documented? Has an analysis been done to show that the Forest can meet their annual cut and still maintain 60% of a watershed with trees greater than 15 feet tall?”

LETTERS WITH COMMENTS ON THIS SUBJECT INCLUDE:

0579, 0808, 1952, 3223, 3239, 3350, 3621, 4485, 4495

FOREST SERVICE RESPONSE:

The Forest Service guideline was developed after a major flood event in Cabin and Log Creeks on the Cle Elum Ranger District in 1975. At that point in time, it had been estimated that nearly fifty percent of both drainages were in a harvested condition (trees less than four feet tall). The District Ranger felt that the 1975 flood event was directly related to the amount of cut over land, because other unharvested drainages in that same locality has not experienced the flood damage. About this same time, Dr. Glen Klock (USFS Forest Sciences Lab, Wenatchee, Washington) developed the KWCEA model, which provided a systematic means of evaluating risk associated with lands in a harvested condition. Klock made the assumption that watershed recovery had occurred when at least one-third of the trees (fully stocked stand of conifers) was fifteen feet or taller.

The Forest Soil Scientist and Forest Hydrologist recommended to the management team that fifty percent was probably too much of any particular sub-drainage to be in a harvested condition. They further recommended that the Forest Service use thirty percent as a point where an on-site investigation would be needed to determine watershed condition. The management team agreed that fifty percent was probably too much, but they also thought that thirty percent was too conservative; therefore, it was agreed that when sub-drainages that were one thousand acres or larger in size were in a harvested condition, or if there was a major concern about cumulative effects identified in the I.D. process, that a thorough analysis would be made to determine the degree of risk for that particular sub-drainage. The Forest Service has used this guideline as a caution flag, so that watershed condition would be evaluated by a team of specialists before any particular drainage has more than forty percent of its area in a harvested condition.

The one thousand acre size limit was adopted as a result of a concern in the Thompson Creek sub-drainage (approximately 1300 acres) on the Leavenworth Ranger District. This guideline seems to be applicable to other parts on the Forest as well.

In 1988, the Forest re-evaluated the guideline, basically refining it, but not really changing the basic concepts. A Forest-wide Standard and Guideline in the soil section of the Plan, Chapter IV, has been developed to incorporate this concept. As written, this standard mandates that a watershed analysis be conducted whenever "more than 40% of the forested area in a 1,000 acre or larger sub-drainage is projected to be in openings at any one time." More importantly, this new standard requires that a detailed watershed analysis be made by an appropriate group of specialists whenever project scoping identifies cumulative effects to be an issue or concern (considering all ownerships).

Using this standard, the Forest Supervisor had a team of specialists make an analysis of some forty different sub-drainages on the Cle Elum and Naches Ranger Districts during the summer of 1988. Thirty of these sub-drainages required a detailed analysis (26 on the Cle Elum District and 4 on the Naches District). Rescheduling of several timber sales occurred as a result of this analysis. From the data that was developed, both Districts will be able to monitor these sub-drainages and determine how well the model values reflect watershed risk in the event of a major flood.

As more information becomes available, modifications of this standard may be necessary because of timber type, soil differences, or some other selected factor; however, for this point in time, this is the best method the Forest Service has for assessing watershed condition on a Forest-wide basis. It must be recognized that analysis of this kind is only one element used in the decision making process. The District Ranger must still decide whether or not the risks are too great to harvest timber and build roads in any particular sub-drainage. The standard does not set a limit as to how much land will or will not be harvested in any sub-drainage. The standard does establish a point at which a more thorough analysis must be conducted as part of the assessment of the potential effects of a project or number of projects on a watershed system.

COMMENTS ON PLANNING DOCUMENTS BY

ELECTED OFFICIALS

FEDERAL AND STATE AGENCIES

INDIAN TRIBAL GOVERNMENTS

This section contains photocopies of letters received from elected officials, Federal and State agencies, and Indian Tribal Governments on the Draft Environmental Impact Statement, Proposed Forest Plan, and Supplement to the Draft Environmental Impact Statement.

Due to the number and length of responses received from these groups, we have elected to photocopy those portions of the letters containing direct comments on the planning documents. Original letters with all enclosures and addenda are on file and may be viewed at the Forest Supervisor's Office in Wenatchee, Washington.

ROD CHANDLER
5TH DISTRICT WASHINGTON

COMMITTEES
BANKING, FINANCE AND
CREDIT AFFAIRS
EDUCATION AND LABOR

Congress of the United States

House of Representatives

Washington, DC 20515

September 26, 1986

02139

218 CANNON BUILDING
WASHINGTON DC 20515
(202) 225-7781

DISTRICT OFFICES
3330 181ST AVENUE SE
BELLEVUE WA 98002
(206) 462-0118

1028 SOUTH 320TH
FEDERAL WAY WA 98003
(206) 893-8371
(206) 841 2878

Mr. Donald Smith
Page 2
September 29, 1986

(02139)

Mr. Donald Smith
Forest Supervisor
Wenatchee National Forest
P.O. Box 811
Wenatchee, Washington 98801

Dear Mr. Smith.

As you are aware, October 1 brings the deadline for public comment on the proposed land and resource management plans for the Wenatchee National Forest.

Over the next several months, your staff will be sorting through the hundreds of responses to glean an overall perception of public opinion on how the Wenatchee National Forest should be managed in the years to come. The quality of the forest's relationship with the people who use it will be closely related to the responsiveness that you show in reviewing those questionnaires.

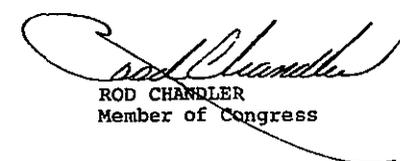
Certainly, if your mail is anything like mine, you have heard many complaints about conflicts between hikers and off-road-vehicle users. As I mentioned in my August 6 letter, I have received well over 400 letters from people who consider it a definite conflict for hikers and ORV's to be using the same paths. At that time, I provided you with a summary of the complaints that my staff put together. However, I feel that you should be fully aware of the seriousness the people of this state place on this issue. Enclosed you will find photocopies of the most helpful of the letters I have received to date. I hope that you will give them your full consideration and include them in the factors that you use in planning multiple use areas for the Wenatchee Forest.

Wenatchee is becoming known as a National Forest with serious conflicts between ORVs and hikers. In particular, Myrtle Lake Trail Nos. 1400 and 1404, which are said to be the heaviest areas of conflict in the state. Other trails with very high incidences of conflict are the Chelan Summit Trail to Boiling Lake Nos. 1261 and 1259, East Nason Ridge No. 1583, Devils Gulch No. 1220, Yellow Hill No. 1222, Duncan Hill No. 1434, Mission Ridge No. 1210, Mount Lillian No. 1372, and Tronsen Ridge No. 1204 of the proposed Chelan/Gold Creek Hiking Area.

In the proposed North Fork Entiat Hiking Area, North Fork Entiat River Trail No. 1437, South Pyramid Creek to Pyramid Peak No. 1439, and Pyramid Peak Trails Nos. 1433 and 1411 are reported to be areas of moderate to high conflict. In the proposed Mad River Hiking Area, the Upper Mad River Trail to Blue Creek Camp Trail No. 1409, Mad Lake Trail No. 1409, Two Little Lakes Trail No. 1426, Whistling Pig Loop Trail Nos. 1424 and 1417, Klone Peak Loop Trail Nos. 1426 and 1409, Cougar Mountain Trail Nos. 1419 and 1418, and Shepto Creek Trail No. 1429 have all been reported to be areas of moderate to heavy conflict. And finally, in the proposed Teanaway-Negro Creek Hiking Area, trails with moderate to high conflict include Negro Creek No. 1210, which is temporarily closed to ORVs but will reopen next year, Three Brothers No. 1211, Iron Mountain Trail No. 1212, Miller Peak Trail No. 1379, Iron-Bear-Teanaway Ridge Nos. 1351 and 1364 and Blewett Ridge County Line Trail No. 1226.

I would hope that you will take these concerns very seriously as you review the Forest plan for Wenatchee National Forest and make sure that wherever there is conflict, ORV use be eliminated so the letter and spirit of Executive Orders 11644 and 11989 can be fully enforced.

Sincerely,


ROD CHANDLER
Member of Congress

RC/dd

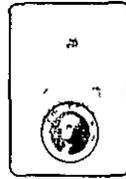
K-279

02122

SHIRLEY L. DOTY
FOURTEENTH DISTRICT

02122

OLYMPIA OFFICE RESIDENCE
HOUSE OFFICE BLDG 4402 ENGLEWOOD
01 YAKIMA WA 98504 YAKIMA WA 99709
206 786 7810 509 968 6619
TOLL FREE HOTLINE 1 800 582 6000



STATE OF WASHINGTON
OLYMPIA

September 28, 1986

Don Smith, Forest Supervisor
Wenatchee National Forest
301 Yakima Street
Wenatchee, Washington 98801

Dear Mr Smith

Prior to the public hearing in Yakima in late July I had studied the background information and various plans suggested by the Forest Service for the management of the Wenatchee National Forest. Thank you for sending me those materials. Then at the meeting I heard more about alternative "C", the preferred plan, which would reduce available harvestable timber by 22%, and have a significant impact on our area in loss of jobs and loss of income. It astonished me to hear that the Forest Service thought we could absorb and accept this severe loss

As one of the elected representatives of this area I have been working diligently with other state and local officials to increase the opportunities for people to find work in the Yakima Valley. We are struggling mightly to turn around our high unemployment figures by actively looking for new markets for all our products, agricultural, forestry, and small manufactured items. The state has established CINTRAFOR specifically to enhance the marketability of the wood products industry, and our legislature has consistently sought ways to help business and industry. There have been a few signs lately that the timber industry is slowly coming back. For that we are thankful.

Of course preservation of wildlife and encouragement of recreation are important to all of us, but a million and a half acres, more than half of the 2.2 million acre Wenatchee Forest, have already been allocated for wilderness, scenic, and roadless recreation.

We must look at a more balanced management plan not one which would provide for one use at the expense of the other. I believe the Essential Alternative Plan which equates to your Plan "B" with some minor modifications would be better suited to the needs of our area.

Please take time to carefully re-evaluate the proposed management plans. I would also like to suggest you give serious consideration to reviewing the data used in formulating your choices. I believe there is more recent data which could give a more accurate picture of the industry as it is today, and consequently a more accurate picture of the magnitude of the impact. This is an extremely critical issue for all of central Washington, and indeed, the economy of our state.

If you and your staff members feel it would be helpful to meet with elected officials from our area I am sure we would be very interested in discussing this issue with you. Please let me know if I can be of help in sponsoring such a gathering.

Sincerely,

Shirley Doty

K-280

02128

Washington
State
Senate



GEORGE L. SELLAR
REPUBLICAN CAUCUS CHAIRMAN
TWELFTH DISTRICT

September 29, 1986

Donald H. Smith
Forest Supervisor
301 Yakima St.
P.O. Box 811
Wenatchee, WA 98801

Re: Wenatchee National Forest
Draft Environmental Impact Statement
Proposed Land and Resources Management Plan

Dear Mr. Smith,

Let me take this opportunity to thank you for allowing me to make some comments on this proposed plan. I have tried to gather as much information on this issue as I can while developing my particular position.

I am fully aware of the need to preserve our national forests for the recreational and enjoyment purposes, that we all cherish so much in our beautiful valley, while at the same time allowing reasonable timber harvest to provide the jobs and the economy in the area. I believe you have attempted to do that in plan C/2200 and I am reasonably comfortable with that position. I do however feel the yield could be raised closer to the ten year average of 166 million board feet, which would be some improvement on the C/2200 position.

In the area of the inventoried roadless areas I would support the timber industry on that issue. I suggest that the forest service move rapidly to develop that acreage removed from the roadless designation to assist in the possible increased timber harvest.

I certainly do appreciate the thorough study and assessment by your department. I know you will get a great number of responses which is certainly the way it should be. I trust your judgement will be a sound one in the struggle to keep the economy moving and still protecting the environment.

Thank you in advance for your consideration of this request.

Sincerely,

George
GEORGE L. SELLAR
State Senator

GLS:bv

303 LEGISLATIVE BUILDING • OLYMPIA WASHINGTON 98504 • (206) 786 7622
1224 TERRACE DRIVE • WENATCHEE WASHINGTON 98801 • (509) 884 7511

CURTIS P. SMITH
REPUBLICAN WHIP
THIRTEENTH DISTRICT
ROUTE 2, BOX 1 NW
EPHRATA WASHINGTON 98823
RES TEL 509 787 2996



House of Representatives
STATE OF WASHINGTON
OLYMPIA

September 16, 1986

Don Smith, Forest Supervisor
Wenatchee National Forest
301 Yakima Street
Wenatchee, WA 98801

Dear Mr. Smith

I attended a meeting in Ellensburg at the Hal Holmes Center on September 10 regarding forest management. It was the consensus at that meeting that Plan B be adopted with minor changes. I certainly agree with that opinion. It appears that to accept anything else would definitely affect construction funding of our schools and, most of all, affect the economy of those counties involved.

I would hope that you could waive any decisions until all economic conditions have been thoroughly studied.

Sincerely,

Curt Smith
CURTIS P. SMITH
State Representative

CPS ns

00735

FORTY-NINTH LEGISLATURE
1986
410 LEGISLATIVE BUILDING
OLYMPIA TEL (206) 786 7608
COMMITTEES
COMMERCE AND LABOR
TRANSPORTATION
RULES

K-281



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Olympia Field Office
2625 Parkmont Lane SW, B-2
Olympia, Washington 98502
206/753-9444 FTS 434-9444

October 9, 1986

Ref. 1-3-86-I-302

Mr. Donald H. Smith
Forest Supervisor
Wenatchee National Forest
301 Yakima Street
PO Box 811
Wenatchee, Washington

Dear Mr. Smith:

This is in response to your request for comments on the proposed Land and Resource Management Plan and the Draft Environmental Impact Statement for the Plan for the Wenatchee National Forest, Chelan, Kittitas and Yakima Counties, Washington. Our comments in this letter pertain only to the Plan's coverage of endangered species. Additional Fish and Wildlife Service comments were provided to you in a September 25, 1986 letter.

On September 22, 1986 we provided you with a list of threatened, endangered and candidate species that may occur on the Forest. The gray wolf (*Canis lupus*) was not included on that list, but you should be aware that it is possible that portions of the forest might be used by this species.

Additional candidate species that were omitted from the Plan and which should be included for management consideration are the bull trout (*Salvelinus confluentus*) and the California bighorn (*Ovis canadensis californianus*).

Baseline data on listed and sensitive (candidate) species are needed for long range management. Regardless of which alternative is selected by the Forest Service for overall management of the Wenatchee National Forest, good baseline data are essential for determining population trends of endangered species, identifying their use areas, and implementing the various tasks directed in recovery plans for listed species conservation. We recommend that criteria be developed for inventorying listed and sensitive species populations on the Forest. These criteria should be included in the Standards and Guidelines section of the Plan along with provisions for incorporating information obtained from the inventories into the various planned Forest activities. In considering the input of Forest activities to listed species, please remember that any action that is authorized, funded, permitted or carried out by the Forest that may affect a listed species requires consultation pursuant to Section 7(a)(2) of the Endangered Species Act of 1973, as amended.

The Plan indicates that one bald eagle nest is located on the Forest. We recommend that the Standards and Guidelines section plan for the development of a site specific management plan for this and future nest territories.

As you are aware, the Service is considering listing of the plant species *Hackelia venusta*. Should this species be submitted for proposed listing, it is likely that this will occur prior to the final release of the Forest Plan. This point should be made in the Plan and Environmental Impact Statement.

As directed in our September 22, 1986 species list to you, and pursuant to Section 7(c) of the Act, you should prepare an assessment of the impacts to listed species from implementation of the Forest Plan. Should you determine that any aspect of proposed management may affect listed species, you should request formal consultation with this office.

If we can be of further assistance to you, or if you have questions regarding your responsibilities under the Endangered Species Act, please contact Jim Michaels at the above phone number and/or address.

Sincerely,

Charles A. Dunn
Charles A. Dunn
Field Supervisor

c: FS (Kathy Johnson)
WDG (Nongame)
WNHP



U S ENVIRONMENTAL PROTECTION AGENCY
 REGION 10
 1200 SIXTH AVENUE
 SEATTLE WASHINGTON 98101

04495

WENATCHEE NF

04495

-2-

REPLY TO
 ATTN OF M/S 443

Don Smith
 Forest Supervisor
 Wenatchee National Forest
 P.O. Box 811
 Wenatchee, Washington 98801

Dear Mr. Smith:

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act we have reviewed the Draft Environmental Impact Statement and Proposed Land and Resource Management Plan (DEIS and Plan) for the Wenatchee National Forest (WNF). The WNF is located in Central Washington and includes 2.1 million acres.

Certain components of the documents we thought were particularly well done. We especially appreciated the candid approach to describing additional data needs and the effective approach to discussing cumulative effects.

Based on our review we have rated the DEIS EC-2 (Environmental Concerns - Insufficient Information). Enclosed is an explanation of our EIS rating system. The primary reasons that we have environmental concerns are as follows.

- o The process for managing forest activities is not sufficiently detailed that we can be assured adverse environmental effects, particularly to water quality and fisheries, will be prevented. We suggest more fully describing the management processes of the WNF.
- o Standards and guidelines for Fisheries and for Water, Soil, and Air, need to be more fully discussed/developed in the Final EIS/Plan. A process for collection of adequate baseline data in conjunction with project planning should be specifically proposed, so that the next plan will have an appropriate information base.

The details of our comments are included in the enclosed review report. Several of the items identified in this review were discussed in the meeting we had with your staff in Seattle on September 24, 1986 and in subsequent telephone conversations. This interaction has been useful for us in becoming familiar with issues on the WNF.

SEP 30 1986
 SEP 30 1986

Supr	Dep
LMP	E R IM
AD	LDS
AS	MSP
	Fire
IN	LA
TRC	RWMS
IP	Soil
Per	WS
RRC	
Trv	LR
	TC
FSI	RQ

The intent of our comments is to be constructive. We are confident that by addressing our concerns and comments, the WNF can present a Final EIS and Plan which clearly shows that important resources will be adequately protected, while providing WNF personnel with the necessary flexibility to manage day to day activities on the ground.

Thank you for the opportunity to review this DEIS and Plan and for sending us the Best Management Practices document and Water Quality Monitoring Plan. We plan to submit comments on the latter two documents under separate cover. If you have any questions about our review, please contact Wayne Elson of our EIS and Energy Review Section at (206) 442-1463.

Sincerely,

Robert S. Burd
 Director, Water Division

Enclosures

- cc: USFS, R-1
 USFS, R-4
 USFS, R-6
 Dick Wallace, Washington DOE
 Brian Boyle, Washington DNR
 Patrick Wright, USFWS
 Sierra Club
 NMFS
 CRITFC
 Office of the Governor
 NWPPC

K-283

U.S. ENVIRONMENTAL PROTECTION AGENCY REVIEW REPORT ON THE DRAFT
ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED LAND AND RESOURCE
MANAGEMENT PLAN FOR THE WENATCHEE NATIONAL FOREST, WASHINGTON

PROCESS DESCRIPTION

The Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (Plan) rely heavily on subsequent environmental analyses and data collection for pinpointing specific impacts from forest activities. In order that we can be satisfied that the environmental effects of the selected alternative are acceptable, we need to have a complete picture of the forest management process. There are a number of elements within the forest management process that we believe are very important to minimizing adverse environmental impacts, particularly water quality effects. They include

- 1 A data base of existing conditions from which technical experts and the public can judge expected effects and level of uncertainty of the predictions
- 2 Best Management Practices (BMPs) and prescription development
- 3 Selection of BMPs for a particular activity [Environmental Assessment (EA) preparation] and how uncertainty is factored into selection
- 4 Thorough on-site inspection and administration, verifying that a particular activity is occurring as prescribed in contracts, leases or permits
- 5 Monitoring after the completion of an activity to determine whether impacts were accurately predicted
- 6 Repairing damage caused by adverse effects that exceeded predictions
- 7 Upgrading BMPs or prescriptions to correct inaccurate predictions

The DEIS and Plan did an excellent job of describing the available data base. The fact that the WNF realizes there are significant data gaps is very important in how the plan is structured. On-site inspection, repairing damage and upgrading BMPs have weaker commitments and are not clearly described. The most important component that is missing is a good description of how these elements are related and dependent on each other. For example, the Standards and Guidelines make heavy use of the goal statement as the basis for determining compliance with a particular standard. This is not specific enough, it weakens the link between predicting impacts (pursuant to the goal) and determining actual impacts. The process for on-site inspection, repairing damage, and upgrading of BMPs where necessary should be more specifically outlined.

As discussed on page V-3 of the Plan, Ranger Districts will have much of the "doing" responsibility. This responsibility should be described in context with the process described above. This will aid in understanding the Plan's system of accountability.

On page V-20 of the Plan, the monitoring program for water states that "further action will be required" when BMPs are not meeting water quality standards. This component of the Forest Management Process is very important. The Standards and Guidelines do not specify at what point this "further action" will be needed and how "further action" will be taken. Not only should the Standards and Guidelines be more specific, but the process description needs more detail here.

We would recommend that the Final EIS and Plan include a complete process description addressing the elements listed above.

WATER QUALITY

The presentation of water quality data on page III-75 is good. It does raise a number of questions, however, as it is difficult to determine water quality standards compliance from averaged water quality data. It should be noted that, typically, water quality standards are written for instantaneous and site-specific compliance. For example, Table III-32 indicates that a maximum value of 900 Nephelometric Turbidity Units (NTU) has been measured on the WNF. Similarly, pH values have been recorded well below, and fecal coliform counts well above, state standards. Where have these violations occurred? To what extent may they reflect managed activities on the WNF? (Would some of the Entiat Experimental Forest data help answer this?) We suggest revising the discussion to emphasize where (and under what conditions) water quality problems have been noted, as opposed to giving forest-wide averages. Statements regarding compliance with standards should acknowledge these problems.

For the Yakima basin, where land ownership is intermingled, the DEIS identifies a situation "where a significant cumulative effect on sediment yield may exist in the future." We note that, under fisheries, such a situation would trigger the Forest Service to consider altering its planned activities in the basin. We believe such consideration is appropriate, and should also be afforded in situations where a cumulative effect on water quality is likely. The Final EIS and Plan should provide standards and guidelines for how such situations will be handled.

The relationship of water quality monitoring to the other elements of the forest management process is not clearly spelled out in the DEIS and Plan. It is recognized that a separate and detailed monitoring plan document has been prepared. However, the Final Plan should include more definitive goals and objectives for the use of monitoring data gathered. Monitoring is a key element in the management framework to evaluate actions, modify activities, and upgrade BMPs where necessary to achieve desired environmental protection results. The Final EIS and Plan should be expanded to provide better policy and program direction for an effective monitoring plan.

The adequacy of the monitoring plan to assess environmental impacts and methods to ensure that the assessments are used in management decisions are key factors in EPA's ability to evaluate the adequacy of Forest Plans and EISs. The Final Plan should clearly outline how monitoring will be carried out such that mid-course corrections can be made in forest management. This serves as a *system of accountability, reduces adverse effects from any uncertainties in predicting Plan impacts, and makes it clear to the public how the plan will be implemented*. As the uncertainty in being able to predict water quality and fish habitat effects increases, it becomes more important to insure that activities are monitored to prevent adverse effects.

DOMESTIC AND IRRIGATION WATER SUPPLIES

According to the DEIS the WNF provides 95 percent of the water used for irrigation and domestic water systems in Chelan, Kittitas, and Yakima Counties. To ensure that current and any future surface drinking water supplies are protected information including location, size, and source of drinking water supplies should be included in the Final EIS. Also any instances of waterborne disease occurrences should be summarized, as should any water quality monitoring information (e.g., for turbidity and fecal coliform levels).

Watersheds or areas within watersheds which are particularly sensitive to activities which might have a detrimental effect on water supplies should be identified. Sensitive areas may be defined by such factors as the physical features of the watershed, the number of water users in the watershed, the type of water treatment employed, the location of water intakes, and past history of water quality problems. There may also be effects on ground-water supplies. The potential impact of the proposed Plan on drinking water aquifers should be addressed.

SOILS

The DEIS documents the level of existing soil data and the need for additional data as well. The Plan needs to outline the process for collection of adequate soil survey data where it is not currently available, prior to the occurrence of soil disturbing activities. Standards and guidelines should specify that such activities will not occur without consideration of adequate data in project planning analyses. Forest-wide standard No. 11 under Water, Soil, and Air (Plan page IV-98) should be revised by removing statements such as "where available."

FISHERIES

Chapter III of the DEIS provides a very good overview of existing (at the time of printing) knowledge of the status of fish habitat and fish population on the WNF. Many of the numbers used in the DEIS should be changed to reflect more recent information (for example, we are aware that more spring chinook have returned to the Yakima basin in the last 2 years than the 10 year average of 500 noted in the DEIS). Obviously, given recent increases in escapement, changes in harvest management related to the US-Canada Treaty, and the goals

of the Northwest Power Planning Council (NWPPC) and their efforts under the Columbia River Basin Fish and Wildlife Program, maintenance of high quality spawning and rearing habitat on the WNF will become increasingly important. Habitat quality is one key component to the success of all these efforts.

We are pleased that the DEIS considered not only presently utilized habitat on the WNF, but also included potential escapement and smolt habitat capabilities under the assumption that efforts to decrease losses "downstream" will be successful. The DEIS acknowledges (page III-47) that high quality habitat directly affects the harvestable portion of the runs. We concur, given equal escapement levels (regardless of the percentage of losses downstream) degraded habitat will ultimately provide fewer adult fish. The same harvest level cannot then be supported if escapement is to be able to sustain the run. Of course, avoiding impacts to habitat for stocks that are not currently self-sustaining (minimum viable) is even more important to the success of the efforts to rebuild them.

We were also pleased with the candid approach taken in the DEIS to identifying where data on fish habitat quality and fish populations is lacking. Very little specific information exists for most of the WNF. It is obvious that this plan will not be able to make project-specific decisions in many cases. The immediate focus for the upcoming implementation and planning period must therefore be on significantly upgrading the fisheries data bases. This should be done in conjunction with project planning and implementation, so that the next plan will have an adequate foundation.

It is for this reason that many of our comments focus on the following points:

- 1 The adequacy of the process to gather site-specific data, where little exists initially, in conjunction with planning for individual activities over the course of the planning period.
- 2 The adequacy of the process to gather data over broader areas (i.e., relating to potential cumulative effects of many individual activities), where little exists initially over the course of the planning period.
- 3 The adequacy of standards and guidelines for protecting fish and fish habitat, and the extent to which they take into account site-specific and cumulative effects data as it is collected.

We consider these areas to be key to managing fish habitat on the WNF so that impacts are minimized. Each of these areas is discussed separately below.

Site-Specific Data We consider it crucial that adequate data be available prior to initiating any ground-disturbing activity. Where little site-specific information on fish and fish habitat exists, additional data should be collected. We are not suggesting that all surveys for the entire forest need to be completed before any projects can take place. Rather, we believe an assessment of habitat quality and potential fish use in the general area of a proposed activity should be completed, and the results incorporated in project planning. This allows identification of areas that are either highly important or already degraded such that (in either case) more stringent

protection than is afforded by the Plan's forest-wide standards and guidelines can be provided. Areas that could not be protected could be avoided entirely. Without such an assessment prior to projects occurring, significant impacts could result. Such impacts would have to be considered reasonably avoidable and, therefore, unacceptable.

In relation to this issue, the DEIS and Plan is not consistent. In some instances, collection of additional data is proposed. In other cases, there is a tendency to conclude that impacts are not significant - and thus do not require special management consideration - without any data to support such a conclusion. For example, it is assumed that the habitat in the Entiat watershed has returned to nearly the pre-fire/flood condition, but it is noted that there "is very little data to support this contention." The result is that "monitoring will be done only through the regular forest-wide monitoring plan to detect change." We believe that in identified or potential problem areas, more intensive monitoring is necessary to 1) determine whether recovery from past impacts is occurring, and 2) to support whether and how further projects can occur without exceeding management thresholds or adding to already significant impacts. One of the purposes of the regular monitoring program is to identify such potential problem areas requiring more intensive monitoring.

Similarly, after describing existing instances of potential cumulative impacts within the Wenatchee drainage, the DEIS (page III-52) states that, "as a matter of judgement, it is not thought that any of the activities have resulted in significant impacts to the fisheries on the Wenatchee watershed, as a whole" (emphasis added). Where impacts are believed to exist, actions should be taken to mitigate them, and further activities should not significantly worsen them directly or cumulatively. More specifically, protection of beneficial uses is necessary wherever the use (fish populations) occurs, it can not be traded off against lack of impacts elsewhere to conclude overall nonsignificance.

Another example appears in the forest-wide standards and guidelines for soils (No. 11, page IV-98 of the Plan). This item states that detailed soil survey information will be utilized "where available" (emphasis added). The DEIS notes repeatedly that where detailed surveys are not complete, information is inadequate for project planning. Since mass movement and excess erosion can have significant impacts (direct and cumulative) on fish habitat, we consider site-specific soils information to be vital prior to soil disturbing activities occurring. Without it, adequate mitigative measures can not be identified. Once again, all surveys do not need to be complete before any activities occur. Rather, local site-specific assessments must accompany project planning where data is inadequate. Standards and guidelines should include this requirement.

Overall, the DEIS does a good job of acknowledging the serious lack of existing data on the WNF. The Final EIS/Plan should be more careful not to misinterpret existing data, and should rely more on collecting sufficient site-specific data over the course of the next implementation and planning periods. In particular, a standard should appear in the Plan requiring that adequate fish habitat information be available prior to implementation of activities which may affect the quality of that habitat. Then, the Monitoring

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Plan should be expanded to describe not only the regular forest-wide program, but also the project-specific data collection process and the framework for more intensive monitoring where impacts have occurred or are predicted.

Cumulative Effects Data The regular monitoring program should also be designed to gather data pertinent to potential cumulative effects both in basins where such impacts are considered at least possible, and where "none known" appears in the matrices. Since most basins fall into these categories, it is the regular monitoring program that should include parameters of concern for cumulative effects (as identified in the fisheries, soil, and water matrices).

The draft Plan does generally identify fish habitat inventories as a priority, and element 7.1 of the Monitoring Plan describes monitoring for fish habitat capability in the four major watersheds on the WNF. However, we find no discussion of when and how the needed habitat inventories will be carried out. Also, the level of monitoring described does not directly reflect the impacts identified in the DEIS (in particular, each of the WNF's 27 major subbasins, at a minimum, should receive the monitoring discussed).

Standards and Guidelines for Fish Habitat Protection The Forest-wide Standards and Guidelines that relate to activities potentially affecting fish and fish habitat are appropriate as far as they go. We believe they should be expanded and made more specific in order to ensure the protection intended. In some cases there need only be minor wording changes for them to be more effective (such as changing "should" to "will" in guideline No. 6, page IV-89, regarding mitigation for adverse effects to habitat). In most cases, however, standards need to be attached to the general guidelines listed. For example, how will fisheries needs be met in the design, construction, and maintenance of roads (No. 8, page IV-90)? (The specific guidelines for roads do address fisheries to some extent, and the WNF's BMPs are cited. It would be helpful, however, to outline key BMPs directly in this portion of the Plan.)

Similarly, how will the results of fish habitat inventories be used in project planning? Specific standards should be presented to provide the framework within which activities can be considered acceptable. These standards should relate to all pertinent components of fish habitat. As one example, a standard for an acceptable level of instream sedimentation would allow a project planner or team to determine whether predicted increases in erosion from an activity would be acceptable, given pre-project levels of sediment.

Such standards would insure that project plans minimize adverse effects and help to determine where more stringent management prescriptions are necessary. The plan proposes one scheme of management for all fish streams. We anticipate that completion of more surveys will allow identification of both relatively more important habitat areas and areas that have been or may be degraded by management activities. For both types of areas, protection beyond that provided in prescription EW-2 would be warranted.

We were pleased to note that the forest-wide standards for Range include cutoffs for allowable livestock forage use as a function of slope and soil hazard class and management intensity level (Plan, page IV-93). While we agree that impacts of grazing will vary by slope and soil hazards, the rationale for the percentages chosen should be provided.

Similar support should be provided for the 40 percent cutoff for created openings in drainages larger than 1000 acres (Plan, page IV-97), and for the minimum percent effective ground cover per erosion hazard class (Plan, page IV-98) These types of standards are appropriate and we were pleased to see them proposed The EIS should document why they are the appropriate values

Connected to any such standards should be monitoring elements designed specifically to address the adequacy or effectiveness of the values chosen This is particularly important on the WNF where detailed data on existing fish habitat quality are at present generally lacking, and adequate soil surveys are not yet complete

The standards and guidelines included in Management Prescription EW-2 ("Riparian-Aquatic Habitat Protection Zone") make up the primary direction for protection of fish habitat on the WNF We concur with the decision that the streamside zone warrants its own management prescription We further concur with the intent embodied in the stated purpose of management within the zone "The primary purpose is to maintain optimum riparian habitat for wildlife and fish and to protect wetlands " We have already noted that, given the lack of currently available data, it will be essential to collect site specific data to implement management strategies for streamside zones The EW-2 prescription should be conservative enough and specific enough so that significant impacts will be avoided It is from this perspective that the following comments on the EW-2 prescription are provided

Given the stated primary purpose of the prescription, it is important that the EIS/Plan evaluate why management activities would improve on the functions and values of the zone over a "no entry" scheme In other words, since only one management scheme is proposed for the entire streamside zone, the EIS should thoroughly evaluate whether the proposed scheme is reasonable The best way to do this is for the EIS to consider, to the extent possible, alternative schemes ranging from "no entry" to "no special management consideration "

Some of the important details of the EW-2 direction appear in Chapter IV of the DEIS (pages IV-40 and 41), but are not reflected in the EW-2 prescription itself in the Plan In particular, the specifics of rotation period under the extended shelterwood scheme, and the stipulation that no more than 10 percent of a given subbasin's zone be affected in a decade, are not reflected in the Plan Assuming they will be added back in, further guidance on the amount of shelter trees to be left within the zone should also be provided How many trees per acre would need to be left to assure adequate woody debris recruitment, and how is blow-down and natural mortality factored into this number?

Throughout the prescription, it is stated that various management activities could only occur to the extent that they are "compatible with the goal " Lacking are standards delineating when activities would be considered compatible We realize that specific determinations must be made on a project-specific basis, however, guidance for making those determinations is appropriate in the Plan (Please refer to the above example regarding a standard for acceptable instream sedimentation)

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More specific standards are also needed under the following elements of the EW-2 prescription

- Wildlife Surveys and Plans, No 1 In addition, this element should cite the more project-related survey work that we have indicated is needed A brief statement committing that such work will be performed would suffice
- Range Planning and Inventory, Activity Statement No 1 Standards should be provided to guide how allotment management plans can ensure maintenance or enhancement of the zone
- Timber A general expansion of this element is needed The direction provided in the DEIS (page IV-40 and 41) should be included Beyond this, further detail for when timber management activities would be compatible with the goal for the zone would be helpful (e g , when would firewood collection generally be compatible with optimizing fish habitat quality?)
- Water, soil, and air This element emphasizes improvement and rehabilitation projects Additional specific guidance relative to protecting beneficial uses of water (via management of the streamside zone) would be appropriate For example, practices to reduce delivery of eroded sediment to streams help protect both water quality and fish habitat Limiting of livestock grazing in watersheds having domestic water supplies similarly can reduce the significance of impacts
- Facilities, Road Operation (Maintenance) Procedures to minimize impacts are mentioned, but are not outlined Operators should not only be advised of the appropriate procedures, but should be required to follow them Thus, outlining them as standards in the Plan is essential

IMPLEMENTATION DIRECTION

The Plan states on page V-2 that "If environmental analysis shows little or no environmental effects are expected beyond those identified and documented in the Forest Plan Final EIS, the analysis will probably result in a categorical exclusion " This needs to be rephrased The type of environmental document should be based on the significance of an activity not whether or not it is mentioned in the Final Plan

Monitoring element 7.1 addresses Management Indicator Species (MIS) For anadromous fish, chinook salmon are proposed as the MIS Sockeye salmon have clearly different habitat requirements, as do coho and steelhead Chinook habitat alone does not adequately reflect the needs of these other species These anadromous species should also be considered MIS for the WNF, so that the monitoring plan will address potential impacts to all of them

The physical and biological parameters that will be measured for fish should be outlined Sediment, large organic debris, canopy, flow regime, and nutrient cycling are all examples that come to mind of important components of a stream's capability to support fish

The trigger for further evaluation here is a 10 percent change in long-term habitat capability. Depending on the existing condition of a particular habitat area, this may or may not be appropriate. Until more site-specific data are available for the next Plan, we cannot determine whether up to a 10 percent change is acceptable in all areas. A more appropriate trigger for the time being would be to reverse the proposal, as follows: "Decrease in habitat capability below 90 percent of natural capability." This would dovetail well with a project-specific data collection program. The existing habitat capability would be estimated first, and predicted impacts evaluated against whether resulting capability would be within 90 percent of the stream's natural potential. Where existing conditions are already below this standard, further activities should only be allowed in conjunction with direct habitat improvement work or other mitigation.

The water monitoring element (10) is the key component of the monitoring plan. The adequacy of many of the other resource management activities will be determined by their level of impacts on water quality and quantity. This element of the monitoring plan should contain the general policies and procedures upon which the more detailed WNF water quality monitoring plan is based.

The emphasis of the water quality monitoring should be focused in sensitive or high hazard areas, rather than randomly monitoring 10 percent of the management activities. Monitoring should also focus on the protection of beneficial water uses as identified in the water quality standards for Washington. It is important to include the process the WNF will use to verify whether the designated management activities are adequately protecting water quality and beneficial uses.

ALTERNATIVES

The way that Chapter IV is structured appears to cause some environmental effects to be missed. Environmental consequences are discussed in terms of each alternative on each environmental component like recreation, scenery, wilderness, and fisheries. For example, there appears to be no discussion of the effect of 113 family campgrounds and 27 resort and organizational sites on the environment. The current and future water quality effects of sanitary facilities and solid waste disposal should be included in the Final EIS.

AIR QUALITY

Approximately 13,542 cubic feet of firewood are projected to be taken from the WNF. The health effects of wood smoke appear to not have been considered.

Smoke particles emitted from incomplete combustion of wood are small enough to penetrate deep into the lower respiratory tract when inhaled, these particles may have relatively high concentrations of compounds that are known and suspected carcinogens. The FEIS and Plan should identify the health impacts of wood smoke.

Forest land managers that provide firewood have a unique opportunity to educate the public regarding fuelwood use and air pollution through the permit process. For example, pamphlets discussing the association between wood stoves, air pollution, and health concerns, or providing tips on efficient wood stove operation, could be distributed with fuelwood permits. If appropriate literature is not readily available, we would be happy to provide examples that are being used elsewhere.

CUMULATIVE EFFECTS

We commend and recognize the conscientious attempts to address cumulative effects, both in Forest Service-managed watersheds, watersheds of intermingled ownership, and off-forest. The matrix approach to discussing these potential impacts is understandable.

As a general comment, the extent to which the matrices can be relied upon (regarding accuracy - i.e., should some "none known" entries be "possible?") is in direct relationship to the reliability of the data going into them. In most cases, very little data exists. The numerous "none known" entries appear to more precisely represent "not known" situations. "None known" implies data have been collected and no cumulative effects were identified. It would appear that in most cases little or no data have been collected in order to identify cumulative impacts.

We would recommend the most appropriate use for the matrices at this point is to help direct the forest-wide monitoring program. Where cumulative effects are known to be possible or likely, more intensive monitoring should be implemented in conjunction with project planning. Where no data on cumulative effects exists, the ambient monitoring plan should include stations and parameters to gauge the overall "health" of the watershed. (For example, temperature and sediment data in larger order streams may be collected first. If indications of basin level impacts are noted, more intensive monitoring should accompany project planning and implementation.) Used in this way, the matrices will "fill themselves in" for the next planning period. Also, more stringent standards and guidelines should apply to activities planned in basins where significant cumulative impacts have already occurred.

Another general comment is that the Plan needs to address how identified cumulative effects will be taken into account in the future. In the fisheries section of the DEIS (Chapter III), it is stated that "In subbasins where a cumulative effect could result in a significant change in fisheries habitat potential, Forest Service activities may need to be altered and/or mitigated." We concur with this statement. However, it appears to address only basins with intermingled ownership. It should apply to any drainage. Also, a similar statement does not seem to exist for other resources, such as soil and water, which can suffer significant cumulative effects as well. Finally, the positive intentions of the statement do not show up in the Plan under either the forest-wide standards and guidelines, or those for individual management prescriptions. These sections of the Plan should include not only the general commitment and direction of this statement, but also more specific standards and guidelines for carrying it out. (For example, thresholds of impact beyond which cumulative impacts are considered significant.)

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The Environmental Consequences chapter does a good job of addressing cumulative effects for the various alternatives. In particular, the separate discussions for groups of watersheds having different levels of intermingled ownership lands helps to disclose the differences among the alternatives. We concur that as more private ownership and acreage are allocated to timber harvest, the potential for cumulative effects increases. It is important for the Final EIS and Plan to note, however, that cumulative effects can also become significant in basins wholly managed by the WNF, and that monitoring will be designed to identify such impacts before they become unacceptable. The Final EIS and Plan should also provide specific support for the cutoff values used. For example, the potential for cumulative effects is assumed to be insignificant where less than 30 percent of a basin is available for harvest. Similarly, a 40 percent value is used as a forest-wide standard for basins exceeding 1000 acres. What are the bases for these figures? Whatever the figures used, the monitoring plan should be designed to address the question of whether they are appropriate.

SUMMARY OF THE EPA RATING SYSTEM
FOR DRAFT ENVIRONMENTAL IMPACT STATEMENTS
DEFINITIONS AND FOLLOW-UP ACTION *

Environmental Impact of the Action

LO--Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities with no more than minor changes to the proposal.

EC--Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EO--Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment.

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Department of Energy

Bonneville Power Administration
P O Box 3621
Portland, Oregon 97208

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4. We suggest that strong consideration be given to protection and enhancement of anadromous fish habitat when you make your decision on a resource management plan for the Wenatchee National Forest.

Thank you for the opportunity to review and comment on the draft EIS. Please let me know if you need further information.

Sincerely,

Anthony R. Morrell
Anthony R. Morrell
Environmental Manager

Enclosure

Forest Supervisor
Wenatchee National Forest
USDA Forest Service
P.O. Box 811
Wenatchee, Washington 98801

COMMENTS ON THE DRAFT EIS

We have reviewed the Draft Environmental Impact Statement (EIS) on the Wenatchee National Forest Proposed Land and Resource Management Plan, and we offer the following comments for your consideration.

1. We would like to compliment you on the good job you have done of addressing both existing and proposed energy transmission corridors.
2. In our review, we noted that the Wenatchee National Forest has designated Research Natural Areas as corridor exclusion areas. It is our understanding that the only types of areas that can be called exclusion areas are those having a statutory prohibition to rights-of-way for lineal facilities or corridor designation (see enclosed July 13, 1982, memorandum from R. M. Housley, Deputy Chief, US Forest Service, to Regional Foresters, R-1 through R-6). In the Northwest, the only National Forest areas we are aware of that are known as exclusion areas are those designated as Wilderness Areas, Primitive Areas, or National Recreation Areas (where specifically excluded by legislation). Therefore, to be consistent with Forest Service policy, we believe Research Natural Areas should be identified in the EIS as avoidance areas rather than exclusion areas. Bonneville Power Administration would make every effort to avoid Research Natural Areas. If you have any questions on this point, please contact Mr. John O. Hooson, Environmental Specialist, at FTS 503-429-3299.
3. Any of the alternative management plans in the EIS would be acceptable from the corridor planning standpoint, since none of the plans would adversely affect existing or future designated transmission corridors.

In reply refer to SJ

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1920 Land and Resource Management Planning

Date

JUL 13 1982

Subject: A Proposal for Coordinated Corridor Planning Direction
on NFS Lands in the Western States

To: Regional Foresters, R-1 through R-6

REPLY DUE AUGUST 13

The National Forest Management Act, Federal Land Policy and Management Act, and Mineral Leasing Act of 1920, as amended, address the need for designation and management of utility-transportation corridors on Federal lands.

A 1980 Interagency Agreement between the Forest Service and the Bureau of Land Management, coupled with direction in the NFMA planning regulations, stimulated NFS corridor planning, particularly in the western states. While the mandate to cooperate with BLM and to develop standards and guidelines for designating corridors is understood and accepted, different approaches have been taken, and much good work has been done. For example, in Region 1, the Governor of Montana, Region 1 Regional Forester, and BLM State Director agreed to a joint transportation-utility corridor study within Montana because of mutual State and Federal concern over the effect of corridor planning on public lands and adjacent or surrounding private/State lands. An interagency team then developed planning objectives, analyzed existing right-of-way siting and the management situation and evaluated approaches for corridor identification on Federal lands. Utilities, Federal power marketing agencies, and in-house organizations provided background information, technical review and critique throughout this process.

Our experience including the Region 1 study, leads to several major conclusions which appear applicable Service-wide. They are:

- a. We need to develop uniform effective policies and procedures for managing linear facilities in topographically constrained areas (e.g., mountain passes, river valleys)
- b. Planning for future rights-of-way is an imprecise task. Many variables affect when and where new facilities will be needed. State and Federal agencies alone cannot plan for future rights-of-way or corridors.
- c. Technical compatibility factors are so complex that a case-by-case evaluation is probably necessary after an application for a particular right-of-way is received.
- d. The interrelationships of technical compatibility, environmental, social, land use and resource concerns, and landownership must be considered in corridor planning.

Regional Foresters, R-1 through R-6

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e. A combination of the direct (where facilities can go) and indirect (where facilities cannot go) approaches to corridor planning and designation present more advantages than disadvantages in meeting both Federal land planning responsibilities and State regulatory role in siting linear facilities.

f. A phased study of interconnected windows, exclusion areas, and avoidance areas appears to be the best method to identify corridors. This approach seems more practical than the designation of long linear corridors, except where existing critical corridors need to be identified and formally designated.

Based on these conclusions, we propose uniform national direction to guide Service-wide planning and decisionmaking for transportation and utility corridors, a copy is enclosed for your consideration. Format will be worked out later, i.e., sequencing into the Directives System. Our aim is to establish direction which clearly answers the following questions:

- How does the Forest Service designate a corridor?
- When does the Forest Service designate a corridor?
- What constitutes corridor designation?

Please review the material and give us your comments and suggestions by August 13, 1982. LMP/WO (Larry Hill) is coordinating development of this direction with WO/Lands and Engineering. Feel free to discuss the proposal with him (382-8013), but we will want your thoughtful comments in writing as well.

R. M. Housley
Deputy Chief

Enclosure

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Proposed Uniform National Direction
for Coordinated Corridor Planning on
National Forest System Lands in the Western States

AUTHORITY.

Principal Authorities. The following statutes provide the primary foundation and guidance for transportation and utility corridor planning.

1. The Forest and Rangeland Renewable Resources Planning Act of 1974, as amended (RPA).

a. Section 6 requires the development, maintenance, and revision of land and resource management plans, and sets forth the principal standards and guidelines that will govern planning and management of the National Forest System

2. The Federal Land Policy and Management Act of 1976 (FLPMA)

a. Section 503 requires the utilization of rights-of-way in common in order to minimize adverse environmental impacts and proliferation of separate rights of way; the Secretary to issue regulations containing the criteria and procedures for use in designating such corridors; and permits any existing corridors may be designated as transportation and utility corridors pursuant to Section 503 without further review.

3. The Mineral Leasing Act of 1920, as amended

a. Title 1 of this Act authorizes the Secretary of the Interior, through the Bureau of Land Management, to grant rights-of-way for oil and gas pipeline across all Federal lands. If the project affects only National Forest System lands, the Forest Service has responsibility for issuing the permit. For projects affecting Federal lands under the jurisdiction of more than one Federal agency, the Secretary of the Interior (with approval of affected agencies), grant a right-of-way over all the involved Federal lands. The Act encourages the utilization of rights-of-way in common to the extent practical.

Related Authorities.

1. 36 CFR 219.10(b)(14),(d)(5), and 36 CFR 219 13(b)(10) and FSM 1920 provide broad management standards and guidelines direction for transportation and utility corridors.

OBJECTIVES. The objectives in applying the following Servicewide direction for transportation and utility corridor planning are to:

1. Avoid the proliferation of separate linear right-of-way corridors.
2. Meet the spirit and intent of existing legislation.

3. Plan and designate corridors on National Forest lands within the land management planning process, with recognition as required of corridor situations and needs on other ownerships and jurisdictions.

4. Insure full coordination between Regions and with Federal and State agencies.

5. Provide consistency between Regions with enough flexibility to handle special and unique problems.

POLICIES. The policies which follow provide guidance for transportation and utility corridor planning and designation in the Forest Service

1. Corridor planning and designation, including rights-of-way siting, will be accomplished through the NFMA planning process, with appropriate emphasis given to intergovernmental and interregional cooperation. As a general rule and consistent with demonstrated need, corridors will be designated in Forest Plans through the assignment of appropriate management prescriptions

2. The identification and selection (designation) of future corridors will be based on the combined window, exclusion area and avoidance area concept as applied through the NFMA planning process. Formal designation of linear corridors depends upon demonstrated public need as exposed during this process.

3. The location of existing transportation-utility facilities may be designated as corridors without further review (FLPMA, Section 503), or addressed for designation through the NFMA planning process consistent with identified public issues, management concerns, and resource use and development opportunities.

4. Regional Foresters will promote development and use of a uniform Federal/State analysis, evaluation, and decisionmaking process for individual rights-of-way proposals under joint jurisdiction of Federal and State agencies in order to achieve interstate consistency in rights-of-way and corridor decisions.

5. To help achieve interstate-interregional coordination and consistency in rights-of-way and corridor planning and decisionmaking, Regional Foresters will promote establishment of joint State/Federal Coordination Committees to review land management plans to assure that corridor goals are achieved. Compatibility at Regional and State boundaries is an essential major goal.

6. A transportation-utility corridor will be considered formally designated when any of the following occurs:

(a) approval of a Regional or Forest Plan, or revision or amendment thereof, which allocates lands to a linear corridor, including "windows", and existing corridors, or absent an approved NFMA plan,

(b) delineation in a special use permit of the exterior boundaries of a right-of-way within which one or more compatible facilities or uses will be permitted

RESPONSIBILITIES. Responsibility for developing specific Regional corridor guidance, within this direction, remains with Regional Foresters. Implementation is accomplished through Forest planning

DEFINITIONS. (to be completed, corridor, window, avoidance and exclusion areas, others, etc)

GENERAL REQUIREMENTS FOR TRANSPORTATION AND UTILITY CORRIDOR PLANNING.

1 The approach used in planning corridors will recognize existing rights-of-way, identify areas with restrictions and provide flexibility in analysis and selection of future corridors. Generally, this approach will be used on a Statewide basis within a Regional Forester's jurisdiction, working directly with the State and other significant Federal land management agencies. The following are the basic components of a corridor designation process

a A Statewide map inventory of present and proposed linear facilities (electrical transmission, fuel transmission, communications, highways, and railroads, canals, ditches, pipelines, etc, see FLPMA Section 501).

b. Documentation of the Statewide corridor situation including an assessment of the linear facilities (e.g., existing and projected linear facilities, technical and engineering compatibility considerations, etc).

c. Development of specific criteria for the identification in Regional or Forest Plans of existing critical rights-of-way, corridor exclusion areas, avoidance areas, and windows. This provides the basis for any actual subsequent designation of a corridor in a Forest Plan

d If appropriate, prepare and execute an agreement or similar coordinating mechanism with the appropriate Governor and BLM State Director, or other appropriate agency head establishing an interagency group which coordinates the application of corridor planning criteria. This group will coordinate planning for specific right-of-way project proposals involving multiagency jurisdiction.

2 The criteria for identifying corridors are designed for application to all lands; however, the USDI-Bureau of Land Management, USDA-Forest Service, and State agencies will only apply the criteria on lands within their jurisdiction. However, application of these criteria by one agency may reflect resource situations and land use situations on other adjacent or nearby jurisdictions. Local governments and other Federal agencies have the option to consider these standards in their planning. These broad criteria are

A. EXISTING RIGHTS-OF-WAY CORRIDORS - Land areas currently occupied by existing transportation-utility facilities. Includes only those which are of critical importance to national or regional commerce, or which have been identified as an issue to be addressed in the NFMA planning process. Examples. See FLPMA Title V, Section 501.

B EXCLUSION AREAS - Land areas determined to be unavailable for corridor allocation or facility siting. Include only those areas with a statutory Congressional mandate that excludes linear facilities, example: National Wilderness Preservation System units.

C. AVOIDANCE AREAS - Land areas that pose particular land use or environmental impacts which would be difficult or impossible to mitigate (May vary by type of facility)

1. Areas where establishment and use of corridors conflict with land use/land management objectives

Examples:

Specialty managed areas, such as areas designated for developed and primitive recreation, research natural areas, environmental education areas.

Environmentally sensitive areas (certain wildlife habitat areas, faults, wetlands, slump areas, etc.)

Archeological and historical sites.

Areas with specific visual objectives which conflict with facility placement.

Active coal mining units

High site timber lands when low site lands are available for rights-of-way.

2 Areas with special or unique values that have been accorded specific and sometimes protected management status through "legislative" action. Facility placement would conflict with these values

Examples:

National Recreation Areas (NRA)

Wild, scenic, and recreational rivers

Nationally classified trails

State recreation areas

3. Areas which through the NEPA scoping process have been identified by local government bodies (within their areas of jurisdiction) as not suitable for the placement of linear facilities

Examples:

Urban residential areas

City parks

D. WINDOWS - Usually short, narrow passageways through constrained areas which are the most feasible potential locations for linear facilities, considering engineering and/or environmental factors.

Examples.

Areas recognized as critical corridor segments because of physiographic or technical suitability

Restricted passages remaining subsequent to allocation of lands for exclusion or avoidance areas.

Existing critical corridor segments through sensitive areas, such as urban, residential areas or areas of intensive land use.



United States Department of the Interior

OFFICE OF THE SECRETARY

PACIFIC NORTHWEST REGION

500 N.E. Multnomah Street, Suite 1692, Portland, Oregon 97232

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October 9, 1986

ER 86/1110

Don Smith
Forest Supervisor
Wenatchee National Forest
P.O. Box 811
Wenatchee, Washington 98801

Dear Mr. Smith:

The Department of Interior has reviewed the Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (PLRMP) for the Wenatchee National Forest, Washington. The following comments are provided for use and consideration when preparing the final documents.

Fish and Wildlife Resources

A systematic and conclusive assessment of Forest Plan alternatives was made difficult for the following reasons: (1) There is a lack of detailed biological and forest activity information. (2) Many of the data presented are generalized and do not accurately reflect the potential for individual forest activities to impact biological resources, e.g., road construction was not adequately analyzed according to the sensitivity of the affected resources. (3) There is a lack of a comprehensive range of alternatives, i.e., and it would be helpful if an alternative that maximized fish and wildlife production were not included. Discussion of such an alternative would be very useful for comparison purposes and to present the full range of benefits for a forest that is managed under the concept of multiple use. (4) No clear analysis was presented showing the true net public benefits of the various alternatives. For example, it was not made clear if the sport value of anadromous fish was considered.

Alternative E appears to have the greatest potential of all the presented alternatives for producing the best mix (number of species and number of individuals per species) of sensitive animal/plant species, big game and small game, non-game animals, and anadromous and resident fish. However, even alternative E is not the best designed fish and wildlife plan. It does not include measures that would significantly increase deer and elk populations such as protecting and improving summer and winter range areas. Neither does it protect wildlife from disturbances caused by motorized vehicle (motorcycles and snowmobiles) use over large tracts of areas without roads.

All the environmental impacts to fish and wildlife habitat and mitigation requirements/costs have not been identified in the subject document. Because of this we recommend that the Plan include an intensive monitoring effort to determine if the chosen alternative is working as expected. The Forest Service (FS) should consider the use of two methodologies developed by the Fish and Wildlife Service (FWS). Habitat Evaluation Procedures (HEP) and Instream Flow Incremental Methodology (IFIM). HEP is a method which can be used to document the quality and quantity of available habitat for selected wildlife and fish species. HEP provides information for two general types of fish and wildlife habitat comparisons: (1) the relative value of different areas at the same point in time; and (2) the relative value of the same area at future points in time. By combining the two types of comparisons, the impact of proposed or anticipated land and water use changes on wildlife and fish habitat can be quantified. IFIM can be used to assess aquatic habitat as a function of flow. It is a collection of field techniques, computer models and analytical procedures designed to predict changes in fish habitat due to increments of flow change. It can also be used to evaluate such diverse impacts as changes in channel structure or alterations from a pollution source. In general it can be used to translate changes in land use to changes in stream environment. The use of HEP and IFIM, as well as other carefully designated studies, to monitor how well the chosen Forest Plan works, will substantially reduce the uncertainty surrounding the predictive capabilities of the Plan for protecting fish and wildlife. Use of such monitoring methods would also assist the FS in taking timely corrective actions to activities that would impede meeting fish and wildlife goals on the forest.

The DEIS emphasizes the potential for cumulative environmental impacts due to activities on land of "intermingled owners" (lands that are not owned by the FS but are within or near Forest boundaries) and FS land. This appears to be a fair assessment of the impact situation because the management goals of the intermingled owners appear to dictate a much faster rate of harvest of mature timber than will occur on FS lands. A discussion should be included that shows how the FS plans to modify their cutting plans when the cumulative impacts of logging activities on FS and intermingled lands threaten fish and wildlife resources. A discussion should also cover the feasibility of the FS acquiring intermingled land. This discussion should include FS policy on securing all mineral rights to any land that is acquired by purchase in fee title (preferred for conservation of fish and wildlife resources) or trade. Federal ownership of mineral rights will ensure that the FS has a full range of options for making management decisions that will protect fish and wildlife habitat on any acquired lands.

There is National interest in improving Columbia River anadromous fish runs through, among other things, mitigation of past environmental impacts to fish habitat. The FS should take every precaution to see that the Forest Plan is consistent with positive measures that are being planned and acted upon under legislation such as the Northwest Power Act and the Fish and Wildlife Plan being developed by the Northwest Power Planning Council.

Implications of the Migratory Bird Treaty Act for projects on the Forest should also be considered. The discussion of migratory bird use of the Forest is inadequate. A thorough discussion should be included as to how the FS plans to prevent the destruction, and enhance the habitat, of birds, nests and eggs protected under the Migratory Bird Treaty Act.

Mitigation of potential adverse impacts, from Forest activities, on fish and wildlife needs to be fully considered. It is the policy of the FWS to actively seek to mitigate losses of fish and wildlife habitat as a result of development projects. If FWS is requested to review specific projects/activities that result from the Forest Plan they will apply the

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FWS Mitigation Policy (Federal Register, Vol. 46, No. 15, January 23, 1981; amended February 4, 1981) to those same projects/activities. The overall goal of the Policy is twofold. (1) conserve, protect, and enhance fish and wildlife habitat; and (2) facilitate balanced development of our Nation's natural resources.

Cultural Resources

The Wenatchee Forest Plan and DEIS constitute an impressive, up-to-date summary of the Wenatchee National Forest program for identifying, evaluating, protecting and interpreting to the public its cultural resources. For cultural resource planning beyond the project level, this program may well have potential to serve as a model for other forests. The plan advocates integrating the Wenatchee Forest comprehensive planning goals with those of the Washington State Historic Preservation Office. This approach should result ultimately in the creation of the historic contexts needed to better understand the significance of cultural resource discovered on the forest and, thus, their best possible treatment.

Given the particular relevance of the plan to cultural resource needs that have been identified nationally, the impact of the forest's selection of the "C" management alternative would seem to be properly mitigated. Complete implementation of the Wenatchee cultural resource program would be expected to produce highly desirable results for the Wenatchee National Forest.

National Parks

A review of the maps provided indicates that all alternatives considered propose similar management of areas adjacent to North Cascades National Park and Lake Chelan National Recreation Area. These areas would be classified as WI-1 (wilderness), RE-3 (dispersed recreation), and SI-1 (retention of visual quality along scenic travel routes). Each of the classifications is compatible with and supports the National Park Service (NPS) management objectives for North Cascades National Park and Lake Chelan National Recreation Area.

Page III-29 (Lake Chelan-Sawtooth Wilderness) of the DEIS contains a reference to the "North Cascades National Recreation Area (underlining added)." It appears that this reference should be to the Lake Chelan National Recreation Area. On page III-30 (Glacier Peak Wilderness) there is no mention of the adjacent Lake Chelan National Recreation Area or of North Cascades National Park.

Dispersed recreation is preferable in the zone near the park bounded by the William O. Douglas Wilderness Area on the south, Norse Peak and Crystal Mountain on the north, and the park on the west. More intensive recreation use and development in this zone could impact the Crystal Lakes and Deadwood Lakes areas in the park. Development other than dispersed recreation near this primary park entrance should be limited to the ST-1 prescription, which calls for retention of the visual-quality objective and for retention or enhancement of the viewing and recreation experiences along scenic travel routes.

Wild and Scenic Rivers

One area of concern is the discussion of Wild and Scenic Rivers. The National Park Service is the custodian of the Nationwide Rivers Inventory (NRI), which was conducted under the authority of the Wild and Scenic Rivers Act (W&SRA).

The forest should, as part of the river study process, conduct studies to determine suitability, and deal with those findings in the various alternatives. To further clarify the process of river designation, two enclosures are attached. Attachment 2 is a set of standard terms. The status of rivers as possible candidates for inclusion in the National System of Wild and Scenic Rivers is difficult to determine without terms that are tightly defined; the enclosure is one possible set of standard terms. Attachment 3 is a flow chart of the recommended study process. The chart sets forth a recommended procedure of conducting evaluations that may result in the designation of a river or river reach as a component of the National Wild and Scenic River System, or deletion of it from the NRI or any other management designation imposed by a Federal land management agency. Comments A through E are footnotes to the chart.

Enclosed is a copy of River Recreation in Washington: An Initial Inventory and Assessment (Attachment 4). Pages 112 to 115 and pages 120 to 125 are relevant to the Wenatchee National Forest. Also enclosed are five pages from NPS's computer data bank containing more information than that in the report (Attachment 5), and a separate package (Attachment 6) on River Cultural Values that has been extracted from the parallel Archaeological and Historical Resources, State of Washington, this report parallels the river recreation report.

National Natural Landmarks

Nowhere in the EIS or proposed plan do we find any discussion of National Natural Landmarks (NNLs). There are seven proposed NNLs in the forest. These are Meeks Table, Edwards Plateau, Fish Lake Bog, Thompson Clover, Tumwater, Eldorado Creek and Mount Adams. A discussion of the NNL Program should be included in the plan.

BLM Administered Lands

Based on a review of the maps submitted in the Plan/EIS package, all the alternatives are generally consistent with the BLM proposed management of adjacent public land. The apparent inconsistencies are identified below.

Alternatives A, A/NFMA and H.

1. FS allocations in the No. 1 and No. 2 Canyon areas appear inconsistent with adjacent BLM lands managed primarily for watershed protection. Watershed problems in this area could directly affect Wenatchee and vicinity.
2. BLM lands in the Entiat Valley are primarily managed for range and wildlife. Winter range is an important factor; intensive forest management of adjacent FS lands could adversely affect it.
3. BLM lands north of Lake Chelan are primarily valuable for grazing and wildlife. This area also contains winter range and is not entirely fenced from FS land.

Alternatives B, C, D and I.

1. BLM lands in T.28N., R.21E., Sec. 29 did not have any ORV restrictions designated in the Spokane District proposed Resource Management Plan (August 1985). Topography and access may limit any potential conflict.

Alternatives E and F.

1. Same potential conflict in T 28N , R.21E., Sec 29 as in Alternatives B, C, D and I.
2. The same potential inconsistency with ORV's exists in the Brisky Canyon area.

Water Resources

Sources of drinking water provided to the public and staff on the National Forest should be discussed. If ground water is used, the occurrence of ground water should be described, and precautions to protect ground-water quality should be addressed. The statement and plan should also address the subject of sanitary facilities provided by the National Forest management for recreational and administrative sites, indicating monitoring and any other measures used to protect ground-water and surface-water quality.

Alternative F would appear to preclude the possible enlargement of Bumping Lake if all of the lands surrounding the existing lake were to be formally classified to protect the natural setting. The environmental statement should be modified to discuss the impacts of precluding the enlargement of Bumping Lake including the foreclosure of one of the primary options for providing water for instream flows to enhance runs of salmon and steelhead in the Yakima River basin. Another option would be to modify Alternative F to allow for the possible future enlargement of the lake. The other alternatives appear to adequately allow for the possible enlargement of Bumping Lake.

Mineral Resources

The planning document makes an excellent effort to depict the effects of various alternatives and the Proposed Plan on the availability of lands for mineral entry, and the extent of restrictions imposed on lands that are left available for mineral entry.

However, the document does not consider minerals as a valuable resource to be treated on a par with other resources in the development of the forest plan, and ultimately on the land allocations. The availability of lands for mineral entry and the levels of restriction appear to have been based totally on other resource concerns without due consideration of the effects on mineral exploration and development.

Treatment of mineral potential is confusing due to a lack of clear statement of the terms and the methodology used. The confusion regarding "mineral potential" and "potential for exploration/development/production within 50 years" is pervasive throughout the minerals narrative of the document. Occasionally other terms such as "probable" mineral resource potential compound the confusion. For instance, in the DEIS (Minerals section, page III-85) potential for locatable mineral occurrence is shown in Figure III-11 and Table III-37 with the definition to be given in Table III-37a. However, that table does not describe mineral potential but "Potential for exploration/development/ production within 50 years." It does not follow USGS, BLM or USBM usage of the term mineral potential.

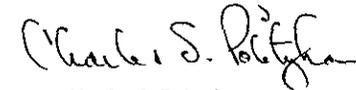
Leasable mineral classification is given in Figure III-12 (page III-93 of the DEIS). The classification is credited to USGS/BLM, but excludes the Known Coal Resource Area determined by those agencies. The KCRA should be shown on Figure III-12.

Areas identified for land disposal (Category IV) include much land which is valuable for coal, oil, and gas, geothermal, and hardrock leasables. An explanation as to how the determination that it would be in the best interests of the public to dispose of these lands was made and whether the mineral estate would be reserved to the Federal Government would be useful to reviewers. This is of concern since it is noted in Chapter II of the plan (p. II-72) that the mineral resources need to be inventoried and since mineral leasing is a source of revenue to the Government.

Our additional comments related to specific portions of the subject documents are attached.

Thank you for the opportunity to review this document.

Sincerely,



Charles S. Polityka
Regional Environmental Officer

Attachments:

1. Specific Comments
2. River Terminology
3. Flow Chart
4. River Recreation in Washington: An Initial Inventory and Assessment
5. Exerpt from NPS Computer
6. Exerpt from Archeological and Historical Resources State of Washington
7. Suggested Modification of Tables

ER 86/1110

Attachment I

U.S. Department of the Interior Specific Comments Related
to the
DES and Proposed Land and Resource Management Plan
for the
Wenatchee National Forest

DEIS

Page III-37, Wildlife The DEIS presents an excellent assessment of affected wildlife species describing unique and special habitats such as old growth, rivers, snags, downed woody material, cliffs and rims, caves and burrows, and talus. It describes the occurrence and status of threatened, endangered and sensitive species in various regions of the forest and explains the establishment of several indicator species for various habitats that are very important for wildlife management.

However, Section IV, the assessment of environmental consequences to wildlife for the Preferred Alternative C (page IV-31) consists of two very short paragraphs, of which only one sentence concerns nongame species. This section needs to be expanded considerably so that it is comparable in detail to the affected environment section.

Page III-42 (d) up to "Northern Spotted Owl". This section includes a listing of forest wildlife that have been listed as "sensitive" by the FS. The FS should be aware that the FWS has published a list of sensitive bird species (September 1985) for Region One of the FWS which includes Washington State. Sensitive species are defined by the FWS as vulnerable or declining species, subspecies, or distinct populations that could become Federally listed as endangered or threatened in the foreseeable future, throughout all or in a significant portion of their ranges without active management or removal of threats. A copy of the FWS sensitive bird list will be provided to the Forest wildlife biologist under separate cover to assist in determining if any of the sensitive bird species use the Forest.

Page III-42 and 43 (d) Northern Spotted Owl. The discussion on spotted owls could be improved. For example the phrase "minimum management requirements" should be explained in terms of viable populations of spotted owls. The National Forest Management Act speaks to managing for viable wildlife populations. As such, any plan must ensure that there are adequate numbers of individual reproductive animals, and that habitat will be well distributed to ensure interaction of individuals within the population.

There appears to be a lack of spotted owl inventories in the past and no formalized plans to do future inventories. The FS should revise and strengthen their policy on spotted owl (and other sensitive, threatened and endangered species) inventory work.

Page III-46, Table III-17 through III-48. The distribution of salmon and steelhead is only generally described. As a result it is difficult to determine how the boundaries and prescriptions of the alternatives will affect fish. A map (similar to the Alternative Maps) that shows fish use and potential fish habitat would be very useful and should be included. Any anadromous fish map that is prepared should show (a) present anadromous fish use according to spawning and rearing areas, (b) potential anadromous fish habitat (juveniles and adults), (c) natural and artificial fish barriers, and (d) areas where data gaps exist.

Page III-47, Paragraph 3. It is correctly indicated that mainstream Columbia River hydroelectric dams have been and still are a major factor in limiting anadromous fish production. However, the situation is changing. Anadromous fish runs in the Columbia River have been improving (e.g., spring chinook and steelhead runs). This is due to a number of factors such as better transportation measures for smolts, improved hatchery practices, and better harvest management of the sport and commercial fisheries.

Aquatic habitat on the forest is an essential part of the habitat base that will eventually be required for expanding Columbia River fish production. Fishery resource managers are optimistic for improvement in Columbia Basin anadromous fish runs due to the recently ratified United States/Canada Pacific Salmon Treaty. It is expected that improvement in the runs will continue. Thus, all existing and potential anadromous fish habitat in the forest should be maintained in its present state or improved. This includes stringent protection for riparian zones. Concerted efforts should be made to restore all aquatic habitat on the forest that is presently in a less than optimal or deteriorated state due to past logging, grazing and mining activities.

Page III-49(e) Fisheries Habitat. Field inventories of fish habitat have not been completed for the Forest. The final EIS should include a detailed discussion on how and when this task will be completed. Such a discussion should indicate standardization of measuring units, sampling methods and timing, definitions of terms, criteria (e.g., criteria for defining cover), classification systems, cartographic scales, and data reduction procedures necessary to permit comparisons of different areas over time.

Page III-53 (12). It is correctly stated that "the main barriers, Keechelus, Kachess, Bumping, Cle Elum, Tieton and Clear Lake Dams have significantly reduced the access of anadromous fish to forest streams. Over 100 miles of previously utilized anadromous streams have been affected. These dams resulted in the complete loss of sockeye salmon in the Yakima system." A detailed discussion should be included in the final environmental impact statement as to the FS's goals for protecting anadromous and resident fish habitat (of the forest) from the adverse effects of future dam construction. In addition, it would be helpful if a detailed discussion was included on how each of the existing dam and reservoir complexes, involving forest lands, could be improved for anadromous and resident fish production. In this regard the FS may wish to include data from a joint FS and FWS anadromous fish habitat survey of the Cle Elum watershed conducted in 1980.

Page III-67, last paragraph. Cattle are presently allowed to compete with elk on elk calving grounds of the Table Mountain Allotment. Cattle compete with elk not only for physical space but for nutritional plant species utilized by elk during periods of gestation and lactation. The Final EIS should present a plan that will eliminate or substantially reduce this problem.

Page III-89. The mineral potential map located on page III-89 of the DEIS should be enlarged to the same scale as the color alternative maps. This would allow the reader to easily compare the effects each alternative would have on areas of varying mineral potential, particularly the areas about which the reader would have specific concerns. In addition, we request that the computer-generated maps which demonstrated proposed management practice on areas of mineral potential be included in the report. Bureau of Mines received these from the Minerals and Geology staff of the Forest. They provided valuable information not available anywhere else.

Page III-90. Additional categories for Table III-37a - Criteria/Parameters for Economic Mineral Evaluation would be useful. Table J-3 in the Wallowa-Whitman National Forest

plan is almost the same, yet it provides two more categories of mineral potential—moderately high and very low. Access categories as used by the Beaverhead National Forest, Montana, also provide additional detail not available in the Wenatchee Forest tables without research. (See Attachment 6)

Page III-95 of the DEIS. The Water and Power Resources Service is now called the Bureau of Reclamation. The names in the table and narrative should be corrected.

Page III-116, Interactions with other Resources. The section on minerals and related sections, indexed and located on page III-153 of the DEIS, was especially useful. This is a remarkable discussion and a technique to be recommended for other forest plans

Page IV-29 Environmental Consequences. Cumulative impacts are not adequately addressed for the following reasons: (1) With the exception of deer and elk, we could not find an adequate analysis of cumulative environmental impacts on wildlife for each of the alternatives. Even for deer and elk a number of questions were not addressed, e.g., were the effects of lost soil productivity on valuable deer and elk winter range included in the analysis? see DEIS IV-29 through IV-32(c). (2) The cumulative impacts of each alternative on fish habitat was not quantified, e.g., number of stream miles adversely impacted by logging and grazing activities see DEIS page IV-32(7) through IV-40(b-7). (3) The analysis should evaluate the cumulative effects of not only FS activities, but also the activities of other public and private entities within, and outside of, the National Forests. (4) The analysis should have considered the effects of the forest, and activities therein, on the Columbia Basin as a whole with respect to fish and wildlife resources and their use. There are 16 National Forests in the Columbia Basin that produce anadromous fish, migratory birds and other resident fish and wildlife species. All of these forests are going through a major forest planning process that will ultimately determine how the forests are to be managed. Human activities on these forests can have a profound effect on fish and wildlife resources of the Basin. This is well illustrated by the fact that 50 to 70 percent of all remaining anadromous fish habitat in the Basin is contained in these forests. Actual and potential Columbia River anadromous fish production will be reduced to the degree that the aforementioned habitat base is impacted. Anadromous fish production downstream of forest boundaries will also be affected negatively or positively by water quality, quantity and timing of waterflows that originate on those forests. (5) The analysis did not adequately cover a broad enough time frame. In general, the impact analysis begins with current trends and continues through the fifth decade. It is not clear if past forest impacts were included or excluded, or at best used as some sort of baseline condition that included current trends. A careful integration of past environmental impacts into the cumulative impact assessment is an important step in developing a complete document. Columbia Basin fish and wildlife habitat has changed dramatically in the past 70+ years. Dams, water flow manipulation and depletions, various watershed management practices of agriculture and forestry, urbanization, industrialization, pollution and various transportation systems have resulted in huge changes in the aquatic ecosystems of the Columbia Basin.

Page IV-40 (c). The statement is made "no conflicts are anticipated between the effects of the alternatives and other plan and policies for the fisheries resources... . Since all alternatives predict increases in fish habitat capability, implementation of any alternative should be compatible with other plans." The use of any one of the presented alternatives could potentially interfere with efforts to restore anadromous fish runs to the Columbia Basin. For example, *livestock grazing on the forest could severely impact the major components of a stream ecosystem*: (a) streamside vegetation which provides shade and cover for fish and supports insects that are used as fish food, (b) stream channel morphology, (c) quantity and quality of the water, and (d) structure of the

streambank which is where undercut banks are formed that in turn provide valuable fish cover.

Page IV-40 (d) The EW-2 Riparian Protection Zone Prescription. A highly detailed discussion of how the FS plans to log the riparian zone is needed. It would also be helpful if an example was included of a typical logging operation where there was work in the riparian zone. We are particularly concerned about how those activities will impact fish and wildlife resources such as anadromous salmonids, resident fish, grouse, deer, and elk

Page IV-79. The tables on pages IV-79 through IV-85 are excellent, however, the Bureau of Mines has suggested a format that provides additional detail for an easier comparison of alternatives. (See Attachment 7)

Page IV-137. Protection of trust resources of the Yakima Tribe would best be served by *Alternative E*. This alternative appears to have the least adverse impact to soils, water, and cultural resources and be highly beneficial to the fisheries. There is some possibility that a lower allowable cut in the Wenatchee would lead to increased competition for reservation timber. While this might economically benefit the Tribe it would also increase the potential for detrimental impacts to reservation fish and wildlife resources.

Page IV-140 Summary of the Relationship Between Short-Term Uses and Long-Term Productivity. This section fails to discuss the many unavoidable adverse impacts that will occur to fish and wildlife habitat (chemical, physical and biological) from the preferred alternative or any of the other presented alternatives. For instance (as indicated on Pages IV-74, 75), most lands having less than a 40 percent side slope will be harvested by some form of ground-skidding equipment. Multiple trips over a piece of ground with a rubber-tired or even track-type tractor can cause soil compaction. The effects of soil compaction tend to be long lasting (more than one decade, as indicated on page IV-74) and they are often additive with each succeeding entry. In addition to reducing soil productivity, soil compaction also reduces the water infiltration rate so that there will be accelerated runoff, thus producing delivered sediment that can impact fish life.

The document indicates that other forest activities besides logging could have long-term consequences to forest productivity of fish and wildlife resources. On page III-85 it is stated "The Forest Service recognizes that minerals are fundamental to the nation's well being and as a policy it encourages the exploration for and the development of the mineral resources it manages." Thus it is reasonable to assume that substantial mining activities could occur in the forest in the future. Toxic materials commonly released by mining are arsenic, cadmium, cobalt, copper, iron, lead, manganese, mercury, nickel and zinc. Fish mortality can result from exposure to these metals in high concentrations. Continuous exposure to low levels of the metals may produce chronic effects such as behavioral changes, reproduction failure or juvenile mortality. Fish may avoid whole stream sections that are polluted with metals.

Proposed Land and Resource Management Plan (PLRMP)

Page II-8. There appears to be some inconsistencies with regard to river studies/designation. Page II-8 of the PLRMP states that the Chiwana, White, Wenatchee, North Fork Entiat, Entiat (two segments) and Mad (two segments) have been determined to be eligible and suitable under the Wild and Scenic Rivers Act. In the Appendix (page B-141), the Chiwana, White and portions of the Wenatchee Rivers are recommended for further study. Again, page IV-34 of the PLRMP states that steps will be taken to

formally designate segments of the Chiwana, White and Wenatchee Rivers. It appears that additional studies are not necessary, and we would encourage you to follow through on the recommendations on page IV-34.

Page II-51 Land Status. This describes state and private inholdings but not intermingled and adjacent Federal lands. We believe it would be appropriate, to clarify the land patterns, to mention lands managed by the NPS and the BLM, both here and in the DEIS, pages III-3 and 4.

Page IV-71 E through IV-113, 1st paragraph, Forest Wide Standards and Guidelines. The Standards and Guidelines that affect fish and wildlife are inadequate in that they do not provide the detail that will be necessary for on-the-ground guidance to FS personnel. For instance no standards are presented for road construction with respect to fish habitat requirements (See page IV-90). Standards for livestock grazing are not designed so that fish and wildlife habitat will be protected, e.g., no specified protection of riparian zone vegetation and streambank integrity.

Page IV-120. It is not clear how deer, elk, and mountain goat winter and summer range will be managed. Also management prescriptions should be strengthened by presenting a detailed discussion on how important fall and spring range for big game will be managed.

Page V-3 through V-30, Monitoring and Evaluation Plan. The monitoring plan, as presented, is inadequate and appears to be understated for fish and wildlife. Monitoring approaches and techniques are not specified. It appears that the FS plans to rely on other agencies for on-the-ground anadromous fish information. In our view, through Sec. 2, No. 6, NFMA, the FS has a responsibility and an opportunity for leadership in managing forest lands and associated natural resources. A thorough discussion should be included in the document on both the adequacy and appropriateness of relying heavily on other agencies for fishery work on immense tracts of Federal lands such as the Wenatchee National Forest.

Appendices

Appendix C. The discussion on mineral potential for each roadless area was excellent but it would be most easily understood by the average reader if the text was supported with a map.

Page C-215. The statement is made "There are 6,996 acres of private lands within the area belonging to the Burlington Northern Railroad Company. A discussion needs to be included about how the FS plans to maintain public fish and wildlife values of the forest in this or any other potential land trade.

Attachment 2

RIVER TERMINOLOGY

- 1 Potential Rivers. Rivers on the National Rivers Inventory, as well as those identified by the Forest Service as having "potential" for designation as Wild and Scenic Rivers, which flow partly or wholly through the Forest. These may or may not include rivers formally designated as "potential" by the Secretaries of Agriculture and the Interior under Section 5(d) of the W&SRA.
- 2 Eligible Rivers. Those rivers found to be eligible for Wild and Scenic status according to resource considerations and in accordance with the Final Revised Guidelines for Eligibility, Federal Register, Vol 47, no 173, September 7, 1982. NRI rivers are not automatically eligible.
- 3 Suitable Rivers. Those eligible rivers found to be suitable for recommendation to Congress as a component of the National Wild and Scenic River System. Such a determination would be conducted only on rivers that are eligible. While there are no nationally recognized guidelines for a suitability determination, the following should be considered: the amount of private land and its use, state and local government as well as public interest, and cost involved. In other words, the eligibility study considers the resources, and the suitability study includes political, economic, and public interest considerations.
4. Study Rivers. Those rivers formally designated by Congress to be studied under Sections 5(a) and 5(b) of the W&SRA. Only one stream in the Pacific Northwest the North Umpqua, is currently in this category.
5. Recommended Rivers. Those rivers which are found to be eligible and suitable, and which are recommended to Congress to become components of the National Wild and Scenic River System. In the past such a recommendation has usually been made only after Congress first directed that a study be made under provisions of Sections 5(a) and 5(b) of the W&SRA. However, this does not preclude agency-initiated studies.
- 6 Wild and Scenic Rivers. Those rivers so designated by Congress under Section 3(a) of the W&SRA.



United States Department of the Interior

BUREAU OF MINES
WESTERN FIELD OPERATIONS CENTER
FAST 360 3RD AVENUE
SPOKANE WASHINGTON 99202

09596

September 22, 1986

Mr. Donald H. Smith
Forest Supervisor
Wenatchee National Forest
P.O. Box 811
Wenatchee, Washington 98801

Dear Mr. Smith

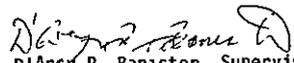
SUBJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) AND PROPOSED LAND AND RESOURCE MANAGEMENT PLAN FOR THE WENATCHEE NATIONAL FOREST, CHELAN, KITTITAS, AND YAKIMA COUNTIES, WASHINGTON (ER 86/1110)

Enclosed is a copy of the letter we sent to the Department of the Interior on the review of the Wenatchee National Forest DEIS and Proposed Land and Resource Management Plan.

The maps attached to your letter of July 18, 1986, were excellent. Maps of this kind included in the EIS are essential for those readers who wish to understand mineral resource potential, how these resources will be managed, and how this management is related to the management of other resources. We cannot provide input with regard to areas of mineral resource potential at this time. We are planning to provide you with this data in the future and hopefully will be able to compensate with quality. It is our desire to assist the Forest Service Minerals and Geology staff in every possible way to assure the most equitable management of mineral resources on Federal land within the limitations of time and manpower.

Please contact this office should any questions on our review of the EIS arise or if you need any assistance with mineral information.

Sincerely,


D'Arcy P. Banister, Supervisor
Minerals Involvement Section
Branch of Engineering Studies

Enclosure

K-301

09596



United States Department of the Interior

BUREAU OF MINES
WESTERN FIELD OPERATIONS CENTER
FAST 360 3RD AVENUE
SPOKANE WASHINGTON 99202

September 17, 1986

Memorandum

To State Director, Oregon State Office, Bureau of Land Management, Portland, Oregon

From Supervisor, Minerals Involvement Section, Branch of Engineering Studies

Subject Review of Draft Environmental Impact Statement and Proposed Land and Resource Management Plan for the Wenatchee National Forest, Chelan, Kittitas, and Yakima Counties, Washington (ER 86/1110)

Thank you for the prompt response to our letter of July 3, 1986, requesting unabbreviated versions of the DEIS and Proposed Land and Resource Management Plan. We have completed our review and found your plan and DEIS to be excellent and one of the most comprehensive with regard to minerals we have reviewed. Although all of the points we feel necessary were addressed, we do have a few requests and suggestions. They are

1. Enlarge the mineral potential map located on page III-89 of the DEIS to the same scale as the color alternative maps. This would allow the reader to easily compare the effects each alternative would have on areas of varying mineral potential, particularly the areas about which the reader would have specific concerns. In addition, we request that the computer-generated maps which demonstrated proposed management practice on areas of mineral potential be included in the report. We received these from the Minerals and Geology staff of the Forest and feel they would provide valuable information not available anywhere else.
2. Illustrate mineral potential for each roadless area in the appendices. The discussion in the text was excellent but it would be most easily understood by the average reader if the text was supported with a map.
3. The tables on pages IV-79 through IV-85 are excellent; however, we feel they could be substituted by the following table.

Potential Category*	Acreage	Alternative 1 % acres affected (by access category**)				Alternatives 2, 3, 4, etc.
		A	B	C	D	
I						
II						
III						
IV						
V						
Total of forest						

* Same as page J-10, appendices, Wallowa-Whitman National Forest DEIS (enclosed).
 **Same as Beaverhead National Forest, Montana, Revised DEIS (enclosed). This format will provide additional detail and an easier comparison of alternatives.

4. Provide additional categories for table III-37a-Criteria/Parameters for Economic Mineral Evaluation.

The enclosed table for the Wallowa-Whitman National Forest is almost the same, yet it provides two more categories of mineral potential--moderately high and very low. Access categories as used by the Beaverhead National Forest, Montana (enclosed) again provide additional detail not available in your tables without research.

We feel implementation of our suggestions will provide added detail and understanding for the reader.

We offer special congratulations on your "Interactions with other Resources" sections. The section on minerals and related sections are indexed and located on III-153 of the DEIS. This is a remarkable discussion and a technique we will recommend to all of the other forests we review.

Sincerely,

Darcy Bahister
 Darcy Bahister, Supervisor
 Minerals Involvement Section
 Branch of Engineering Studies

Enclosures

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Table J-3 *
 EVALUATION CRITERIA FOR NONFUEL MINERALS

CATEGORY	I	II	III	IV	V
1 Potential for Substantial Development/Production Within Ten Years	High	Moderately high	Moderate	Low	Very low based on current knowledge.
2 Current Activity Level	Production or development in progress or pending investment decision	Comprehensive exploration, development likely. May include some small scale production.	Exploration programs which may include sampling, geochemical and geophysical surveys, geologic mapping, reconnaissance drilling. May include some hobby-size producers.	Sporadic exploration with occasional isolated intense programs by companies or prospectors.	Occasional interest by prospectors.
3 Land Position	Long-term maintenance of claims by established mineral companies/individuals.	Long-term	Intermittent by established mineral companies/individuals, long-term by prospectors	Short-term by established companies/individuals. Intermittent by prospectors.	Sporadic
4 Geology	Known and favorable for development of significant ore deposits.	Known and considered favorable from comparison with other producing districts.	Not well known, but appears to have favorable characteristics.	Not well known, some favorable characteristics.	Either unknown or unfavorable
5 Reserve/Resource	One reserve established. Hill Mountain significant production	Presence of, or strong potential for, substantial resources. May include small reserves.	Potential for large resources is unknown. Possibly some very small pockets of reserves.	Some mineral occurrences, but not enough information to establish resources	Unknown

* Includes all areas not in other categories

*2020 1/10/20
 E/S Appendices*

**

- Category A Withdrawn or proposed for withdrawal from mineral entry.
1. Wilderness areas.
 2. Wild and scenic rivers
 3. Sites for facilities
 4. Historic and cultural sites
 5. Developed recreation sites.
- Category B Statutes or executive orders require specific protection or mitigation measures.
1. Proposed wilderness areas.
 2. Congressionally mandated wilderness study areas.
 3. RARE II Further Planning areas.
 4. T & E Species.
 5. Roadless (Type I) dispersed recreation areas.
 6. Culturally significant areas.
- Category C Special conditions exist on lands which require special lease stipulations or plan of operation conditions.
1. Big game winter range.
 2. Elk calving area.
 3. Riparian area.
- Category D Standard lease stipulations and plan of operation conditions apply.
1. Timber production areas.
 2. Existing mineral processing areas.



00716

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

ENVIRONMENTAL & TECHNICAL SERVICES DIVISION
847 NE 15th AVENUE SUITE 350
PORTLAND OREGON 97232 2279
(503) 730 5400

DRAFT

00716

F/NWR5:1

Mr Don Smith
Forest Supervisor
Wenatchee National Forest
Wenatchee, WA 98801

SEP 1 1986

Re: Draft Environmental Impact Statement (DEIS) for the proposed
Land and Resource Management Plan, Wenatchee National Forest

Dear Mr. Smith:

The National Marine Fisheries Service has reviewed the subject
draft environmental impact statement

In order to provide as timely a response to your request for
comments as possible, we are submitting the enclosed comments to
you directly, in parallel with their transmittal to the
Department of Commerce for incorporation in the Departmental
response. These comments represent the views of the National
Marine Fisheries Service. The formal, consolidated views of the
Department should reach you shortly.

If you have questions concerning our draft comments, please
contact Jim Esch (503) 230-5427 or PTS 429-5427. Your continuing
coordination efforts are appreciated

Sincerely,

[Signature]
Dale R. Evans
Division Chief

Enclosure

WENATCHEE NF

SEP 19 86

SUP	DEP
AO	LMP
AS	ELM
BUD	LDS
FISC	MIN
I&E	FIRE
IP	REC
PER	ARCH
DR	R&WS



General Comments

The professional fish and wildlife staff on the Wenatchee National Forest should be commended for their effort to accurately represent all natural resource issues in the DEIS. However, there is a common theme in the DEIS and Plan that on-forest habitat greatly exceeds its present use, and that this fact is mainly due to off-forest impacts. Similar forest planning documents that NMFS has already reviewed in Oregon, Washington and Idaho contained this same common theme. This attitude on off-forest impacts tends to down-play the sometimes serious fish habitat degradation that we have observed on national forest lands throughout the region. Logging, road building, livestock grazing, and other permitted activities on the National Forests need to share the responsibility for the present depressed state of the Columbia River Basin's salmon and steelhead stocks.

The National Forests also need to take a more tangible approach in their evaluation of land management activities and their effect on production of anadromous fish. There are always going to be losses due to existing main-stem hydroelectric projects and problems due to harvest inequities. The National Forests should recognize that man-caused mortality will always influence, to some degree, the numbers of fish that can be produced on tributaries to the Columbia River.

The National Forests provide the majority of the available habitat for natural fish production in the Columbia River Basin. It is our hope that the Forest Service will concentrate its management effort on strengthening its role as steward of this anadromous fish habitat. Existing habitat must be protected and degraded habitat improved if long range fishery production goals are to be realized.

We offer the following specific comments on the DEIS and Plan

Specific Comments

Proposed Land and Resource Management Plan

Page II-23, paragraph 4. The text indicates that anadromous fish runs have declined solely due to commercial fishing, irrigation and mainstem Columbia River dams. We suggest that you include factors permitted on the Forest that have also contributed to this decline such as logging, grazing, road building, etc.

Page II-24, Production Potential. The information presented here needs to be supported with additional detail. For example, the coho production estimate appears to be out of line with previous estimates. In the context of the forest planning process, it may be more appropriate to estimate present and future maximum

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potential fish production only on lands administered by the National Forest Service. Also, please provide details of the derivation of the catch and harvest data in the table on the bottom of page II-24

Page II-65, Table II-25 Harvest information is presented under the heading "Fisheries". The methods used to derive these figures should be detailed in the text.

Page II-70, "Fisheries". Given the identified information gaps in the fishery data base the final Plan should discuss whether confidence limits can be placed on the fishery estimates made in the Plan and the DEIS. It is stated that a methodology needs to be developed to address these data gaps in the fishery data base. We propose that the Plan is the proper place to develop this methodology, and suggest that the final Plan include a formula and schedule for gathering this information.

Page III-5, paragraph 4. Best Management Practices (BMP) are referred to but are not explained or detailed anywhere in the plan. The final plan should contain a reprint of the BMP's, possibly as an appendix of the Plan.

Page IV-12, "Fisheries". In the sixth paragraph under this heading, it is stated that most private in-holdings will be clear-cut within 10 years. We suggest that the same planning criteria applied to National Forest lands be used to analyze the effects of this timber harvest on Forest goals and management activities.

Page IV-25, Table IV-1 The table needs some clarification. The final plan should clarify whether the thousands of pounds of harvest for Habitat Improvement is in addition to the commercial harvest. Also, chinook salmon appear to be rather stable in numbers through the year 2035 (Page IV-26). Yet the previous page of the table showed over a sevenfold increase in pounds harvested over the same time period. This discrepancy should either be explained or corrected in the final plan.

Page IV-89, Wildlife and Fish. We suggest that projects be prioritized on the basis of their importance or potential importance as habitat for fish and wildlife rather than just their cost effectiveness.

Page V-14, Monitoring Plan. Please explain what smolt habitat capability is. Also, we recommend that there be consistency between the monitoring plan and the other previous displays of forest outputs. Earlier in the document, units of adult fish or thousand pounds of harvest were used. In this table the unit is smolt production. It is difficult to make a comparison of alternative actions when units of measure are not consistent throughout the Plan.

Draft Environmental Impact Statement

Page II-156, Economic Values. The economic indicator for anadromous fish is described as "commercial harvest of anadromous fish." While commercial harvest is an important contributor to the National economy, other values can be assigned for recreational fishing. For some species of anadromous fish, this sport harvest is a major factor in their dollar value, and may increase in the future.

Page III-46, Anadromous fish. Some part of the decline in anadromous fish numbers should be attributed to land use practices on the Forest.

Page III-47, paragraph 1. The FEIS should explain how smolt habitat capability is calculated

Page III-47, paragraph 5. The June 1982 NOAA Technical Memorandum, NMFS, F/NWR3, Net Economic Values for Salmon and Steelhead from the Columbia River System is cited as the source for harvest distribution data for anadromous fish spawned on the Forest. This report is now outdated. Enclosed with our comments is the latest effort by NMFS to provide economic information for resource planners.

Page IV-122 and 123, Fisheries Interactions-Trees. The discussion here deals with options for the use of funds available for fish habitat improvement. A suggested use of Knutson-Vanderburg Act funds is road culvert fish passage restoration. We recommend that culverts improperly designed or installed be replaced with funds other than those earmarked for habitat work.

Page IV-123, paragraph 2. It is suggested here that timber harvest along stream corridors may increase fish production due to warming effects. We offer that many factors, in addition to temperature, limit productivity in anadromous fish streams. We recommend that the potential benefits of temperature elevation be carefully weighed against the possibility for excessive heating, decreased summer streamflow, and increased sedimentation. Generally, we view an undisturbed riparian zone to be optimal for fish production.

WILLIAM R. WILKINSON
Director



STATE OF WASHINGTON
DEPARTMENT OF FISHERIES

117 Council Administration Building • Olympia, Washington 98501 • (360) 753-6000 • (SEA) 233-6600

September 3, 1986

Mr. Doug Rushton
Department of Ecology
St. Martins Campus
Olympia, Washington 98504

Dear Mr. Rushton

Draft Management Plan for
Wenatchee National Forest

We have reviewed the four documents, plus maps, that constitute a draft management plan for Wenatchee National Forest. In aggregate, the reports contain excellent qualitative narrative on the status of Pacific salmon resources and the inter-relationships with planned activities on the Forest. However, we can only judge the plan to be deficient since it does not establish any quantitative technical linkage between salmon production and proposed major environmental modifications. The plan concedes that many activities - timber harvest, recreation, livestock grazing, road management, fire management, small hydroelectric projects, irrigation impoundments - can alter the quality and quantity of available fish habitats. The plan also discusses the distinct possibilities of significant adverse impacts due to cumulative effects and frequently mentions the higher risks of damage as levels of various planned activities increase.

Unfortunately, none of these factors are ever translated into measurable predicted impacts on salmon resources. The inherent assumption is that habitat capabilities can be at least maintained under any configuration of the proposed alternatives. Knutson-Vandenburg (K-V) funding, which is directly related to timber sales, is treated as "enhancement" even though the plan admits that a significant amount needs to be diverted to projects such as inadequate culverts resulting from past activities on the Forest. We believe that the most optimistic possible forecast would be for the future K-V funds to cover normal mitigation practices as these new environmental modifications occur. Special appropriations should be requested to mitigate for past damages which are described in the plan. Many mitigation needs are long overdue. In addition, it is not realistic to expect K-V funds to handle any environmental events such as a major slide or stream channel change due to their limited amount and constraint to the vicinity of timber sales. A single massive slide in a major salmon production area could make all the plan's forecasts obsolete. Again, the

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DEPARTMENT OF FISHERIES
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Mr. Don Rushton
September 3, 1986
Page 2

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plan should prescribe the need for special appropriations to handle these types of problems. If all of the above can be successfully incorporated into a revised plan, then outputs from any additional appropriations might be legitimately described as potential fisheries "enhancement". We also propose that any special funding needs become part of the Forest's preferred alternative instead of being linked to other options since the current connection to Alternative E appears to be only coincidental (e.g. "E" shows the highest at \$200,000, "C" shows only \$25,000). We have appended specific comments on a section-by-section basis mainly to support the general conclusion reached above. These begin with the Appendices to the Draft Environmental Impact Statement (DEIS) (600 pages), followed by the DEIS itself (550 pages) and the Proposed Forest Plan (350 pages). (Note: I have not attempted to reference a similar concern each time it appeared.) However, we must stress that it will be impossible to have any meaningful input on the plan until it is revised to establish a quantified relationship between levels of environmental modifications and salmon production. Alternatively, the plan could be revised to document the lack of use of such a relationship in spite of the weight of scientific evidence which supports its existence. A procedure to develop this relationship and implement the needed levels of mitigation would be included. A third option would be to set an overall provisional mitigation level for funding that is directly proportional to the amount of forest area disturbed. A final possibility to consider would be special treatment of anadromous fish (salmon and steelhead) via a separate, supplemental EIS process, possibly for all Forests in the Columbia Basin. Reasons for this approach would be (1) the present inability to quantify impacts from environmental disturbance, (2) the special status of treaty Indian fishing rights, and (3) the cumulative effects of multiple forest management plans on overall Columbia River fish production.

Sincerely,

Sam Wright
Senior Fisheries Research Scientist

SW rc

DETAILED COMMENTS ON THE PROPOSED
WENATCHEE NATIONAL FOREST PLAN

Appendices - Draft Environmental Impact Statement

Page A-9 It is probable that naturally produced salmon resources will be managed for maximum sustained yield (MSY) which is not synonymous with full habitat utilization. The latter would equate to equilibrium yield in the absence of fishing.

The provision of higher water temperatures may be a benefit in some stream reaches, but can eventually create high temperature problems as the same water moves downstream. In addition, higher summer temperature benefits can be at the expense of winter rearing habitat conditions. These potential trade-offs should be added to the narrative.

Page A-19 Under opportunities for No. 7 (Wildlife and Fish), the cooperation should be extended to all entities with fisheries resource management responsibilities.

Page B-62 The modified Universal Soil Loss Equation (USLE) originated as a predictor of soil loss from tilled agricultural lands. Its modification for use in the Forest requires an extrapolation outside the available data base. At best, the results should be portrayed as relative index changes between alternatives. However, the specific methodology questions will remain irrelevant unless the plan develops a quantified technical link between sedimentation and salmon production.

Page B-63 Predicted changes in water yields should also be treated as a rough index since they are based only on vegetative manipulations by silvicultural prescriptions. Probable changes in peak flows and minimum flows are not analyzed. As is the case with sediments, many subsequent discussions treat both factors as absolutes.

Pages B-66 to 83 The economic techniques for salmon resources are difficult to understand. The second full paragraph on page B-66 plus the discussion under "Wildlife Habitat and Diversity" on page B-67 indicate that priced values are limited to recreational uses on the forest and ex-vessel commercial fishery values. Table B-IV-2 on page B-82 and the second paragraph on Page B-83 indicate the same illogical treatment. If this is the case, modification will be necessary to reflect true national values.

Page B-159 Table B-VIII-1 begins to unveil the primary problem in the draft plan. Water yields and sediments are really only indexes, the former by the plan's own definition. The Anadromous Fish Commercial Harvest shows only a very slight difference between nine alternatives, ranging from 63 to 66 thousand pounds. Alternative E shows the highest level, but this is not linked in any manner to its lowest index value for both increased water yields and sediments.

Pages B-184-185 The increases for anadromous fish are unrelated to any of the environmental manipulation differences in the nine alternatives. They will mainly be the result of non-Forest Service actions except for an increment attributable to appropriated habitat enhancement funding that varies by alternative.

Draft Environmental Impact Statement

Page 5-8: As the summary for Alternative E states, it has the distinct negative features of lowest timber harvest, least mineral resource area activity, least payments to counties, lowest employment and lowest income. This makes it an especially poor place to coincidentally propose the highest level of appropriated funds for fisheries enhancement (which is the only reason for Alternative E's highest ranking for anadromous fish production).

Page III-45 The conversion of actual fishery trips to recreation visitor days means that the values in Table B-IV-2 (page B-82 of the Appendices) are unrealistically low. At these levels, the values would fall far below any of the contemporary economic valuations for Pacific salmon benefits in the Pacific Northwest.

Page III-47: As stated in the draft plan, all of the estimates for salmon production will have to be updated. The current goal of the Northwest Power Planning Council is to achieve a survival rate of 90 percent for smolts at each dam. However, recent attempts to increase this goal were unsuccessful, and any assumption that off-Forest Dam losses will be nearly eliminated is unrealistic. The ability of spring chinook to rebuild to MSY will depend mainly upon their inherent reproductive capability and its relationship to the cumulative population removal rate from dam losses plus catch and non-catch fishing mortalities. This reproductive capability can be significantly altered by the quality of spawning and rearing habitat. Amount of rearing habitat (quantity) will determine the maximum production potential.

Page III-53 Fish passage must include not only the commonly-referenced upstream movement of adults and downstream migration of smolts, but also the ability of rearing juveniles to move freely between preferred habitats during their early life history stages. This is particularly critical for fish such as spring chinook, which have prolonged freshwater rearing periods and often move upstream as juveniles.

Page III-54 The inventory and funding priority discussion for habitat improvements illustrate a basic flaw in the draft plan, e.g., there will always be extensive time periods between identification and correction of fish habitat problems on the Forest. Significant fish production losses, possibly irreversible, would occur during these delays. Problems arising from environmental modifications on the Forest must be corrected as they occur, and the inventory and funding mechanisms in the plan need to be revised accordingly.

Page IV-32 The conclusion that the Forest's fish production capabilities would increase under any alternative is far too optimistic, since no losses of any type are calculated for environmental disturbance activities such as timber harvest, associated road building and grazing. Funding for fisheries work is treated as enhancement only, even though much of it would be diverted to problems created from past Forest management practices. The plan does not acknowledge any major risk of future environmental damage exhausting the available funding sources.

Page IV-33 The figures for appropriated funds in Table IV-11 do not appear to have any direct relationship to components of the nine alternatives. It appears that the peak amount of \$200,000 in Alternative E could just as easily be included with the preferred Alternative (C).

Page IV-38 Several alternatives would include the diversion of K-V funds to provide fishing access. This would further diminish the availability of these relatively modest funds for correcting past environmental damage on the forest and fulfilling newly emerging needs in a timely manner.

Page IV-72 Delivered sediment is correctly described as only an index in this section, with the analysis value being limited to relative differences between alternatives. Other parts of the draft plan treat predicted sediments as total expectations. Unfortunately, the sediment index shows long-term increases for every possible alternative. This is incongruous with the forecast of no net adverse impacts on the fish resources due to Forest activities.

Page IV-122 The word "enhancement" is continually mis-used throughout the draft plan. In virtually all cases, the available funds will actually be utilized for mitigation of past or current habitat damage on the Forest. Some projects, such as spawning channels, may appear on the surface to be enhancement, but in reality will probably be comparable to the plan's earlier example of a post-fire salmon spawning channel on the Entiat River.

Page IV-124 The inter-action between fisheries and water should include the negative aspects of higher peak flows and lower minimum flows, which are not a part of the calculated index values. The section on fisheries and soil contains one of the many narrative descriptions which concede the significantly greater risk of damage to fish resources from certain alternatives. Unfortunately, these numerous greater risks are never translated into quantified lower long-term forecasts for salmon habitat capabilities. Another good example of higher risk is in the fisheries-road inter-actions.

Proposed Land and Resource Management Plan

Page IV-96 Other descriptions for the Class III streams indicate that any with fish potential would be included. However, this description limits inclusion to streams that are rehabilitated or enhanced. The broader definition is much better, since the absence of fish can also be due to inadequate spawning populations or recent fish passage problems - both correctable problems.

Pages V-14 and V-15 Several entries under Fish should be revised. Actual juvenile spring chinook abundance per standardized unit of habitat area should be measured and compared with MSY production abundance needs. Successful production will depend upon a full year of adequate habitat conditions, which can best be measured by the fish themselves. The variability which would initiate further evaluation should parallel the plan's forecast of continual abundance increases. For fisheries mitigation (improvement), the critical measures should involve correction of all critical areas in a timely manner in order to minimize production losses. The same need applies to migration obstacles.

Page A-15 and A-16 This table clearly illustrates the problem of delayed mitigation of fisheries resource damages. The plan, in its current form, must phase-in correction of past problems due to the limited and uncertain availability of funding. No reserve of any type is provided for new problems that arise. These would presumably be added to the list for correction at some dates far in the future.



00579

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Mail Stop PA 11 • Olympia, Washington 98501-5711 • (206) 459-6000

Mr. Don Smith
September 22, 1986
Page two

00579

September 22, 1986

Mr. Don Smith, Forest Supervisor
Wenatchee National Forest
P.O. Box 811
Wenatchee, Washington 98801

Dear Mr. Smith

Governor Booth Gardner has delegated review and coordination of comments on National Environmental Policy Act documents to the Washington Department of Ecology. This letter is the response of the state of Washington to the Wenatchee National Forest's Proposed Land and Resources Management Plan and Draft Environmental Impact Statement. We appreciate the opportunity to provide comments and assist in your efforts to develop a workable Plan for managing the Wenatchee's valuable resources.

Since each alternative favors a different mix of resources and resource values, the "preferred alternative" would hinge upon one's perspective of resource management. Therefore, due to the broad nature of interests and the range of mandates represented by the various state agencies, there is no "preferred alternative". Rather, we have taken the approach of discussing the alternatives that are presented in the Plan, emphasizing evaluation of the preferred alternative. Three areas of special concern were identified. Detailed comments and suggestions regarding these areas are included in the enclosures.

- 1 The descriptions and analyses of water quality and related elements are disconcerting in that no degradation is promised even though the data and information provided indicate otherwise. For example, sedimentation is increasing over the life of the Plan, but at the same time water quality and anadromous fish production are supposed to increase; a relationship contrary to our experience.
- 2 There is a need for basic data in several areas; e.g., baseline information on fish populations and habitat. As a corollary to the need for basic data, monitoring and evaluation of past, present, and future management activities should be implemented. (Specific examples of data needs and monitoring/evaluation needs are included in the enclosures).

- 3 Washington State contains all or part of seven National Forests. We reserve the opportunity to examine the cumulative effects of all the Forest Plans once they are completed and at that time additional comments may be submitted regarding the Wenatchee Plan.

In Ecology's role as coordinator for this Plan, we received comment letters from state agencies and those letters are included as enclosures to this letter. Please refer to those letters for specific, detailed comments and for inclusion in your final plan.

We congratulate you and your staff for your good work thus far to complete this important planning effort.

Sincerely,

Andrea Beatty Rifiker
Director

Enclosure

- cc County Commissioners, Chelan County
County Commissioners, Kittitas County
Regional Administrator, EPA, Region 10
State Agencies
Affected Tribes

K-309



00579

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Midway Pl. 11 • Olympia, Washington 98501 B711 • (206) 459-6000

September 15, 1986

COMMENTS
WENATCHEE NATIONAL FOREST
DRAFT ENVIRONMENTAL IMPACT STATEMENT and
PROPOSED LAND AND RESOURCE MANAGEMENT PLAN

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I AIR QUALITY

- K-311
- A. The state's primary concerns with regard to air quality maintenance are centered upon the recently revised "Smoke Management Plan" and the visibility standards that are included in it. In general, the discussion included in the DEIS and the Plan adequately cover the state concerns.
- B. The cumulative and synergistic impacts of Forest Service burning and confinement fire policy needs to be examined in conjunction with the agricultural burning by farmers and orchardists [especially in the spring] and prescribed burning and wildfire management by the Washington State Department of Natural Resources, Bureau of Land Management Plum Creek Timber, Burlington-Northern, and other large landowners.
- C. DEIS, page II-124, Air Quality. It is stated that the Forest will demonstrate reasonable progress in reducing total suspended particulate from a starting point of 49,000 tons from prescribed burning. Please explain what is "reasonable".
- D. DEIS, page III-79. The National Surface Water Survey is being done by the Environmental Protection Agency with Forest Service assistance. Areas known to be sensitive to acid rain deposition should be described and their current and probable future management described. What efforts are being made to coordinate with the Department of Ecology's Air Program in this effort?

II WATER RESOURCES AND INSTREAM VALUES

A General

Monitoring is mentioned several times as the tool that will be used to determine if the Forest is meeting its requirements for protecting its numerous resources. Monitoring can be expensive and requires increased numbers of personnel to do. How does the Forest propose to accomplish the required monitoring and how and in what priority will monies be allocated among the resources?

B Land Management

1. The alternatives contemplate various levels of timber harvest, road building, and other management activities. These activities can have negative impacts on fish habitat (and other instream values) and, therefore, reduce production potential. In light of the varying levels of activities being considered, it seems highly improbable that estimated fish harvest and habitat capabilities would be the same for all alternatives. Please explain this apparent contradiction.
2. A major difference between alternatives C and A appears to be in the acres allocated to wildlife habitat management areas (EW-1). With 100,000+ acres being allocated to alternative C (and harvest levels being higher in C than in A), where will the difference in volume be harvested in alternative C?
3. Why is a zero potential automatically assumed for those watersheds with less than a 30% harvestable area? Other factors need to be taken into consideration, such as location of harvestable acres, location and miles of road, stability of soils, stream channel characteristics, and other factors. Please explain why these factors and others that may be relevant were omitted.
4. DEIS, page III-140. The statement is made, "The exact effect of livestock grazing on fisheries within the Wenatchee National Forest has not been studied." We are glad that this data and information gap has been identified. What is expected to be gained from the studies that are presumably going to be done to fill this gap? How do the studies fit in with maintenance of water quality, grazing allotment plans, and the forest plan?

- 5 DEIS, page III-149, Water - Roads. Other things besides those listed can impact water. These other factors should be discussed. They include harvesting practices (e.g. skidding through and across streams), road abandonment practices, off-road vehicle use, and others.
- 6 Timber cutting patterns can impact snow melt. Smaller clearcuts tend to retain snow longer that larger ones due to shading. The harvest pattern can impact snow melt, and, therefore, runoff. This needs to be discussed.

C. Water Use and Flows

1. The discussion of uses of water originating on the Wenatchee National Forest should mention the importance of those flows for instream resources because of the amount of attention currently being given to fishery-related problems on the mainstem Columbia River.
2. Water use is planned around normal summer low streamflows. Based on the 1985 drought experience, it may be prudent to develop alternative supplies and conservation plans. Please elaborate Forest Service plans relative to alternative supplies and conservation.
3. Considering the present and possible future uses of groundwater in and around the Wenatchee Forest, the description of groundwater resources is lacking. Information concerning sources, problems, anticipated uses, and other, similar, relevant information is needed.
4. Expected impacts of water yield changes on the small streams which are often the most significant streams in terms of fish utilization and production need to be discussed.
5. Projected water needs for various on-Forest and off-Forest uses need to be thoroughly examined.

6. Varying levels of increased water yields have been calculated for each alternative based on timber harvest, but they do not appear to be correlated to anything. What will be the effects on channel stability, sediment loads, and instream uses? In what drainages will these increases have positive impacts and in what drainages will they have negative impacts?
7. DEIS, page II-128, Energy. An explanation of the proposed small hydro-electric sites is warranted.
8. DEIS, page III-78. Since there appears to be a lack of data to adequately quantify cumulative effects, it seems inappropriate to assume that "none known" means no negative cumulative effects exist in a particular drainage.

D. Instream Values

1. One of the Forest's tools for mitigation is to restrict forested openings (opening defined as trees less than 15 feet tall) to less than 40% in any watershed greater than 1000 acres. Has this 40% limit been shown to be adequate? Is it based on research or otherwise documented? Has an analysis been done to show that the Forest can meet their annual cut and still maintain 60% of a watershed with trees greater than 15 feet tall?
2. DEIS, page III-75. There is a brief discussion of impacts from projects on water. This discussion focuses on aquatic and fish habitat. Ecology is concerned with impacts on all instream values, including fish, wildlife, water quality, navigation, recreation, flows, aesthetics, and other environmental values.

E. Fisheries

1. The DEIS shows no substantial differences between alternatives in impacts on instream values, particularly water quality and fisheries. Based on the greatly disparate levels of roading and timber harvesting between alternatives, please provide data and other information to substantiate the apparent lack of difference in impact levels.

- 2 The analysis of the fishery resource states that fish populations will increase with all alternatives
- a Since alternative A is very similar to alternative C, is this statement based on documented rates of increase in fish populations which have resulted from past management? If not, what will make the difference? What data are being used to justify an increase in the fishery in all alternatives regardless of the level of harvest and road building?
- b The increase in the fishery appears to be based on the assumption of receiving K-V and appropriated monies to enhance existing fish habitat to mitigate the effects of timber harvest and road construction. How were the appropriated monies for fisheries calculated for each alternative? Should the Forest expect additional dollars for fish in a time affected so strongly by budget cuts? Should the Forest rely on K-V dollars to mitigate all possible negative impacts to resident fish particularly when "non-essential K-V" is not protected in base rates? Has work accomplished by the use of K-V funds been documented to mitigate all impacts for which it was used in the past?
3. The DEIS is unclear why Alternative G would produce the least amount of cutthroat
- 4 The Forest's riparian protection zone prescriptions appear to offer no protection for class IV streams, yet these streams are numerous, directly affected by timber harvest and provide supportive habitat to downstream channels. How will these streams be managed?
- 5 The DEIS states in several sections that very little data exists to evaluate forest stream habitat and fish populations. How were the effects and environmental consequences to fisheries calculated without sufficient data? How will data which is collected in the future be integrated into the plan?
- 6 DEIS, Page II-78, Table II-1 under Section 7, Wildlife and Fish, in the issue of "Ability to meet fish Habitat Needs," it is stated that various measures, " . . . should assure that no degradation of forest streams should occur " Please elaborate

- 7 DEIS, Page II-78, Ability to Meet Fish Habitat Needs. The strongest words used with regard to meeting fishing demands are, "Should meet the existing demand level " This sounds precarious, what are the Plans if the existing demand level is not met? Page II-2 of the Plan states, "Although Recreation use is projected to increase steadily in the future, the Forest has so much to offer that crowding and shortages are expected to be only localized problems." On the one hand, recreation is projected to steadily increase, but on the other hand fishing demand is expected to (i e, should) meet *existing* demand for first two decades of the plan Demand is increasing, but will only be met at existing level. What will be done about the excess demand? The alternatives do not all extend to the fifty year planning horizon that the plan covers

III WATER QUALITY

A General

A fairly substantial amount of data and information dealing with water quality and its protection is presented in the DEIS and in the Plan. However, the following issues should also be discussed

- Existing water quality
- Current water quality trends
- Water quality monitoring plans
- How water quality monitoring plans will be incorporated into management decisions and programs
- An explanation of how water quality standards will be met
- Whether or not special conditions will be implemented where warranted

Specific comments on various sections of the documents follow

- 1 In several places in both the Plan and the DEIS, the Forest's best management practices are referenced. These should be summarized and included in the final EIS along with a timetable for implementation.
- 2 All alternatives were calculated to show an increase in fish populations regardless of the levels of road building and timber harvest. These increases were based on mitigation and enhancement projects which will depend on funding which may or may not be available in future years.
- 3 Impacts to lakes and ponds from forest practices and mining activities are not addressed. Impacts to groundwater quality are not adequately addressed and could result from the use of fertilizers, pesticides, or herbicides.
- 4 Plan, page II-76. The wildlife and fish comparisons only talk about wildlife. Impacts to fish need to be listed.

5 Plan, page V-20. The water quality monitoring plan does not have enough detail to evaluate it. The reference is made in the table to "see water quality monitoring plan for parameters", but the plan is not included in any of the documents. Six samples per year to evaluate cumulative effects does not seem adequate based on the information presented. A discussion of where, when, and what the sample would cover is warranted. Impacts to both mainstem rivers and small watershed should be studied.

6 DEIS, page III-75. The comments and table III-32 on water quality data need to be explained. The mean value for fecal coliform of 31.99 is depicted with maximum values reaching 2400. Washington State Water Quality Standards for Class AA waters require that fecal coliform organisms shall not exceed a geometric mean value of 50 organisms/100mL, with not more than 10 percent of the samples exceeding 100 organisms/100mL. The table inaccurately shows 50 as being the maximum when it is really the maximum geometric mean value. The water quality data need to be displayed to see the true number of samples exceeding the standard (the table shows a maximum value of 2400) and to evaluate trends indicated by the data. The same may be true for turbidity where maximum values reach 990 NTU's with 5 NTU's over background as a standard. What is the background value for NTU's? A basis for comparison is needed.

7 DEIS, page III-78, Cumulative Effects. How does the Forest Service take into account effects on water quality from other land managers? NEPA requires this to be done (see NEPA, 1508.7).

8. DEIS, page III-78. The statement is made that water quality impacts from mine tailings do not exceed "thresholds" for toxic materials and heavy metals under "normal" conditions. "Thresholds" and "normal" need to be defined. Water quality standards (Chapter 173-201 WAC) apply to man-caused activities under any runoff condition.

9. DEIS, page III-80, Soils. Maps depicting locations of special concern soils areas (i.e., mass wasting areas, degraded areas) would be helpful in comparing past management with current and proposed conditions.

- 10 DEIS, page IV-97. The table of Riparian-Aquatic Protection zone widths gives no indication of what will be left in these zones. Clearing is limited to 40% in a watershed and prescribed burning is allowed, but no indication of leave trees for large organic debris recruitment, temperature control, species composition or other similar, relevant information is given. Requirements for leave trees and understory vegetation should appear in the FEIS. Management prescription EW-2 (page IV-127) does mention extended shelterwood harvest as the predominant method, but this should be clarified. This section further mentions increasing sunlight to benefit stream productivity. What stream productivity parameters will be increased (e.g. what species will be considered?) Resident cutthroat may benefit from higher temperatures, but summer steelhead and chinook could suffer.
- 11 DEIS, page IV-87. The statement is made that any water body found to not meet water quality standards "should" be restored to the prescribed quality (#68). The FEIS should explain how the water body will be restored and replace the "should" with shall.
- 12 Appendices, page B-173. Benefits to fish and wildlife were not included in the present net value computations and need to be accurately compared to the alternatives. The table on this page shows discounted costs and benefits for wildlife and fish, but these remain deceptively constant throughout the alternatives. Please explain why, with the greatly varying levels of impacts to these resources with the various alternatives, the PNV changes so little.

B. Sediment

- i DEIS, table S-2, page S-8, Summary of Results Relating to Planning Problems, the sediment increase index shows increases in all alternatives. Please explain why the planning premise is not the reduction/elimination of water quality degradation. It seems that with better technology and management techniques that land managers would be able to reduce sedimentation.

- 2 DEIS, page II-13. Anadromous fish "habitat" is depicted as rising dramatically in the fifth decade of the Plan. Given that sediment yields rise at about the same time (page II-16), the word habitat seems a misnomer. Fish production may rise in spite of habitat loss due to sedimentation. (See comment on Plan, page IV-61.)
- 3 DEIS, page II-74. The comparisons of alternatives for impacts on water quality should list expected sediment yields. Implementing the same measures for all alternatives to deal with sedimentation does not make sense.
4. DEIS, table II-3a, pages II-114, 115. Water. Improved watershed acreage increases from 57,000 acres to 136,000 acres under all alternatives, but background sediment yields continue throughout the life of the plan at 930.5 thousand tons per year. The correlation between "improved" watershed conditions and a constant sediment load needs to be clarified. Each part of the table is not labeled and this makes locating some items difficult.
5. DEIS, page III-75. The statement is made, "Continued efforts to reduce sediment levels leaving the National Forest are necessary to maintain existing water quality levels." Contrary to this, on page IV-73, Figures IV-31 through 33 all depict increased sediment. It is not clear that whatever the "continued efforts" are can lead to maintenance of existing water quality levels based on the information presented.
6. DEIS, page III-96. Chronic sediment sources not only need to be corrected, but correction should be assured. Identification of problem areas, planning of appropriate remedial actions, prioritization and follow-up all could be part of dealing with these chronic sediment sources.
7. Plan, page IV-61. The plan "delays" the amount of delivered sediment until after the fifth decade when it rises dramatically for all alternatives. In alternative H this is as high as 19.6% over background. This demands an explanation. Most roads will be built within the next 22 years and they are typically the source of much of the sediment. What is the source of the sediment in the latter decades of the Plan?

The preferred alternative has a nearly five percent increase in sedimentation over natural levels for the first five decades, yet it is stated that the Class AA water quality standards will be met. The anti-degradation policy of Washington state [Chapter 173-201-035(8) WAC] provides that beneficial uses shall be protected allowing NO water quality degradation which would interfere with existing beneficial uses.

- 8 Appendices, page B-184 The expected sediment increases do not appear to meet the anti-degradation clause of the water quality standard (see comment number seven, above). The expected commercial harvest of anadromous fish in the year 2030 as listed on this page shows significant differences alternative E provides 743,000 pounds with alternatives A, G, F, G, H, and I all only providing 482,000 pounds -- a 65% reduction. Obviously, impacts from the Forest's management activities become the limiting factor for fish production with this dramatic degradation of this beneficial use. Note that this also will be well after the solving of management problems downstream from the Forest on the Yakima and mainstem Columbia Rivers, so that those factors currently affecting production cannot be blamed for these reductions.

C Mines

- Under mining activities, only past mining is discussed with no discussion of future activities such as road building and site disturbance for exploration or extraction. Even though these topics may be covered in separate, project-specific environmental documents, some generic impacts should be covered.
- DEIS, page III-78, Cumulative Effects Potential water quality degradation due to leached heavy metals and other toxic substances associated with mine tailings are discussed. It is stated that water quality standards would not be exceeded under normal runoff. Abnormal runoff conditions and the prescribed management reaction to these needs to be discussed. A definition of normal needs to be provided. What is the management prescription for these tailings?

- DEIS, page III-149, Water - Minerals Peshashtin Creek has been recommended for additional sampling or elimination from the Washington State list of potential hazardous waste sites. Which action is going to happen and based on what criteria?

D Roads

- Roads contribute much sediment to streams. Abandonment of unneeded roads, both existing and future, needs to be considered and would need to include measures to preclude future erosion, mass wasting, and sedimentation problems.
- Any new or reconstructed bridges must be located so existing water quality is not altered. Any non-emergency alteration of water quality requires a short-term water quality modification from the Department of Ecology.

E Range

- Why do all alternatives show an increase in grazing? From the information provided it is not clear that the demand is there for increased grazing.
- DEIS, page III-47, Water degradation is identified as a problem associated with rangeland management. While it is good to identify that a problem exists, one needs to go farther and discuss the degree of the problem, possible solutions, a timeframe to develop and implement a plan to solve the problems, and, lastly, follow-up and adjustment to determine how well the effort worked and what could and should have been done differently to achieve better results.
- DEIS, Page II-84, Range Management The preferred alternative ultimately provides for an increase of between 10 and 15 thousand AUM's over the five decades of the plan. In the section on water quality (page II-74), measures implemented to maintain or enhance water quality are the same for all alternatives. This approximately 10% rise in the number of AUM's may have negative impacts on water quality. Please explain how the 10-15 thousand AUM's will be accommodated and the resource impacts associated with it (e.g., wildlife, water, aesthetics).

- 4 DEIS, page IV-126 Management prescription EW-2 (Riparian-Aquatic Zone) allows grazing and will feature an "extensive scheme" for management. What is the "scheme"? On the same page it is stated that allotment plans will maintain or "enhance" the riparian-aquatic zone. We are interested in how this will happen since it is our experience that livestock do not enhance riparian zones, any "enhancement" is usually incidental to much damage.

IV WASTE MANAGEMENT

The documents should address the types, amounts, and the methods for handling and disposal of wastes generated by recreationists (dispersed, campground, special events, and other), at work sites, work centers, and ranger stations. A litter control plan, discussing problems, solutions, and future opportunities would be beneficial.

The documents do not contain any information regarding recycling. Does the Wenatchee National Forest have a recycling plan? Considering the amount of public concern and the need for conservation of natural resources, if there is no recycling plan, one needs to be developed and should include such things as recycling of office paper, recycling of motor oils from vehicles, and the reuse of materials where feasible. The Litter Control and Recycling section of the Department of Ecology's Yakima Office ([509]575-2800) can provide advice and guidance in developing litter control and recycling plans.

We are concerned that former Forest Service dump sites (and also sites of unauthorized dumping) may contain potentially dangerous materials, such as empty herbicide containers. There needs to be an identification and evaluation of these former dump sites to determine if there are any problems, such as leaching, of hazardous or other materials from these sites.

Mines and mine spoils are mentioned several times in the documents. Oftentimes there are chemicals and other substances [e.g. fuels] associated with mining that could cause environmental damage. Mine spoils may contain heavy metals. These potential sources of hazardous materials need to be identified and evaluated. If the evaluation determines there are solid or dangerous wastes present at these mining sites (or any other sites), disposal shall be in compliance with Chapter 173-303 and 304 (WAC), the laws for State Dangerous Waste and the Minimum Functional Standards for Handling Solid Waste, respectively.

Many Forest Service installations and work sites have storage areas for hazardous materials, such as fuels or herbicides. Spill containment procedures, equipment, and personnel need to be discussed. Some installations may have underground fuel storage tanks that are extremely old and may have high risk of leaks. Identification and evaluation of "high risk" underground storage tanks is needed, especially those with the potential to contaminate soil or groundwater, particularly groundwater used for water supplies.

V GENERAL and ENVIRONMENTAL QUALITY

A General

- 1 An index would be helpful in finding specific data and information that may be located throughout the documents. A cross-reference guide would aid in evaluating the data and information.
- 2 Instead of viewing some circumstances and activities as "irreversible", it may be more appropriate to view them as an opportunity to do something different.
- 3 Page numbers are occasionally wrong. For example, in the Appendices Table of Contents for Section B, Chapter VIII is listed as starting on page B-155 when it actually starts on B-157.
- 4 Two documents that can have an impact on resources within Wenatchee National Forest are

Beery, Marsha 1982

Wenatchee River Basin Instream Resources Protection Program Including Proposed Administrative Rules (WAC 173-545) and Supplemental Environmental Impact Statement (Water Resources Inventory Area 45) Washington State Department of Ecology.

USDI Bureau of Reclamation and the Washington State Department of Ecology January, 1986.

Plan Formulation Summary (Yakima River Basin Water Enhancement Project, Washington) Report to Regional Director, Bureau of Reclamation and Director, Department of Ecology

Copies of these documents can be obtained by ordering through the Publications Officer, Department of Ecology, Mail Stop PV-11; Olympia, WA 98504-8711

- 5 The impacts of illegal and unpermitted uses of the Forests need to be examined and their impacts analyzed and worked into the planning process. Activities that should be examined include.

-Failures to abide by timber sale contract provisions (for items like yarding through streams, draining petroleum products onto the ground, cutting leave trees in the riparian zone)

-Grazing allotment problems (putting animals on too soon or taking them off too late, management around water courses, spreading of noxious weeds)

-Poor roading practices (logs buried in roadbeds, poor culvert placement)

-Special uses (poor access road management by permittees, poor mine management)

B Management and Public Involvement

- 1 A portion of the RPA targets are allocated to each Region and then to the Forests, and finally down to Ranger Districts. The criteria that are used to allocate a Region's/Forest's/District's part of the overall RPA target needs to be discussed. While the criteria are discussed in the Regional Guide, there needs to be at least a brief discussion of the allocation process needs to be included in the DEIS.
- 2 The Multiple Use-Sustained Yield Act of 1960 says nothing about community stability but refers to recreation, range, timber, watershed, wildlife and fish as the multiple uses.
3. DEIS, page II-134, Social Effects. The basis of how, when, where and to what extent attitudes, beliefs and values would be impacted needs to be explained. From the information presented in the table, there is no way to see how the inherent conclusions were derived.
- 4 Budget increases are unlikely under Gramm-Rudman. Budget cuts are generally the rule. How would budget cuts be distributed among the resource areas?

- 5 What are the differences in management costs between alternatives?
6. How will comments on the DEIS be addressed in the final? Will there be an opportunity to see what comments others are making and whether the Forest Service response is adequate?
7. DEIS, page II-3. The costs of the alternatives need to be discussed and displayed. Virtually anything can be done, but the costs need to be shown. For example, it is technologically possible to remove all sediment from a stream downstream from a sloughed-out trail, but the costs incurred to do that would not be commensurate with the benefits.
- 8 It would be beneficial in the evaluation of alternatives, if impacts on the lands' productivity were displayed across a variety of resources (i.e. timber, forage, water, wildlife, fish, and recreation).
- 9 DEIS, page II-148, Nonpriced Outputs. It is stated that subjective judgements are made in assessing whether benefits from the nonpriced outputs outweigh the opportunity costs of priced outputs. While we have no suggestions for a better way to do this comparison, we would like to see the criteria and other factors that went into the judgement, including a definition of the "check-off point" as to when a nonpriced output is "more valuable" than a priced output.

C. FORPLAN Model

- 1 Mathematical Model (FORPLAN)
A description is given of what FORPLAN is supposed to do, taking into account costs, budgets, resource limitations, and the like. A major problem with modeling, as evidenced in the FORPLAN description, is that it cannot model values. It cannot compare, in an acceptable fashion, commodity values and non-commodity values. It is reasonable to compare commodity values with other commodity values [such as different harvest timings], but *not* with non-quantifiable values.
- 2 In the FORPLAN model, how many stems (or acres) does one plot represent? Is the sampling frequency per acre large enough to yield reliable results for all resources?

- 3 FORPLAN only models *monetary* (i.e., quantifiable) cost and benefits. How are non-monetary costs and benefits analyzed, evaluated, predicted, and monitored?
- 4 The objectives and constraints for the FORPLAN model need to be displayed. The process for developing the objectives should be visible.

D Cumulative Effects

- 1 While it is true that the Wenatchee National Forest is not responsible for off-Forest uses of water, the cumulative and synergistic impacts of forest activities with non-Forest activities need to be examined.
2. The cumulative effects of the Forest Plans on the following areas must be defined and evaluated
- a Tourism. The impacts of reducing visitor days on one Forest may be small but state-wide, and coupled with Oregon and Idaho, they can be significant.
 - b Timber harvest levels and rate/timing of harvest. These factors can impact the local, regional and state economies and, to some extent, demographics.
 - c Habitat manipulations that reduce wildlife habitat, especially critical areas such as riparian zones, calving areas, migration routes, and wintering areas need to be discussed. How and when habitat manipulations of adjacent Forests and adjacent land managers are done can impact wildlife resources.
3. The cumulative effects analyses are very general, non-quantitative for most resources and based on incomplete data. Cumulative effects were calculated for water and soils and expressed as water yields and sediment, but these two parameters were not correlated to any beneficial uses.

- 4 DEIS, page III-76 The discussions concerning cumulative impacts fail to meet National Environmental Policy Act (NEPA) requirements. In NEPA, section 1508 7, Cumulative impact; cumulative impact is defined as the impact on the environment which results from the incremental impact of actions when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. The following topics, their contribution and how they combine to cumulatively impact resources need to be discussed, as a minimum

- Intermingled ownerships and related land management activities
- Water use
- Mining

Cumulative effects in all major functional categories should be examined, including timber, water, wildlife, range, recreation, soils, cultural resources, and special uses. In the section of NEPA on Scope (1508 25), connected actions are to be discussed in the same project statement

E Vegetation

- 1 Page S-14, Vegetation. The Environmental Consequences of the Alternatives on vegetation primarily considers trees and forage. Species other than tree and forage species need to be thoroughly examined and discussed for such things such as how they fit into the various forest ecosystems, what happens under various management scenarios, and how the Wenatchee Forest intends to manage non-tree and non-forage species. This "non-commodity" vegetation could be handled in much the same way as non-game species of wildlife.
- 2 How is the removal of the timber and the removal of forage by grazing affecting ecosystem balance and nutrient cycling? What is the management program for replacing nutrients lost due to soil erosion, removal of timber, removal of mined materials, and removal of forage? How is the bioregional energy balance affected?

F. Range

- 1 DEIS, page III-148, Priced Outputs. The values received for AUM's are not based on market transactions, but are based on grazing permit fees. This is not the best way to evaluate value received. Like the other products mentioned in this section, grazing value should be based on market transactions. This would allow comparisons with other resources and help decisionmakers better decide the efficiency of spending -- i.e., are they putting the money where the return is the greatest? Further, by only ranking the value based on fees received, the value is underestimated. Why is the "value" for grazing determined in this way rather than like the other resources? All costs and benefits associated with cash resources need to be considered when evaluating value.
- 2 Plan, page IV-53, Vegetation. Several references are made to the need for range analysis work and evaluations in order to develop allotment plans. These plans should be based on the biological and physical capabilities of the allotment and then meshed, as nearly as feasible, with overall management goals. The statement, "through full implementation of these reanalyzed plans that livestock numbers will be increased.." presupposes the outcome of the data analysis. Range analyses may or may not show the allotments capable of sustaining additional AUM's without damage to other resources. How is the Forest making the decision to increase grazing in the face of data that admittedly has not been collected, let alone analyzed?
- 3 Plan, page IV-53, Vegetation. In the first paragraph it is stated that the expected increase in permitted use will be accommodated through the second decade. As was done for other resources, livestock use through the life of the plan needs to be considered.
- 4 Overgrazing may result in selecting for an undesirable plant species and that species may not be usable by either wildlife or livestock.

G Wilderness

- 1 DEIS, Alternatives Considered. The document need to contain a full range of alternatives. Not considering the addition of new areas to the Wilderness system unnecessarily limits the range of alternatives. The rationale for the elimination from study of some of the alternatives needs to be displayed.
- 2 Impacts of management activities adjacent to (but outside of) a Wilderness on the Wilderness need to be examined and discussed. Subjects to be discussed should include at least the following noise impacts on wilderness values, gas and oil drilling under Wilderness, and air quality and visual impacts from prescribed burning.
- 3 The amount of wilderness and wilderness use is depicted as the same for each alternative in table S-2 on page S-9 of the DEIS. By not even contemplating additional Wilderness, the Forest is unnecessarily omitting alternatives. There needs to be a demonstration of why an alternative that would include the adding of more wilderness to the Wilderness Preservation System was not included. Further, table II-3b that begins on page II-124 of the DEIS and is titled, "Qualitative Resource Outputs and Environmental Effects," does not mention wilderness. Some of the prime values that wilderness provides are qualitative and they ought not be omitted from the table.
4. Page S-16, Section K, Irreversible or Irrecoverable Commitment of Resources. The statement is made that timber resources can be irretrievably lost by land being designated as Wilderness. The President can recommend declassification to Congress, which can then, in turn, act upon that recommendation. Admittedly the likelihood of this scenario is small, but it is possible.
5. DEIS, page II-91, Management Areas. Conspicuous due to their absence are Spotted Owl Management Area Plans.

- 6 DEIS, page III-16, Inventoried Roadless Areas. While the Washington State Wilderness Act of 1984 did not require a review of remaining roadless areas or require that remaining roadless areas be managed to preserve future wilderness designation options, neither did it preclude the Secretary of Agriculture from preserving the option. The statute says the roadless areas "need not be managed," which means they can be managed to preserve wilderness values.
- 7 DEIS, page III-33, Wilderness Capacity and Demand. A map(s) that would show the relationships between the various Wilderness areas and the subdivisions within them would be beneficial in assessing needs, cumulative effects, and impacts to other resources.
- 8 Forest Service management policies for backcountry and Wilderness areas can have serious impacts to resources. Management of sensitive areas around water bodies is especially important. Limiting party size and composition can have beneficial impacts. For example, limiting the number of horses in a party can reduce water quality degradation by reducing fecal coliform, reducing soil compaction (and thereby increasing runoff), reducing the number of trees with horse-caused injuries, and the unpleasantness of manure in trails which may eventually be washed into water. It appears that the current policy of a combination of people and horses adding up to twelve is working and with District Rangers having the prerogative of allowing additional people or animals, any change to allow increased numbers across the board would not be warranted.

H Timber Management

- 1 What is the percent error in the timber harvest calculations and what will be the likely impacts on local economics? Many things are based on the assumptions in the timber harvest calculations. If the confidence level of the timber harvest calculations is low, it may invalidate some of the proposed actions that are based on the assumptions.
- 2 DEIS, pages II-111, 112 Timber. It would be helpful to have the timber sale quantities in acreages (as well as volume); in order to make comparisons with acreage reforested and subjected to timber stand improvement work.

- 3 DEIS, page II-112, Under natural reforestation It is assumed the correct acreage under Alternative C is 22 thousand acres rather than 22,000 acres, as written
- 4 The mean annual increment for various forest types would give a gross characterization of overall impacts of timber harvest activities on timber availability, cutting rates, and compliance with the Multiple Use - Sustained Yield Act of 1960

negative impact on environmental quality than do trails through such things as water quality degradation (during construction and maintenance), displacement of animals through the removal of habitat, acreage made unavailable for other uses, management problems (e.g. litter, vandalism, illegal firewood removal, poaching), maintenance costs, and aesthetic impacts

The Wenatchee needs to examine what other trail managers in the area are doing. There are no other significant trail systems in the Wenatchee area that are not managed by the Forest Service. Therefore, the impacts of Forest Service trail management decisions may put undue pressure on those few miles of trail outside Forest Service jurisdiction.

I Recreation and Wildlife

- 1 DEIS, page S-11, section 1 Recreation It is stated the amount of unroaded recreation outside wilderness is a major concern on the Forest. What is to preclude the changing of an administrative classification status from unroaded to roaded and what would be the ramifications?
- 2 DEIS, page III-37, Wildlife Only vertebrate species are acknowledged to exist on the forest. Other species, such as insects, can have a significant impact on forest resources and can be impacted. Food chain impacts need to be addressed. If there are no data available, the data gap needs to be identified and information gathered.
- 3 DEIS, page III-137 The statement, "There are no significant interactions between air and wildlife" is erroneous. Animals breathe, birds fly.
- 4 DEIS, page III-142, Threatened, Endangered and Sensitive species. There is no mention of species listed by the Washington Department of Game.
- 5 With the current and projected levels of recreational use in unroaded areas, it is not clear that increasing roading while reducing the numbers of miles of trails is a good approach to meeting this demand. There needs to be a justification for removing 51 miles of trail during a time when the demand for trails is increasing. Nationwide, including the Pacific Northwest, trails are being reduced in numbers and reducing the number of miles of trails on the Wenatchee National Forest would only exacerbate that situation. The opportunity to develop or maintain trails in a forested setting such as the Wenatchee are diminishing. Roads have a much more



STATE OF WASHINGTON
DEPARTMENT OF GAME

600 North Capitol Way GI 11 • Olympia Washington 98504-0091 • (206) 751-5700

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DEPARTMENT OF GAME
OLYMPIA, WA 98504

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James F. Torrence
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Specific examples of these conflicts involve fish, big game, old growth indicator species and wildlife economics. It appears that model outputs of fish are not affected by differential sediment volumes, a result that seems counterintuitive. Especially since you state that some streams may suffer cumulative impacts, we would expect sediment outputs to be unevenly distributed, reaching impacting levels in some locations. We believe that management activities would affect fish habitats and populations. Although activities off WNF may have the largest influence on fish production, it is still important that on-forest actions aid recovery efforts. We suggest that the WNF examine fish/sediment models developed on other forests

With big game, we feel that differences in Forest-wide harvest activity and road management would far outweigh the effects of 1300 acre-equivalents per year of habitat improvements. In addition, it appears that what we see as limiting factors for the various herds are not incorporated as model parameters. Projected population increases within the Plan may be possible, but we believe that they would require a concentrated program of winter range improvements and strict vehicle access restrictions. Our suggestions for big game management emphasis areas are discussed below.

With old growth indicator species, such as pileated and three-toed woodpecker and marten, it appears that minimum management requirements (MMR's) would not be met. Information on dispersion distances (EIS, page III-43) conflicts with table outputs given earlier (EIS, page II-108). In addition, we believe that management should be above MMR level for all species. Also, the amount of acreage allocated to SOMAs is less than 25% of the average old growth found in Washington spotted owl home ranges.

We also believe that the alternatives would vary in their effects on recreation, and that the local economy would reflect these differences. Fish and wildlife oriented recreation supports a significant amount of economic activity statewide, totaling \$864 million in 1983, \$2.8 billion counting the effects of a standard spending multiplier. We know that campground occupancy rates can fluctuate with the level of opportunity for fishing and hunting. In addition, you have stated that recreation contributes more to local economy than timber. It seems reasonable that differences among alternatives should lead to different effects on the local economy's recreation sector. Perhaps our disagreement stems from your assumed linear relationship between road mileage and total recreation. It would be helpful to describe model assumptions and parameters so that these differences might be resolved.

Three other process-related issues should be raised. First, we suggest that the Plan would benefit from a broader range of livestock grazing alternatives. The approaches there appear very similar, especially given a certain existing level of conflict. Resolution of current and possible future problems is very important to us. Second, we strongly recommend that you strengthen the language in your wildlife oriented Forest-wide Standards and Guidelines. We do not believe that qualifiers such as "if possible", and "strive for" are

James F. Torrence, Regional Forester
Pacific Northwest Region
USDA Forest Service
P.O. Box 3623
Portland, Oregon 97208

PROPOSED LAND AND RESOURCE MANAGEMENT PLAN
AND DRAFT ENVIRONMENTAL IMPACT STATEMENT
Wenatchee National Forest

Dear Mr. Torrence:

Washington Department of Game staff have reviewed the Proposed Plan and DEIS, comments follow.

We wish to thank you for the opportunity to respond to your Plan documents, and for Wenatchee National Forest (WNF) efforts to include us at each preliminary step. Land and waters in WNF are extremely valuable for the fish and wildlife resources managed by this agency, so coordination with the Forest is a high priority for us. We appreciate how immense a task it is to put together a comprehensive resource plan which features a full range of alternatives, you are to be commended. It is our intention to continue to work with WNF to achieve successful wildlife management on the Forest, meeting population goals, and making wildlife oriented recreation available to the public

Because we believe that impacts on fish and wildlife would be higher than stated, we cannot support your preferred alternative as formulated. We do hope that the level of detail we provide will be helpful in arriving at a final plan which is better for wildlife and still meets other resource requirements. Our response focuses on the changes that we believe should be made. We do not dwell on the good parts of the documents, although much is well done. Brief examples are the formulation of most Forest goals, and from the standpoint of informing effectively, most of the tabular displays and diagrams. Please understand that we recognize many others, though they may not be mentioned

A major source of concern involves mechanics of the planning process. Model outputs do not always match what we would expect to occur over the various alternatives. Because the assumptions and parameters you use in model runs are not shown, there is no chance of reconciling these differences. Moreover, we are unable to add our expertise to refine the models. We strongly recommend that you include model descriptions in the appendix volume, as well as output tables for all indicator species across the full planning horizon.

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appropriate for this section. Instead, it would be helpful to set firm standards, as was done for other resources, to implement Forest goals, and to state operative minimum management requirements for all indicator species. The third issue involves fish and wildlife valuation.

Economic Value of Fish and Wildlife

We are concerned that your economic efficiency calculations seriously underestimate the value of fish and wildlife. These are public resources, enhancements represent real benefits and impacts produce real losses. Both affect present net value. Where the resource is enhanced, benefit is measured by the public's net willingness to pay (WTP) for extra outputs. When losses occur, the proper measure is net willingness to accept payment (WTA) to do without the resource.

We believe there are several ways that PNV figures are biased away from fish and wildlife values. First, an arbitrary reduction of 37.5% was made from the numbers derived by Loomis and Sorg for the 1985 RPA documents. We strongly believe the justification for that reduction, which you give in the Appendices, page B-81, is not correct. With Travel Cost Method (TCM), an implicit demand curve is mathematically derived, and consumer surplus determined. Net, not total, willingness to pay is measured by consumer surplus. We agree that TCM studies are site-specific. However, the conjecture that study locations are typically high quality sites should be substantiated and quantified by sensitivity analysis before value reductions take place.

In fact, there is more reason to believe that the Loomis and Sorg data underestimated applicable wildlife values. TCM measures only the use component. Other sources of value involve existence of the resource, option to make future use of it, and opportunity for increased knowledge to lead to new or enhanced uses. For some species and ecosystems, we would expect these components to add significant value.

Another factor is that no attempt is made to incorporate fish and wildlife losses as costs in PNV calculations. It should be noted that WTA is the proper measure of value for this purpose, and that WTA magnitudes are typically higher than those of WTP. In addition, losses should be measured from current conditions, not current direction.

Finally, a small relative bias is introduced through attributing a 1% real growth rate in timber prices, while holding other resource values constant over time. Taking into account the relative growth of demand for fish and wildlife oriented recreation over the last 10-20 years, we feel that timber values are unjustly favored by your assumption.

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Recommended Alterations to the Preferred Alternative

The recommendations which follow include changes in prescription definitions, specific allocations, and management techniques. We believe that their adoption not only would be better for fish and wildlife, but also would produce a stronger plan. We ask you to make these changes to your preferred alternative. Major topics are grouped under separate headings.

Management Prescription EW-1

We believe that several refinements need to be made in this management area to assure successful big game habitat emphasis. As a start, it would be very helpful to strengthen the associated language in your Forest-wide Standards and Guidelines (Plan, page IV-91). However, the primary shortcoming is that a general prescription is written to cover multiple species and seasons. To remedy this, we recommend that you develop separate sections for deer, elk and mountain goats, with appropriate management criteria for each, as well as for winter, summer and transition range. As an example, objectives for winter range could include protection and development of thermal cover, and protection of forage from overgrazing. Summer range objectives could include creation of forage areas, road closure targets, and protection of calving, fawning and hiding areas. Specific target criteria would vary by species.

In addition, we recommend that all activities within the EW-1 management area be judged by their impact on big game. Optimum cover/forage ratios are discussed but not often specified in your documents. For deer and elk winter range, 40-60 should be the target, with specific canopy closure, as identified in Thomas, et al., *The Blue Mountain Handbook*, for cover areas. Increased habitat effectiveness should be achieved. In this regard, on low elevation winter range, we believe that reduced timber harvest, and road and ORV trail closures during key periods will be necessary.

Your preferred alternative incorporates most of the big game acreage we specified at an earlier stage in the planning process. We ask that you add the rest of that acreage (to match the Alternative G allocation), as well as the following area.

- 1 Mud Creek corridor, Entiat drainage (change from ST-2, RM-1)
Extensive use by mule deer in winter and during fall migration

Management Prescription EW-2

Riparian zones make up a small portion of Wenatchee National Forest, but support a larger number of species than any other management area. Because of this abundance, we support the prescription goal of optimizing habitat for wildlife. However, we do not agree that your proposed management will attain

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the optimization you seek. Your proposed prescription retains less than one-third of the big trees, we suggest that canopy cover should exceed 60% to be more optional for wildlife.

We recommend that area definition be functional. Minimum zone width should be based on the area of physical influence measured by slope distance equal to natural tree height. Soils, vegetation and topography can then be used to widen the zone, where appropriate. In addition, reaches of class III streams should be included in this management area when key wildlife habitat is present. Harvest within the riparian corridor should emphasize maintaining cover, stabilizing soils, and providing large organic debris for instream habitat needs. Large snags must be present for the many species that use them. Instead of shelterwood, selective harvest of intermediate-sized trees would be better for wildlife. Maximum harvest per decade should be 5%. Snags should be maintained at 100% potential woodpecker habitat.

Management Prescription OG-1

We believe that protection of old growth habitat should be given very high priority. At the same time, we question whether old growth attributes can be adequately recreated by management activities. For this reason, we strongly recommend that existing old growth areas be dedicated, without allowable harvest. Acreage scheduled for addition, due to future growth, to the OG-1 management area under your preferred alternative can be used as study sites, to judge the effectiveness of actions taken to recreate old growth values. Until the success of these management activities is assured, we consider it extremely unwise to allow further loss of this dwindling resource. The existing old growth prescription will not meet the cover needs of your indicator species. We suggest you reference materials used to develop MMRs and C. Phillips, et al., Siuslaw National Forest.

Roads

Of all forest management tools, roads are the most impacting. Each mile of road requires the destruction of four acres of wildlife habitat. Roads allow human intrusion, which leads to increased harassment, poaching and vehicle/animal accidents. Many species of wildlife, but particularly big game, avoid roads, effective habitat and carrying capacity are reduced. Populations are lowered, as are high quality viewing and hunting opportunities. In addition, roads are the greatest source of increased sedimentation of forest streams, which can significantly impact fish populations.

To mitigate these adverse effects on Wenatchee National Forest, we strongly recommend that the following measures be adopted as standards. It is important that new roads avoid key habitats, including riparian zones, wetlands, natural forest openings, and places with special uses, such as deer and elk travel corridors and calving areas. Buffers of natural vegetation should be left to

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screen these critical habitat features. When stream crossing is necessary, it should be done at a right angle, to minimize the area of impact. It is also important to limit open road densities to levels compatible with prevailing wildlife use. Optimum elk habitat requires 0.2 mi/sq mi or less, significant drops in habitat effectiveness for deer and elk occur at levels above 1 mi/sq mi. We ask you to strive for optimum level in the most critical areas, which we would be happy to help you specify. Elsewhere on WNF, our goal for maximum open road density is 1 mi/sq mi.

On WNF, average road density is listed at 3.75 mi/sq mi in roaded areas. We understand that this figure does not take into account spurs and dead-end roads. Even at the lower number, habitat effectiveness for deer and elk is reduced by about 50%. We note also that road mileage would increase under every alternative. To mitigate adverse effects, we recommend that you minimize new road mileage, and develop closure programs on both new and existing roads to approach less impacting density levels. Regrading and revegetating corridors is most effective. Road management programs, either with gates or the green-dot system, can also be used. Often, seasonal closures are sufficient. Washington Department of Game priorities for new road management areas on the Forest are as follows:

1. Entiat, Mad and Chiwawa River drainages - Entiat Ranger Districts
2. State Rte. 2 to Alpine Lakes Wilderness - Lake Wenatchee R.D.
3. Wenatchee Mountains, east of U.S. 97 - Leavenworth and Cle Elum Ranger Districts
4. South of Interstate 90 near Cle Elum - Cle Elum R.D.
5. Thorp Mountain area - Cle Elum R.D.
6. Nile River drainage - Naches R.D.
7. Tieton River drainage - Naches R.D.

As for specific construction projects, we recommend that you not permit development of the Naches Pass Road. The Little Naches basin is critical summer and transition range for big game. It is also a major migration route for deer and elk wintering in the Naches, Wenas and southwest Kittitas County valleys. Motorized traffic in the drainage is already at high levels, adversely affecting these species. Putting in the road would compound this impact, and would compromise co-operative efforts by our two agencies and Plum Creek Timber Co. to control access.

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Off Road Vehicles

Our concerns over this issue are long-standing, with correspondence dating back to the first Wenatchee National Forest ORV Plan Environmental Assessment in 1975. Since that time, we have consistently stated that ORV's have a detrimental impact upon wildlife and their habitat. Our position is based upon the large number of professional studies documenting impacts of motor vehicles on wildlife. Many of these studies were conducted by the Forest Service, and published in professional journals. Unfortunately, little work has been undertaken to document impacts from ORV use in forested habitats. We believe that a comprehensive study of these potential adverse effects should be undertaken. At the same time, conflicts have grown. With the availability of funds in 1978 from the Interagency Committee for Outdoor Recreation (IAC), ORV trail development on WNF increased substantially. This occurred despite our request that site-specific wildlife and habitat evaluations be done for each proposed development before project authorization. Our position today remains the same, no new ORV development should occur on WNF until the following have been performed to standards mutually agreeable to WDG and WNF:

1. Complete a comprehensive study that quantifies the extent and timing of wildlife and habitat impacts from ORV development and use.
2. Develop and implement a mitigation plan to offset or minimize any ORV impacts identified in the comprehensive study
3. Develop and implement a monitoring plan of ORV use on WNF trails, consistent with Executive Order 11644 (USDA Forest Service, 1977). The monitoring plan should be designed to identify impacts before they occur, and should allow for successful implementation of the mitigation plan of (2), above. We believe the existing ORV monitoring plan is not comprehensive enough to meet basic needs of wildlife and habitat management
4. Develop and implement effective enforcement and education plans for ORV and road management programs on the Forest. Currently, the onus of enforcement is borne by County ORV Deputies and our Wildlife Enforcement Agents. There are too few personnel to do an adequate job. Because federal land and statutes are involved, we feel that WNF should assume lead responsibility for enforcement of ORV use on the Forest

Finally, we believe that high wildlife habitat values cause some areas to be inappropriate for ORV development and use. We have already identified a number of these sites, and believe the bulk of remaining unroaded areas may well fit into this category. Others will require careful evaluation before a determination can be made. One specific case for which we have recommended no further ORV development is the Negro/Shazer proposal. This agency performed a wildlife assessment for the project. Our recommendation, based on wildlife needs and habitat use of the area, was not to build or improve trails for ORV

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use. We request that these recommendations be adopted. If they are not, please send us notice of the reasons for your decision.

Roadless Areas

Because roads are so impacting, wildlife would benefit by leaving as many roadless areas as possible in a pristine state. We believe that your description of the roadless percentages of inventoried areas after planned entry understates adverse effects. With the proposed management of your preferred alternative, these sections will not be roadless. For clarity, it is also important to separate your treatment of inventoried roadless areas from that of wilderness. The two classifications feature different values, and support different uses.

When entry is unavoidable, low harvest intensity, appropriate to transitional areas, should be applied. Road mileage should be minimized, with all roads closed to public access. After harvest, regrading and revegetation of corridors should be used to the maximum extent possible. In addition, we believe that certain changes should be made in management allocations if inventoried areas must be opened. We repeat that our strong preference is that they not be roaded. The changes are as follows:

1. Entiat, Stormy Mountain and Slide Ridge - EW-1
Key summer range and migration routes for Entiat mule deer herd. We are especially concerned with impacts of new roads on herd ecology and recreational quality.
2. Nason Ridge - RE-3
Important habitat for a major mountain goat herd. To reduce impacts, decision to allow ORV access should be reconsidered.
3. Alpine Lakes Adj. - RE-3
Again, to reduce impacts on mountain goat.
4. Devil's Gulch, Waneum and Lion Rock - EW-1
Important summer range and migration routes for the Colockum elk herd - very high priority for remaining roadless. Proposed allocation would allow improvement of cover/forage ratio. Focus should be on minimizing impact of roading, with low mileage and full closures required. Grouse Spring Road, in Waneum area, should also be closed, at least seasonally
5. Taneum, Manastash and Quartz
Quartz is the last undisturbed area between major summer and winter ranges. We believe it should be left unroaded. ORV trails above Milk Lake should be rerouted to protect meadows and riparian zones. Low mileage and cooperative road management programs should be emphasized in interspersed ownership of Taneum and Manastash areas.

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6. Norse Peak Adj.
ST-1 allocation is important mountain goat habitat, and should not be roaded or logged. In other sections, close roads after harvest.
7. William O Douglas Adj.
Change GF to ST-2. Many small fragments provide summer range and migration routes for deer, elk and mountain goat. Roads should be closed after harvest; transitional nature should be emphasized. For specific segments of this area:
 - a. Miner's Ridge - change ST-2 to ST-1
 - b. Clover Springs - change GF to ST-2
 - c. Rattlesnake Cr. - change RE-2B and GF to EW-1
 - d. Timberwolf Mt. - close all new roads, restrict ORV's
 - e. Wildcat Cr /Russell Ridge - change all to RE-3
8. Blue Slide
Change majority of Divide Ridge from GF and ST-2 to ST-1. Allocate U.S. 12 to Teton River Valley, and area near Grey Cr Campground to ST-2. Close all roads after harvest. Key summer range and migration routes.
9. Goat Rocks Adj.
Close all roads after harvest.
10. Thorp Mountain
Change RE-2A to RE-3.
Mountain goat population already impacted by ease of access. Coordinate activities with private landowners.
11. Teanaway
Change SI-1 to RE-3.
Summer range and migration routes for major mule deer herd, with northern portion of area supporting mountain goat.

Range Allocations

Potential conflicts that livestock can create with wildlife use of the Forest include overgrazing, impinging on critical habitats, and passing diseases. To minimize these problems, we suggest that a number of measures be taken. First, grazing allotments should calculate AUMs only on the acreage that is actually used by livestock. Level to moderate slopes and presence of water are necessary.

Second, allotments should avoid critical habitats. In this regard, we recommend that fencing or reduced stocking be used to protect riparian zones, and achieve the goal of optimum wildlife habitat. Specific priority areas for this action are within drainage bottoms on the Manastash Allotment, and in the

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Teton River and Rattlesnake Creek drainages. Timing restrictions should be sufficient to remedy another specific conflict, the competition for space between cattle and elk during calving season on the Table Mountain Allotment. A conflict in the Manson Game Management Unit should be studied to determine the proper course of action. We believe that any new grazing should be directed away from big game winter range.

Finally, domestic sheep should not be allowed to graze near bighorn sheep habitat. Diets overlap, and bighorn have no natural defenses against diseases and parasites that can be passed. Specific areas of conflict on WNF are Clemans Mt. to Bald Mt., and the Swakane/Chumstick Mt. vicinity.

Forest Grouse

We would also like to recommend opportunities to benefit ruffed grouse, as well as the other grouse this indicator species represents. Riparian management as we have suggested above would provide a good base. In addition, we would support reduced logging, grazing and ORV use adjacent to natural meadows. Specific areas of key grouse habitat are as follows:

1. Rocky Saddle - Milk Lake, Naches R.D.
2. Bald Mt. - Rock Cr. - Cattle Camp Spring - Two Point Spring Naches R.D.
3. Bethel Ridge - Microwave Tower Area, Naches R.D.
4. Lion Rock - Table Mt., Cle Elum R.D.
5. Sugar Loaf Mt., Entiat R.D.

Mission Ridge and Other Winter Recreation Facilities

Because of intermingled ownership, 1200 acres of Game Department lands were leased for development of the Mission Ridge Ski Resort. In many respects, this arrangement has proved to be beneficial for the last 20 years. However, there are impacts, directly attributable to development of the Mission Ridge facility, which threaten wildlife in the Squilchuck and Stemilt basins. These impacts are cumulative, occurring over a long period of time, and were not identified by WNF in the prospectus and original lease documents (May 1965). The adverse effects result from zoning changes on private lands. What used to be forest and range now has commercial and residential use. This, in turn, has caused complete loss of lower elevation lands for wintering wildlife. Upper elevation developments are impacting summer/fall transition range, and important deer and elk migration routes. As one result, we have been faced with an increasing workload from wildlife damage claims and "problem" wildlife complaints.

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We feel that consideration of wildlife needs early in the planning of Mission Ridge could have prevented most of these impacts. By creating an all-weather road to the ski base area, providing power and other services (easy access), land development was encouraged and accelerated.

We are now faced with two major land development proposals near the Mission Ridge base area, well above existing developments. If construction occurs, we believe it will eventually eliminate all big game movement between the Stemilt, Squilchuck and Mission watersheds. Summer and fall use of these areas will be greatly reduced, as elk and deer seek scarce undisturbed sites. One of these proposals, Constellation Ridge Resort, has already requested development permits and zoning changes. The project would require access across WNF lands to tie into the Mission Ridge base area, also constructed on the Forest. We have made it clear to Wenatchee Mountain, Inc (Mission Ridge operation and management) that no access will be granted across Game Department lands for a destination resort, or any other year-round development. Our reasons have been clearly stated: we manage these lands primarily for the Colockum elk herd, and believe that other than winter-only use would have a significant detrimental impact on long-term herd survival.

Because Forest lands are central to the Constellation Ridge proposal, we feel that you should document potential impacts on habitats and wildlife use of the area. Of particular concern to us are long-term cumulative effects from ski resort and associated development. A mitigation plan should also be developed, to offset impacts on wildlife from use of Forest lands for commercial purposes. An appropriate method to address these concerns might be through rewriting the Term Special Use Permit, recently issued by WNF to Wenatchee Mountain, Inc. for continued operations at Mission Ridge (30 year lease). Your permit does not currently address our concerns. This agency recently issued a Term Special Use Permit (20 year lease) which does identify impacts and mitigation responsibilities for continued use of department lands. In your Forest Resource Management Plan, we ask that you address ski resort expansion and year-round use of WNF, cumulative long-term impacts from development of adjacent lands, and strategies to mitigate impacts on wildlife. We are currently developing a Colockum elk study proposal to address these and other concerns. We invite you to identify ways you might cooperate in this study

Information Needs

We favor a comprehensive monitoring plan which tracks model assumptions and parameters. Because you use indicator species to represent all forest wildlife, it is important to study habitat and populations for indicators, and also the linkages between these and non-indicator species. In addition, other data gaps exist. Big game winter use of the more heavily forested areas above specified winter range should be quantified and mapped. Human disturbance of mountain goats occurs, but little is known about threshold levels at which impacts become significant. Study of the effects of different sources of disturbance could point out useful management options. We also believe that

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grizzly bear and gray wolf recovery plans should be among those that you follow and monitor.

Land Acquisition and Exchange

Within the EW-1 management area description, in the section on lands, you state that public ownership of winter range is preferred. We strongly agree, and would support further acquisition of private inholdings within these areas as they become available. Recommended priorities in Entiat Ranger District are Swakane Canyon, Oklahoma Gulch, Entiat River Valley, and Twenty-five Mile Creek. Those in Naches Ranger District are lower Nile Creek drainage, lower Rattlesnake Creek drainage, Gold Creek, Rock Creek, and Garrett Canyon area along the slopes of Bald and Clemans mountains.

Although we support acquisitions of important habitat, we are concerned about the potential adverse effects of land exchanges. Creating large contiguous blocks of land can increase management options for Forest-owned portions, at the cost of giving up options on the privately-owned blocks. Net effects on fish and wildlife can only be judged on a case-by-case basis. We ask that you continue to consult us on any future land exchange proposals.

Specific comments follow

Proposed Plan

Page I-2, paragraph 3. Do model outputs and environmental effects in the plan include the Alpine Lakes area?

Page II-6, Production Potential. The existing setting does not represent maximum unroaded potential, because existing roads could be regraded and reseeded.

Page II-16, paragraph 2. We understand that all 4,667 miles are "system" roads, and do not include spurs. What is total road mileage on the forest?

Page II-19, Deer and Elk Winter Range. We believe that this method of populations actually underestimates deer and elk use on the Forest.

Elk Summer Range. We agree that some harvest could improve forage for elk. However, potential impacts from associated roading could easily outweigh the positive effects. Reduced livestock grazing would also be appropriate.

Mountain Goat Range. Other populations occur at Norse Peak and Henry M. Jackson wildernesses, and the Teanaway, Mt. Clifty and Keechelus Ridge areas.

Page II-20, Threatened, Endangered and Sensitive Species. Washington State status of Northern spotted owl is threatened, not sensitive. In addition, our

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Nongame Data System shows historic occurrences of grizzly bear and gray wolf at locations involved with timber sales (records enclosed). These species should also be used as indicators, and recovery plans discussed in your documents

Page II-21, Production Potential. It would be more helpful here to model and display production potential for all indicator species. Also, WFUD potential should be shown.

Demand. This discussion is limited to demand for deer and elk hunting. Non-consumptive use and hunting for other species are also important components of wildlife resource demand, and should be quantified. It would be appropriate to give expected WFUD's here.

Page II-24, Production Potential. Despite the uncertainty in these numbers, this presentation is more helpful than the preceding section on wildlife.

Page II-27, current timber harvest level. The figure of 176.8 million board feet appears to conflict with quantities given on pages II-29 (140.5), II-30 (184,164), and II-66 (131.9). These differences should be clarified.

Page II-31, Current Management Program. Your presentation of existing conditions is informative.

Page II-41, paragraph 1. The water quality data also show that standards are exceeded at times. We are concerned with potential local impacts on fish, so discussion of violations, rather than average compliance, is important

Page II-50, Current Management Direction. Hydraulic Project Approval is required for any prospecting activity within the ordinary high water mark. However, for panning and small sluice boxes, application need not be made, and the pamphlet 'Gold and Fish', published by this agency and Washington Department of Fisheries, serves as approval. The pamphlet must be brought to the work site.

Page II-54, Roads, Overview. The existing road density of 3.75 mi/sq mi has major impacts on wildlife. As discussed above, we strongly recommend maximums of 0.2 mi/sq mi in important wildlife areas, and 21 mi/sq mi elsewhere. On the next page, typical road densities proposed for currently unroaded areas are also high. In addition, even these numbers understate impacts if spur and dead-end road mileage is not counted.

Page II-65, Table II-25. Comparison with the table on page IV-26 would be possible if outputs were shown here for all indicator species. We ask you to include them and to show your model parameters, so that assumptions can be checked.

Wildlife Habitat, Big Game. Please explain model relationships which show potential increases of about 40% from a habitat potential over 6 times that of current program acreage.

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Big Game Estimates. Figures for 1986 seem to show that the current program is producing at maximum potential. Is this so?

Cutthroat Trout. Do numbers refer to smolts or adults?

Anadromous Commercial Harvest. Using pounds as units of measurement makes comparison with outputs on page IV-26 very difficult.

Page II-66, Table II-25, Trees. It is not clear how these figures are derived, or why they appear to conflict with those on pages II-27, II-29 and II-30

Page II-68, Recreation, 4. We strongly believe that this type of information on wildlife impacts from ORV's should be obtained before more large ORV allocations are made.

Page II-69, Wildlife. The NFMA requires that viable populations of all naturally occurring species be maintained, well distributed, within the planning area. Threatened or endangered species must be maintained, with no harm to individual animals.

Page II-70, paragraph 2. Population trend data for indicator species should also be gathered by WNF.

Page II-73, Roads. What assumptions do you make concerning road construction and recreation use? As far as impacts of roads on fish and wildlife, a great deal is already known (e.g.- Perry and Overly, 1977). However, information on ORV impacts would be helpful.

Page III-4, paragraph 2. We believe that avoiding activity in the riparian zone would be more beneficial for fish and wildlife, better for soils and water quality.

Paragraph 3. We are concerned that increased runoff would likely occur during peak flows, when it is less useful and brings greater risk of stream scouring. Throughout your documents, runoff seems to be treated as a benefit, though it may well be highly impacting.

Wildlife and Fish, paragraph 2. Fish and wildlife habitat are also affected by thinnings, reforestation and use of chemicals.

Page III-5, paragraph 4. We do not agree that Best Management Practices would assure no degradation of forest streams.

Page III-7, paragraph 1. We disagree that long-term, high-intensity timber production would improve big game cover/forage relationships. Paragraph 3. Snags and down wood would be reduced by this type of management, wildlife numbers would decrease.

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Page III-9, Water Quality and Quantity Cumulative Effects, paragraph 2. As stated above, we do not agree that Best Management Practices are sufficient to safeguard water quality

Page IV-3, Wilderness, 4 What kinds of facilities are to be developed? This goal appears to conflict with goal 20, page IV-5.

Page IV-5, Wildlife and Fish. These goals are generally well formulated. However, we believe that it would be appropriate to remove qualifying language from goal 1. Also, in goal 2, please add that viable populations of desirable non-native species will be maintained

Page IV-6, IV-7, Water, Soil and Air We support these goals.

Page IV-12, paragraph 1. As formulated, harvest intensities in riparian areas would impact wildlife.

Paragraph 2. Increased populations of species using snags and down woody material would occur only if you make more snags than now exist.

Fisheries, paragraph 3. In connection with the habitat improvement plan mentioned here, we look forward to contributing to future Sikes Act planning. Does the 3% increase of resident cutthroat trout take into account habitat degradation due to roads?

Page IV-20, Wildlife, paragraph 3. If snags and down woody material will only be managed for 60% of potential wildlife use, impacts will occur.

Page IV-21, paragraph 3. Availability of down woody material will be reduced for wildlife as well.

Page IV-24, Roads. We believe that you should discuss the need to control public use of forest roads in areas with densities greater than 1 mi/sq mi.

Forest Management Objectives. In contrast to what is stated, it appears that Table IV-1 shows resource outputs but not annual funding levels.

Page IV-26, Table IV-1. It would help a great deal to show fish and wildlife models and parameters, so that we could see how the numbers in this table are derived, and comment on the assumptions you use.

Chinook Salmon. As we mentioned above, numbers in this table are hard to compare to weight on page II-65.

Mule Deer, Elk These objectives are equal to maximum production potential shown on page II-65 Is this correct?

Bald Eagle. Does management for two nest sites comply with recovery plan objectives?

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Spotted Owl. The 79 pairs in 1987-1995 is almost equal to MMR level. Because risk factors exist for spotted owl, we question whether this is a proper management strategy

Page IV-27, Table IV-1, Sediment. Has any modeling been done for sediment impacts on resident and anadromous fish? Models are available from other forests.

Page IV-29, Table IV-1, Fuel Treatment. These figures are very close to your current program. This appears to conflict with the statement on page IV-22, paragraph 3, that burning of forest residues will be discouraged.

Page IV-30, Recreation Setting Have cumulative effects of more roads and recreation been included in big game output models?

Page IV-31, Trails. We strongly recommend that you re-evaluate this whole section, not only by ROS class, but also for conflicts with other resources, such as big game winter range and mountain goat habitat.

Page IV-44, Wildlife, paragraph 1. Carrying capacity would increase for some species, decrease for others. We also believe that road closures must accompany big game habitat management to make these efforts effective.

Paragraph 2. Effectiveness of old growth allocations depends on distribution and elevation, as well as adequacy of structural relationships.

Page IV-45, paragraph 3. As we have stated above, Best Management Practices do not prevent degradation of stream habitat. We strongly recommend that you develop a predictive model which includes the effects of your management activities

Page IV-47, Table IV-6. Unsuitable acreage appears to include non-forest land. We suggest that you retitle this column, or separate the non-forest component.

General Forest. Why have 166,895 unsuitable acres been included in the general forest prescription?

Page IV-49, Timber Yield Tables - Special. As stated above, we believe that 15-20 large trees per acre are not sufficient for old growth, big game cover or riparian protection prescriptions.

Page IV-52, Table IV-9, Age Class. Are shelterwoods put into the overstory or understory age class, or is average stand age used?

Page IV-59, Water, paragraph 1. Water quality standards will be met on the average. We are concerned with potential impacts on fish from events where standards are exceeded, and believe this should be discussed in your documents.

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Page IV-62, paragraph 3. Could the Minimum Management Requirement (MMR) for dispersion be met under the forty percent criterion you mention here?

Paragraph 4. Another method to lessen soil compaction would be to limit designated skid trails to 10-15% of the sale area

Page IV-66, Roads, Management, paragraph 1. Another appropriate goal for road management is to reduce wildlife disturbance, harassment and road-induced mortality.

Page IV-71, Recreation Planning and Inventory, 7. We suggest that design of road and trail systems also be consistent with other resource objectives of the applicable management area.

Recreation Planning and Inventory, 8. We believe this standard should read, "Evaluate existing developed and dispersed recreation sites to determine if they meet the present and anticipated future public desires and resource capability, as well as other resource objectives of the applicable management area."

Page IV-85, 50. We maintain that it is within this agency's management prerogative to stock previously unstocked waters.

Page IV-86, 55. We support this standard. It should be applied forest-wide.

Page IV-89, Wildlife Surveys and Plans, 2. Population studies of management indicator species should also be conducted by WNF.

Page IV-90, table, Riparian. One-half of riparian snag-using wildlife species are cavity nesters in large snags (list attached). Wood duck are dependent on this class of habitat. Therefore, the riparian prescription should include an adequate large snag component.

Page IV-91, 13. We strongly recommend that you adopt standards for protection of important wildlife travel corridors. Perhaps these could be connected with riparian management criteria.

In Addition, we question whether modifiers such as "strive for", "consider", and "where possible" are appropriate for standards. It should be noted that this language only appears in the wildlife sections.

We also suggest that MMR's for management indicator species be included here.

Winter Range, b. Thermal cover units should be a minimum of 30 acres to provide a wind-free core. Winter Range c.

Winter Range, c. Open road density on winter range should be reduced to a maximum of 1 mi/sq mi, 0.2 mi/sq mi in certain key areas.

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Page IV-96, Planning, 2. Please add: d. are within a special wildlife area.

Page IV-97, table. Is width measured in horizontal or slope distance? Minimums should be the direct influence zone slope distance equal to natural tree height.

3. Can your MMR dispersion constraint be met with 40% of a watershed in created openings?

4. We strongly recommend that burning not occur in riparian zones.

Page IV-105, Road Closures, paragraph 1. The USFS Region Six road management committee also identified consideration of the public's recreation experience as valid basis for road closures.

The final item in this list allows a closure if one "is necessary to protect or enhance National Forest resources." Because roads affect wildlife use so significantly, we believe it necessary to reduce open road densities to a maximum of 1 mi/sq mi forest-wide, and 0.2 mi/sq mi in key habitats.

Page IV-113, EW-2 Riparian. We recommend you add: d. Are in areas having special wildlife values.

Page IV-120, Recreation, Use Administration, Standard and Guideline, 2. Recreational objectives should be included in this standard, and in the corresponding Activity Statement entry.

Page IV-121, Non-Structural Habitat Improvement, Standard and Guideline, 2. Pruning and crushing could be added as appropriate vegetation management techniques.

Activity Statement, 1. Effectiveness index is not used anywhere else in the documents. Its derivation and meaning are not evident. What cover/forage ratio does an index rating of 80 imply? Are road densities considered?

Range Planning and Inventory, Activity Statement, 1. We question whether wildlife forage production should be subservient to livestock range use in a big game habitat management prescription.

Page IV-122, Timber, Regeneration Harvest, Standard and Guideline, 1. Definition of deer and elk thermal cover (Glossary, page 6L-23), should be incorporated into these standards. However, with shelterwood the predominant harvest method, it is unlikely that 15-20 large trees per acre would be sufficient to provide effective thermal cover. Increase use of selective harvest, and meet the specific canopy closure defined by Thomas, et al.

Intermediate Harvest, Standard and Guideline, 2. Within this wildlife prescription, snags should be managed at 80% of potential woodpecker habitat.

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Reforestation, Activity Statement, 1. Delayed planting and wider spacing of seedlings would help to meet forage production objectives.

Timber Sale Preparation, Guideline 2, Activity Statement 1. We ask that you consult with this agency in establishing fawning, calving and kidding areas.

Page IV-124, Facilities, Local Road Construction, 1. Language should be added to this standard to establish a specific road density threshold. In EW-1 areas, where the emphasis is on big game, 1 mi/sq mi should be the maximum, with 0.2 mi/sq mi in key sections.

Page IV-125, Recreation Planning and Inventory, Standards and Guidelines, 2. The primary purpose of this management prescription is to maintain optimum riparian habitat for wildlife and fish and to protect wetlands. We believe that stronger language is appropriate for the standard on new campsite development.

Page IV-127, Regeneration Harvest, Activity Statement, 2. Please add that you will consult with this agency on decisions to concentrate leave trees away from the stream course.

Regeneration Harvest, Standards and Guidelines, 1. As we stated above, selective harvest would be more appropriate for riparian protection.

Intermediate Harvest. Please add 3. Manage snags for 100% potential woodpecker population.

Water, Soil, and Air, Improvement, Standards and Guidelines, 1. Enhancement of wildlife habitat would also be appropriate.

Page IV-128, Minerals and Geology, Processing of Site Specific Development Proposals, Standards and Guidelines, 4. The riparian zone is not appropriate for disposal of toxic mine tailings

Page IV-129, Facilities, Local Road Construction, Standards and Guidelines, 1. Because this is a wildlife prescription, better language for this standard would be, "Locate roads outside the zone wherever possible."

Standards and Guidelines, 3 Please add, "Maintain screening vegetation adjacent to all roads in the riparian zone."

FA&O Construction and Reconstruction, Standards and Guidelines, 1. As with roads, these structures should be located outside the zone whenever possible.

Standards and Guidelines, 3. Transfer systems should be located outside the riparian zone.

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Page IV-134, top of page, Standards and Guidelines, 2. In all general forest prescriptions, you should mention that snags will be managed at 60% of potential woodpecker habitat.

Page IV-141, Management Prescription OG-1. As discussed above, we have major concerns with this prescription being applied to all old growth areas outside of wilderness. We believe that not enough is known about managing timber to produce critical old growth functions.

Description, paragraph 2. One standing snag per acre does not meet minimum management requirements (MMR's) for pileated or Northern three-toed woodpecker. MMR's for marten specify 6 down logs per acre.

In addition, we believe you should specify no activities in this management prescription during breeding season, and minimum canopy closures of 50% for marten, 65-80% for spotted owl.

Wildlife and Fish, Wildlife Surveys and Plans. Surveys should be made of species with minimum management requirements, to see if habitats are occupied.

Page IV-142, Timber, Regeneration Harvest, Activity Statement, 1. To account for future mortality, more than a minimum number of dominant trees should be left per acre.

Activity Statement, 2, a. Spotted owl inhabit areas with a canopy closure of 65-80%. b. MMR's for pileated and Northern three-toed woodpecker specify 2 snags per acre. c. MMR's for marten require 2 snags and 6 down logs per acre. Canopy closure must be at least 50%.

Intermediate Harvest, Activity Statement, 1. We believe this should read, "Thin to maintain a multi-storied, uneven-aged stand (see old growth description)."

Page IV-143, Intermediate Harvest, Standards and Guidelines, 2. The spotted owl management plan in the Regional Guide specifies that dead and dying trees will not be removed.

Timber Stand Improvement, Activity Statement, 1. We ask you to state that chemicals will not be used in this prescription.

Timber Sale Preparation, Standards and Guidelines, 1. Activities should be strictly timed to avoid breeding season.

Page IV-145, Initial Attack Suppression..., Standards and Guidelines, 1. Here and in the following standard, we ask that you add "which maintains multi-layered, uneven-aged stands."

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Page IV-147, Wildlife and Fish. It would be helpful here to add a standard specifying that development of ski areas and other recreational sites will avoid key wildlife habitats.

Page IV-152, Timber. In this prescription, salvage harvest should maintain enough snags for 60% of potential woodpecker habitat.

Page IV-161, Non-Structural Habitat Improvement, Activity Statement, 1. It would be helpful here to state forage level allocated to wildlife.

Page IV-162, Timber, Intermediate Harvest, Standards and Guidelines, 2. In this prescription, harvest should maintain enough snags for 60% of potential woodpecker habitat

Page IV-163, Water, Soil, and Air, Improvement, Standards and Guidelines, 1. We believe that all actively eroding stream channels should be rehabilitated.

Standards and Guidelines, 3. We suggest that you strengthen this wording by changing "consider" to "conduct".

Page IV-171, Wildlife and Fish, Non-Structural and..., Standards and Guidelines, 1. Please add: "Manage snags at 100% potential woodpecker habitat level."

Page IV-176, Wildlife and Fish, Non-Structural Habitat Improvement, Standards and Guidelines, 1. Please add: "Manage snags at 100% potential woodpecker habitat level."

Page IV-182, Wilderness, Standards and Guidelines, 1. It would be helpful to add: "Regulate human activities where necessary to prevent habitat degradation and wildlife harassment."

Page IV-183, Intermediate Harvest, Standards and Guidelines, 2. In this prescription, harvest should maintain enough snags for 60% of potential woodpecker habitat.

Page IV-189, Intermediate Harvest, Standards and Guidelines, 2. In this prescription, harvest should maintain enough snags for 60% of potential woodpecker habitat.

Page IV-193, Wildlife and Fish, Non-Structural and..., Standards and Guidelines, 1. The opportunity exists to seed utility corridors with wildlife forage in winter range and key elk summer range.

Page IV-197, Range. In wilderness, we believe it would be appropriate to phase out livestock allotments as they expire.

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Page IV-203, Wildlife and Fish, Non-structural Habitat Improvement, Standards and Guidelines, 1. In this prescription, snags should be managed for 80% of potential woodpecker habitat.

Page IV-204, Intermediate Harvest, Standards and Guidelines, 2. The 80% criterion mentioned in our previous comment should be stated here.

Page V-4, paragraph 2. We strongly recommend that you also monitor your model parameters to see if assumptions and predictions are valid.

Page V-13, Table V-1, Wildlife. As we stated in the previous comment, model parameters and assumptions should be monitored.

Wildlife, 6.1. Another important monitoring component is to determine occupancy rates of old growth indicator species.

Wildlife, 6.7. Our spotted owl studies have been completed; additional census work by WNF will have to be undertaken to fulfill this element.

Page V-14, Fish. Other elements we believe you should add are monitoring of SCHI model parameters against fish population samples, and sediment/impact linkages.

Draft Environmental Impact Statement

Page S-4, Wildlife, paragraph 3. We have enclosed occurrence records of grizzly bear and gray wolf sightings from areas of recent timber sales on WNF.

Page S-5, Roads, paragraph 1. Road densities of 3.75 mi/sq mi have significant impacts on wildlife, especially big game. We recommend that closures and/or regrading and reseeding be used to reduce this figure.

Page S-9, Table S-2. From the range of figures, it appears that model outputs of anadromous fish do not account for sediment increases.

Page S-13, Fisheries, paragraph 1. Since resident fish numbers should be a better measure, it would be better to include them in the Table S-2 display.

Page S-14, Table S-5. With fairly large differences in allocations among alternatives, it is unclear why permitted grazing levels vary so little.

Page S-16, Probable Adverse Environmental Effects That Cannot Be Avoided, paragraph 2. Management activities can also have long-term effects on water.

Page S-17, Short-Term Uses vs. Long-Term Productivity. We believe it would be good to discuss old growth in this context. Cutting old growth may cause permanent loss of valuable attributes. In contrast, dedicated stands form a gene pool resource, harbor insect inhibitors (birds), serve as spore source of

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nitrogen-fixing fungi (spread by small mammals), and so maintain long-term productivity of the forest.

Page I-8, Planning Problem #4, paragraph 1. We believe that more attention needs to be given to the effects of roads on wildlife.

Page II-3, paragraph 2. Impacts should be compared to existing conditions rather than current direction.

Page II-15, Water, paragraph 1. In each alternative water quality standards would be met on the average. We feel that it is important to know potential adverse effects of those times when standards are not met.

Page II-16, Soil. Sediment volumes increase significantly for all alternatives in years 50-150. A question that this fact poses is what future activity levels bring such sediment increases. It would help to see model parameters.

Page II-48, Minerals. Withdrawal figure of 12,826 acres disagrees with numbers given in the accompanying table.

Page II-71, Table II-1 Under Alternative F, acreages for unroaded, motorized and non-motorized recreation appear to be in conflict with percentage breakdowns listed immediately below.

Page II-72, Table II-1, Management of Areas That Are Presently Undeveloped. We believe that these percentages are somewhat misleading. Putting roads in these areas will cause them to cease being roadless. A more revealing figure would be the number of inventoried areas you plan to leave truly roadless in each alternative.

Page II-74, Table II-1, Water Quality and Quantity, Water Quality. As we have stated above, Best Management Practices do not eliminate degradation of water quality.

Page II-90, table. Roaded dispersed recreation is not compatible with big game emphasis (EW-1) if road densities are over 1 mi/sq mi. Riparian wildlife emphasis (EW-2) would have the same potential conflict; in addition, developed recreation would usually be inconsistent with this prescription.

Page II-92, Management Area OG-1, Description, paragraph 2. We question whether 10-15 large trees per acre would be sufficient to meet canopy closure needs for MMR species. Pileated and Northern three-toed woodpecker require two snags per acre. Marten need a canopy closure of at least 50%, and 6 down logs per acre. Spotted owls should have a canopy closure between 65-80%.

Page II-95, paragraph 1. We commend your intention to combine compatible facilities to the same corridor whenever possible.

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Pages II-100, II-101, Unroaded Motorized Use and Capacity. We believe that wildlife are adversely affected by widespread ORV use. Because of this, we do not support unroaded motorized use allocations which are 2-5 times projected demand.

Page II-108, Table II-3a, Spotted Owl. Our research indicates the average amount of old growth used by owls in Washington is 4500 acres.

Page II-108, Table II-32, Marten. The figures given here match those for pileated woodpecker. However, the two species are distributed at different distances. In addition, MMR's require at least 894 marten. This may be a misprint, or incorrect parameters may have used in your model. Please explain how the numbers of animals were calculated. Both pileated woodpeckers and owls need to be distributed differentially in FORWET and FORDRY.

Page II-109, Table II-3a, Wildlife Habitat Improvement. There are fairly large differences across alternatives in this category as well as in the magnitude of timber activities. However wildlife-related PNW (EIS, page II-152, Appendices, page B-173) does not change. We believe that this result is clearly erroneous.

Page II-124, Table II-3b. In many categories, comparing outputs and effects to current direction rather than existing conditions makes impact assessment more difficult.

Pages II-142, II-143, Table II-3b, 15. Sensitive Species. We understand that state listed species are required to be managed with the same considerations as federally listed wildlife.

16. Game Populations and Distribution. It appears that distribution information was inadvertently left out.

17. Non-Game Populations and Distribution. This category was not included for alternatives F-I, on page II-143.

Page II-147, Present Net Value. As discussed in the main body of this response, wildlife are a publicly-owned resource. Losses caused by management actions represent costs which affect net public benefit calculations.

Page II-148, paragraph 4. Here, and elsewhere in your documents, you treat increases in water yield as an unqualified benefit. We believe that runoff timing could easily cause extra flow to be impacting, and without holding structures, unavailable to downstream users.

Page III-8, pie charts. It would be helpful here to include a breakdown of fish and wildlife oriented recreation for comparison.

Page III-12, Off-Road Vehicle (ORV) Use, paragraph 1. The figure 192,000 causes us to question your projected average of 346,000 RVD's for unroaded motorized use, 1980-1990, in Table III-3.

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Page III-38, Old Growth Forests. As stated in the main body of this response, we believe that your definition of old growth does not meet minimum management requirements. Additional constraints are needed for percent canopy closure, and numbers of snags and down logs per acre to meet the individual needs of each species.

Page III-39, Dead and Defective Tree Habitats, paragraph 1. It would be helpful to outline possible methods for eliminating snag removal by firewood cutters. These might include changes in permit language, increased enforcement, and education programs.

Cliff, Rim, Caves, Burrows, and Talus, paragraph 2. Talus habitats can also be affected by alteration of the hydrologic regime due to harvest of timber above and adjacent to them.

Page III-40, Deer and Elk Winter Range, paragraph 1. We feel that your technique of proportioning game populations by percentage of WNF land within game management units actually understates the number of animals that use the Forest at least part of the year. We believe that more realistic estimates would be 29,000 deer and 14,500 elk, with harvests of 3450 and 4500, respectively. In addition, the department goals generally differ from ten-year averages.

Page III-42, Elk Summer Range. Consideration should also be given to increasing carrying capacity by limiting livestock allocations.

Threatened, Endangered and Sensitive Species. Should grizzly bear and gray wolf receive fuller treatment? Both have occurred on the Forest (see attachments).

Page III-43, paragraphs 1-4. We agree with your use of the single-paired SOMA concept.

Table. Dispersal distances should be measured center to center. Also, it is unclear how these figure relate to the output table on page II-108, where numbers of marten and pileated woodpecker are equal, although dispersal distance constraints differ.

Page III-44, Demand for Wildlife, paragraph 1. As discussed above, we believe that more accurate harvest estimates would be 3450 deer, and 4500 elk

Pages III-44, III-45. In your discussion of recreational use of wildlife and fish, it would be helpful to show WFUD's and their corresponding value.

Page III-58, Figure III-9. This diagram is very helpful.

Page III-75, paragraph 1. We are also concerned with impacts from those instances when water quality standards are not met

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Page III-81, Nutrient Losses. Removal of snags and down wood also causes loss of nutrients.

Page III-86, Recreational Minerals, paragraph 2. As mentioned earlier, Hydraulic Project Approval is required for any instream prospecting activity. For panning and small sluice boxes, the pamphlet 'Gold and Fish' serves as Approval. The pamphlet can be obtained by contacting any Department of Game office.

Page III-118, Recreation Setting/Wildlife, paragraph 3. Wildlife losses also occur through poaching and when animals are hit by cars.

Paragraph 5. Please add "and direct mortality" after "factor".

Paragraph 7. It would be helpful to show wildlife-related WFUD's and associated value.

Recreation Setting/Fisheries, paragraph 1. What is the imputed value of this recreation?

Page III-123, Wild, Scenic, and Recreational Rivers/Wildlife, paragraph 3. We believe that restrictions on activities from these designations would lower impacts on wildlife.

Page III-133, Wilderness/Wildlife. We believe your statement, that wilderness designation has very little effect on wildlife, is clearly wrong. Maintaining natural ecosystems and natural levels of all wildlife species is a definite benefit of wilderness designation. The absence of roads and minimization of human disturbance assures long-term maintenance of populations.

Wilderness/Vegetation Trees, paragraph 1. Management activities in wilderness which do affect natural vegetation are livestock allocations and mining.

Page III-135, Wildlife/Wildlife, paragraph 2. Your statement that indicator species will be monitored does not appear to be reflected in the monitoring plan (Plan, page V-13).

Page III-136, Wildlife/Vegetation: Trees, paragraph 3. Known adverse effects from harvest activities include loss of old growth acreage.

Washington State status of spotted owl is threatened.

Page III-138, paragraph 1. Another mitigation possibility is to restrict permitted mining to certain seasons.

Paragraph 3. We suggest that operating plans definitely be rejected if there is an unavoidable conflict with endangered species habitat.

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Wildlife/Roads, paragraph 3. Roads also lead to increased legal and illegal kills of game animals. To contradict the last sentence, we believe that fairly good information is available on the extent of reduced wildlife use of habitats adjacent to forest roads, and we refer WNF to Perry and Overly, 1977, Thomas et al., and Brown et al. for quantifications.

Paragraph 4. We believe that for most species benefits from created edge have been outweighed by impacts.

Wildlife/Social/Economic. Adverse effects on big game winter range also lead to direct mortality.

Page III-139, paragraph 2. It would be helpful to model sediment/fish interactions.

Paragraph 6. How many K-V fisheries projects were funded in fiscal year 1986?

Page III-142, Fisheries/Roads, paragraph 1. Roads are the major cause of stream sedimentation and loss of habitat, as you point out on page III-150, Soil/Roads, paragraph 1.

Page III-143, Fisheries/Social/Economic, paragraph 1. It would be informative here to include the value of fishing WFUD's.

Page IV-3, Developed Recreation. We do not agree that more roads inevitably mean more recreation opportunity, and firmly disagree that the relationship is a proportional one. Use of an area can drop due to relative crowding, because of wildlife avoidance of roads, or from other intangible factors.

Page IV-9, Conflicts with Other Agency Plans and Policies, paragraph 2. Our goals are more comprehensive than stated. Species population and road management goals may also be in conflict with these and other alternatives. We recommend WNF obtain a copy of WDG Region 3 operations plan.

Mitigation Measures, 5. Habitat protection is an important reason for road closures.

Page IV-31, Alternative B, paragraph 3. We believe there are only two species dependent on early successional stages: American kestrel and Western bluebird.

Page IV-32, Mitigation Measures for Wildlife, paragraph 2. It should be acknowledged here that mitigation would not be effective for all species of wildlife. Other measures, not mentioned, involve road location and design, size, shape and location of harvest units, protection of critical habitats, protection of snags, and rotation length.

Page IV-35. We strongly recommend that you develop a model which relates populations to management activities and resulting sedimentation.

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Page IV-37, paragraph 5. We do not agree that Best Management Practices can assure no significant reduction in stream habitat.

Page IV-41, paragraph 1. As we stated above, we believe that 15-20 trees per acre would not be sufficient to provide optimum wildlife habitat.

Is the 10% harvest restriction given in terms of volume or acreage?

Page IV-52, last paragraph. It should be noted that this agency has fed elk in the winter to make up for increasing losses of winter range to agriculture and development.

Page IV-56, Mitigation Measures for Vegetation: Forage, paragraph 4. We agree that grazing management can make improvements over conditions from unmanaged livestock use. We do not agree that it is preferable in all cases to no livestock allotments.

Page IV-62, bottom paragraph, left column. Here you appear to allow that Best Management Practices do not prevent stream degradation.

Page IV-72, Mitigation Measures for Water, paragraph 1. Your statement here about the effectiveness of Best Management Practices conflicts with the first paragraph in the section on direct effects of each alternative, located on this same page.

Page IV-73, graphs. It would be helpful to extend all these graphs through the entire planning horizon.

Page IV-92, last paragraph. As we discussed above, road densities should be a maximum of 0.2 mi/sq mi in key wildlife areas, and 1 mi/sq mi elsewhere.

Page IV-93, Alternative's Conflicts with Other Plans and Policies. As given, all alternatives may be in conflict with this agency's road management goals of 1 mi/sq mi forest-wide, and 0.2 mi/sq mi in special areas (open road density).

Page IV-103, last paragraph. It would be helpful to show model parameters.

Page IV-104, Recreation Setting/Fisheries, paragraphs 2, 3. The implication here that increased roading is key for fishing opportunity is contradicted by outputs listed on page II-104, showing that Alternative E gives the most WFUD's.

Page IV-106, Recreation Setting/Minerals, paragraph 1. Impacts are described as temporary; however, coal mining operations often last for decades.

Page IV-109, Wild, Scenic, and Recreational Rivers/Wildlife, paragraph 1. We believe that activity restrictions due to these classifications would generally benefit wildlife.

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Page IV-114, Scenery/Wildlife, paragraph 3. We believe that lower road densities in alternatives E and F would provide better wildlife viewing.

Page IV-118, Wildlife/Wildlife, paragraph 2. Old growth areas provide critical forage for deer and elk during severe winter weather.

Paragraph 3. Forage is reduced, not eliminated, in old growth.

Page IV-121, Wildlife/Soil. Productive soil leads to productive vegetation for wildlife.

Wildlife/Roads, paragraph 2. According to Perry and Overly (Washington Department of Game, 1977), Deer use increased 44% at a distance of 1/8 mi. from open roads. Elk use increased 44% at 1/8 mi., and another 25% in the next 1/8 mi. Even these figures are simplifications - original data might be used in more detail within this section. Direct effects of roads on wildlife also include poaching and vehicle-caused mortality.

Page IV-122, Wildlife/Social/Economic. It would be helpful here to give the figures for wildlife oriented recreation expenditures.

Fisheries/Vegetation Trees, paragraph 3. Temperature increases can also have detrimental cumulative effects downstream of harvest activity. In addition, openings allow greater cooling during severe winter weather.

Page IV-123, paragraph 2. As stated above, we believe that your standard of 15-20 trees per acre leaves insufficient canopy for optimum riparian habitat. We recommend selective harvest for riparian areas.

Fisheries/Vegetation: Forage, paragraph 1. We question whether livestock use would improve plant cover to the benefit of fish.

Paragraph 4. You state here that shelterwood sites are unsuitable for livestock forage. This seems to conflict with your plans to make shelterwoods the predominant method of riparian harvest and to continue with riparian grazing allocations.

Page IV-124, Fisheries/Water, paragraph 1. Increased yields are likely to occur during peak flows, making impacts more probable than benefits.

Paragraph 2. The direct relationship you mention does not appear to be used in your model.

Fisheries/Soil. We do have concerns for sedimentation impacts on fish habitat. Taken over the entire planning horizon, all alternatives show increases which, together with background level, could cause significant localized impacts.

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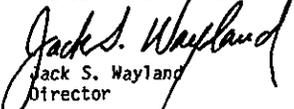
Fisheries/Roads, paragraphs 2, 3. As stated above, we disagree that best management practices give sufficient protection. Measurable changes in fish production do not appear to be shown by your model outputs.

Page IV-143, paragraph 4. Vegetation management activities also adversely affect wildlife, although we agree that some species benefit from openings. In addition, there will be a continuing reduction of large tree component snags, down wood, and large organic debris for stream habitat. Species dependent on these features will be impacted.

Thank you for the opportunity to comment on the WNF document. We trust you will find our information useful in preparing final plans.

Sincerely,

THE DEPARTMENT OF GAME


Jack S. Wayland
Director

JSW:jt

Enclosures

cc. Game Commission
Agencies
Regions

ROBERT L. WILDER
Director



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JAN TWYNN
Director



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WASHINGTON STATE PARKS AND RECREATION COMMISSION

150 Clearwater Lane KY 11 • Olympia Washington 98504 5711 • (206) 753 5755

September 5, 1986

August 11, 1986

Mr Clifford Rushton
Forest Plan DEIS Coordinator
Department of Ecology
PV-11
Olympia, Washington 98504-8711

Dear Mr Rushton

Re Wenatchee National Forest DEIS

Considering the issues and concerns on this forest, Alternative C provides a good balance of recreational opportunities. Dispersed, unroaded recreation receives appropriate acreage allocations for both motorized and nonmotorized recreation. This option supports the State ORV Plan by providing for motorized recreation in unroaded areas.

Future recreation facility needs as addressed in the Statewide Comprehensive Outdoor Recreation Plan for this region are also answered by this Alternative. An increased need for camping facilities and motorized trail recreation by 1990 are met in this option. Greater protection for scenic values is allowed and more acres are allocated to game range. Fisheries are also enhanced.

One qualifier--you have assumed demand for recreation facilities will grow commensurate with population growth. Be aware that recreation demand can and often does exceed population growth and must be anticipated.

Thank you for the opportunity to comment on the plan.

Sincerely,

LORINDA A ANDERSON
Recreation Resource Planner

LAA ah

TO Doug Rushton
Department of Ecology
FROM Ron Effland, Environmentalist *Ren*
RE Draft EIS - Proposed Land & Resource Management Plan -
Wenatchee National Forest (35-2650-1850 E-2988)

The staff of the Washington State Parks and Recreation Commission has reviewed the above-noted document and does not wish to make any comment.

Thank you for the opportunity to review and comment.

bh

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ACOB THOMAS
Director



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August 20, 1986

Mr. Clifford D. Rushton
Forest Plans Coordinator
Dept. of Ecology
Mail Stop PV-11
Olympia, WA 98504-8711

Log Reference 817-F-FS-WEN-08
Re Wenatchee Forest Plan and
Draft EIS

Dear Mr. Rushton:

A staff review has been completed of the above referenced draft environmental impact statement and proposed land and resource management plan. The document adequately considers known and anticipated cultural resources and the potential for impact to these. The precautions proposed to identify cultural resources and to avoid or mitigate anticipated impacts to identified or unidentified cultural resources are adequate.

Thank you for this opportunity to comment.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(206) 753-4405

dw

cc: Susan Carter

K-339



WASHINGTON STATE DEPARTMENT OF
Natural Resources

00342

BRIAN BOYLE
Commissioner of Public Lands

OLYMPIA WA 98504

00342

September 2, 1986

Mr. Don Smith
Forest Supervisor
Wenatchee National Forest
P.O. Box 811
Wenatchee, WA 98801

Dear Mr. Smith:

In our recent letter of response to the Okanogan National Forest Draft Environmental Impact Statement (DEIS) and Plan, we supported and echoed recommendations from other states in the Pacific Northwest Region that no final forest plans be issued until all drafts have been made public. Our concern is that the sustainable harvest or management of other resources on each of the national forests could change appreciably with significant cumulative effects statewide. Because of this, we wish to reiterate our support for this recommendation to you and defer selection of a preferred alternative at this time.

In our comments, we will address the No Action Alternative, Economic Efficiency, Alternatives Assessment, discussions specific to Hydrology and Cumulative Effects, Geology and Mineral Resources, Natural Heritage and General Observations.

NO ACTION ALTERNATIVE

Alternative A, the "No Action Alternative," appears to be a continuation of the recent programmed sale of timber. However this is not the case, since during the period 1975-1984 the offering of timber totalled 184 million board feet annually. This is in contrast to the "No Action Alternative" which would offer for sale 140.5 million board feet annually. A decline of over 20 percent is a significant change. Even if we compare this with the volume sold (1975-1984), the total is 164 million board feet annually. In this instance the decline is nearly 15 percent which is still a substantial change.

The phrases "current level," "current management direction," and "current planning data" should be clearly explained for a better understanding of how the "No Action Alternative" was created.

Mr. Don Smith
September 2, 1986
Page 2

ECONOMIC EFFICIENCY

Strict economic efficiency is determined by maximizing present net value (PNV) for the market-priced products. To do this, it is essential to include the benchmark alternative labeled "Maximum Present Net Value Based on Established Market Price." Once this is determined, other alternatives can be assessed against the economic efficiency alternative to determine the value of market goods given up.

If it is recommended, for instance, that 2,000 acres of old-growth be reserved to maintain a pair of northern spotted owls, the cost of this decision can be calculated by determining the value of the market-priced goods lost. This seems to be a sensible way to approach the valuation of the nonmarket goods.

Present net value (PNV) is used in the Plan/DEIS for valuing both commodity products and nonmarket goods. Only the commodity goods should have dollars assigned to them. For maximization of social net benefit, implicit dollar values should not be added to market-derived dollar values. The combined value does not provide a meaningful measure for choosing between alternatives. Nonmarket values should be arrayed separately for the purpose of the EIS analysis.

ALTERNATIVES ASSESSMENT

Community effects are a concern for federal and state government. Revenues to counties, jobs, and income effects, are all important. An effort should be made to increase these when feasible. Also, impacts beyond the first decade should be considered. With the departure for one decade, there may be an initial boost, which is then followed by a substantial decline. Alternative I is one which on the surface looks good in terms of first decade harvest, but has a substantial harvest decline in subsequent decades.

The alternatives were assessed using a simple rule of thumb--all alternatives that do not have positive community effects are rejected. Using this rule, Alternatives A, C, E, F, and G were all unacceptable. Alternative I was also rejected because of the departure feature of the timber harvest over time. Alternative H (timber production maximization) had a low present net value. For this reason it seems appropriate to reject it from further consideration.

The alternatives which appear to make the most sense in terms of a continuation of timber as a commodity resource and an important community stability resource are Alternatives B and D.

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Mr. Don Smith
September 2, 1986
Page 3

Of these two alternatives B would have much greater impacts on the nonmarket resources which is clearly a multiple-use resource concern. Alternative D would continue to provide stability to the local economies at the recent timber harvest level and also allows for flexibility with respect to the nonmarket resources.

HYDROLOGY AND CUMULATIVE EFFECTS

The DEIS for the Wenatchee National Forest simplifies the impacts on water into the categories of water yield changes and sedimentation. The simplification of complex hydrologic systems seems to be a valid approach for long-term strategic planning.

In the Plan/DEIS, long-term projections of sediment yield show that maximum levels occur after as much as 150 years. Although it is not specifically stated, recovery rates must be expected to be very low. These projections seem to be unrealistic.

K-341
IV
The issue of cumulative effects was also simplified. It is assumed that basins with more timber harvesting scheduled and having a larger proportion of area in private ownership have a greater risk of cumulative effects. Further discussion of what cumulative effects are and how they occur would provide a better insight about their significance when comparing alternatives.

GEOLOGY AND MINERAL RESOURCES

An important issue to the Department is access to land for mineral exploration and mine development. The Department is in support of protecting and improving the opportunities for mineral exploration when consistent with the protection of other resource objectives. Our Geology and Earth Resources Division staff may have information on specific areas in the Wenatchee National Forest of mineral interest. Please feel free to call Ray Lasmanis, Division Manager, at (206) 459-6372 in Olympia.

NATURAL HERITAGE

Special Plants

The Wenatchee National Forest has the highest concentration of endangered, threatened, and sensitive plant species of any national forest in Washington. We agree with Forest Service policy to maintain viable populations of all sensitive plant and animal species.

Mr. Don Smith
September 2, 1986
Page 4

Since management for other resources potentially conflicts with maintaining viable populations of sensitive plants, standards and guidelines should be developed.

Research Natural Areas

The Research Natural Area Program is strongly supported by the Department as part of the cooperative effort of federal, state and private groups to establish a statewide system of natural areas. The natural area needs, outlined in the State of Washington Natural Heritage Plan (WDNR 1985), will be best met by all the participants inventorying for, and designating, the best examples of representative ecosystems and rare species populations on their lands. On the Wenatchee National Forest this means low- and mid-elevation forests be considered, especially those that cannot be located on other national forests or state and private lands.

Special Interest Areas

The discussion of the Tumwater Botanical Area is accurate as far as it goes. The area is also habitat for the only known population of Hackelia venusta (showy stickseed). This species is soon to be proposed for listing as endangered under the Endangered Species Act. It is quite unusual for a botanical area to be designated for other reasons and then be found to contain an endangered species. A management plan should be developed for this area which specifically takes into account this rare plant. Publicity regarding the area as being habitat for the species should avoided.

The technical staff of our Private Forestry and Natural Heritage Division has prepared detailed comments relating to natural heritage resources. These will be sent to you under separate cover.

GENERAL OBSERVATIONS

We would expect the plan to ensure operations be conducted to equal or exceed the requirements in the Forest Practice, Forest Fire Protection, Surface Mining, and Forest Insect and Disease Control state statutes and subsequent regulations. Additionally, we would expect the transportation system management program not to interfere with the access for Department-managed lands.

Overall, the Wenatchee National Forest Plan provides a good basis for making sensible decisions of how to manage the national forest during the next 10-15 years. The maps were well done, especially the color coding, which is helpful for understanding the differences between the management alternatives. We did note that

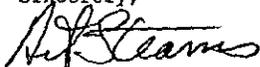
00342

Mr. Don Smith
September 2, 1986
Page 5

the map provided for the preferred alternative does not reflect the ownership changes brought about by recent USFS-DNR land exchanges in Chelan and Kittitas counties.

We appreciate this opportunity to comment on the Wenatchee National Forest Plan and DEIS. If you would like further clarification, please call Glenn Yeary, Manager of the Analysis and Planning Section in Olympia at (206) 586-4435.

Sincerely,



Art Stearns
Supervisor

AS:MH:mks

c: Andrea Beatty Riniker, DOE

K-342



**BOARD OF COMMISSIONERS
CHELAN COUNTY**

STATE OF WASHINGTON
WENATCHEE WASHINGTON 98801
TELEPHONE 509/663 4803

September 29, 1986

Don Smith
Forest Supervisor
Wenatchee National Forest
P. O. Box 811
Wenatchee, WA 98801

RE Proposed Land and Resource Management Plan and Draft Environmental Impact Statement, Wenatchee National Forest

Dear Mr. Smith

The Board of Chelan County Commissioners have had an opportunity to review the proposed plan and draft environmental impact statement. Prior to providing specific comment we would like to point out that due to the volume of material provided, the nine alternatives offered and the numerous management issues discussed within each alternative, it becomes extremely difficult to provide specific and detailed comment. We have, therefore, attempted to confine our comments to three general areas of concern rather than any one alternative. We are hopeful that these concerns will be addressed in the final alternative developed.

The first area of discussion can be generally categorized under economic concerns and/or issues. The plan contains a wide range of potential impacts relating to employment in the wood products industry, however these projections are based on some rather old economic data. We would suggest that the economic model be updated in order that more accurate projections might be presented. With better quality data perhaps all parties might better understand the implications of the various proposals. In any event we would suggest that the final plan be structured so as to have the most positive impact on the wood products industry in Chelan County, consistent with the comments which follow.

Also in the area of economic impact we find very little discussion of the value of tourism and recreation which have been long recognized as important aspects of the local economy. Certainly the alternative selected and management direction provided for such issues as developed recreation, view sheds, cultural resources, etc., will have the potential to significantly affect the tourism and recreation industry. It is equally important to include in the final plan, an RE-1 category recognizing the expansion and development potential of Echo Valley and the Stormy Mountain ski areas since winter sports help expand our recreation season.

Don Smith
September 29, 1986
Page 2

Under the general heading of water we have concerns relating to both water quality and water quantity. With regard to water quality, it is important to recognize that the alternatives which have the potential to significantly increase sediment loads will have an impact on local growers. The area of most concern would be increased maintenance costs for irrigation pumps and sprinkler nozzles. This is a problem today for growers in the Entiat Valley and along Mission Creek.

Water quality is an important issue throughout the County, but perhaps more so in the Icicle Valley since that stream serves as the municipal supply for the City of Leavenworth. This Board has serious reservations with the concept of substantially expanding small existing campgrounds in that drainage, particularly since there is some potential to seriously degrade water quality. Certainly there must be other campgrounds better suited to accept expansion impacts than those within the Icicle Valley.

Another concern with water quantity relates to the potential for increasing water yield from the national forest. If increased yield means impacting the timing of runoff, this may seriously affect the problem of maintaining in-stream flow requirements for local rivers. In the event that we are unable to adequately maintain in-stream flow requirements local landowners will immediately suffer affects.

Our final comments come under the general heading of off-forest impacts. There seems to be very little information contained within the proposed management plan or the draft environmental impact statement regarding the wild, scenic and recreation river classifications and more particularly how those classifications may affect private lands within the national forest boundary. Before such proposed classifications are enacted, it is extremely important that the local land owners have a clear understanding of the issues.

The last off-forest issue relates to winter range. While there are substantial benefits to increasing deer and elk numbers, we do not have a clear understanding of potential impact this may have on off-forest winter range. There certainly should be additional discussion on this matter particular with those land owners who might be most directly affected. One alternative may be to examine the plans for optimum forage production and utilization by commercial livestock and consider modifications in consideration of the winter range issue.

We wish to thank you for the opportunity to review and comment on the proposed plan and draft environmental impact statement. The plans of the Wenatchee National Forest have rather direct bearing on Chelan County and we look forward to working with you as a final document is developed.

Sincerely,

John S. Wall
John S. Wall
Chairman

Thomas A. Green
Thomas A. Green

James L. Young
James L. Young





Kittitas County, Washington

03254

BOARD of COUNTY COMMISSIONERS

District One
Donald E. Sorenson

District Two
Roy A. Lumaco

District Three
Rich Hoctor

03254

September 30, 1986

Mr. Don Smith, Forest Supervisor
Wenatchee National Forest
301 Yakima Street
Wenatchee, WA 98801

Re: Wenatchee National Forest Management Plan

Dear Mr. Smith:

Your recently published National Forest Plan with Alternative "C" as your preferred alternative, indicates that the losses to Kittitas County could be substantial. We are also concerned that the actual losses may be greater than what you indicate.

We do believe that a balanced timber harvest is essential, and that job opportunities be provided through the harvest and manufacturing of forest products, and the availability of continued mining activities.

Our position on the Management Plan is inescapably tied to the unresolved issues of the Spotted Owl. We would prefer that timber yields not be reduced until it is determined how many acres of timber will be set aside for each pair. It is difficult to address this plan until a determination is made on this issue. We believe that your preferred alternative be modified to enhance all the values that exist now in the Wenatchee National Forest. After your determination of the SOMAS, the allowable cut should be maintained at its present allocation. This allowable cut would insure the availability of timber and would still provide a compatible multiple use balance for all the other amenities that exist on the forest.

We recognize that increasing the allowable cut from that proposed in preferred Alternative "C" may affect other areas. Our concern is with the subsequent impact that road construction would have on continued resource management. We recommend strongly that all unnecessary new roads be closed to motorized activities following harvest and that you dedicate these areas for dispersed recreation. This modified proposal could also be an enhancement to wildlife resource.

Mr. Don Smith
Page 2
September 30, 1986

We strongly urge your modification of Alternative "C" to reflect the concerns we have expressed. Your implementation of these suggestions would insure the future of our Region.

We would also like to express our gratitude to you for the time you have taken to explain the Management Plan to us.

Sincerely,

KITTITAS COUNTY BOARD OF COMMISSIONERS

Rich Hoctor, Chairman

Roy A. Lumaco, Member

Donald E. Sorenson, Member

K-344



yakima county, washington

BOARD of COUNTY COMMISSIONERS

 ← District One
 JIM WHITESIDE

 ↔ District Two
 GRAHAM TOLLEFSON

 ⇨ District Three
 CHARLES J. KLARICH

September 29, 1986

Mr. Don Smith

Page 2

Mr. Don Smith, Forest Supervisor
 Wenatchee National Forest
 301 Yakima Street
 P.O. Box 811
 Wenatchee, Washington 98801

Re FOREST SERVICE PLAN

Dear Don:

K-345 You have our sympathy and our gratitude. Sympathy because we are only too aware of the hazards of culling a single recommendation from a broad range of diverse positions. Gratitude for the fine work you and your staff are doing in informing people of the alternatives available to make the forest serve the most people in a reasonable manner. Also, we thank you for sending a team of your people to meet with us.

We have met with representatives from most groups involved in creating positions within the range of alternatives. We have met with our own planning staff, attended public meetings and followed comments which occurred within the media. We feel we are now prepared to present to you our comments.

The Yakima County Commissioners unanimously support the Forest Service Alternative B with certain modifications. Briefly, we would like to summarize our reasoning.

- 1) We feel that the appetites of the various parties interested in the forested area should have been satiated during the recent wilderness negotiations. We feel it was the best compromise possible as is indicated by the apparent lack of total satisfaction by any individual interest. Whenever a compromise is struck, in this case involving the use of forest land, there has been a taking from status quo. It is our sense that there can be no more give from land available for cutting.
- 2) Perhaps there needs to be an indicator species by which the impact on the animal population can be gauged. But to choose the Spotted Owl, a species by which there is such diverse opinion on its needed habitat, seems rather peculiar. Estimates range from 1,000 acres to 8,600 acres per pair. In addition the credibility of the assumption that it needs

old growth timber is under question. We as Commissioners have taken sworn testimony by the Yakima Indian Nation that certain of its arid lands are the habitat of the Spotted Owl--land which has as its tallest plant growth the sage brush. Further, Spotted Owls are reportedly inhabitants of second growth timber. In addition to land set aside for Spotted Owls, more land would be set aside for the Marten, the 3-Toed Woodpecker and Pileated Woodpecker. The cumulative total of set aside would be much too great an impact on potential timber harvest.

- 3) Considerable doubt has arisen as to the validity of the numbers used and the methodology of the process. So much so that the feelings are that the statistics are skewed in order to validate a pre-determined position. We feel these statistics should be held up to an unbiased evaluation prior to the final adoption.
- 4) The assumption is that reduced cuts increase recreational opportunity. The opposite would appear to be true. Again the forested area dedicated to assure adequate wilderness recreational activity seems to be sufficient. For the balance of the forest recreational users, it would appear that the logging roads increase one's ability to reach a destination in less time. Thus a wider range of both single day and overnight experiences are made available to the increasing pressure of the population. Additionally, by opening a limited number of new roads, it seems the concentration of harvesting would be diminished and more acreage would be available for the same amount of harvest.

Our concerns which would modify or affect Alternative B are

- 1) We are concerned about the 525 miles of trail which are eliminated by Alternative B. Upon inquiry it appears the Forest Service is not sure from where this figure comes. This adds support to 3) above.
- 2) We are also concerned about the reduction of scenic quality on scenic corridors. We would support full retention along these travelways rather than partial retention. At this time it not clear to us just how partial retention would appear.
- 3) Care should also be taken that the final plan does not conflict with the objectives of the Yakima River Basin Enhancement Project now in progress. Under this project, millions of dollars will be spent to increase instream flows for the protection and enhancement of anadromous fish as well as to provide supplemental water supply to meet irrigation needs. With such a large investment of public funds, it is important that spawning habitat for anadromous fish are protected from logging-related damage. Construction of 2,196 miles of new logging roads, coupled with harvesting a quarter million acres of currently undisturbed natural watershed, will be counterproductive to the work of the Yakima River Basin Enhancement Project unless protective measures are used.

Mr. Don Smith

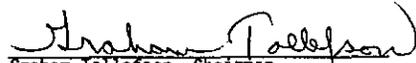
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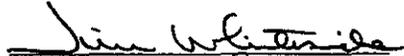
- 4) We definitely oppose running roads right up to Wilderness boundaries. There should be a buffer zone.
- 5) It is our feeling that clear-cutting should be limited as much as possible--perhaps used only to deal with diseased timber.
- 6) To reduce the conflict between cutting and trails, we would prefer to see a management policy which would assure that trails which are impacted will be restored and properly marked.
- 7) A great deal of litter is created from logging. Would it be possible that a deposit by the successful bidder be required in order to assure post harvest clean-up? If this is not done satisfactorily, then the deposit could be used to defray the cost of clean-up either by a youth corps or by lawbreakers who are sentenced to community service.

A final note. We suspect that the Spotted Owl habitat issue and the need for accelerated road building are means to address future wilderness creation by interested parties. Our preference is for any wilderness addition to be addressed on its own at an appropriate time.

We greatly appreciate being given the opportunity to comment.

Sincerely,


Graham Tollerison, Chairman


Jim Whiteside, Member


Charles J. Klarden, Member
BOARD OF YAKIMA COUNTY COMMISSIONERS

JW/bah

K-346

Office Of The Mayor
City of Seattle

Charles Royer Mayor

October 1, 1986

Don Smith
Forest Supervisor
Wenatchee National Forest
P.O. Box 811
Wenatchee, Washington 98801

Dear Mr. Smith:

The citizens of Seattle have a keen interest in the Wenatchee National Forest, and we are pleased to respond to your Draft Land and Resources Management Plan.

The Wenatchee is a popular destination for Seattleites who help make it one of the most visited forests in the country. The wild and beautiful Wenatchee draws us--whether for hiking, hunting, fishing, rafting, or simply driving the scenic mountain pass highways. Hikes along quiet trails through the roadless back country are cherished outings for many of our citizens. As the Draft Environmental Impact Statement points out, demand for hiking and other primitive types of recreation will continue to increase. We are concerned, however, that the destination will continue to shrink with the proposed plan.

We are particularly concerned about the increase in road construction proposed. These additional roads will reduce trail mileage, increase fishing pressure on fragile mountain lakes, increase sedimentation and eliminate the lower forested trails. Not only do these areas remain open for a longer season, they provide extended hikes, disperse visitors, and often include special features such as groves of giant trees and undisturbed shores of major rivers. More roads will only push the increasing numbers of users into smaller and higher areas, which will only increase impacts to these fragile high mountain lands.

The City also owns land in and near to the forest, (e.g., Entiat Valley and Cedar River). Thus, we are concerned about the effects of management to the adjacent national forest lands.



Don Smith
October 1, 1986
Page two

Seattle residents are also concerned about wildlife habitat in our national forests, particularly old growth forests which have become so scarce. We must make every effort to preserve these ancient and complex expanses of forest and their associated wildlife that find refuge nowhere else. The Lake Creek Valley which drains into the Little Wenatchee River is an example of such an area with huge evergreens towering over a gentle trail along the creek.

Clean water for fish, irrigation and recreation is a critical resource of national forest. The protection of drainage basins in roadless areas will maintain that high water quality. It will also benefit from wild and scenic rivers designation for such rivers as the Wenatchee, Entiat, Naches, and their tributaries. As we resurrect our fisheries, an important recreation and economic resource, we must have undisturbed spawning areas with clean water.

The North Fork of the Entiat River Valley is another example of a valuable but dwindling resource. Here, the significant trail, wildlife, scenic and ecological values indicates a strong need for preservation. Roadless lands in the Chiwawa and Mad River drainages and Mission Creek and Manastash Ridge are also valuable and deserve protection.

Tourism and recreation are our state's fastest growing industries. Sales of books, tours, camping equipment, lodging and roadside services are just some of the activities that benefit the local and regional economy. Leavenworth demonstrates this so beautifully.

Maintaining the scenic beauty that draws people to the forest must be a priority. The shores and mountains that rise above Lake Wenatchee and Lake Chelan must be maintained in all their natural, spectacular beauty. The Chinook Pass and White Pass highways also traverse stunning scenery that needs strong protection.

Significantly, our quality of life is a major attraction for industries seeking new locations. Such economic diversity will complement the contribution of our timber industry as we move into the next century and adapt to new economic patterns.

Don Smith
October 1, 1986
Page three

Protecting the Wenatchee National Forest's outstanding scenic, recreational and wildlife resources is essential for continued growth of our economy, to provide refreshment from the stresses of modern life, and to gain a better understanding and appreciation of our natural heritage. Proper stewardship of these public lands will provide many benefits for us and our children. We urge you to give careful consideration to these values. Alternative F (supported by conservationists, sportsmen, and fishing groups) would better provide that kind of stewardship for these public lands, and we urge you to incorporate many of its features in your final plan.

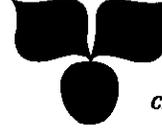
Thank you for the opportunity to comment.

Sincerely,



Charles Royer

CITY OF YAKIMA



03684

Office of the Mayor

CITY HALL, YAKIMA, WASHINGTON 98901

Phone (509) 575-6050

September 26, 1986

Don Smith
Forest Supervisor
Wenatchee National Forest
P.O. Box 811
Wenatchee, WA 98801

Dear Mr. Smith:

With reference to the Wenatchee National Forest Plan prepared by the Forest Service, the Yakima City Council believes that the severity of the economic impact under proposed alternative C warrants full consideration of the report prepared by Brian Long, titled: "Economic Impact Analysis of the United States Forest Service Proposed Alternative C on Chelan, Kittitas and Yakima Counties" (August, 1986).

A majority of the Council believes that the public is entitled to a reconciliation of the data inconsistencies on the timber harvest, and that the IMPLAN I/O model must be updated to 1982 relationships. A supplemental document should then be issued by the Forest Service with opportunity for both public comment and public hearings.

Sincerely,

Henry Beauchamp
Mayor

K-349

The City of Roslyn
OFFICE OF THE MAYOR

03391

Roslyn, Washington 98941
Sept. 23, 1986

03391

Wenatchee National Forest
Supervising Officer
Forest Planner
301 Yakima St.
P.O. Box 811
Wenatchee, WA 98801

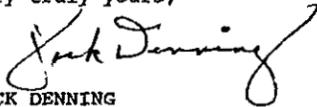
Dear

As Mayor of the City of Roslyn, Washington, I have been instructed by the Council of the City of Roslyn to formally respond to the latest Wenatchee National Forest Plan and in particular to the 10 year timber sale plan contained in one of the Appendixies to the Forest Management Plan. The City of Roslyn objects very strenuously to the 10 year timber sale plan as it pertains to Section 36, Township 21 North, Range 13 East and Sections 6 and 8 of Township 20 North, Range 14 East, Kittitas County, Washington, or more commonly referred to as the Easton Ridge area. As you are aware, the City of Roslyn domestic water originates from Domerie Creek. The Domerie Creek watershed encompasses Easton Ridge and any logging, road building or slash fires would potentially contaminate the Domerie Creek watershed.

The Forest Service in the past has acknowledged in its various plans, including the Alpine Lakes Wilderness Plan, the future pressure that the Forest Service would foresee for maintaining clean water. The theory obviously is that the more the National Forest is used, the more potential the variety of uses has to contaminate clean water. Today is that foreseeable future and the City of Roslyn is complaining now, not in the future (although the City will complain in the future as well). I find it amazing how the federal government through the Environmental Protection Agency and the Clean Water Act can place demands upon municipalities such as the City of Roslyn to maintain high standards for its drinking water yet on the other hand allow the National Forest Service to completely undo what Congress had intended to obviate with the Clean Water Act. Let's work together, not against each other for the preservation of clean water.

I trust that you will record the City of Roslyn's objection to the Wenatchee National Forest Plan and in particular to the 10 year timber sale plan and act thereupon. Should you want any further input please feel free to contact me or any other citizen of the City of Roslyn.

Very truly yours,


JACK DENNING
Mayor

cc: Regional Office, Portland, Oregon

K-350

TOWN OF NACHES
PHONE 653 2647 P O BOX 95
NACHES WASHINGTON 98937

03353

September 24, 1986

Don Smith, Forest Supervisor
Wenatchee National Forest
301 Yakima Street
Wenatchee, WA 98801

Dear Mr. Smith:

Naches is a very small town with its economy almost totally reliant upon forest products and agriculture. The impact on all of us when a few jobs are lost is significant. Any cut in revenue to the schools would hurt severely. There is an ongoing need for construction of school buildings which have been put off due to declining revenue from the depressed lumber industry. Any further cut would be unthinkable.

You seem to have decided on Plan C for your comprehensive plan for the Wenatchee National Forest. I believe this plan would cause severe hardship in this area. We do believe a balance is necessary between forest uses and appreciate the recreational uses of the forest as well as the commercial. Plan C is not in the best interests of any of us.

The Essential Alternative Plan seems to be a reasonable plan that will protect our forests, wildlife and economy and allow for continued recovery in the timber industry. Please consider this plan and I urge you to accept it as your comprehensive plan for the Wenatchee National Forest.

Sincerely,


Mary E. Tenney, Mayor

K-351



03427

"UNION GAP"
"THE OLD TOWN WITH NEW IDEAS"

102 WEST AHTANUM PHONE 248 0432 UNION GAP, WASHINGTON 98903

September 23, 1986

Don Smith, Forest Supervisor
Wenatchee National Forest
301 Yakima Street
Wenatchee, WA 98801

Dear Mr. Smith:

The recently released Wenatchee National Forest Plan prepared by the Forest Service includes your preferred alternative plan "C" which you admit will eliminate 210 jobs and \$6.6 million in income throughout Yakima, Kittitas and Chelan counties. While it may be the general belief of the Forest Service that this economic impact will be accepted by the communities in the region, the actual losses are significantly greater than you have led the public to believe.

The data used by the Forest Service to make their calculations takes into account a 22% reduction in available harvestable timber and bases the economic impacts on pre-1982 timber industry production and a 1977 IMPLAN I/O model. These base calculations are not realistically translatable to 1986 timber industry practices.

Through the efforts of the Yakima County Development Association and the Forestry Task Force of the Greater Yakima Chamber of Commerce, an independent economic analysis of the impacts of preferred alternative "C" has been conducted. The findings of this analysis indicate an actual job loss of 936 jobs and a loss of \$29.5 million in total income should alternative "C" go into effect. This severe impact is totally unacceptable to the citizens of Central Washington

While we believe a balanced timber harvest is necessary, we favor

03427

Don Smith, Forest Supervisor
September 23, 1986
Page 2

maintaining existing employment opportunities through the harvest and manufacture of forest products. This is essential to economic stability in our communities. Environmental protection can be afforded the forest without negative impacts on employment through the following:

1. Adopt alternative "B" with minor changes.
2. Meet minimum requirements, but do not reduce timber yields until Spotted Owl habitat requirements are established specifically for Wenatchee National Forest environments.
3. Enhance wildlife resources through a selective road management program.
4. Protect the existing trail system and replace trails which are lost due to road development. Disperse trail use concentrations through additional trailheads.
5. Develop the roadless areas within the first two decades to bring those under management.
6. Intensively manage all the suitable general forest to enhance tree replacement and growth

It is the sincere belief of myself and officials from the three-county area, Chelan, Kittitas and Yakima, that the implementation of alternative "B" with these minor changes will allow for continued recovery in the timber industry, recreational opportunities, and environmental protection, all without negatively impacting the regional economy.

It is with a sincere concern for the future of our region that I urge you to accept and implement these recommendations for management of the Wenatchee National Forest.

Sincerely,

John P. Hodkinson, Jr
Mayor
City of Union Gap

K-352

Town of Harrah

P O Box 10
HARRAH, WASHINGTON 98933

September 26, 1986

Don Smith
Wenatchee National Forest
301 Yakima Street
Wenatchee, WA 98801

Dear Mr. Smith

The Town Council of the Town of Harrah, Washington, wishes to express concern regarding the preferred alternative plan "C" on the Wenatchee National Forest Plan. The enactment of plan "C" will have a profound negative effect on the economy of Yakima, Kittitas and Chelan counties. Whether this impact is the 6.6 million dollar loss as your study predicts or the 29.5 million dollar loss that an independent economic analysis predicts, the loss will adversely affect our area due to jobs lost and money allocated from timber sales to school and road funds.

As council members we recognize the importance of planning for the future and we believe that a balanced timber harvest is necessary. We urge you to adopt alternative "B" with a few minor revisions as follows:

1. Meet minimum management requirements, but do not reduce timber yields until Spotted Owl habitat requirements are established specifically for Wenatchee National Forest environments.
2. Enhance wildlife resources through a selective road management program.
3. Protect the existing trail system and replace trails which are lost due to road development. Disperse trail use concentrations through additional trailheads.
4. Develop the roadless areas within the first two decades to bring those under management.
5. Intensively manage all the suitable general forest to enhance tree replacement and growth.

We strongly believe that Spotted Owl requirements need to be specifically established for the Wenatchee National Forest and that both the Spotted Owl habitat requirements and the job requirements of our citizens need to be taken into consideration before setting timber cutting policies. Please give careful consideration to a slightly revised alternative "B" which will offer environmental protection and recreational opportunities without a negative impact on our three county area and on our state.

Sincerely,

Town of Harrah Council

Barbara Harrer, Mayor
Linda Walker, Council Member
Gail Wenman, Council Member
Lillian Garcia, Council Member

Barbara Harrer
Linda Walker
Gail Wenman
L. L. Garcia

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CONFEDERATED TRIBES AND BANDS

Yakima Indian Nation

GENERAL COUNCIL
TRIBAL COUNCIL

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POST OFFICE BOX 151
TOPPENISH WASHINGTON 98948

September 23, 1986

James Torrence, Regional Forester
Wenatchee National Forest
P.O. Box 811
Wenatchee, WA 98801

Dear Mr. Torrence

The Yakima Indian Nation would like to take this opportunity to comment on the fisheries aspects of the Wenatchee National Forest Management Plan. We would like to state at the outset that although it is claimed repeatedly that increases in fish to the forest will largely be due to increased escapements, it is possible to sustain and increase escapement only if high quality fish habitat is provide. Therefore, it is of the utmost concern to the Yakima Nation that the best possible habitat for salmon and steelhead is available on forest lands. We also feel that diminished numbers of fish within the forest is not only due to downstream effects, but also because of environmental perturbations, use as grazing, road building, and timber harvest within the forest itself.

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Roads - Our concerns regarding roads center around increased sediment yield and fish passage. Clearly, the large number of roads proposed to be built will result in a greater number of culverts. Each culvert imposes a risk of failure and an increased maintenance cost. Present surveys on the Naches District show 60% of the culverts present fish passage problems, and these are stated to be on resident fish streams. Are there no anadromous fish in these streams because of poor culverts? In addition, these inventories were not done on the Cle Elum district or in the Wenatchee or Entiat Drainages. We therefore, do not know the status in these areas. These surveys should be completed and funds should be appropriated to correct passage problems, with highest priority given to streams with a potential for producing anadromous fish.

It is stated in the DEIS that road density is 3.75 miles/section (III-96) or 4 miles/section (III-149). There is no discussion of densities within sub-basins. Studies on the Olympic peninsula have shown detrimental levels of sediment entering streams with road densities greater than 3 miles/section. There must be studies done to determine appropriate road densities on the Forest, and this should be done on a sub-basin scale.

It appears that these will be a proliferation of ORV roads on the forest. Is there an inventory of existing roads, and has there been an analysis to determine the impacts of these roads to fish habitat. We would like to see this analysis completed before there is an increase in these activities on the forest.

In certain watersheds (Little Naches/Upper Rattlesnake) there is evidence of high natural levels of mass wasting. Will inventories be done to evaluate

past performances of roads and their association with mass wasting, particularly on a sub-basin level. Because of the increased sediment associated with roads, we would encourage reductions of timber harvest in those watersheds with high natural levels of mass wasting.

Soil - The DEIS states that impacts of sedimentation resulting from timber harvest will be negligible compared to background levels. These levels were based on a model designed for predicting soil erosion on agricultural land. Has there been any calibration to determine if these predictions are valid. As stated above, there needs to be predictions done on a sub-basin scale. Potential cumulative effects are identified on a number of sub-basins. We feel that empirical data should be gathered to better prescribe management actions. Of particular concern are the Little Naches, Manastash Creek, Pyramid Creek, Blowout Creek, Taneum Creek, and Nason Creek. These creeks are all present or potential anadromous fish bearing waters. Without detailed sub-basin evaluation, it is difficult to assess the appropriate management strategy. We also question whether 40% of a watershed in created openings with trees less than 15 feet tall will adequately avoid cumulative effects of increased sediment loading. There is no discussion of the basis for this strategy, or whether this is too much or too little for particular sub-basins. As stated in the Plan the soil survey information for the Yakima County portion of the plan is "terribly out of date and not adequate for project level planning." This is very disconcerting when management plans are being developed for the Yakima River Basin.

Water - We are particularly concerned about the impacts of harvest activities on water yields. Your analysis looks at water yields on a forest wide basis. We feel there must be analysis performed on sub-basins where cumulative impacts have a high likelihood. In addition, we feel that mean annual yield has no real meaning. The concerns are high peak flows, which act to destabilize stream channels, and reductions in summer low flows. Although one approach is to claim that summer low flows will be increased due to reduction in evapotranspiration, there is no discussion of the converse. That is, after tree planting, will there be a greater (than pre-harvest) level of evapotranspiration a short time later. We feel this analysis is crucial for sound management decisions. In addition, as stated above, there is no discussion of why 40% created openings, or 1,000 acres is used as a guideline to reduce impacts. We would also like to see analysis and a monitoring program to examine the effects of rain-on snow events in these areas, and the impacts to fish habitat. Finally, temporary water yield increase (DEIS III-76) as a result of timber harvest can result in unacceptable long term habitat degradation.

Range - While we are dubious about the positive effects of cattle grazing on fisheries habitat, we do not see large scale impacts of grazing on fisheries in the forest at this time. However, we feel that the amount of grazing (AUMS) should be held constant. If there are new grazing allotments, these should be surveyed to determine the impact on the aquatic ecosystem, and

detailed mitigation plans should be devised. We would also like to see an inventory of cattle/fish impacts that exists on the forest today.

Fisheries - We would like to commend you on the detailed discussions of the fisheries impacts of the plan. However, this analysis is based on a distressing lack of detailed data. If the forest is in fact a multi-use land management area, sufficient funds should be provided to adequately survey all resources. We question the resources committed to fisheries habitat management as compared to timber harvest and its associated requirements (roads, administration etc.). There should be an immediate increase in resources committed to habitat inventories, studies of fish populations and distribution etc. It is only in this fashion that sound management decisions can be made.

We feel that the EW-2 designation is by and large a sound management strategy. Some questions are not addressed however. Are there certain slopes too steep for harvest within this area. We would like to suggest that on very steep slopes (70%) that there be no harvest below the first topographic break uplope from the stream. Also, we have some concern that firewood cutting can have deleterious effects successful management in this area. We would like to see that no firewood cutting of live, dead or downed material be allowed within 100 feet of any class I, II or III stream. It is only in this fashion that a recruitment of woody debris can be guaranteed.

We have some questions about the reliability of assumptions regarding smolt habitat capability when no detailed surveys have been done. Additionally, what precisely is the method for defining smolt habitat capability.

We feel that an inventory of forest service related activity that has already impacted fisheries habitat is germane to good management practices. It is possible that this could be accomplished in part from air photos and past records of activities.

We feel that Table III-18 (DEIS III-47) is in error. Smolt Habitat capability for Sockeye in the Yakima River is estimated in your table to be 0. In fact, studies are just beginning to determine the feasibility of fish passage at Lake Cle Elum. If passage is possible there are many miles of good habitat above the Lake, and we would not want the Forest Service to preclude any management options based on underestimations of potential smolt yield. We understand that predictions of smolt yield are in flux in the Yakima Basin at this time, but would like to see a further refinement of this number.

Because of the potential cumulative effects as a result of intermingled ownerships on Forest Service lands, we support the theory of pre-and post harvest monitoring. One question is when will this begin, and what will be the level of involvement. We hope that empirical data will be gathered, rather than through estimations based on theoretical models. We would hope these monitoring programs include inventories of bank stability, incidence of mass wasting sediment yield, presence of woody debris, and water yield, and that these analysis take place at the sub-basin level. In addition, we feel

that there should be analyses of changes in stream temperatures as a function of harvest activity. These should include areas under EW-2 management, as well as analyses of cumulative effects in areas cut prior to implementation of the new plan.

We feel that the standards and guidelines section is lacking in substance. What are the standards to be used to insure that there is adequate woody debris in streams. What stream temperature guidelines will be used? Is there a baseline input of sediment that is acceptable? What are the guidelines for mitigation, or enhancement? What will order priorities for expenditure of K-V or appropriated funds? What is the guideline that will determine that a bridge rather than a culvert will be installed at stream crossings? Questions of this nature should be addressed? We find a very elaborate set of criteria for wilderness areas (which by the very nature of being in a natural state should require few guidelines) and little discussion with regard to fish and wildlife concerns. We hope the final EIS will have a more substantial analysis.

Finally, we would like to see a detailed monitoring plan outlined in the document. Specifically, which sites and what resources will be monitored.

Alternatives - We feel that your representation of alternatives with regard to fisheries impacts is not realistic. Alternative E shows the least changes in sediment yield and water yield, and the greatest number of fish throughout the 5 decades of the scope of planning. In fact, these benefits are accrued solely due to the large amount of appropriated funds, if the modelling of sediment and water yields is accurate. We feel that this is not a realistic alternative. Conversely, we see fisheries benefits in Alternative B due to large expenditures of K-V funds. In essence, this alternative says that you can degrade habitat, but you will then have the money to mitigate the impacts. Again, we feel this is not a viable alternative. In fact, we question the availability of expenditure of K-V funds. Our understanding is that authorization of these expenditures have not been forthcoming. Intensive timber management on the forest predicated on mitigation with K-V funds leave the fisheries resource in an extremely precarious situation. In addition, these funds can only be used for activities within sale boundaries, and as reported in the DEIS, primarily for mitigation in resident fisheries. How then can these funds be used to mitigate for downstream, cumulative impacts? How can they be used to repair existing inadequate culverts? Will there be expenditures for mitigating habitats lost due to construction of the Naches River Road (Highway 410) along the Naches River for example. We hope that a sufficient level of appropriations will be requested to address these concerns.

Because there is so little inventory data collected on the forest, it is difficult to have specific sub-basin requests for management strategies. We therefore, can only offer a generalized strategy that will address our concerns. When additional data is made available, we would be happy to discuss site specific recommendations with you.

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We would like to see along all anadromous streams a classification similar to ST-1 that would extend from the upslope limits of the EW-2 to above the first topographic break. This would entail a limited entry with no commercial thinnings. This will decrease road use and construction, and will reduce the amount of the land base that is actively undergoing changes resulting from timber harvest. As additional data becomes available, these streams could then be managed on a more site specific basis. We concur with your alternative C for the American Teanaway, Entiat and Bumping River corridors. We feel that alternative F is most appropriate for the Rattlesnake Creek Drainage. Both the Teaneum and Manastash Creek drains need to be afforded as much protection as possible due to the large amount of private ownership in the Teaneum, and the past intensive harvest activities in the Manastash. Both these creeks are anadromous fish bearing streams.

The Yakima Nation would also like to thank the Wenatchee National Forest for their commitment to meeting the needs of the Yakima people, and we look forward to continued discussions with you in this regard. Please refer to correspondence from the Columbia River Inter-Tribal Fish Commission for additional concerns regarding fish and wildlife resources on the Wenatchee Forest. If you have additional questions about our comments, please contact Larry Wasserman of my staff at 865-5121, ext. 672.

Sincerely,

Harvey E. Adams
Melvin R. Sampson, Chairman
Yakima Tribal Council
Yakima Indian Nation

cc Tim Weaver, Tribal Attorney
Timber Committee, Yakima Tribal Council
Fish and Wildlife Committee, Yakima Tribal Council
Lynn Hatcher, Fisheries Resource Management-Y.I.N.
Dale McCallough, C.R.I.T.F.C.

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COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

975 S.E. Sandy Boulevard, Suite 202, Portland Oregon 97214

Telephone (503) 238 0667

September 30, 1986

Mr. James Torrence
Regional Forester
Pacific Northwest Region
319 S.W. Pine
P.O. Box 3623
Portland, OR 97208

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Dear Mr. Torrence,

The Columbia River Inter-Tribal Fish Commission appreciates this opportunity to comment on the Draft Environmental Impact Statement (DEIS) and the proposed Wenatchee National Forest Plan. The Commission is composed of the Fish and Wildlife Committees of the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakima Indian Nation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe. These four tribes have rights reserved by treaty to take fish that pass their usual and accustomed fishing places. Among these fish are the anadromous species that originate in the Wenatchee National Forest.

The Nature of the Treaty Right

The tribes' right to take fish that pass their usual and accustomed places is a right confirmed by numerous court decisions. See e.g. Sohappy v. Smith, 302 F.Supp. 899 (D. Or. 1969), aff'd, United States v. Oregon, 529 F.2d. 570 (9th Cir. 1976); Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979) (Passenger Fishing Vessel). In addition to binding state governments, See Passenger Fishing Vessel 443 U.S. at 682 and n.25, the treaties are also binding on private citizens, See e.g. United States v. Winans, 198 U.S. 371 (1905), and of course the federal government. Passenger Fishing Vessel, 443 U.S. at 682; See also Confederated Tribes of the Umatilla Reservation v. Alexander, 440 F. Supp. 553 (D. Or. 1977). Absent specific authorization by Congress, Indian treaty rights cannot be abrogated. Id., citing Mencinnee Tribe v. United States, 391 U.S. 404, 413 (1968).

In Passenger Fishing Vessel, the Court painstakingly examined the circumstances surrounding the negotiation of the treaties in an attempt to divine the parties' long-term intentions. The Supreme Court emphasized that Governor Stevens invited the Tribes to rely on the United States' good faith

efforts to protect their right to a fisheries livelihood. Stevens specifically told the tribes: "This paper [the treaty] secures your fish." Id. at 667 n.11. During the treaty negotiations, "the Governor's promises that the treaties would protect that source of food and commerce were crucial in obtaining the Indians' assent." Id. at 676 (emphasis added). As the Supreme Court stressed:

It is absolutely clear, as Governor Stevens himself said, that neither he nor the Indians intended that the latter "should be excluded from their ancient fisheries," . . . and it is accordingly inconceivable that either party deliberately agreed to authorize future settlers to crowd the Indians out of any meaningful use of their accustomed places to fish.

Id. The Supreme Court also mentioned that the treaty guaranty of "the right of taking fish" was meaningful only if fish were available for the taking. Id. at 678 (emphasis added).

The 130 years since the treaties were signed have witnessed a truly startling number of methods by which the quantity of fish available for the taking could be reduced -- if not decimated. The courts have responded to these threats to the treaty right by declaring a policy that the treaty right cannot be defeated by technology or other methods not anticipated by the treaty signatories. For example, in United States v. Winans, 198 U.S. 371 (1905), the defendant constructed a fish wheel (a device capable of destroying an entire run of fish) and excluded the Indians from one of their usual and accustomed fishing places. Commenting on the effects of improved fishing devices, the Court noted that:

wheel fishing is one of the civilized man's methods, as legitimate as the substitution of the modern harvester for the ancient sickle and flail . . . It needs no argument to show that the superiority of a combined harvester over the ancient sickle neither increased nor decreased rights to the use of land held in common. In the actual taking of fish white men may not be confined to a spear or crude net, but it does not follow that they may construct and use a device which gives them exclusive possession of the fishing places, as it is admitted a fish wheel does.

Id. at 382. Thus, although improved technology may be brought to bear on the fishery, that technology cannot be allowed to imperil the rights secured to the parties to the treaty.

This result was reaffirmed by the Supreme Court in Passenger Fishing Vessel. There the Court declared that "[n]on-treaty fishermen may not rely on property law concepts, devices such as the fish wheel, license fees, or general regulations to deprive the Indians of a fair share of the relevant runs of anadromous fish in the case area." Passenger Fishing Vessel, 443 U.S. at

684. The Court's intent is clear: absent specific treaty abrogation legislation from Congress, (Menominee Tribe v. United States, 391 U.S. 404, 413 (1968)), no one may use any method to deprive treaty fishermen of their fair share of the anadromous fish.

Federal Duty to Protect Subject Matter of Treaties

In addition to their obligation to not destroy Indian treaty rights without specific Congressional action, federal agencies must use their authority to safeguard that which is the subject matter of federal treaties. In Kittitas Reclamation District v. Sunnyside Valley Irrigation District, 763 F.2d 1032 (9th Cir. 1985), the Ninth Circuit affirmed a district court order to operate a Yakima water project in a manner that would preserve spring chinook salmon redds. Federal project operators had originally sought to reduce water releases in order to store water for the next irrigation season. The proposed flow reductions would have left the redds high and dry. Testimony at the district court hearing indicated that the proposed water storage would be possible if twelve redds were transplanted or if berms were constructed. Id. at 1035. However, the district court judge was "unsure of the effect of these measures, so he continued the watermaster's authority to release water as necessary." Id. Expressly declining to decide the scope of the Yakima Indian Nation's treaty fishing rights, Id. at n.5, the Ninth Circuit found that the district court judge had fashioned a reasonable remedy. Id.

The message in Kittitas is clear. Federal agencies are obligated to exercise their authorities in a manner that will protect -- not degrade -- the habitat needed to support anadromous fish. In addition, when addressing anadromous fish habitat needs, various measures may be utilized, but the final choice turns not on traditional notions of agency expertise, but on the biological needs of the fish.

Magnitude of Fisheries Reserved by Treaty

The Forest Service's duty to protect and enhance anadromous fish habitat does not cease once a fish run becomes viable. The tribes did not reserve a right to take a few fish from a meager run struggling for survival. Some might argue that the Columbia River treaty tribes reserved the right to continue harvesting that number of fish that they had traditionally harvested. Obviously, that harvest level is not yet possible given the contemporary depleted fisheries. The Supreme Court has held that both Indian and non-Indian fishermen possess a right, "secured by treaty, to take a fair share of the available fish." Passenger

Fishing Vessel, 443 U.S. at 684-85. The Court determined that Indian harvest allocation should not exceed 50% of the harvestable fish. Id. at 685-86. The Court then declared:

It bears repeating, however, that the 50% figure imposes a maximum but not a minimum allocation . . . [T]he central principle here must be that Indian treaty rights to a natural resource that once was thoroughly exclusively exploited by the Indians secures so much as, but no more than, is necessary to provide the Indians with a livelihood -- that is to say, a moderate living. Accordingly, while the maximum possible allocation to the Indians is fixed at 50%, the minimum is not; the latter will, upon proper submissions to the district court, be modified in response to changing circumstances. Id. at 686-87.

Perhaps the reason why this "moderate living standard" unearthed by the Supreme Court has not proven to be a truly thorny problem in Pacific Northwest fisheries management is because no one can reasonably contend that the Indians' harvest presently yields a moderate living. This fact was implicitly acknowledged by the Supreme Court in Passenger Fishing Vessel when it stated that the 50% ceiling on the Indians' harvest allocation was necessary "to prevent their needs from exhausting the entire resource and thereby frustrating the treaty right of 'all [other] citizens of the territory.'" Id. at 686.

Regardless of what the term "moderate living standard" means, it will eventually be defined by the judiciary -- not a federal agency. See Id. at 687. As discussed earlier, the Ninth Circuit has already determined that federal agencies must refrain from taking actions that will reduce the number of fish in a depleted run. See Kittitas, 763 F.2d at 1035. Nor does this duty cease when an anadromous fish run manages to increase its numbers beyond the dangerous level of minimum viability. In United States v. Adair, 723 F.2d 1394 (9th Cir. 1984), the Ninth Circuit stated that:

Implicit in this "moderate living" standard is the conclusion that Indian tribes are not generally entitled to the same level of exclusive use and exploitation of a natural resource that they enjoyed at the time that they entered into the treaty reserving their interest in the resource, unless, of course, no lesser level will supply them with a moderate living. Id. at 1415 (emphasis added).

Here the Ninth Circuit has indicated that the Klamaths must be allowed to achieve their "moderate living." No one knows what that is. The court explicitly stated the possibility that the "moderate living standard" may only be achieved by allowing the tribe to enjoy the "same level of exclusive use and exploitation" it had at the time the treaty was concluded. Id. The purport of this holding is clear. Federal agencies owe a duty to refrain

from activities that will interfere with the fulfillment of treaty rights. Moreover, this duty cannot be performed by engaging in an "accommodation" or "balancing" process between Indian treaty rights and a competing economic interest such as timber harvest. Any such "accommodation" reached by the Forest Service would amount to a de facto abrogation of Indian treaty rights. In the context of forest management, unless the Forest Service can demonstrate that the tribes' treaty rights are presently being fulfilled, it cannot justify approving activities in the forests that will cause further degradation of anadromous fish habitat.

The National Forest Management Act Mandates Coordination

The Forest Service is only one of the many entities involved in the complex interactions that have caused the diminution of anadromous fish runs to their present state. Columbia River hydroelectric development and other downstream problems have done grievous harm to the basin's fish runs. While the Forest Service can rightfully blame downstream problems for much of the harm inflicted on anadromous fish, such blame does not obviate the Forest Service's responsibility to protect anadromous fish and the need for all parties with management authority that affects these fish to work together to improve the fishery resource.

In dealing with anadromous fish, the Forest Service must look beyond the boundaries of a given national forest. Columbia River stocks of anadromous fish migrate as far inland as Lake Osoyoos and as far north as Alaska. As the Pacific Northwest has come to realize, the anadromous fish runs can only be restored if state, federal, and tribal land, water, and wildlife managers adopt a coordinated "gravel-to-gravel" management approach to this valuable and mobile renewable resource.

This approach is reflected by the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program. The Fish and Wildlife Program, mandated by the Pacific Northwest Electric Power Planning and Conservation Act, 16 U.S.C. Section 839b (1982), encompasses the Columbia River and its tributaries and will be financed by Pacific Northwest ratepayers. This comprehensive protection, mitigation, and enhancement effort does not appear to be integrated into the DEIS or proposed plan. Nor were the increased fish returns made possible by the recently concluded United States/Canada Salmon Interception Treaty, See 16 U.S.C. Section 8396 (1985 Supp.), mentioned in either document.

These efforts, along with the Salmon and Steelhead Enhancement Act, have changed the complexion of fisheries management in the Columbia Basin. The success of both the Salmon Interception Treaty and the Fish and Wildlife Program turn upon maximizing utilization of the anadromous fish habitat in Columbia River tributaries. A large percentage of these tributaries run

through national forests. The Forest Service must acknowledge its responsibilities to act in concert with these policies. The Forest Service cannot make a reasoned decision with respect to anadromous fish habitat if it does not factor these activities into its decision-making process. The Pacific Northwest cannot afford to spend money enhancing fisheries that are simultaneously being degraded by timber harvest, road-building, and grazing.

Forest Service coordination with Pacific Northwest fisheries enhancement activities is not only sound policy; it is also required by law. Forest Service regulations declare that a review of state, federal, and tribal planning and land use activities shall be included in the forest plan EIS. See 36 C.F.R. § 219.7 (a)-(c) (1984). In addition, the regulations provide that this review shall consider the objectives of federal, state, local, and tribal governments, inter-related impacts of these plans, and a decision by the Forest Service on how each forest plan shall address these inter-related impacts. Id. at (c)(1)-(4). Among the objectives of federal, state and tribal governments are the fish production plans currently being formulated under the auspices of United States v. Oregon, the Fish and Wildlife Program, and the Salmon Interception Treaty.

The Wenatchee National Forest states that its fisheries management proposals are compatible with the Columbia Basin Fish and Wildlife Program and the Yakima River Basin Water Enhancement Project because these plans and all DEIS alternatives call for habitat improvement. See DEIS at IV-40. At best, this is a gross over-simplification. Not all habitat is equal. Do the locations of planned habitat improvements for these plans and alternatives correspond? Does the Forest anticipate timber, range, or mining management activities that will nullify any of these enhancement projects? How is a forest management activity that is inconsistent with a Fish and Wildlife Program measure consistent with the tribes' treaty rights?

Statements such as the following will not fulfill the Forest Service's duty to consider tribal land use objectives and determine how the forest plan inter-relates with these objectives:

Though there is considerable competition for the water produced in any alternative, there is no significant conflict between the effects of the alternatives and others' plans and policies for the water resource. Principal competitors for water produced on the Forest include irrigation interests, small hydroelectric interests, and those interested in maintaining adequate fish habitat.

DEIS at IV-72. There are few issues that have spawned more conflict than disputes over water allocation in the Yakima Basin. The amount, quality, and timing of water flow in the Yakima Basin are factors whose importance cannot be over-emphasized. Forest management will affect these characteristics and thus much more

detailed coordination is necessary before the Forest Service satisfies its NFMA duties, treaty-imposed duties, and its trust responsibility to the Yakima Indian Nation.

The idea that proper fishery management requires coordination of harvest, passage, and production needs has been around for a number of years. It is also an integral aspect of the Northwest Power Planning Council's efforts to coordinate restoration of Columbia basin fisheries to the extent affected by hydroelectric power production. See e.g. Northwest Power Planning Council, Salmon And Steelhead Planning, Staff Issue Paper (June 3, 1986):

A gamut of potential problems may result from uncoordinated actions. Fish production investments may be in conflict. Power system operations may diminish production or offset increases in production. Harvest practices could prevent escapement in adequate numbers to ensure sustained increases in yield. The mixed-stock harvest could undermine passage actions designed to protect or enhance certain stocks of fish. Harvest and power needs may not be sufficiently defined to guide production efforts. Production decisions may be made without full regard to harvest needs and to power system constraints with respect to passage. Land and water management actions may undermine fish production investments.

When actions are taken in the absence of a system perspective, there also may be too little recognition of the spectrum of choices among production, passage and harvest actions. Actions may be taken without consideration of the full range of alternative means to achieve objectives. Actions may be taken with inadequate analysis of their likely effectiveness. As a result, there is no assurance that a given action achieves sound biological objectives at the minimum economic cost.

Moreover, in the absence of a system perspective, monitoring and evaluation of actions may be uncoordinated, lacking, short-term, sporadic, or narrow in focus.

Id. at 8. In addition to improving the quality of resource management, coordination often results in lower costs. In this time of fiscal austerity, the Forest Service would do well to explore all the possibilities provided by increased coordination.

Statements in the DEIS indicate that the WNF feels that coordination will fulfill treaty rights:

On the Forest, management for habitat stability and stream integrity, specific fish habitat improvement

projects, and ongoing research by the Yakima Indian Nation regarding management of chinook salmon in the Yakima River system will all contribute to enhancement of fisheries habitat. Continuing coordination with the Washington State Departments of Game and Fisheries, the Yakima Indian Nation, and the U.S. Fish and Wildlife Service, will also contribute substantially to meeting the responsibilities defined by the Yakima Indian Treaty.

DEIS at III-46. See also Id. at II-136 ("With continued coordination between the Forest Service and all the other groups and agencies which affect fisheries production and potential, long-term compliance with the Treaty is anticipated."). As far as these statements go, they are correct. (What does long-term compliance mean? Does that mean the Forest anticipates short-term non-compliance?) The tribes' treaty rights probably will not be fulfilled in the absence of coordination. However, what is the standard or goal that this coordination is designed to achieve? The appropriate legal standards are delineated at the beginning of these comments.

Anadromous Fish Assessment

As a consequence of its federal mandate to protect, mitigate, and enhance fish and wildlife while assuring the Pacific Northwest an adequate and economical power supply, the Northwest Power Planning Council is currently estimating the location and extent of anadromous fish in the Columbia Basin. This assessment will:

estimate the resource value by characterizing the productivity of each stream reach. Productivity is defined to be comprised of three factors: smolt production, migration use and upstream geography which may, through sedimentation, affect downstream anadromous fish areas. This study will quantify the smolt productivity of each stream reach. Migration will be accounted for by including in any estimate of smolt production for an individual stream reach upstream productivity as well, i.e., the productivity will accumulate as one moves down a stream. Stream reaches upstream of anadromous fish areas which have the potential to adversely affect downstream use will be identified quantitatively.

See Northwest Power Planning Council, Proposed Work Plan Pacific Northwest Hydro Assessment Study (August 1, 1984) at 3. The results of this study will provide the most current and comprehensive examination of Columbia Basin anadromous fish production capability available. This study will be used to identify areas and stream reaches that, due to their value to

fish, should be protected from hydroelectric development. It would be wasteful and expensive indeed to invest money in habitat enhancement and protection only to have those efforts smothered by sediment generated by logging and roadbuilding. The Forest Service and anadromous fish managers from federal, state, and tribal governments should coordinate to make sure that the information generated by this study will foster the most judicious resource utilization possible.

Cumulative Impacts

There are 17 national forests in the Columbia basin that produce anadromous fish. These are: the Clearwater, Nezperce, Bitterroot, Boise, Challis, Payette, Salmon, Sawtooth, Umatilla, Wallowa-Whitman, Mount Hood, Malheur, Ochoco, Gifford Pinchot, Okanogan, Willamette, and Wenatchee. All of them are going through the forest planning process. Approximately 50 to 70% of all remaining anadromous fish habitat is contained in these forests. Events on these forests will have a profound impact on the anadromous fish resource that is vital to the welfare and existence of the four treaty tribes.

Unfortunately, the Forest Service does not seem to realize that each forest is an important cog in the machine that will either revive the fish runs or slowly log, road, graze, or mine them into oblivion. To adequately assess the environmental impacts of its actions as required by NEPA, the Forest Service must study and disclose the cumulative impacts of all 17 forest plans listed above on the Columbia River anadromous fish runs and the four Columbia River treaty tribes. It is simply not adequate for each forest to merely look at the impacts of its activities within the borders of the forest or in the surrounding communities and counties. Nor is it adequate for the Forest Service to baldly assert that it has assessed cumulative impacts while offering absolutely no evidence that it has made any such consideration. Fish production precluded by activities within each forest and in conjunction with other forests affects not only surrounding communities, but also downstream Indian tribes and other fishers both inriver and in the ocean.

Adequate assessment of cumulative impacts requires a certain management worldview. It requires that managers of land, water, or fish realize that even though they may only have management authority over a relatively small aspect of the anadromous fish lifecycle, their management decisions may have a decisive impact on other fishery management decisions or the fishery resource itself. This is by no means a revolutionary concept. In fact, the Forest Service avails itself of this management approach every time it asserts that the reason that basin fish production is not any higher is because of downstream passage mortality and harvest management. The Forest Service is correct when it states that harvest and passage considerations are important to the overall health of the Columbia basin anadromous fishery.

However, fish production, both natural and hatchery, are also equally important. The Forest Service is directly responsible for natural fish production occurring on national forest lands. Pointing accusatory fingers at other entities does not relieve the Forest Service of its duty to ensure that its management will not adversely affect already depleted naturally producing stocks.

There are many who consider the need to provide for increased natural fish production to be a major constraint on anadromous fish harvest regimes. The tribes have forgone harvest of fish, to which they are legally entitled, for the purpose of providing increased escapement of naturally spawning adults. Despite these efforts, and despite the increasing numbers of returning adults (many of which are hatchery fish), the tribes are under pressure to further forego harvest opportunities. Forest management that will cause reduction in natural fish production will further exacerbate this situation. Reductions in natural fish production directly conflict with the tribes' treaty rights.

The Forest Service has often informed CRITFC and tribal staff that the Forest Service is only responsible for supplying smolt habitat capability and that there is far more capable habitat than there are smolts. The Forest Service's responsibilities include more than merely furnishing a given amount of habitat. The Forest Service must identify that which is being utilized by fish and, to the extent it can, that which will be utilized through either United States v. Oregon or Fish and Wildlife Program enhancement measures.

By defining its responsibilities solely in terms of smolt habitat capability, the Forest Service attempts to dodge responsibility for existing fish production on national forest lands. Stated differently, by looking only at habitat capability, the Forest Service does not distinguish between habitat that is currently producing fish and that which currently is not. This distinction is crucial because habitat is not fungible. One of the most well-known traits of anadromous fish is that they instinctively return to the stream in which they were born. They do not automatically return to any stream that might happen to be available. Thus, given the depleted levels of many of the naturally spawning anadromous stocks, forest management that fails to protect currently utilized habitat may well result in the destruction of naturally producing stocks despite the great advances being made in juvenile passage and harvest controls. Moreover, because the Forest Service is not protecting currently utilized habitat, destruction of naturally-producing stocks could occur even though the forest may actually be increasing its available "smolt capable" habitat! See e.g. DEIS at IV-137 ("Although every alternative would maintain and enhance the resident and anadromous fish habitat on the Forest, there would be differences in the potential pounds of anadromous fish that are available for sport and commercial harvest.") That is why bland reassurances that fish habitat will be maintained or increased fail to satisfy fishery managers.

A symptom of the WNF's failure to protect naturally-producing stocks is its failure to designate sockeye as a management indicator species. Wenatchee River sockeye are not currently supplemented by hatcheries. In addition, the habitat needs of sockeye are significantly different than those of either chinook or steelhead. Given the lack of hatchery supplementation, sockeye would be a particularly appropriate indicator of the effects of forest management on fish habitat.

It is commendable that the Wenatchee National Forest has attempted to evaluate the cumulative effects of its management activities on anadromous fish. See e.g. DEIS at III-49-54. Unfortunately, there is some important information that was not provided in the DEIS. For example, at no point is the term "cumulative effects" defined. Instead, the DEIS declares that there are three types of human-induced cumulative effects on fish (water quality, stream and streamside habitat integrity, and man-made migration obstacles). DEIS at III-49. What about the effects of forest management on the gene pool of the stocks originating in the forest? Stated differently, does forest management, either on its own or in coordination with other entities, identify local stocks and protect them?

How does production of anadromous fish on the forest interact with downstream harvest? Are fish originating from the WNF subject to a mixed-stock fishery? If so, how will forest management affect that mixed-stock fishery?

It is good that the Forest has chosen a geographic scope for its cumulative effects examination that is commensurate with the migratory range of anadromous fish. However, it is unclear how far "downstream of the forest boundary" the Forest will look. Some Wenatchee National Forest fish are harvested in the ocean. What percentage? Will there be a synergistic effect between ocean harvest and forest management that might constrain Columbia River mainstem fisheries on either steelhead, sockeye, or chinook?

The DEIS states that it has determined "whether there has been, is, or may be in the future a cumulative effect of man's activity" on the four major Forest basins (Chelan, Entiat, Wenatchee, and Yakima). DEIS at III-51. Once again, how was this determined? Forest Service staff at both the forest and regional level have informed CRITFC staff on numerous occasions that cumulative effects studies of the breadth described above are either difficult or impossible to do. Of course CRITFC is gratified that the WNF has chosen to do these legally-required studies, but we are understandably curious about the method used.

The WNF has presented some of its cumulative effects information in the Table III-21 matrix. There it matches the four major WNF drainages with characteristics such as stream habitat integrity and man-made obstruction obstacles. Within these major characteristics are sub-categories such as

downstream effects, WNF only effects, and intermingled ownership effects. In many cases, the table states that there is no known cumulative effect, but at no time does the DEIS state how this determination was made.

In describing situations on or below the four drainages where there may or may not be cumulative effects, the DEIS makes extensive use of the term "significant." See e.g. DEIS at III-51-54. However, no definition of what the WNF considers to be "significant" is provided. Given the complete lack of information as to how the cumulative effects analysis was conducted and the absence of any definitions of terms, it is difficult to provide constructive criticism of the WNF's assessment of cumulative effects.

In its discussion of cumulative effects on the Wenatchee watershed, the DEIS states that:

[s]ome of the logging activities [on non-Forest Service land], although they comply with the State of Washington's Forest Practices Rules and Regulations, may result in long-term losses of habitat production by influencing stream habitat integrity. The primary contributing factor to this loss will be in the quality of streamside cover (and the nutrients it produces) and in long-term inputs of large woody debris.

DEIS at III-51-52. (This statement reinforces what many fish, wildlife, and watershed advocates have been thinking for years. The basis for this statement should be disclosed. No doubt the Washington Department of Natural Resources and the Department of Ecology will be similarly interested.) Is it just the Wenatchee watershed which will suffer from inadequate state forest practices rules? What about the intermingled ownership areas in the upper Yakima basin? How much large woody debris is actually needed?

Shortly thereafter, the DEIS states that the effects of future logging in riparian zones by non-Forest Service entities is unknown. In addition, these intermingled lands should be "monitored and forecasted on a site-specific basis when formulating future Forest Service project plans. In subbasins where a cumulative effect could result in a significant change in fisheries habitat potential, Forest Service activities may need to be altered and/or mitigated." DEIS at III-52. What is a significant change in fisheries habitat potential? Shouldn't the answer to this question depend on the stock(s) that may be affected? Are these fish subject to the treaty rights of the Columbia River treaty tribes? Are these fish involved in the United States/Canada Salmon Interception Treaty? Will proposed management nullify enhancement resulting from the expenditure of Columbia Basin Fish and Wildlife Program funds? These are just some of the questions the Forest Service must address to determine whether there is "significant" harm to fish habitat.

On the Yakima system, the DEIS notes that stream habitat integrity has been affected in several drainages, but although "[t]hese changes in some cases appear to be individually significant...the overall effect on anadromous and resident fish in the Yakima Basin is probably not great." DEIS at III-52. One paragraph later, the DEIS states: "No inventory of stream habitat or streamside habitat integrity has been completed for the streams of the Yakima Basin, so the net significance of forest management is unknown. However, basin-wide, it is not thought that Forest Service activities have had significant effects on anadromous and resident fisheries habitat potential." *Id.* The lack of any definition of the term "significant" or "individually significant" vis a vis "overall significance" makes the discussion of cumulative effects in the DEIS virtually meaningless.

The DEIS states that intermingled lands in the upper Yakima system in the Cle Elum District have huge blocks of clearcuts and that many riparian areas have been subjected to unrestricted timber harvest. *Id.* It also states that these actions may have resulted in cumulative effects, but that these effects can only be measured by pre-harvest and post-harvest measurements. *Id.* The reason that cumulative effects are a concern is that their existence, if not taken into account, can frustrate achievement of environmental goals. The Forest Service is obligated to gather the information necessary to develop responsible estimates of cumulative effects so that a decision-maker will be able to take the action needed to achieve a given environmental goal. It is a result-driven process. In the absence of this information, the Forest Service must not undertake actions likely to cause additional cumulative effects. Unless the Forest Service generates the information needed to assess cumulative effects, it will be unable to either identify the environmental consequences of its action or achieve its fish habitat goals. The Forest Service's failure to gather that data needed to identify the impacts of its activities must not be used as an excuse for maintaining those same activities.

The Forest Service's ability to identify and counteract detrimental cumulative effects is severely hampered by its lack of inventory data. The Wenatchee National Forest's lack of data is candidly acknowledged throughout the discussion of cumulative effects and in its proposed plan at page II-76. It is essential that the Forest collect the data necessary to make the decisions necessary to provide for both fish and other forest resources. See 36 C.F.R. Section 219.12 (d). The tribes' treaties provide independent sources of federal authority for generation and compilation of the data the Forest Service needs to ensure that vital spawning and rearing areas are identified and protected. To fulfill the tribes' treaties, greater fish production is required. The burden is on the Forest Service to ensure that its management activities will not further diminish the basin's fish production. The first step towards fulfilling this duty is to generate the information needed to show that its activities will not further hinder production. Since fish live

in drainages and different drainages support differing levels of fish, drainage-specific information is needed.

The Wenatchee National Forest's reliance on the smolt habitat capability approach tends to conceal cumulative effects on fish. The DEIS recognizes this when it states: "At some point, if the habitat becomes fully seeded with anadromous fish, then there may be, at that time, a net significant cumulative effect of Forest management. This should become apparent in future Forest planning periods." DEIS at III-53. The Forest Service claims that it is only a habitat manager and cannot be responsible for actual populations of anadromous fish. Yet here, when it is convenient, the Forest Service chooses to recognize a cumulative effect not when it harms the habitat, but only when it might adversely affect an existing population. As recent fish escapements demonstrate, that point in time when national forest habitat will be fully seeded is coming far more quickly than the DEIS indicates. The ultimate health of Columbia basin fisheries lies in full utilization of remaining habitat -- much of which lies on national forest lands.

Mitigation

The Forest Service has often relied upon mitigation in the hope that mitigation will compensate for the damage inflicted on fish habitat by timber harvest. However:

Mitigation of fish habitat losses is often presented as a panacea and substitute for maintenance of habitat quality. The concept of "fisheries mitigation" is more myth than substance. It seldom materializes and when it does, it only partially compensates for substantial losses. There is no history of fisheries budgets sufficient to mitigate substantial losses of quality habitat. Recent and projected budget trends indicate a status quo situation.

See Espinosa, Background Paper Fisheries Resources Analysis of The Management Situation Clearwater National Forest (undated) at 56-57 (emphasis in text). The Commission is unfortunately acutely aware of the vagaries and inadequacies of fisheries mitigation. Thus, we are extremely skeptical of vague promises of best management practices, implementation of standards and guidelines, and reliance on enhancement to mitigate management impacts on fish habitat.

Given the importance of the anadromous fish resource, very little reliance should be placed on mitigation measures that do not have a proven record of effectiveness. The Forest Service must be careful to not ask more of a mitigation technique than it can give. New or untested mitigation techniques should be thoroughly evaluated before being widely used and relied on. Monitoring should be vigilant, stringent, and should include all

entities that are involved in the management of anadromous fish. Finally, mitigation methods should be chosen on the basis of the protection they will provide the fishery resource, not how much they will affect the cost/benefit analysis of commodity resources such as timber, range, and mineral extraction. See e.g. Pacific Power & Light Co., Opinion No. 381-A, 30 F.P.C. 499 (1963), aff'd in part, rev'd in part on other grounds, 333 F. 2d 689 (9th Cir. 1964), cert. denied, 379 U.S. 969 (1965) (where it is declared that it is the policy of other federal agencies to require complete recompense for fisheries damage.) The DEIS should be revised to include analyses of known mitigation techniques. These analyses should include evaluations of effectiveness, standards for application, and any other information that might be of aid in deciding whether a given mitigation technique is appropriate. Is reliance on habitat enhancement as mitigation appropriate in the face of the current federal budget crunch? The Commission will be happy to contribute its expertise towards evaluating the use of various mitigation methods on a case-by-case basis.

The DEIS lists the EW-2 Riparian Protection Zone Prescription as being the primary fisheries resource mitigation device. It states that the primary objective of this prescription is to maintain optimum riparian habitat for fish and wildlife and to protect wetlands. DEIS at IV-40. However, this prescription allows both shelterwood and clearcuts in the riparian zone. How does timber management in the riparian zone create better fish habitat than just leaving the area alone? How does increasing sediment delivery to the stream and decreasing the availability of large organic debris benefit fish habitat? Although it is possible that a slight temperature increase may increase juvenile growth rates, what is the cumulative effect of these forest-wide temperature increases? How are downstream waters affected? Are there existing or potential temperature problems downstream that will be exacerbated by the EW-2 prescription? What sediment thresholds is the WNF using? How much large organic debris is needed to provide optimum habitat conditions? Alleging that even-age management in the riparian zone will provide optimum fish and wildlife habitat hardly differs from alleging that no timber harvest in the riparian zone will maximize timber production.

Anadromous Fish Minimum Management Requirements

After combing the DEIS, the proposed plan, and the appendices, we have been unable to find the MMR for anadromous fish. It is our understanding that the NFMA regulations require each forest to delineate MMRs for fish and wildlife. 36 C.F.R. Section 219.27. We are aware that Region VI has issued regional guidelines declaring that state implementation of state forest practices act requirements, developed pursuant to the federal Clean Water Act, are suitable for use as the anadromous fish MMR. (However, given the WNF's view that state forest practices rules

permit activities causing long-term losses of habitat production, this approach is not appropriate. See DEIS at III-51-52) The CRITFC has a thorough critique of this approach and we will be happy to submit it to the Wenatchee National Forest if that is the approach the Forest has adopted. Unfortunately, we have not found any statement in the planning and NEPA documents stating that the Forest has done this. We wish to reserve the right to submit comments on the WNF's choice of anadromous fish MMR.

Trust Responsibility

The trust responsibility is that special relationship between the United States and Indian tribes that originated in Cherokee Nation v. Georgia, 30 U.S.(5 Pet.) 1 (1831) where the Supreme Court described Indian tribes as "domestic dependent nations" and declared that "their relation to the United States resembles that of a ward to his guardian." Id. at 17. This relationship is part of the very fabric of federal Indian law and it imposes stringent fiduciary standards of conduct on federal agencies in their dealings with Indian tribes. See United States v. Creek Nation, 295 U.S. 103 (1935). See also Northern Cheyenne Tribe v. Hodel, Civ. No. 82-116-BLG (D. Mont. May 28, 1985) at 23.

In Northern Cheyenne Tribe, the court declared that "a federal agency's trust obligation to a tribe extends to actions it takes off a reservation that uniquely impact tribal members or property on a reservation." Id. at 27. In an attempt to save its coal leasing EIS from invalidation, the Secretary of the Interior alleged that there was no specific statute or treaty that required the Department to consider the impacts of coal leasing on the tribe as an entity. Id. The Secretary also alleged that his decision to lease the coal was in the "national interest" and "vital to the nation's energy future." Id. at 29. The court declared that:

The Secretary's conflicting responsibilities and federal actions taken in the "national interest," however, do not relieve him of his trust obligations. To the contrary, identifying and fulfilling the trust responsibility is even more important in situations such as the present case where an agency's conflicting goals and responsibilities combined with political pressure asserted by non-Indians can lead federal agencies to compromise or ignore Indian rights.

Id. at 29-30 (citations omitted). Similarly, the Forest Service must not allow its obligations to the Columbia River treaty tribes to become lost in its concern for the local citizenry. It must accord the treaty right special consideration and scrupulous safeguards. As detailed in the earlier legal analysis, the treaties impose substantive, not just procedural, obligations on the Forest Service. These obligations are not fulfilled by

actions which sanction degradation of fish habitat needed to re-build the Columbia River runs.

Sales Below Cost

Over the years, fish and wildlife concerns have often been subordinated to the needs of allegedly more economically valuable, but environmentally damaging commodities such as timber harvest, irrigated agriculture, grazing, and hydroelectric power production. Thus, it is not without some ironic amusement that the Commission observes the current controversy over unprofitable timber sales. Those who have advocated resource decisionmaking primarily on the basis of short-term economic gain suddenly find themselves "hoisted on their own petard." Perhaps this role reversal will convince all those involved in natural resource decisionmaking that cost/benefit analysis is at best an "unfaithful lover" and that resource decisions are best grounded on other bases.

The Commission is not automatically opposed to "sales below cost" per se. What concerns us is that the DEIS contains no assurance that any of the timber sales proposed for the next 50 years will actually recover its real costs. The NFMA regulations require that the Forest Service "shall compare the direct costs of growing and harvesting trees, including capital expenditures required for timber production, to the anticipated receipts to the government...." See 36 C.F.R. Section 219.14(b) (1984). "Direct costs" are defined to "include the anticipated investments, maintenance, operating, management, and planning costs attributable to timber production activities, including mitigation measures necessitated by the impacts of timber production." Id. at Section 219.14(b)(2) (emphasis added).

The Commission is concerned that the Forest Service will respond to the "sales below cost" controversy by artificially "improving" its timber sale balance sheet by shortchanging mitigation needs. The DEIS should disclose the manner in which mitigation measures and levels of mitigation funding are chosen and applied. This information may demonstrate that the timber production envisioned by the proposed alternative fails to include all mitigation costs and is therefore even more cost ineffective than it presently appears. Bland assurances that the Forest Service will implement mitigation measures which it alone determines are necessary frustrates the policies behind both NEPA and NFMA. Both of these statutes demand disclosure, public scrutiny, and public input.

In attempting to "justify" "sales below cost," the Forest Service should explain where it intends to find the funds to pay for mitigating the effects of timber management on fish and wildlife. It is our understanding that Knutsen-Vandenberg funds for fish and wildlife are not generated by "sales below cost"

whereas a sale that covers its costs also yields mitigation money. In other words, fish and wildlife are much more adversely affected by a below cost sale than by a sale that is financially sound.

Budget

Given the present domestic spending trends, it is extremely unlikely that the Forest Service will be able to count on receiving budgets of equal or greater amount than what it currently gets. The DEIS should include a complete explanation of how the WNF will respond to budget cuts, which programs will be cut and the amount of the cuts.

Neither the plan nor the DEIS explain the role of Bonneville Power Administration funding of Fish and Wildlife Program measures on the WNF. Without a thorough discussion of BPA funding, the public may suspect that BPA dollars are being used to displace habitat protection activities for which the Forest Service is responsible. This fear is being confirmed by the WNF. In discussing cumulative effects in the Upper Yakima basin, the DEIS declares that "[a] more detailed study of these potential effects is recommended and could be implemented as a basin-wide study under the auspices of the Northwest Power Planning Council's Fish and Wildlife Program." DEIS at IV-39. Since these potential effects are the product of timber harvest on private and WNF lands, a cumulative effects analysis is clearly the Forest Service's obligation.

Hydroelectric Applications

The Secretary of Agriculture has an important role to play in the licensing of hydroelectric projects that will be located in national forests. Section 4(e) of the Federal Power Act, 16 U.S.C. Section 797(e) (1982) declares that the Federal Energy Regulatory Commission is authorized:

To issue licenses...for the purpose of constructing dams...or other project works...upon any part of the public lands and reservations of the United States...Provided, that licenses shall be issued within any reservation only after a finding by the Commission that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired, and shall be subject to and contain such conditions as the Secretary of the department under whose jurisdiction such reservation falls shall deem necessary for the adequate protection and utilization of such reservations....

It is the Forest Service's duty to impose terms and conditions that will assure adequate protection for national forest lands from the harms resulting from hydroelectric development. See Escondido Mutual Water Company v. La Jolla and Rincon Bands of Mission Indians, 104 S. Ct. 2105, 2114-15 (1983). It is also part of the Forest Service's trust responsibility to the tribes to ensure that it exercises its duty to impose terms and conditions so that the tribes' treaty rights are protected. The tribes possess considerable expertise in this area and would welcome further consultation with the Forest Service to ensure adequate protection.

The Northwest Power Planning Council is in the process of developing a list of potential hydro sites with the least potential for adverse impacts on other resources. Forest Service activities related to hydroelectric power should be coordinated with these efforts.

Anadromous Fish Concerns

Our review of the Wenatchee's draft planning documents revealed several weaknesses in the fish management sections. Foremost of these is the already noted lack of basic information. But what bothers us even more is that there is no clearly defined plan to obtain the missing data. Throughout the fish sections we encounter statements indicating that the information presented is approximate, based on incomplete knowledge, or is simply a judgment call, but nowhere do we find a strategy for filling in the gaps. How does the Forest intend to begin answering the ten questions outlined on page II-70 of the Plan?

What ten year period was used to develop the forest's average present anadromous fish escapement figure (Plan II-23)? Recent returns, at least to the Yakima system, are considerably greater than those indicated and we question whether the figures presented accurately reflect the present escapement condition.

Why is smolt habitat capability assumed to require full escapement on the forest (Plan II-24)? Assuming conditions in the habitat are not widely fluctuating then its capability will remain unchanged regardless of escapement level. The number of smolts produced may vary with parent escapements but the habitat's ability to sustain them is a variable independent of fish numbers.

The Forest's estimated commercial and sport harvest potential (Plan II-24) is misleading: What mortality rate is referred to when it is assumed that "off-Forest dam losses are nearly eliminated"? Given presently available technology we can, at best, anticipate a reduction in average per-project mortality from the existing 15 percent to something between 5 and 10 percent. That's still a far cry from near elimination of mortality. Those same anticipated harvests are also based upon the assumption that the systems will "produce fish to their

maximum potential". Is this a realistic condition to expect? Naturally operating systems rarely, if ever, produce any one species (or group of related species) at a maximum rate. Rather, balanced systems simultaneously produce numerous species at rates below any one's maximum. This helps to maximize species diversity and the occupation of all available ecological niches. Continuously maximizing any particular species can only be done at some other species' expense, and such a condition is indicative of a system out of balance. The potential harvest figures, therefore, need to be based on more realistic assumptions and recalculated. Further, it would be helpful if these tables displayed (1) applied smolt-to-adult survival rates, and (2) more consistent units (e.g. smolts produced and number of adults harvested rather than smolts and pounds of fish harvested.)

The Wenatchee National Forest's responses to issues, concerns, and opportunities (Plan, Chapter III) contain confusing, often faulty implications. While discussing wildlife and fish (III 4-5), for example, the Plan states: "Water quality may often limit the Forest's fisheries production potential. For instance, most of the streams exhibit very low water temperatures year-round due to their high altitude and have low nutrient content which results in slow fish growth". Such statements imply that cold, relatively sterile water is of low quality. This is simply not true. Water "quality" is a reflection of conditions that produce it. Pacific NW fish species have evolutionarily adapted to conditions, one of which is water quality, shaped by the region's long term climate, geology, and vegetation. If they hadn't they wouldn't be here in the abundance that they are (or at least were prior to technological man's intrusion upon them). It is illogical to thus infer that any major component of a successful system, such as water, would be of "low" quality. We must assume that well established fish species (or other long-time forest occupants) are well adapted to the water produced there, that it is apparently of sufficient quality to meet their requirements. So if their growth (for instance) is slower than that of another, similar species or stock in another location with different environmental conditions, this situation does not reflect, and should not be interpreted as reflecting, poor quality conditions in the former location. When the Forest Service insinuates that various habitats can be "improved" by warming the water and adding nutrients it displays both an ignorance of the adaptive process and ramifications of sudden environmental change and an arrogance about its role as land manager. As habitats are manipulated for man's benefit, many of those species that existed well in the unmanipulated habitat will likely decline in number. The alluded to "improvement" reflects a totally anthropocentric viewpoint.

This attitude is reflected elsewhere in the Plan. In the same section (III-5), for example, we find the statements: "The plan will maintain or enhance wildlife diversity by the identification and management of essential wildlife habitats. Non-game populations will be maintained while deer and elk

populations will increase". Our immediate response is, what habitats does the Forest consider to be non-essential? Also, if deer and elk are to be emphasized then a greater proportion of the forest will have to be maintained in earlier successional stages that favor such species. This, in turn, will restrict the amount of forest available to species that do not thrive under these conditions. So it is highly unlikely that the forest plan can fully achieve both intended goals. If one, or a group of, species is favored it will be at the expense of something else. The forest is not a bottomless cornucopia of resources; there are finite limits on what it can and will produce. Statements or implications to the contrary are false.

One extremely troubling aspect of Wenatchee's draft plan is its constant reliance on outside programs or agencies (e.g. Northwest Power Planning Council, BPA, and Bureau of Reclamation) as means to stem and reverse declines in numbers of anadromous fish returning to upper Columbia River watersheds. By so doing, the Forest implicitly absolves itself of any responsibility for having contributed to those declines. Simultaneously, however, the planning documents recognize that "{t}imber harvest, and roading due to timber harvest, are man's activities which would have the greatest potential to reduce fish habitat capability on the Forest" (Plan IV-45). Surely the Forest can see that, given the existing obligations (and ongoing efforts) to rebuild depleted Columbia River fish runs, reducing fish habitat capability is tantamount to reducing fish numbers. Forest management activities on the Wenatchee, therefore, do have direct impacts on the forest's fish resources. As a result, Wenatchee National Forest must include in its management plan a clearly set forth program of how it intends to replace fish lost as a result of its silvicultural activities. The Forest cannot simply rely on other programs to increase escapements, wait until some establish residence on its lands, and then take credit for increasing production. As long as some forest management activities directly contribute to declines in fish numbers, then other forest management activities must be carried out for the express purpose of replacing those losses. Habitat improvement projects dependant for funding upon other, fish habitat capability-reducing activities (e.g. those funded by timber sale-generated KV funds) are insufficient. The fish's welfare cannot be held hostage. Past timber sales, for instance, have damaged fish habitat with virtual impunity. Continuation of the timber program cannot be a prerequisite to rectifying that condition. The Forest must realize that it has a duty to protect the entire spectrum of forest resources and that the days of some resources being more equal than others is past.

Wenatchee's Fisheries Inventory/Improvement program, outlined on page IV-44 (Plan), indicates that an average of \$111,000/year will be spent. Of this amount, \$86,000 (77%) will be KV monies; the remaining \$25,000 (23%) will be appropriated funds. In other words, better than three quarters of the anticipated habitat work will be entirely contingent upon implementing a successful, profitable timber sale program! Such

an approach concerns us for numerous reasons. Initially, fish habitat damaged by past timber sale activities will not likely receive benefit from these funds unless a new sale that generates KV dollars occurs in the same general area. Assuming that most new sales will be laid out in new areas, then most damage from earlier sales will likely stay unfixed. And if this is the case, then the forest's existing habitat deficit will simply remain.

What information does the Forest have that leads it to believe that future timber sales will be so profitable that they will generate sufficient KV dollars to supply that program's other responsibilities (e.g. replanting cut-over lands) as well as the \$86,000/year that will fuel the habitat work? Have past timber programs been so lucrative? Will the fluctuating timber market lend its support? We remain somewhat skeptical and question the wisdom of assuming that all will work as smoothly as the Plan would have us believe. Because if it doesn't, the habitat disturbing activities will likely have occurred (timber programs are hard-money based) but the "soft" KV dollars necessary to put damaged habitat back together may not be available. Where are we then?

The draft Plan clearly recognizes the demand for increasing the fish resource on Wenatchee forest lands. It also notes the massive efforts being expended elsewhere to help satisfy that demand. Why then is Wenatchee's commitment to this aspect of forest management so tenuous? Surely a case could be made to support a request for appropriated funds or other hard monies with which to initiate the much needed fish program on Wenatchee National Forest. Until such time as the Forest Service is willing to demonstrate that its commitment to managing the so-called amenity resources is similar to its commitment to commodity resources, it will not deserve the confidence of agencies or people who recognize the major imbalances in its management programs.

TIMBER

Harvest levels

Current timber harvest level is 170.9 MMBF with 5.9 MMBF of unregulated harvest for a total of 176.8 MMBF (Plan-II-27). The ten-year average (1975 to 1984) harvest of green timber was 146 MMBF. During this period the actual volume offered was 184 MMBF; the volume sold was 164 MMBF. Presently 850 MMBF of uncut timber volume is under contract. Allowing that timber companies usually keep a two-year volume on hand at any time, they have 478 MMBF of uncut volume which can be added to any new purchases (Plan-II-30). The Plan will decrease the total sale volume to 78% of the current management plan (Plan-III-7). Under Alternative C the chargeable volume is 129.7 MMBF and the total volume is 138.1 MMBF. Given the large stockpile of sold timber volume which can be added to the harvest planned for the next decade, a total volume of 185.9 MMBF could be harvested per year for the next

decade. This harvest magnitude is essentially a departure from the current harvest level. If federal timber had been more expensive the logging companies would not have bought it and built up a stockpile. If these companies did not have their stockpile, the WNF would not increase their offerings in any year to make up for any reduction in harvest during a previous decade. To prevent cumulative effects of logging by various logging companies working in a basin, there should be an annual limit on harvest volume as well as sale volume. That is, harvest volume should not exceed LTSY. Buying timber when it is cheap, stockpiling it and then cutting massive amounts when a profit can be made might be justifiable by the timber companies but intensifies the burden carried by the environment.

Timber Yield and Prescriptions

Timber yield tables for the general forest and for special prescriptions involving long rotations are given in the Plan (IV-49). Prescriptions for the general forest are GF-1, 3, 4, 5, and 6. These represent high to low silvicultural investments (primarily level of planting and thinning and harvest method). Only 3961 acres are allocated to GF-1 and 242,490 acres allocated to GF-4. With the silvicultural treatments provided on GF-1 acres, the average annual growth at culmination (CMAI) would be 60.3 ft³/acre/yr on wet forest types. On GF-4 lands this figure is 57 ft³/acre/yr. On GF-1 land trees reach 19.1 inch DBH at CMAI at 110 years while under GF-4, trees reach only 10.1 inch DBH at 110 years old. Although the growth rates at CMAI are provided for comparison, what are the differences in resulting timber volumes for the two prescriptions? On the surface it appears that it would be worth treating more land with the GF-1 prescription because in wet forest, 7 to 9 inch trees are worth \$222 and 19 inch trees are \$525.50. Even larger trees can be worth up to \$613.94. How do the economics of silviculture and harvest of trees in GF-1 vs. GF-4 compare? How will wildlife populations fare on such massive devotion to GF-4 compared with GF-1? Will local mills be able to retool to handle the much smaller logs and will these logs satisfy the full range of future demand for wood products?

"Volume projection for existing stands is very important because predicted yields are critical in the determination of allowable sale quantity" (Appendix-B-53). A land prescription such as GF-4 accounts for a large acreage. How accurately does a single yield table represent such an area? How homogenous is an area such as represented by GF-4 lands? Have experimental plots been studied on steep hillsides of different slope gradients, altitudes, aspects, and soil types to explore the range of growth response? How well have the topographic and soil conditions been evaluated for each management prescription in arriving at a real average yield table for each?

The average net growth on the WNFs existing timber stands is 29 ft³/acre/yr. Additional yield can be achieved by the following treatments: planting genetically superior trees- 10%;

thinning of stands- 10%; disease and insect losses- 30%; harvesting trees at culmination- 50%; fertilization- 7%. These treatments amount to 107% increase. Are all these treatments necessary to achieve the growth attributed to GF-1? When it is stated that 50% more growth can be achieved by harvesting at CMAI (110 years for wet forest in GF-1) rather than allowing growth to slow down, what age forest is the one at CMAI being compared with? It would seem that terminating growth at culmination is premature. During all the growth of any given forest plot prior to CMAI, the volume increments were less than at CMAI. If the decline in growth rate were precipitous it might be justified to cut the trees at CMAI but if the growth rate 50 years after CMAI is equivalent to that 50 years before that point, there is no more reason to stop growth at CMAI+50 than at CMAI-50. Letting trees get larger makes them more valuable in addition to providing more wildlife habitat, vegetation diversity, and less sedimentation.

Table IV-9 (Plan-IV-52) presents the present and future conditions on the WNF related to growth, mortality, and growing stock of trees. Presently annual net growth is 25.9 MMCF/yr; annual mortality is 10.2 MMCF/yr. Total annual growth is then 36.1 MMCF. The timber sale program is 25.3 MMCF/yr offered for all 50 years (Plan-IV-27). The ASQ of green trees is 23.8 MMCF/yr. Annual net growth minus ASQ equals 2.1 MMCF/yr which should be added to the growing stock. Annual growth is shown to increase from 25.9 to 27.0 MMCF/yr in the future forest so the growing stock should increase even faster than 2.1 MMCF/yr with time. Why is there such a drastic decline in the growing stock (i.e. from 2056 to 1580 MMCF)? The LTSY for alternative C is 29.3 MMCF/yr. Why is timber growth in alternative C listed as 19.7 MMCF/yr in year 2030 (DEIS-II-113)?

Using the conversion 5.45 BF/CF (Appendix B-79) one could calculate that 8.8 MMCF will be added to the annual harvest for the next decade solely through the harvest of the stockpiled volume. This means that 32.6 MMCF/yr could be harvested. This harvest level, which is above the LTSY, appears unwise. It could not, however, account for the large decline in growing stock. How does this decline occur?

Under alternative C there will be a suitable timber base of 643,898 acres. The acreage allocated yearly to various harvest techniques will be: clearcut- 1934 acres; shelterwood- 5026 acres; selective cut- 2896 acres; total cut from 9856 acres. Will these selective cuts be primarily small clearcuts or primarily individual selection. Clearcutting in the past has been 3000 acres/yr (DEIS-III-62) so there is apparently an effort to reduce acres of clearcut. Is this change designed to meet an MMR?

Special Harvest Prescription

The special timber harvest prescription SP-2 will be used in EW-1 and EW-2 management units. This special yield table

requires "long-rotations of up to 260 years" (DEIS-IV-44). What does "up to 260 years" imply? Establishing 260 years as a rotation age is an important new concept in timber management (see L.D. Harris, 1984, "The Fragmented Forest" in which long rotations of 320 years were proposed). What is the frequency distribution of forest site types in the EW-2 zone. It could be a concern that poor sites would not allow old growth characteristics to emerge at stand ages less than 260 years.

A comparison of the GF and SP yield tables raises some questions. The GF-1 prescription has a pre-commercial thin and a commercial thin at age 70 to 90 years and has 54 trees per acre at CMAI at 110 years. The SP-2 yield table used in EW-2 (riparian) has only a precommercial thin and has only 20 trees per acre at 130 years. Why is there this great difference in number of trees per acre? Riparian zones should be an area of greater than average tree production so the low tree density and timber production here is peculiar. What tree densities in old growth stands are typical in different areas of the forest? Is the low timber production in the EW-2 area compared with GF areas solely a result of the different stand ages used (110 years for GF-1 and 130 years for SP-2)? What is the growth rate in EW-2 areas at 110 years?

If 25 foot riparian zones are the rule on low gradient, highly productive anadromous streams, one could expect a tree stem every 87 feet (using 20 trees/acre as a wet forest density). The S+Gs for EW-2 suggest that the leave trees in this zone could be concentrated near or away from the stream depending on how much light is desired in the stream bottom. If the riparian width is 25 feet, concentrating the trees along the stream essentially means having a "picket fence" along the channel.

How exactly would a long-rotation work? Would half of the initial stand be removed on the first commercial cut and half on the second cut? Removing more than 50% on the first cut could simply remove the oldest trees and leave only trees significantly less than 130 years old. These trees would then not be able to reach 260 years old by the second cut. This process would reduce the effective maximum stand age from 260 years to something much less. Trees of greater than 130 years old should be left to produce 260 year old trees in the regenerated stand. These trees should represent a frequency similar to a normal old growth stand. Which tree species are to be left after a first cutting? Will the leave trees represent the species mix found originally? If a riparian community has been managed in the past, will future management provide the species composition which might have been found before any management? For example, is cedar to be a component of the riparian community of the future? Will presently managed riparian zones be allowed to attain 260 years of age before further cutting?

Local Communities

Typically timber harvest is justified in the interest of

supporting local communities. Longview Fibre and Plum Creek export a significant amount of logs to Pacific-rim countries. What fraction of trees taken from the WNF is simply shipped overseas for further processing. It would seem that the argument of supporting local mills and economies with high levels of harvest is unjustified if these logs are shipped out of the community.

Historically, local mills depended for about 60% of their timber demand on the WNF (DEIS-II-65). New mills are proposed at Entiat and Pateros with a capacity of 50 to 70 MMBF. If privately owned timber is largely gone, where will these mills get their timber? Can the forest afford to encourage more mills to be dependent on national forest timber when these mills do not plan on future extinction of private holdings? These companies plan to "liquidate their timber assets within the next decade" (DEIS-IV-76). These companies are unable to produce timber at sustained yields so intend to try to pass on a "liquidation" mentality to the Forest Service and see the high value fish, wildlife, and recreational base sacrificed.

Revegetation

Only 6 of 16 tree species on the WNF are considered important enough commercially to warrant investment in tree improvement (DEIS-III-60). These trees are Douglas fir, ponderosa pine, western white pine, noble fir, pacific silver fir, and western larch. There are seed orchards for all but western larch. Even though revegetation will be done by mixed planting, it would seem than with the enormous acreages involved that some tree species which are presently in low densities will become even rarer. Cedars, for example, are in high demand and were once common in riparian zones. How will this and other species fare in the future and how will demand for these trees be met?

Land suitability

About 30% of suitable timber land occurs on slopes suited to use of tractors and rubber tired skidders (DEIS-III-144). These vehicles cause soil compaction. On steeper slopes the incidence of surface erosion and mass failure increases. Lands listed as having regeneration difficulty include those on slopes greater than 99% (Appendix B-11). Why was such a steep slope chosen as a baseline for concern? Has it been found that on all soil types that 99% is the point at which erosion hazard increases dramatically? An information need for soils is to find the amount of canopy which can be removed "before failures start to move" (Plan-II-72). Hopefully, the goal is not to see exactly how much can be removed in an effort to get the slope just within the critical point.

Of the old-growth lands, 87,584 acres are considered suitable forest land and 34,529 are unsuitable. What makes these

lands unsuitable? Are they less than 10% stocked? How will the unsuited lands of old-growth be used to meet the needs of old-growth dependent species?

Roadless Allocation

There are presently 694,200 roaded acres on the WNF out of a total of 2,164,180 acres (DEIS-III-55). On the suitable dry and wet forest there are a total of 492,182 roaded acres. There are 643,898 suitable acres designated in alternative C (Plan-IV-47). This would indicate that 151,716 acres of suitable forest are to be roaded under the preferred alternative. However, adding up the acres to be roaded from the 23 inventoried roadless areas (DEIS-II-27) shows that 288,702 acres will be roaded. Unfortunately, in order to add 151,716 more acres to the timber base about twice that area will be roaded. Of the 23 inventoried roadless areas only 8 will leave greater than 50% of their area as roadless, whereas it is stated that 19 of the 23 will have a "substantial" portion maintained as roadless (DEIS-II-27).

The DEIS (II-102) shows wilderness use to be the same for all alternatives in every decade. With the large differences in roadless area available among alternatives, is it reasonable to assume that the lack of roadless-non-motorized recreation in one alternative would not be met with higher use of the wilderness areas?

K-370 Wild and Scenic Rivers

Timber harvest allocations would preclude possible Wild designation on some rivers (DEIS-IV-109). Does this occur in alternative C? Only the Chiwawa, White, and Wenatchee Rivers are proposed for classification in alternative C, whereas some other alternatives propose the Entiat, N.F. Entiat, and Mad Rivers. The DEIS (IV-126) claims that the Mad River, Swauk-Naneum Creek and Naches River minor tributaries have more than 50% of their area allocated to harvest prescriptions; the Entiat River, Mission Creek, and Taneum-Manastash Creek watersheds have more than 40% allocated to harvest prescriptions; all others have less than 40% so designated. The Little Naches River at 50% timber harvest allocation was overlooked. Also, when private acres are included in the analysis of percentage of the subwatersheds allocated to timber harvest, the picture is much different. There will be 24 of the 27 subwatersheds in which more than 50% of the basin will be harvested (DEIS-IV-67).

ROADS

Road density

Alternative C will result in new road construction of 1710 miles in the next 50 years. Of this, 810 miles of road will be constructed in unroaded areas and most of this will occur in the next 24 years (DEIS-II-30). Since most of the road mileage will be concentrated in the suitable forest land, the construction of

810 miles of road on 151,716 acres equals 3.4 mi/mi². This road density is what would be expected on gentle slopes (Plan-II-54). Much lower road densities would be found on steeper slopes. Why is the typical road density of roaded areas for the WNF listed as 3.75 mi/mi² when densities as low as 1.1 mi/mi² are found on steep slopes? If the WNF will be fully-roaded within the next 24 years, why are sedimentation peaks occurring in the 14th decade? Considering the increasing demand for wilderness and roadless recreation and the critically short supply of wilderness recreation, why does the road-building policy advocate massive upfront construction? This seems to preempt any further consideration of many roadless areas from protection or use as recreation areas and concentrates sedimentation into the next 3 decades.

Road density in the past has averaged 4 mi/mi². Current roading practices will reduce this to 3 mi/mi² on newly roaded lands (DEIS-IV-92). However, because the remaining timber base will be on those lands of greater than average steepness, this reduction in road density may reflect a change in harvest method rather than roading method. It is stated that "though new roads will be required, 50% of them will be closed, and a sufficient number of existing roads will be abandoned" (DEIS-IV-92). Timber yield lost due to long-term service roads is 4.4% and that due to spur roads is 1% (DEIS-III-146). If by closing 50% of the roads we arrive at a road density of 3 mi/mi², then the road density just after logging is 6 mi/mi². If timber yield lost due to roads totals 5.4% at a road density of 6 mi/mi², the road width would be 47.5 feet. If only permanent roads are considered, the road width would be 39 feet. Where is the error in these calculations? Possibly actual road densities are really higher than stated; or the degree of road closure is not as high as stated.

SOILS AND SEDIMENT

There are four major watersheds on the WNF which are considered separately in planning- the Chelan, Entiat, Wenatchee, and Yakima. In the WNF as a whole there are 200 different kinds of soils and 30 different geologic formations. The reason for this wide range of environmental conditions is the broad range of altitudes (750 to 9000 ft) and annual precipitation (10 to 120 inches). Soil Resource Inventories (SRIs) were used for general planning including identification of unstable soil areas and areas with regeneration problems. The SCS is currently completing intensive soil surveys on most of the WNF. Yakima county still remains to be studied. Intensive surveys will be available for the WNF in 3 to 5 years.

Which areas have been identified as unsuitable for timber harvest because of concern for soil productivity? Are there any guidelines as far as slope gradient, soil composition or type, landscape sensitivity (e.g. concern for fisheries), sediment yields or surface erosion levels which make harvest unthinkable? In which cases are harvest methods and scheduling simply adjusted

to allow harvest? The four major basins are rated for cumulative effects of soil erosion, compaction, nutrient loss, and mass wasting hazard. All four basins are listed as having possible cumulative effect problems with the four soil effects. It is assumed that negative effects can be avoided by proper management. If this is the case, why are mass failures and surface erosion so common in some basins?

Chelan soils are non-cohesive and are easily moved when surface vegetation has been removed (DEIS-III-82). While the Chelan occupies the position of least hazardous soil conditions, it would appear that under timber harvest activities, the possibility of surface erosion is very likely. "Slumps and debris torrents are an ever present risk" (DEIS-III-82). The description of the Entiat is very similar to the Chelan except for more widespread slumps and earth flows (DEIS-III-83).

Soils of the Wenatchee basin can be very erosive, many soils are prone to compaction, and mass failures have occurred recently in some areas although the basin is fairly stable to this form of erosion. The Chelan, Entiat, and Wenatchee basins are described as having very thin 'A' soil horizons. Because this soil layer is so thin, any additional surface erosion above background could constitute a serious loss of nutrients and reduction of site productivity.

It is peculiar that for each basin the potential effects of wildfire and controlled burning are emphasized over logging effects as the major cause of nutrient loss. The loss from fire was described as nutrient volatilization. Volatile elements in soil are principally N, S, P, and Cl with N being the major element of concern (Wells, C.G. et al, 1979, USFS Gen.Tech. Rpt. WO-7). Nitrogen, however, can be replaced through fixation by nodulated species. These species are often the ones which are excluded by chemical or mechanical means during the revegetation period. Wildfire is certainly a normal factor operating in the ecosystem. If these basins had experienced cumulative nutrient losses over thousands of years, they would not be so productive for tree growth. It is, then, not natural events which so much direct the trend in productivity, but management activity. If it has been decided that prescribed burns followed by suppression of grasses and shrubs are to be management decisions, it is the responsibility of the WNF to determine how productivity can be maintained. There is a tendency in the Plan and DEIS to emphasize accidents of nature as causes for negative effects and to downplay the negative effects of management or even to portray them as beneficial. Adequate ground cover is the primary factor responsible for maintenance of soil productivity and control of soil erosion. Loss of nutrients is much more substantial through soil erosion than by volatilization and it is logging, roading, and livestock grazing which are the primary determinants of future productivity trends.

The Yakima Basin has a wide variety of soil types. It has problems with surface erosion, compaction, and mass failures.

This basin is described as having the most serious soil erosion hazards of the four major basins. What special precautions in timber harvest are being exercised in the Yakima Basin to minimize soil erosion? What will substitute for intensive soil surveys here during the time (5 year period) in which these surveys are being completed?

In the course of an inventory (1978-1979) of degraded acres on the WNF, 143 sites were listed as needing rehabilitation. These sites were termed significantly damaged and eroding. Can rehabilitation really be accomplished on these sites? Since this survey was not completed, one wonders how extensive are the acres of degraded sites. How soon will the survey of degraded sites be restarted and what progress can be made on rehabilitation of all presently degraded sites in the next 10 years?

Index values to soil erosion were calculated for each alternative in the DEIS. The background level of delivered sediment is 930,500 tons/yr. During the first five decades, delivered sediment is below 44,100 tons/yr in alternative C. In decades 6 through 10 sediment levels double (DEIS-II-29). Delivered sediment levels from management activity are lowest in year 2030 in alternative E (23,700 tons/yr) and highest in alternative B and H (87,200 and 71,400 tons/yr, respectively) (DEIS-II-29 and IV-73). Alternative B shares the highest percentage intensive timber management (68%) and has the greatest percentage of clearcuts (66%) (DEIS-IV-75). Alternative D has only a slightly lower percentage of clearcuts (58%) but has considerably less delivered sediment than alternative H which has a lower percentage clearcut (50%). What management options were employed in alternative D to reduce sedimentation below that found in alternative H? Both D and H have approximately the same timber base and differ by only 11 MMBF ASQ. Why does H rise so rapidly from the third decade onward? Why do all alternatives have a sharp peak in sedimentation in the sixth decade? It appears that overmanagement reaches a critical threshold by the end of the planning process (5th decade).

Sediment yields were calculated from the Modified Universal Soil Loss Equation (Appendix-B-62). Which studies have established the validity of using this model as a predictive tool for the forest environment? The model might have general applicability on farmland with gentle slopes but it is questionable whether it is suitable for use in the WNF. What kinds of correlations between predicted and observed sediment values have been calculated? Are there any watersheds on the WNF for which recovery of instream sediment composition has been observed? It would seem that if background level sediment output from the WNF is based on incidental observations of suspended sediment and linked to an erosion model intended for use in a very different physiographic area, the results would be tenuous. Further, if activity related sedimentation provides only an index, there is no assurance that the relative levels of background and activity sediment are reasonable. While index values in one alternative may be twice that shown in another, it

might be argued by some that the increases are all negligible in relation to the background. This kind of statement would assume that we know with certainty the background level or the relative sedimentation levels of background and activity. The accuracy of estimates of the relative levels of activity derived sediment among alternatives is only as good as the accuracy of measures of erosion from different soil units under different treatments or the assumed indices of erosion of soil units.

Alternative E has a lower timber base (524,170 acres) than A, B, D, H, and I. It has 23% of the timber base managed by intensive harvest and 14% by clearcut. Consequently, it has the lowest delivered sediment. Alternative F is also comparable in management plan and sediment output through the first five decades.

Soil loss will reduce the long-term soil productivity by affecting total soil depth, and lowering soil water holding capacity, organic, and nutrient supply (Plan-IV-61). Because of the shallow A horizon depth on the WNF, the broad extent of management activity, and the tendency of management to accelerate erosion, knowledge of actual erosion rates is essential. While the index values may be of help in choosing among alternatives, they do not provide insight into actual erosion rates induced by management (Plan-IV-61). How have sediment inputs from mass erosion been accounted for? Have mitigation factors been employed in calculations of erosion from roads? Would different qualities of roads be built in the various alternatives and how do erosion rates vary on these? If the WNF instituted a policy of road use only during logging activity and then closing and seeding the road, what effect would this have on sediment outputs? If roads are the predominant source of accelerated sediment and decline in their sediment output is very slow, a policy of extensive closure would be advantageous. Benefits to fish, wildlife, and water quality are obvious. Does the WNF have the budget to maintain all roads which will eventually be found in a fully-roaded commercial forest land base if they are all to be kept open? Are there plans to develop models for accurately predicting sediment outputs under different combinations of soil type and management activity?

RANGE

The information on range is difficult for a reader to assemble in a way that allows a reasoned choice of alternatives. Some data will be tabulated below from the Plan and DEIS.

(Plan-II-32 and DEIS-III-67)			
Total forest suitable rangeland	401,000 acres		
Suitable range outside allotments and wilderness	197,639 acres	49.3%	
Suitable range in all allotments	203,461 acres	50.7%	

Estimated total livestock grazing capacity in allotments	27,517 AUM
Estimated grazing capacity outside allotments and wilderness	9,514 AUM
Total forest grazing capacity	37,031 AUM
1984 actual use	20,524 AUM

(Plan-II-66) Current outputs and supply potential

Under current grazing program	
1986	36,800 AUM
2030	39,100 AUM
Production potential	
1986	38,200 AUM
2030	40,700 AUM

(Plan-II-31 and DEIS-III-66)

Total annual forage production	336,000 tons	% of total	100.0
Forage available on steep slopes (i.e. greater than 60 degrees)	112,000 tons		33.3
Forage on steep slopes available to wildlife (10% of 112,000)	11,000 tons		3.3
Forage on gentle slopes	224,000 tons		66.7
Forage unutilized by animals	159,000 tons		47.3
Total forage available to wildlife and livestock (130 MAUM)	65,000 tons		19.4
1984 forage used by livestock	20,500 AUM		
1984 forage left for wildlife	109,500 AUM		
Current management potential of Forest to produce forage for livestock	37,031 AUM		

(DEIS-III-66)

Total forest area	2,164,180 acres
Area suitable for grazing by livestock	400,373 acres
Area outside wilderness capable of providing forage after silvicultural practices	500,871 acres

The data above make several assumptions possible. It appears that there are about 400,373 acres of suitable range

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(note discrepancy between Plan-II-32 and DEIS-III-66). Of this area 50.7% is in allotments. 49.3% of suitable range exists outside allotments and wilderness. How much of this area is grazed by livestock? Table IV-17 (DEIS) indicates that 571,300 acres will be grazed at high and moderate intensities and 326,900 acres will be grazed at low intensities in alternative C. Because suitable range is found on only 400,373 acres, it appears that 170,930 acres of timber land or wilderness will be grazed at high to moderate intensity. Why is this allowed? Are there wilderness allotments? Is grazing within allotments termed high intensity; is grazing in wilderness areas low intensity? How much of the grazing program depends on transitional range and what grazing intensity is proposed here? Grazing on transitional range is apt to increase erosion, slow the recovery of cutover sites through trampling of seedlings, increase the number of seedlings which need to be planted to achieve full stocking after 10 years, and necessitate expansion of the timber base to provide the same LSY possible without grazing of transitional range. Are there any studies to show that these concerns are unfounded? Which studies show that increased tree growth and survival occurs under grazing by cattle? Why is it acceptable to delay revegetation by 10 years but not to allow trees to grow past CMAI?

Aside from suitable rangeland there is an additional 500,871 acres of the WNF outside wilderness which is able to provide forage as transitional rangeland. How many of these acres at any instant in time during the 50 year planning period will be transitional range? Total annual forage production is 336,000 tons. Is this the amount produced on the 898,184 acres of suitable grazing land (DEIS-II-31). It is assumed that 47% of the forage produced either dies and is recycled or is the standing crop needed for future production and soil stabilization. Only 19.4% of the total annual forage production is available to livestock and wildlife. Of the total AUMs of forage, 16% (20,500 AUM) is allocated to livestock. Over the 5 decade period livestock numbers would be increased so that they consume 29% of forage. There is a current management potential to produce 37,031 AUM of forage for livestock (compare with stated potentials of 35,600 AUM in DEIS-II-31 and 38,200 AUM in Plan-II-66). What is the distinction between the current 1986 grazing program in terms of AUMs and the production potential? It appears that the current program is close to potential. What factors produce this situation?

It is reported that there are 22000 deer and 7000 elk presently. If the average deer weighs 200 pounds and an elk 1000 pounds it would appear that 137 MAUM of forage is required although only 109.5 MAUM are estimated in the Plan. There are WNF requirements for amount of forage to be left for watershed stability needs. If a greater amount of forage is really needed by wildlife as indicated above and the watershed requirement is fixed, isn't it dangerous to continue increasing the share allotted to cattle? Although it was claimed that allowances were made for environmental conditions, how many AUMs extra are there

which could be consumed by game? Are deer and elk numbers the only game considered in forage consumption by wildlife? How much is utilized by all other wildlife which must survive on allotments? What happens when abnormally dry conditions occur? Do range specialists ever monitor forage production throughout the grazing period each year to determine when cattle numbers should be reduced? Are cattle ever removed from the range ahead of schedule to protect the watershed, riparian zone, and wildlife forage for the winter season?

Most Forest Service plans claim that competition between cattle and deer is negligible. The WNF Plan, in effect, identifies cattle as the savior of deer by keeping shrubs from growing out of reach. If cattle are performing this service they are either trampling the shrubs or are eating deer food. Although the WNF does not appear to discount competition, it is always surprising how the actions of cattle can be glorified when the need arises.

There are 36 livestock owners with permits on the WNF (DEIS III-7) for grazing on 40 allotments. Only 15 of these jobs are provided to Chelan, Kittitas, and Yakima counties (DEIS-III-148). Current grazing on the WNF amounts to 2990 head of cattle. The number of cattle on the WNF comprises only 2% of the number found in the three counties centered on the Forest. Permittees depend on spring, summer, and/or fall grazing to balance their year-long grazing program. A few depend almost exclusively on the WNF resource (DEIS-III-68). If actual grazing is at the high end of the last 5 year level (20,500 AUM)(DEIS-III-68), then cattle can be expected on the WNF for 7 months of the year. Rather than a small dependence, most grazing on the WNF is done by ranchers relying heavily on the federal subsidy. It seems obvious that the generally minute dependence of the three county area for grazing on national forest land is insignificant. The small percentage of 40 permittees which may be totally dependent on grazing on the WNF amount to how many individuals? Are they dependent on the WNF because of custom, location of their ranch, or unwillingness to pay fair market rates for forage? Considering the great expense to the public in providing all the needed developments on the range to facilitate grazing for permittees (e.g. fences, springs, cattleguards, weed control, driveways, seeding, corrals, pipelines, bridges), how can the WNF continue the deficit spending on range and then not finance needed improvements to stream habitats and degraded sites on watersheds. It was stated that a high investment is required by both permittee and Forest Service before forage can be made available to cattle (DEIS-III-68). How much do permittees provide for range improvements beyond their grazing fees? How great is the financial loss to the WNF when the total expense of the range program is balanced against the minimal grazing fees?

Several poorly documented assertions are made regarding range which heavily influence the predicted effects of livestock. A reference to Scotten (1980) (not provided in literature cited) claimed that there was a big opportunity for improving wild

ungulate habitat by logging and range production (DEIS-IV-52). Supposedly more bluebunch wheatgrass seedlings become established under intensive management than under continuous grazing or complete lack of grazing. Also, after several years, soil cover and plant composition and densities are better outside exclosures where both livestock and wildlife graze (DEIS-IV-52). A related assertion is that grazing of suitable range through intensive systems will maximize production of forage for wildlife in key wildlife areas (DEIS-IV-56). Is stimulation of forage production by wildlife grazing considered insufficient to maintain plant diversity and density? How did plant or wildlife species ever survive before the introduction of cattle on the ranges? Since when has cattle grazing ever been an effective tool to minimize erosion? Are wildlife densities considered to be so low that cattle must fill in the niche and help to graze down the forage.

It seems that such an effort is made to justify use of the forest as rangeland that absurd claims are being presented as to the beneficial effects to the entire ecosystem through cattle grazing. Cattle will promote nutrient cycling, material cycling, and water cycling, increase plant diversity and density, increase wildlife numbers, stabilize riparian zones, increase the productivity of streams (DEIS-IV-52 to 56), increase water quality and water yield (DEIS-III-140), and reduce compaction of soils. This effort to find ecological justification for any management goal, regardless of the well-known abundant detrimental effects, is a specious use of science. These fallacious arguments are supported by the presumptuous thinking that every action of the ecosystem must be managed or altered for its own benefit. It is stated that wildlife habitat can be managed through use of vegetation manipulation, grazing, and prescribed fire. Why would everything need manipulation? It would seem that grazing on transitional range unnecessarily prolongs revegetation after clearcutting by cattle damage to seedlings. It is never demonstrated how conditions (cattle numbers, forage condition and production) on rangeland of the WNF compare with those in any studies cited. Although some of the beneficial effects of cattle might qualify as anomalies or novelties, they should not be taken as generally applicable unless heavily supported since they are counter to the majority of literature and experience. With assertions as far reaching as those presented for effects of cattle, the mechanisms should be thoroughly presented mathematically and should be well-documented, using more than one reference to support any claim. Range was not even a category for information needs in the Plan (II-68). Apparently a few disjointed references sum up all that is needed to justify increasing AUMs.

Since FORPLAN operates on certain tables relating cattle and wildlife numbers to forage production and projecting a multitude of effects on other components of the environment, there is no reason why most of the relationships for cattle and wildlife cannot be quantitatively expressed. This treatment would eliminate the questionable scientific assertions made. There is no indication which of these dubious effects is entered into the

model for range calculations.

As part of the quantitative explanation of cattle/range effects, it could be more effectively explained how there will be an improving trend on 85% of the range in alternative C and only 30% in alternative A by 2030 when grazing is decreasing in alternative A and increasing in C. This should also explain how a 20 to 30% increase in big game will occur in one decade in alternative C. The outputs of various alternatives become shrouded in a cloak of unsupportable range science and relationships plus the mysteries of a FORPLAN run. Part of the deception in presentation of the alternatives is the way that otherwise reasonable proposals are invalidated through a set of hidden baggage which makes them unacceptable. For instance, alternative A is the only alternative which offers continual small reductions in grazing through the 5 decade period. This plan would be feasible were it not crippled by limiting funds for range improvements and stipulating that only continuous grazing systems would be used. Why is there not an alternative with decreasing AUMs which is not so easily dismissed? A real lack of funds for range improvement does not go hand-in-hand with the decreasing AUM scenario. Range improvement funding for any alternative is surely not financed by grazing fees so these funds might as well be provided by WNF budgets. Why make grazing systems unequal among alternatives except to make certain of them unacceptable. Range managers know which system provides the best protection for a given allotment. The real question is how high should permissible AUMs be and still meet other environmental obligations. The WNF Plan simply sets up straw men and invalidates all but the desired alternative. Why is there only one alternative which reduces AUMs?

Another example of faulty planning is found in timber/fish management. Increasing timber harvest is linked to increased generation of K-V funds which can be used in habitat rehabilitation which will lead to increased fish production. If present stream habitats are simply protected from timber harvest activities how much increased fish production would there be? Why is it again that only management (building of structures) is able to provide the stated benefits? Are habitats in streams so degraded that structures are the only solution? It seems strange that the best hope for the fisheries is to remove the timber on the watershed in the hopes of generating funds which may or may not be released to build structures. This scheme might read "destroy it in order to save it."

It is difficult to determine the real effects of timber harvest or AUM levels when so many mitigating or corrective factors are applied. For example, what is the real correspondence between alternative C and E. Alternative E has the best fisheries production but \$200,000 of appropriated funds are budgeted for fisheries work. Is such a budget feasible in reality? What would be the effect of increasing the appropriated funds in alternative C? Why was \$25,000 chosen as an appropriate level of funding and not \$100,000. It would be nice to know

whether the fisheries benefits in alternative E primarily derive from the reduced timber harvest or the fisheries budget. Dismissal of alternative E might easily be caused by varying the costs of uncertain mitigating coefficients and appropriations among alternatives with consequent results on the PNV rather than really observing the benefit of decreasing timber harvest.

The effects of grazing on fish bearing streams is not known on the WNF (DEIS-III-140). There are 938 miles of fish-bearing streams on the WNF and 56 miles of them are in present allotments. Alternative C will add new allotments and increase grazing by 10 to 20% (DEIS-III-68)(or 10 to 15%, see Plan III-8)(or 10 to 12.5%, see Plan-IV-52) in the first decade. At the same time, there will be over 70% more miles of fish-bearing streams in allotments after the second decade. Why are new allotments chosen to provide such a substantial increase in effects to fish-bearing streams when the effects are so poorly known?

Competition between livestock and big game can be reduced or eliminated (DEIS-IV-52). Is competition being eliminated through forage allocations and location of allotments? It would seem not. The WNF has 10 to 20% of the winter range available to wildlife in the area (DEIS-IV-52). However, approximately 50% of the WNF winter range is within commercial livestock allotments (DEIS-III-140). With most winter range being located on private land, it would seem that wildlife would be forced to survive on winter range grazed down by cattle during the summer and fall.

As for inter-and intra-specific competition in big game it "can only be controlled by... hunting" (DEIS-IV-52). These statements again deny any capability of an ecosystem to regulate itself. Why neglect the effects of natural predators or food supply to regulate the populations.

STANDARDS AND GUIDELINES

Forest-Wide

An average of at least two dead and down tree segments per acre (12 inch diameter, 20 foot length) will be left after timber management activities on a site (Plan IV-90). What reference can be cited to substantiate this as an adequate minimum? A review of down wood in old growth forests in Region 6 showed that 31 to 265 tons per acre can be expected (Maser and Trappe 1984). One study reported 121 fallen trees per acre in various decay classes. Considering the importance of fallen trees to maintenance of wildlife habitat (95 species depend on this material, see DEIS-III-39), establishing such a low minimum level can only mean that wildlife numbers will decline. What projected down log level in managed areas was actually used in projection of future wildlife population numbers?

Minimum hard snag requirements per 100 acres for primary cavity excavators will be set to the 60% level (presumably of Thomas 1979). Why is the 60% level established as a good level and what is the present wilderness and non-wilderness average for the WNF? Why does the Plan (IV-90) say only "favor" retention of snags with sign of excavation? Are there plans to remove snags with no present sign of excavation so that snag levels can be reduced from 100% down to 60%? What will be the future diameters of timber produced on these same sites? Will they be large enough to assure future snag recruitment of the larger size classes necessary for certain wildlife? How many green trees will be left on clearcut sites to provide snags or down logs during the period of regrowth? Why is deference shown to the customary method of timber operators to fall all snags? Will this be allowed? It was also customary to fill stream channels with slash and to fall trees downhill.

On winter range it was advised to "consider" short-term roads (Plan IV-91). Because the density of all road types, including local and work roads, which are established through harvest activity is much larger than that recommended for reduction of harassment to wildlife, the requirement for road closure after use should be much more stringent. What will road densities be on logged areas in the various management units after termination of the harvest activity? Because long-term plans for watersheds typically involve cumulation of road miles, road densities reported should not dilute the average by adding in unroaded area outside the management area.

Summer range should have well-distributed cover on 40% of a watershed (Plan IV-91). What is the average percentage cover on summer range undisturbed by past management? This guideline conflicts with that for timber harvest to leave at least 60% cover on watersheds of 1000 acres or more.

The guideline to minimize management activities on spring range "where possible" that would conflict with deer and elk and to provide abundant forage where possible is weak. Why does a more positive guideline such as this not also apply to summer/winter range? Also, how is deer and elk winter range protected by the summer/fall livestock grazing program? A non-structural habitat improvement for winter range was listed as livestock management (Plan IV-91). What is the evidence that livestock is a tool to improve diversity and abundance of forage at the densities prescribed for allotments?

Range

Problems of overuse of allotments or lack of forage are treated by expanding the allotment (Plan-IV-92). Another method which should be listed is decreasing permitted AUMs of livestock. The declining demand for beef nationwide, the minute amount of US beef contributed by national forests at great cost to the taxpayer and ecosystem integrity, the small number of ranchers who benefit from grazing rights on the WNF, and the breadth of

impact of grazing to the WNF add up to a general inability to justify maintained or increasing permissible AUMs.

The table describing allowable use by management intensity level on slopes of various hazard classes is hard to interpret (Plan IV-93). Why, for any soil-slope category, do the percentages not add up to 100%?

Timber

Silvicultural systems must promote stand structure and species composition which avoids risk of environmental damage (Plan IV-94). Does this mean that in replanting that a diverse mixture of tree species will be used and that selective harvest methods will be favored?

Riparian zone widths (Plan IV-97) appear to be reasonable except for the wet forest types on low gradient side slope areas. These areas are apt to be the prime anadromous or resident fish streams and consequently may need more extensive riparian areas to provide shading, litter and wood inputs, channel and bank control, and wildlife habitat. Widths of 75 to 100 feet would be a more appropriate base level. Are riparian widths on side slopes of greater than 70% meaningful; that is, what is the maximum hillslope gradient for which timber harvest is allowed?

A minimum of 80% of an activity area will be left in a condition of acceptable productivity potential for trees after land management activities (Plan IV-98). Does this degree of productivity reduction include that area tied up in permanent roads? Permanent productivity losses on other areas are not permitted by NFMA guidelines. Is loss of productivity from compaction not considered serious if it can be reversed in 100 years?

A minimum percent effective ground cover after cessation of logging must meet certain standards according to severity of erosion hazard (Plan IV-98). On low hazard surfaces a minimum of 20 to 30% ground cover is required and on very severe hazard land 60 to 75% ground cover is required the first year after disturbance. What differences in harvest practices would provide these varying levels of ground surface protection? How can a second year level of ground cover be required? What happens if vegetative recovery is not as rapid as planned? Why would timber harvest be allowed on sites of severe or very severe erosion hazard? No harvest is allowed on Class V soils (Plan IV-98). Is a Class V soil one with erosion hazard greater than the "very severe" class listed in the table?

Detailed soil surveys will be used "where available" in project planning (Plan IV-98). Since the general soil surveys were stated not to be adequate for project planning, what soil analysis will be used for project planning until detailed surveys can be made available?

Roads

Roads on the WNF will not be closed unless "it is necessary to protect or enhance National Forest resources" (Plan IV-105). What percentage of roads of different classes which are to be built will be closed to further traffic after an activity? Signing as a method of instituting road closures is impractical. What methods of road closure will be used?

PRESCRIPTIONS

EW-1 (Key Big Game Habitat)

The S+Gs for the big game habitat units state that range practices will "maximize the production of key forage species for big game." Here, as elsewhere in the Plan, there is the dictum that livestock will be used as a "tool" to benefit wildlife. This appears to be the worst kind of perversion of science and management by construing that the range and stream destruction from cattle grazing we have seen over the last century has been for the betterment of fish and wildlife. If cattle are the tool to maximize forage production for wildlife, then it should be shown that cattle only stimulate forage production and do not consume it, or it should be admitted that wildlife numbers are too low to provide the stimulation to production by cropping that has now been given over to cattle. In summary, production is not maximized for wildlife if a large part of it is taken by cattle. It needs to be well documented that cattle are a tool for improving quantity and quality of forage. Citing one study for such an important claim is hardly sufficient. Even if such a claim is substantiated, the WNF should satisfy the public that proposed AUMs fall within the limits set in these studies and that the WNF employs and enforces the same kinds of management strategies. It means little to prescribe frequent redistribution of cattle by herding when ranchers leave the cattle to inhabit the riparian zones all summer.

Why does the WNF state that created openings will be considered closed when tree heights are 6 feet in areas for deer and 8 feet for elk. Are the deer and elk areas so distinct? Thomas (1979) states that winter thermal cover for elk is 40 feet tall. The Wallowa-Whitman Forest uses 10 feet or greater as the height necessary to be considered closed. Although no more than 40% of any 1000 acre watershed may be opened, the 6 foot rule for "closure" means, in effect, that 80% of a 1000 acre watershed could be cut within two decades.

EW-2 (Riparian-Aquatic Habitat Protection Zone)

The goal of riparian zone management is to protect the distinct characteristics and resource values of this area (Plan IV-125). One of these unique characteristics is continuity of riparian vegetative cover. Although small clearcuts may not be the norm, why are they contemplated at all. The aquatic species which evolved in the streams of Region 6 experienced

predominantly canopied riparian zones. In the interest of providing an acceptable rationale for logging the riparian zones, managers of the WNF feel compelled to claim that logging will benefit the stream ecosystem. There now seems to be the myth growing that streams are really too cold or maybe too sediment-limited so clearcuts and slope erosion are effective management prescriptions. Sediment limitation is apt to be really a lack of woody debris to retain sediments. There should be an attempt on managed lands to design with nature rather than redefining ecosystem rules to correspond with management preferences.

What will be the "effective" rotation age for timber in riparian zones? What are the guidelines for age distribution of trees left in shelterwood cuts? Why is cutting necessary at all in the majority of riparian zones areas?

GF-1 through GF-6 (General Forest, variable timber investment)

These prescriptions represent a continuum from a tree farm utilizing predominantly clearcutting, thinning, fertilizing, and heavy replanting (GF-1) to managed wildlife areas with predominantly shelterwood cutting and low investment in silvicultural techniques (GF-6). The layout of S+Gs for these prescriptions confuse the issue (Plan IV-132 to 140). Do some statements apply to all prescriptions? What are the range S+Gs for GF-3 to GF-6? It seems strange that in a forest of 1,616,345 acres outside wilderness that only 126,756 acres emphasize wildlife management. On the GF lands, livestock grazing will favor timber production (Plan IV-133), yet livestock will be assured the full amount of forage allocated to it. On GF lands the interests of timber and range management seem to be emphasized. Wildlife needs will be met only to "the extent possible" in scheduling timber harvest. Protection to fish habitat or riparian zones were not listed in GF areas. Is it correct that management of these resources will follow forest-wide guidelines? Riparian planning is to achieve objectives of the area management (Plan IV-96). Does this mean that riparian management varies with the GF area objectives through which it passes, or are all class 1 and 2 streams considered equally regardless of the management unit through which they flow?

OG-1

Managing old growth areas on 260 year rotations is a reasonable timber management method which should be employed as much as possible. The primary difficulty with this method would be the intended rate of harvest. Will harvest rate over the next 50 years be at the sustained yield rate on a 260 year rotation? Also, how will roads be managed under this prescription? A fully roaded old growth area with full access to all road miles negates the benefit intended to wildlife dependent on old growth. Stringent road closures must be established for this area in particular.

The plan to salvage dead and dying trees in old growth areas is not in the interest of the wildlife which the old growth area is designed to protect. Recruitment of snags and down logs depends on a continual presence of dead and dying trees in the forest stand. Removal of these down to levels of "2 snags with at least 3 tons of down material (including 3 logs) per acre" (Plan IV-141) is irresponsible. When the number of fallen trees in an old-growth Douglas-fir stand is 121 trees/acre or more and up to 595 tons/acre, specifying minimum levels which are acceptable (and such minute levels) only leads to attempts to minimize the amount remaining.

RE-2 (Dispersed Recreation, Unroaded, Motorized),
RE-3 (Dispersed Recreation, Unroaded, Non-motorized)

The dispersed recreation prescriptions allow only salvage harvest. What method of salvage removal would be employed? Since "short-term roads may be constructed to protect adjacent resources" (Plan IV-154), would salvage to prevent spread of insects or disease be sufficient justification to build roads in an unroaded area?

Range management in these two prescriptions features Level C Management. This involves full utilization of forage allocated to livestock. While the objective of RE areas is supposed to be dispersed recreation, the predominant rights which appear in wording of the prescription favor livestock. Even trail reconstruction will be conducted in a way that favors forage production. While one might assume that wildlife will benefit from this, only the rights of livestock to forage are emphasized.

RM-1 (Intensive Range Management)

Allocation of forage for wildlife on the intensive range areas will be based on analyzed needs (Plan IV-161). Does this imply that if wildlife numbers decrease, that needs will be less? How have wildlife needs for forage been determined for the RM areas and will they be constant regardless of wildlife numbers?

WI-1 (Wilderness)

Level B Management will be implemented for livestock grazing on wilderness areas. Distribution is to be achieved through riding, herding and/or salting. How much riding and herding is actually used in wilderness compared with salting? Because fencing is not allowed in wilderness areas, what method is proposed to reduce use of riparian areas by livestock.

MONITORING PLAN

The adequacy of a Forest Plan depends to a large extent on the effectiveness of its monitoring plan. The monitoring plan for the WNF is given in Section V. Comments follow on the monitoring program.

Recreation

ORV use effects will be monitored through evaluation of public comments. Will independent evaluations of sites be made by Forest Service field personnel? What is the ORV approved monitoring plan? Why aren't the details included in the overall plan? For example, further evaluation will be done if unacceptable damage is done. What level of damage is taken as acceptable?

Wilderness

How is the carrying capacity of a wilderness determined? This would affect both the ability to protect the wilderness resources and the estimation of future adequacy of wilderness to meet recreational pursuits. However, this says nothing of the capacity of the wilderness acreage and spatial arrangement to meet the needs of wildlife and other dependent resources.

Wildlife

The integrity of OG-1 areas will be monitored by field counting annually the MMR sites and biannually other sites. What factors would cause the loss of these sites? If harvest activities are closely monitored, why would the old growth areas disappear?

K-378

Population trends will be monitored by reviewing WDGs data. Doesn't the WNF do any wildlife surveys of its own? Does WDG data cover all MIS species? Which MIS species are being used in the monitoring plan?

A habitat capability of 60% was established as the minimum for primary cavity excavators? What is the current habitat capability and how was the minimum established? The cost per survey is \$2000; how many surveys will be done? Since monitoring frequency is every 5 years, this is a critical point. How representative can a single survey be for the entire forest?

Population trends of elk, deer and mountain goats will be reviewed every 3 years, yet the standard for further evaluation is a population increase or decrease for 5 consecutive years. This guarantees that the conditions for reevaluation will not be met. If a long-term change is a necessary condition, how long is implied? If the WNF is only responsible for managing habitat for big game, why does it monitor game numbers? Does the WNF have the ultimate authority to regulate big game numbers by recommending hunting regulations to balance the AUMs allotted to cattle?

Spotted owl pairs are monitored every 3 years for \$23,400 and T and E species are monitored every 2 years for \$5000. How many T and E species are involved? Is spotted owl monitoring much more difficult or is monitoring of T and E species much less

extensive? Is monitoring of T and E species adequate to represent sensitive and rare wildlife which do not appear on the list?

Fish

Habitat capability for resident and anadromous fish will be measured at 9 sites annually. Physical data will be used to calculate smolt or resident habitat capability. Biological data will be collected by fisheries agencies. If a 20% change in fish production is detected by fisheries agencies what would be done? How long are the index sites and how representative would these be? Will monitoring also be done in relation to logging activities on specific sites? What fraction of sites receiving management per year are monitored for effects on streams in their drainages. Does monitoring include pre- and post-management sampling? If funds are not available for monitoring, will any management be allowed?

What is smolt habitat capability and how is it measured? What parameters are identified in the field as a guide to future smolt habitat capability?

Migration obstacles for anadromous and resident fish will be monitored by accounting for changes in percentage of culverts inhibiting fish passage. It would seem that culverts inhibiting passage should be examined individually rather than as changes in percentage. Culverts on high priority anadromous streams should be repaired immediately. If new culverts are installed using improved techniques, the threshold of a 10% change in problem culverts in 5 years will not be reached even though the number of these problem culverts may remain the same. That is, the percentage of problem culverts declines as the number of high quality new culverts increases.

Range

The capability to produce planned AUM outputs will be monitored and a 10% change in projected AUM outputs would require reevaluation. What is the AUM output? Does it have anything to do with beef production or is it simply the number of cattle which grazed range on the WNF? Permitted AUMs appear to be a constant from year to year once the Plan is adopted. Why is annual forage production not evaluated on index allotments to provide data for mid-season adjustments in permissible levels of livestock. The term AUM is supposedly an index of available forage but when there is no monitoring yearly of forage production under varying climatic conditions, a fixed level of permitted AUMs would lead to damaged range in dry years. If cattle receive only a maintenance ration in dry years, they can be fattened up back on the ranch but wildlife must bear the consequences of overgrazing.

Allotment Management Plan objectives will be compared with Prescription Guidelines. When new allotment plans are written,

if guidelines are not being met, then action will be required. How often are allotment plans rewritten; how often are EAs done on an allotment? Which factors are the key ones to be evaluated when checking for compliance with guidelines?

The availability of transitory range will be evaluated annually by measuring AUMs. Why does the forest count so heavily on transitory range to supply forage when such a small percentage of total forage comes from it? Why is \$3500/yr spent on this activity when it is obvious that range is available after a clearcut? While \$3500/yr may not be a great amount of money to evaluate the forest, it seems extraordinary in comparison with the amounts spent to evaluate stream conditions.

Each allotment will be evaluated for trend, condition and production every 10 years. Four allotments will be studied per year. A trend could be established for only 4 allotments within any given planning period, at best. A 10% increase in acres of downward trend per allotment will initiate further evaluation. Does this mean that degradation of 9% per decade would be allowed? What would be done if a deteriorating trend is established? Considering that precision for range condition estimates is moderate, and a 9% reduction in condition was detected, is no further evaluation needed?

Timber

The annual and decadal timber sale program will be compared with 5-year plans and accomplishment reports on a board foot basis. What happens if 25% more timber is cut one year than was projected? Is there a determined effort to reduce the following year's cut by 25%? Is there basically no problem in allowing a 10-year harvest which is 10% greater than the ASQ?

Restocking of cut sites within 5 years will be assured. What minimum stocking levels are assumed for various species? What happens if a planted site does not meet minimum levels? Is there an obligation to replant sites on which previous planting efforts have failed? How have data on replanting success been used in scheduling timber harvest on sites on the WNF? That is, are there any combinations of slope, aspect, altitude, soil type, and annual precipitation which dictate special harvest restrictions or deny harvest at all because of regeneration problems?

Harvest is allowed only when the stand meets the CMAI requirement. What are the practical implications of this requirement? That is, is there a minimum age or a minimum volume requirement to be attained, or both? How does site productivity variation affect the age of first entry or clearcutting? Answers to these questions are pertinent to understanding the projected times between disturbance of future timber stands.

A fairly low emphasis is placed on determining timber yield tables (\$3000 expended once in the planning period). Since the

prediction of L_{TSY} hinges largely on the accuracy of the timber yield tables, it would seem that more emphasis would be placed on these studies. How accurately is timber yield known for the multitude of site conditions on the WNF? What are the variations involved and how are prescriptions matched with yield table information for a given site?

Water

The effectiveness of applying BMPs will be monitored on 10% of Project activities to assure compliance with state water quality standards at a cost of \$68,950/yr. The Water Quality Monitoring Plan lists variables to be monitored. Where is this plan described? The amount budgeted for this activity indicates concern for meeting the obligations to provide good water quality.

Cumulative effects on water quality and water yield will be assessed for major basins in the WNF. Are any data available at present which would act as the standard by which to evaluate deviations?

Vegetation components in the riparian zone will be monitored on 16 sites at 1 and 5 years after completion of the management activity. How will the sites be chosen? If more than 20% of the area has exposed soil after the activity, what could have been done during the activity to prevent this? How often will clearcutting be used in the riparian zone for tree removal?

Soil

Soil productivity will be monitored by evaluating 10% of all tractor logging units for percentage of area affected. If more than 20% of an activity area is compacted, reevaluation will be necessary. What degree of compaction is required? Will actual measurements of degree of compaction be made or will it be assumed that any paths of heavy machinery will cause compaction? Are cumulative effects of past management accounted for in these area estimates?

Soil erosion losses will be measured one time following completion of an activity from 1% of logging activity areas and road construction sites. If soil losses exceed 10 tons/acre/yr while the project is active, the activity will be reevaluated. What kinds of soil losses have been found in the past for various combinations of soils, slopes, and logging practices? Since acceptable soil loss varies with slope, why is 10 tons/acre/yr an acceptable standard for all slopes? Such a level would be extreme for shallow soil areas on steep slopes? What percentage over natural erosion levels does this represent for various conditions?

Soil productivity will also be measured on 6 dry and 14 wet pairs of forest sites by determining tree growth. Forty sites total per year will be evaluated. If growth rates are not equal

to or greater than yield table values of managed stands, the site will be reevaluated. Are the appropriate yield table estimates minimum values for the sites? If a site does not match the table value, will it then be assumed that the site is really different than those for which the table was created? How extensive is the present system of classification of sites and tabulation of yield estimates? What role does the monitoring program have in refining the tables? What would be done if growth rates seem too low? Does the monitoring program include plans for determining possible reductions in productivity of second growth of managed vs. natural succession on a given site type?

Accelerated mass wasting will be monitored when it threatens significant resources. What evaluation is planned for numbers and surface area of mass failures which may reduce productivity but not directly threaten other resources?

Mining

The adverse environmental impacts of mining operations will be continuously evaluated by reconnaissance surveys of compliance with operating plans at an annual cost of \$2,100. What are the standards for instream compliance; what will be measured? It would seem that this type of monitoring is superficial at the cost and using the methods listed. How much water quality monitoring is the mining company responsible for?

The number of active claims will be monitored continuously. A 10% increase in activity within a management area will initiate reevaluation. Within what time period will this increase be evaluated? Is there a threshold level of surface disturbance in terms of area or magnitude of delivered sediment which should not be exceeded?

The reasonableness of cost to mining operators for implementing their management plans will be assessed. Although costs of operating must be considered by mining companies before undertaking an operation, why is it the responsibility of the Forest Service to assure them that any activity may be conducted at a profit. If safeguarding the environment costs a certain amount, why must an operating plan be watered down so that costs to the operator are less than costs to the environment?

CONCLUDING REMARKS

The WNF has done a remarkable job in assembling a great deal of data and presenting it clearly and completely. There seemed to be few internal inconsistencies. The sections on interactions of major resource components were helpful and provided a good means of assessing the state of knowledge in various areas. Many good literature references were given but in many cases much more complete substantiation of management plans should be provided through literature reviews. We appreciate the candor of the WNF in listing the extent of informational needs rather than trying

to hide these in verbage. Greater ability to deal with the mass of data presented in the three volumes of the Plan could have been achieved with a more extensive Table of Contents and an Index. A great deal of searching was sometimes necessary because of the lack in this area.

We especially appreciate the extensive recognition of and reference to the unique relationship that exists between the Forest, the Yakima Indian Nation, and other affected tribal groups. In no other forest plan that we have reviewed has the Forest Service' obligation to meet treaty rights been so plainly acknowledged. This awareness by Wenatchee National Forest is indicative of the progressive management philosophy we often encountered during our review of its documents.

In describing each variable to be monitored it would have been very helpful to cross-reference specific standards and guidelines so that precise criteria could be associated with monitoring variables. From standards and guidelines, references could also have been given to literature citations which support the use of certain environmental criteria. This format could possibly better integrate the components of the Plan. It is often unclear which of the many relationships between resource components are actually used in modeling outputs. These should be more rigorously elaborated.

We feel that the best of management intentions are frustrated if standards and guidelines are inadequate and the monitoring program is weak or poorly funded. The present lack of information about many resources (e.g. fisheries, fish habitat, riparian zone conditions) makes real management difficult if not impossible until this information is collected. It appears to be the intention of the WNF to continue as usual in the interim hoping for the best using existing management practices. It should be a priority to collect needed information for management as rapidly as possible. In the absence of these data, fish habitat management should concentrate on stewardship of the resource. After all, there is a mandate to protect fish and wildlife habitat and no law which requires the WNF to log its forests. Monitoring needs to be emphasized to establish baselines from which to evaluate future trends and also to improve models of sediment yield. Monitoring funding should be attached as line items in the timber budget. No timber harvest should be allowed if the funds for monitoring are not available. No watered down version of an adequate monitoring plan should be accepted if funding is limited.

More expanded explanations of our position on monitoring are provided in the Appendix. First, there is a general consideration of the question. Second, there is an example of a monitoring scheme that should permit multiple-resource management.

If you would like further information regarding our interpretations of the Wenatchee National Forest plan, please

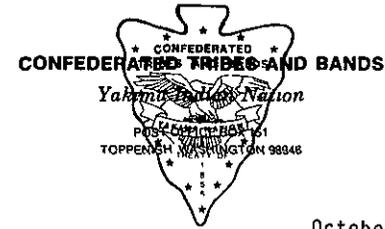
feel free to contact any of our staff, Jim Weber (policy assistant), Alex Heindl (biologist), or Dale McCullough (biologist) at (503)-238-0667.

Sincerely,


S. Timothy Wapato
Executive Director

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CENTENNIAL JUNE 9 1955



GENERAL COUNCIL
TRIBAL COUNCIL

04486

October 1, 1986



Wenatchee National Forest
P. O. Box 811
Wenatchee, WA 98801

Dear Sir,

Attached is the Yakima Indian Nation Wildlife Resource Management Program's review of the Proposed Wenatchee National Forest's Land and Resource Management Plan.

The review selects an alternative, however, qualifies itself by stating none of the alternatives adequately address the Yakima Indian Nation rights under the Treaty of 1855.

The Yakima Indian Nation recognizes the fact there is a wildlife resource interchange between the Yakima Indian Reservation and the Wenatchee National Forest containing the Ceded Area. The Yakima Tribe, through our Wildlife Program, is trying to preserve and enhance this wildlife resource and would hope that the caretakers of the Wenatchee National Forest would do the same.

Sincerely,

Harvey E. Adams
Harvey E. Adams, Vice Chairman
Yakima Tribal Council

HEA/CEP/amb

TO Mel Sampson, YIN, Tribal Council Chairman,
through Carroll Palmer, YIN, Natural Resources
Division Deputy Director

FROM YIN, Wildlife Resource Management Program Staff

DATE 9/30/86

SUBJECT Comments on the US Department of Agriculture, Pacific
Northwest Region's Wenatchee National Forest Proposed Land
and Resource Management Plan, Draft Environmental Impact
Statement

K-382

A large portion of the deer and elk herds that summer in the Tieton River Basin winter on the Yakima Indian Nation's Toppenish Creek Game Preserve and adjacent tribal lands. These herds provide an important natural food source for the Yakima Indian people. While the tribe has allocated large winter range areas to conserve this resource, the ultimate success of these animals depends on the land management practices on the summer range by the U.S. Forest Service. This illustrates how forest activities within the Wenatchee National Forest impact the wildlife resource within the Yakima Indian Nation's boundaries. In addition, the Wenatchee National Forest represents a large portion of the Yakima Indian Nation's ceded area. The Yakima Indian people retain basic treaty rights with respect to the wildlife resource within this area.

In the short time we have had to review the proposed Wenatchee National Forest plan, we have become aware of some major faults in the development of all the alternatives. We will briefly outline our concerns relative to the alternatives and then select an alternative to meet the wildlife resource treaty right needs of the Yakima Indian People.

The alternatives were developed from the "issues and concerns" of public opinion. This information was to serve as the data base for analysis of the major issues and concerns and subsequent alternatives were developed to reflect these issues and concerns. The compiled information was fed into a computer and the analysis was completed using a program called FOREPLAN. This is pointed out in the Draft Environmental Impact Statement, (DEIS). What the DEIS fails to point out is that the assumptions about the value of each of the resources represented as an issue and concern was established by the 1980 Resource Planning Act (RPA) program. The RPA was revised in 1985. Using each of these RPA assumption sets, 2 versions of FOREPLAN were developed. A mix of these two versions was used in preparing the Proposed Land and Resource Management Plans in the Pacific Northwest Region.

What is not clear in the Wenatchee National Forest Proposed Land and Resource Management Plan DEIS is what sort of mix was used. Although the 1985 RPA was a refinement of the 1980 RPA, in his Review of the 1985 RPA Update, O'Toole (1984) states RPA was systematically and deliberately biased towards timber, grazing and other market resources, and away from non-market resources such as fish, wildlife, and recreation. The up-shot of this is that the assumptions used in the economic values of the relationships between timber and other resources are suspect.

K-383

To look for a preferred alternative that would reflect the needs of the natural environment and yet protect the social and economic environment, the public was invited to use a document called, "Reviewer's Guide and Response Form". On page 42 of that document is a table under the heading "How the Alternatives Respond to the Issues". Here is where the assumptions of the RPA are put to use in comparing the alternatives in terms of their market and non-market resources. Nine major headings summarize the major issues and concerns. It does not take much time to examine the unit values for each alternative associated with each of the 9 headings and to conclude that Alternative B and Alternative E are at opposing ends of public forest management philosophy. Alternative B has the greatest non-market resource costs and the greatest market resource benefits. Alternative E has the least non-market resource costs and the least market resource benefits. In fact Alternative E under "Social/Economic unit values for "Change in employment and "Change in income have lost market resource values. Under Alternative A the truth is born out. This alternative is the No action, current management

direction for the forest alternative. Yet, we see in the table that a loss is projected for the next decade for market resources. These two items are very emotional and by using a deceptive "change method of calculating their value, emotions can reach even higher levels. Again it should be pointed out that the bias of the RPA allows for this kind of data confession.

In recognition that the informed public might see part-way through this kind of manipulation, the Forest Service moderates and chooses to come down just off-side of the middle of the fence and yet in favor of a market resource alternative, Alternative C. The hoopla thus pits the environmental and timber industry folks against each other and yet stacks the deck in favor of the timber industry.

In each of the alternatives the cost to the taxpayer to harvest timber is greater than the return from the sale of the timber. The amount of tax dollar loss varies greatly depending on the alternative and it would seem that the percentage of the loss returned from timber also varies greatly. The net percentage the timber industry will realize does not vary greatly and remains about 80% in each alternative. The net amount the timber industry realizes under each plan does vary greatly. Again, we see the magic of the RPA at work.

In short, the economic burden is not fair to the taxpayer. The environmental burden is not fair to the tax payer. The tax payer is going to support the timber industry at a fixed rate in each alternative, and be expected to pay different rates for different degrees of environmental degradation. The less the environmental degradation the greater the rate to the tax payer.

All alternatives fall very much short of protecting the needs of the people by penalizing them for their needs. All alternatives contain elements that damage the natural environment in one way or another and yet protect the timber industry. However, because the Yakima Indian people have charged the Wildlife Resource Management Program with preserving, protecting and enhancing it's wildlife resources within boundaries of the reservation and in the ceded area, we support the adoption of the most environmentally sound plan, Alternative E. Under this alternative there is limited room for the Federal Government to keep it treaty promises for the protection of the wildlife resource needs of the Yakima Indian People. Without that protection, the resource is not managed to meet these needs. In short, this alternative falls short of meeting those needs and penalizes

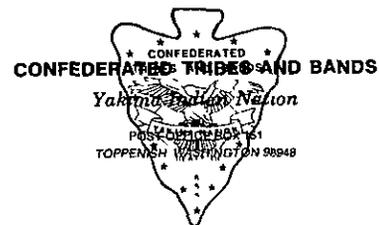
the american tax payer to the greatest extent. However, all other alternatives fall even shorter in meeting these treaty right needs. Alternatives F and G are the more moderate environmental plans. Each contain the attractive elements of E, but in less abundance. Each also contain more of the unattractive elements of the least environmentally sound plans.

In every plan the issue of human recreation varies from the least environmentally destructive to the most destructive forms. Some are compatible with wildlife, some are not. Vehicle use oriented recreation is the most limiting for wildlife habitat use. Preserving an area for its scenic value such that it can be viewed from a car, snowmobile, or dirt bike might be pleasing to the eye if you don't miss seeing the deer and elk that will be absent from your view.

Although most desirable, alternatives E, F, and G contains a management area type near the northern boundary of reservation lands that will surely cause problems for the Yakima Indian Nation. The RE-2B designation allows for off-road vehicle use. The opportunity for trespass on tribal lands is very great. If recreation in this area is a strong issue of concern, the RE-3 would be more compatible with adjacent land owner use. It would be best to include the entire North and South Fork of the Tieton drainage as EW-1 to be managed as summer range for deer and elk. This would compliment the YIN's management of its extensive winter range areas.

04487

ESTABLISHED BY THE
TREATY OF JUNE 9 1855
CENTENNIAL JUNE 9 1955



04487 GENERAL COUNCIL
TRIBAL COUNCIL

MEMORANDUM

TO
THROUGH

Mel Sampson, Tribal Chairman
Carroll Palmer, Director of Natural Resources

FROM
DATE

Cultural Resources
30 Sept 1986

A major legal and conceptual problem with the Wenatchee National Forest Management Plan lies in its failure to recognize responsibility for all of the resource rights retained by the Yakima Indian Nation under the Treaty of 1855. Interestingly the Management Plan (Proposed Land and Resource Management Plan, Appendix C-1) indirectly recognizes Article 3 of the Treaty of 1855

This right includes consideration by the Forest Service of the environmental effects of their land management activities on the water quality and anadromous fish habitat of the Forest.

The Management Plan does not mention a United States Forest Service consideration of the other resource rights specifically reserved in Article 3 of the 1855 Treaty with the Yakima Indian Nation

The exclusive right of taking fish in all the streams, where running through or bordering said reservation, is further secured to said confederated tribes and bands of Indians, as also the right of taking fish at all usual and accustomed places, in common with the citizens of the Territory, and of erecting temporary buildings for curing them, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land

As a basis for evaluating and planning future land use alternatives, a management plan which does not consider rights

October 1, 1986

Wenatchee National Forest
P.O. Box 811
Wenatchee, WA 98801

Dear Sir

Attached is the Yakima Indian Nation's archeological and cultural review of the Wenatchee National Forest's proposed Land and Resource Management Plan.

As you will see, no alternative presented was chosen. The Archeologists retained by the Yakima Nation reviewed the proposed plan and have raised valid concerns which are supported by the Yakima Tribe

It is the desire of the Yakima Nation that the caretaker of the Wenatchee National Forest recognize the Yakima Nation's inalienable rights as presented under the Treaty of 1855.

Sincerely,

Melvin R. Sampson
Melvin R. Sampson, Chairman
Yakima Tribal Council

K-365

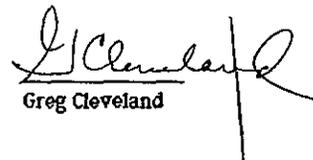
grazing, wilderness, recreational, etc do in fact have a significant impact on archeological sites and traditional use areas. The Wenatchee National Forest Plan tacitly admits in its Reviewer's Guide that Cultural Resource inventory and evaluation (archaeological sites only) is directly tied to timber harvest. The Yakima Nation feels many of the archeological sites outside of these timber harvest areas, mute testimony of past use are being destroyed. Furthermore this narrow approach has made no meaningful attempt to inventory and evaluate traditional use areas.

In summary, Cultural resources are more than archaeological sites within the Yakima Nations Ceded Lands. The Wenatchee National Forest Management Plan fails to recognize and then utilize the established legal rights of the Yakima People as a basis for land use planning. Because from a Cultural Resource perspective the Management Plan promulgates certain specious legal fictions we are unable to support any of the land use alternatives until the Treaty of 1855 is realized as the *a priori* planning document.

K-386



Morris Leo Uebelacker, Ph.D



Greg Cleveland

which were reserved by the Treaty of 1855 is a legal fiction. In the view of the Yakima Indian Nation, the Treaty of 1855 puts legal incumbrances on the land which are determinable, compensable, and real property and as such must always receive *a priori* consideration in planning. Clearly the Wenatchee National Forest Plan inadequately addresses the Treaty of 1855 which should serve, in effect, as the primary legal mandate for planning.

The Wenatchee National Forest Plan sets forth a variety of alternatives for the management of a major portion of the Yakima Indian Nations Ceded Lands and by virtue of proposing various land uses, it directly effects the resources to which the Nation reserved rights. We find no land allocations of traditional resource areas and no discussion of how these various land use categories will affect the Nations reserved resource rights. This is a major oversight particularly in the Draft Environmental Impact Statement. Although the impact statement addresses known archeological sites distributions in a general way it fails to recognize these places as indicators of customary use.

Further the Management Plan fails to recognize that the contemplated land use alternatives limit access and use of these traditional places and resources by mixing incompatible uses. For example, recent rehabilitation of anadromous fisheries brought about by the aggressive planning and cooperative maneuvering of Tribal and other Fisheries Biologists revives the necessity for maintaining access to the usual and accustomed places guaranteed by the Treaty. While many of these Places are now developed without regard to the reserved rights of Yakima Indians, the Forest Service must recognize that with this rehabilitation of the fish runs, the Forest Service must plan for a return of Indian fisherman. Which management alternative allows and recognizes traditional use areas? Which management alternative allows space and access for this land use?

The Cultural Resource Program should define and inventory traditional use zones and archeological sites independent of timber harvest activities. Other uses e.g. motorized vehicles,

BROCK ADAMS
WASHINGTON

United States Senate

WASHINGTON D.C. 20510

January 13, 1989

Forest Supervisor
Wenatchee National Forest
P.O. Box 811
Wenatchee, Washington 98807

Dear Friends:

Thank you for contacting my office to express your concerns about the Wild and Scenic River legislation I plan to introduce late this year. I apologize for the delay in responding. My staff is still in the process of gathering information about Washington's rivers and as a result I have not assembled a list of proposed rivers for inclusion in the legislation. Your views about the Wenatchee River are helpful to me in this process. I want to work closely with the rest of the Congressional delegation, local government officials and citizens like you as I develop this bill. Accordingly, I appreciate having your views and look forward to working on this issue with you.

I am acutely aware of your concerns regarding the effect of this legislation. Many landowners are particularly worried about the possibility of condemnation. One of my foremost goals in designing this legislation is avoiding condemnation. That was also the intent of the original Wild and Scenic Rivers Act of 1968. To date, more than 200,000 acres of land have been designated along Wild and Scenic river corridors in Washington, Oregon and California. None of that land was acquired through condemnation.

There are many landowner protection provisions in this Act which illustrate Congress's intent to protect private landowners from federal acquisition. For example, the Act prohibits the condemnation of a fee interest in land if fifty percent of the corridor is already in public ownership. Most rivers under consideration in Washington will fall into this category.

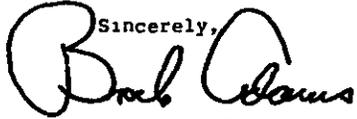
I hope this letter begins to address some of your very valid concerns. I am enclosing the answers to a list of commonly asked questions regarding Federal Wild and Scenic designation. Because of your interest, I will also forward a copy of a brochure on Wild and Scenic designation from the Forest Service and National Park Service when it becomes available. If you have any further questions or comments please contact Jim Gunsolus in my western Washington office at (206) 442-5545, Dave Gallick in my eastern Washington office at

#11748
COMMITTEES:
APPROPRIATIONS
LABOR AND HUMAN RESOURCES
RULES AND ADMINISTRATION

Forest Supervisor
January 13, 1989
Page 2

(509) 456-6816, or Anne Badgley in my Washington, DC office at (202) 224-2621.

Thank you again for contacting me to express your views.

Sincerely,

BROCK ADAMS
United States Senator

BA/gg
Enclosure

K-387

11748

479

QUESTIONS AND ANSWERS ABOUT THE WILD AND SCENIC RIVERS ACT

Q What is the Wild and Scenic Rivers Act?

A. The Wild and Scenic River Act was adopted in 1968 (Public Law 90-542) to protect free-flowing stretches of rivers throughout the United States. The Act seeks to protect and continue the types and intensity of use that exist at the time of designation. Not all rivers are eligible for designation. Only those free-flowing stretches with exceptional natural, cultural, recreational, geological, fish and wildlife, historic or scenic values are considered.

Q Why do these rivers need to be protected?

A. Rivers are one of Washington state's most precious natural resources; they are also one of the least protected. One hundred years ago, when Washington entered the union, there were 8,250 miles of free flowing rivers. These rivers supported bountiful salmon runs and provided clean water to a growing population. Since that time nearly one-sixth (1,300 miles) have been altered by dams, diversions, channelization or pollution. While no one denies the benefits of harnessing some rivers for electricity, irrigation or industrial development, we need to ensure that other rivers remain in their natural condition to provide the benefits of fisheries, water quality, recreation and wildlife habitat.

We are still in an excellent position to preserve and manage these resources for the future. The Wild and Scenic Rivers legislation gives us a tool to begin this process. However, unless we get this process underway we risk losing more rivers and the land bordering them to unplanned development.

Q. How does the Act work?

A. The Act accomplishes its goal in two major ways. First, it prevents new dams and major water projects from being built on designated river segments. Second, the Act helps protect the river or river segment by allowing for management of the land an average of one-quarter of a mile on each side of the river.

A river may be protected through three different classifications. The appropriate designation depends upon the current status of the river. These classifications are "wild", "scenic", or "recreational." A river may be classified entirely under one category or different sections of a river may be designated under

In order to qualify for a "WILD" classification, the river must be accessible only by trail with no development along its banks. Every river segment in Washington that is being considered for this classification is entirely on public land. A "wild" classification means that no road building or ongoing timber harvest will be allowed in the one-half mile river corridor. Grazing may continue as long as it is managed in a manner which doesn't damage the river's outstanding qualities.

A "SCENIC" river is one that is currently accessible by road. It may already be bridged and have a few homes on the banks. The purpose of scenic classification is to retain the natural characteristics of the river. If a river is classified "scenic", large clearcuts within one quarter mile of the river would not be allowed. However, selective logging and small clearcuts would be permitted. Farming activities generally are not restricted as long as they do not disturb the river's outstanding qualities.

The last category is "RECREATIONAL". This category includes river segments with some housing, industrial or commercial use along it. In these areas timber harvesting and agricultural practices are basically unaffected. These activities may continue as long as they do not cause erosion or destroy the view along the river. The purpose of recreational classification is to allow the agencies that manage the land to coordinate plans and to control adverse development along the river bank.

In Washington state, the Skagit River is an excellent example of the successful application of the federal Wild and Scenic Rivers designation. Included as a study river in the original 1968 legislation and designated in 1978, the mainstem of the Skagit was classified "recreational" and the tributaries "scenic."

Q. When can private property be condemned?

A. Federal agencies avoid condemnation whenever possible. It is slow, costly, and politically unpopular. No property in Washington, Oregon or California has ever been condemned for Wild and Scenic River designation.

The Act includes specific protections for property owners. Condemnation of all property rights (fee interest) is prohibited if more than 50% of corridor land is publicly owned. Most Washington rivers which may be considered for designation are more than 50% publicly owned.

Q. When will the government purchase a "scenic easement"?

A. While condemnation for fee title is prohibited in most cases, the government may purchase "scenic easements" or development rights. For example, if the management plan determines that the best use for a particular segment of land is to retain its natural appearance and not allow logging, a payment must be made to the landowner to compensate for not cutting the trees. The landowners retain full title to the land: they may sell it, rent it, leave it to their heirs and restrict public access. The government cannot prohibit a landowner from harvesting timber without just compensation. Often landowners resist scenic easements prior to designation and later, once they understand the system, request that a scenic easement be purchased.

Q. What effect will designation have on property values?

A. In recent studies on two Wild and Scenic Rivers, the Upper Delaware and the Rogue, property values in the designated corridors were shown to increase at a higher rate than those for adjacent lands. Realtors on the Upper Delaware frequently cite the designation in sales listings.

Q. What effect does designation have on agriculture?

A. Because Wild and Scenic designation preserves rivers in their current state, it does not affect existing water rights. Existing irrigation systems are not disturbed. Alterations to existing systems and new water projects are allowed as long as they do not have a "direct and adverse effect" on the attributes which made the river eligible for Wild and Scenic designation. In practical terms, this means smaller methods of providing for water supply such as small diversions or conduits that are wholly private, local, or state projects will not be affected.

Q. How is a river designated under the Wild and Scenic Act?

A. First, information is gathered about various rivers in Washington. This information comes from a variety of sources including interested citizens, governmental agencies, community leaders, power planning groups, industry organizations and environmental groups. As soon as that information is compiled, a draft list of rivers will be released for discussion purposes. There is no list at this time. After these comments are considered, the revised list will be incorporated in a bill format. This bill will not be introduced until citizens and organizations have been given ample opportunity to express their

Q. How can citizens become involved in the process?

A. Ideally the river protection program should be designed by interested organizations and citizens that care about the future of individual rivers. There will be a number of opportunities for citizens to participate. Before a bill is introduced, interested persons should send comments or suggestions regarding specific sections of specific rivers. After the bill is introduced, field hearings are expected to be held in the state to listen to citizen concerns. They are an excellent opportunity to participate in the process. Later, citizens will be encouraged to become involved in the development of a management plan for the river. Meetings will be held and written comments received to formulate this plan. After the final plan is approved, there is also an appeals process if persons feel that their concerns have not been sufficiently addressed.

2198J

U S ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

JAN 25 1989



REPLY TO
ATTN OF

WD-136

Sonny J O'Neal
Forest Supervisor
Wenatchee National Forest
P.O Box 811
Wenatchee, Washington 98801

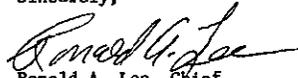
Dear Mr. O'Neal:

In accordance with our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act, we have reviewed the Supplemental Draft Environmental Impact Statement (SDEIS) for the Land and Resource Management Plan for the Wenatchee National Forest. This SDEIS evaluates a new alternative, Alternative NC (No Change), which was developed from the Timber Management Plans originally developed in the 1960's. It also evaluates rivers on the Forest for recommendation for classification in the Wild and Scenic Rivers System.

Alternative NC does not incorporate all the provisions of the National Forest Management Act of 1976 and would not include the specific standards and guidelines for water quality protection. As such, we could not support the implementation of this alternative.

We understand that the purpose of this SDEIS was not to address public comments on the DEIS. Since our September 30, 1986 comments on the DEIS remain outstanding the rating on the DEIS and SDEIS are the same. EC-2 (Environmental Concerns - Insufficient Information).

Thank you for the opportunity to review this SDEIS. Please contact Wayne Elson at (206) 442-1463 for any questions concerning our comments.

Sincerely,

Ronald A Lee, Chief
Environmental Evaluation Branch

cc USFS, R-6

K-390



United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
500 N E MULTNOMAH STREET, SLITE 1692
PORTLAND, OREGON 97232

February 27, 1989

#2446 S



2446 S

ER 89/82

Mr. Sonny J. O'Neal
Forest Supervisor
Wenatchee National Forest
P O. Box 811
Wenatchee, Washington 98807

Dear Mr. O'Neal

The Department of the Interior (Department) has reviewed the Supplement to the Draft Environmental Impact Statement (EIS), Proposed Wenatchee National Forest Land and Resource Management Plan. The following comments are provided for your use and consideration when preparing the final documents, and are supplemental to the Department's October 9, 1986, comments on the draft EIS.

GENERAL COMMENTS

The Supplement is generally adequate in portraying the predicted impacts from implementation of the no change alternative. It states that the Alternative NC will not fulfill the requirements of the National Forest Management Act with respect to fish and wildlife resources. The Fish and Wildlife Service (Service) concurs with this determination, and also considers Alternative NC to be environmentally unacceptable. On-the-ground application of this alternative would result in a heavy loss of important fish and wildlife resources and their habitats. More specifically, migratory birds, anadromous and resident fish, and important big game animals including deer, elk, and mountain goat would experience severe adverse impacts. Riparian habitat would be degraded, and the depletion of old growth forest ecosystems would be accelerated.

Because old-growth forest ecosystems, which provide optimal breeding and foraging habitat for several important vertebrate species, are scarce, the old-growth timber harvest issue is a major concern. The spotted owl is but one member of the rather unique and important animal community that depends on old-growth forests.

The interagency agreement signed on August 12, 1988, by the Director of the Service and the Chief of the U.S. Forest Service, commits the Forest Service to ensure the continued existence of a well-distributed spotted owl population throughout its National Forest range. Under the agreement, both agencies have agreed to coordinate efforts, including research and monitoring. An annual progress report will be supplied to the Service, and the agreement provides for emergency action if a viable population is not maintained. The final documents should refer to this interagency agreement. The terms of the agreement should be reflected in relevant sections such as standards, guidelines and monitoring.

The Forest Service recently released their Record of Decision regarding spotted owl management in the Pacific Northwest. This final decision and its potential effects on spotted owl populations of the Wenatchee National Forest should be addressed in detail in the final EIS. The Service is skeptical that the management alternative (Alternative F)

selected by this decision, in concert with the preferred planning alternative for the Forest, will result in maintaining viable spotted owl populations. This view is based in part on Forest Service plans to include an inadequate amount of suitable habitat for spotted owls.

The Service is concerned about the level of protection that will be provided for Federal candidate plant and animal species of the Forest. In meeting this objective, the Forest Service should fully coordinate with the Service in all planning endeavors and forest activities which might affect the candidate species. In some instances, this may necessitate intensive and continuing coordination efforts between the Service and the Forest Service. A case in point is the present effort of both agencies to protect the candidate plants Delphinium viridescens and Sidalcea oregana var. calva.

SPECIFIC COMMENTS

Page IV-8, paragraph 2: It should be noted that if forest activities have the potential to cause any adverse impacts to threatened or endangered species, the Forest Service would be required to formally consult with the Service under Section 7 of the Endangered Species Act.

Page I-15, 4th column, last block: Reference to the grizzly bear should be footnoted to the effect that the Washington State Department of Wildlife is presently conducting a five year evaluation of grizzly bears in Washington's north Cascades, including Wenatchee National Forest. The evaluation is funded by the Service and will be completed in 1990. At that time the Forest Service may have additional responsibilities with respect to the grizzly bear.

Page I-27, paragraph 5: The 2,200 acre figure for designated spotted owl habitat areas is too low to protect owls in the Forest. Recent studies by the Washington Department of Wildlife indicate that spotted owls in the Washington Cascades require 3,800 acres of old-growth for each owl site (defined as containing an owl pair or individual owl representing the nucleus of a future owl pair; Harriet Allen and Keitlyn Watson, Washington State Department of Wildlife, personal communication). The Service recommends that designated spotted owl habitat areas on the Forest contain at least 3,800 acres of suitable habitat (old-growth forest that is as contiguous as possible), per spotted owl site until such time that research data indicates otherwise. If 3,800 acres of suitable habitat are not available within 2.1 miles of a spotted owl nest, full protection should be given to suitable habitat beyond the 2.1 mile range as appropriate to meet the biological requirements of the owl.

Page I-27, paragraph 6: The spatial arrangement of designated habitat areas for the spotted owl should be based upon the most recent site-specific ecosystem information (e.g. habitat quality with respect to food and competitor species) to improve the probability of survival for the owl. Provision should be made for replacing designated suitable habitat areas that might be destroyed by fire, disease or storm events. All of this will require intensive research and monitoring efforts and close coordination with the Service, Washington Department of Wildlife, and adjacent landowners to the Forest such as the Park Service.

SUMMARY COMMENTS

The Service agrees with the Forest Service that Alternative NC would not meet the requirements of the National Forest Management Act with respect to fish and wildlife resources. If Alternative NC is applied on-the-ground it would cause great loss to

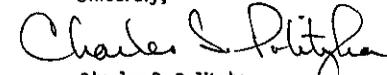
K-391

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important fish and wildlife species and their habitat. Consequently, net public benefits for the Forest would be reduced accordingly. The Service recommends that Alternative NC not be adopted.

Management measures for conserving some vertebrate species (presented in the section on "Analysis of Management Requirements") appear to be inadequate. In particular, management measures for protecting the spotted owl need to be strengthened.

Sincerely,



Charles S. Polityka
Regional Environmental Officer

K-392

#10788



United States Department of the Interior

BUREAU OF MINES

WESTERN FIELD OPERATIONS CENTER
EAST 360 3RD AVENUE
SPOKANE WASHINGTON 99202

January 19 1989

Mr. Sonny J. O'Neal
Forest Supervisor
Wenatchee National Forest
P O Box 811
Wenatchee, Washington 98807

Dear Mr. O'Neal

SUBJECT: REVIEW OF SUPPLEMENT TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
(DEIS)/PROPOSED LAND AND RESOURCE MANAGEMENT PLAN FOR THE WENATCHEE
NATIONAL FOREST, WASHINGTON

K-393

Designating a river segment as part of the Wild and Scenic River System can have adverse effects on the availability of public lands for mineral exploration and development. A detailed minerals evaluation has not been completed but is necessary to determine the mineral potential of these river corridors prior to a management decision. The areas having mineral potential should be omitted from the proposed *Scenic and Recreational Classification* System. As noted by the Wenatchee Forest, in a letter dated September 22 1986, Mineral resources are of utmost importance, and they must be properly provided for under a multiple resource management practice.

If we can be of technical assistance in developing mineral data please contact our office. Thank you for the opportunity to review this supplement.

Sincerely,

D'Arcy J. Banister, Supervisor
Mineral Issue Involvement Section
Branch of Engineering and Economic Analysis

#50998

50998



Department of Energy
Bonneville Power Administration
PO Box 3621
Portland, Oregon 97208-3621

In reply refer to AJ

JAN 27 1989

Forest Supervisor
Wenatchee National Forest
USDA Forest Service
P O. Box 811
Wenatchee, Washington 98801

COMMENTS ON SUPPLEMENT TO THE DRAFT EIS WENATCHEE NATIONAL FOREST

The Bonneville Power Administration has reviewed subject document and offer the following comments

As stated in our comments on the Draft EIS in September 1987 we would again like to comment that, in the Northwest, the only National Forest areas we are aware of that are known as exclusion areas are those designated as Wilderness Areas, Primitive Areas, or National Recreation Areas (where specifically excluded by legislation). Therefore, to be consistent with Forest Service policy, we believe Research Natural Areas should be identified in the EIS as avoidance areas rather than exclusion areas. Bonneville Power Administration would make every effort to avoid Research Natural Areas.

K-394

1. The No Change Alternative analyzed in the Supplement to the Draft EIS should not be selected since it does not provide for the mitigation and enhancement of fish habitat, as do some other alternatives, and may not achieve compliance with regulations
2. We suggest that the Final EIS identify any protected areas, as determined by the Northwest Power Planning Council and BPA, within or affected by activities in the Wenatchee National Forest
3. We suggest that the following sources of information may be useful in your planning process

-The Pacific Northwest Hydropower Data Base and Analysis System.
This data base contains detailed, site-specific information over 2,000 individual hydro project applications submitted to the Federal Energy Regulatory Commission. Data include physical location, institutional status, hydrologic characteristics, cost, and planned power output.

-The Pacific Northwest River Study. The Rivers Study resulted in the Northwest Environmental Data Base, containing an inventory and assessment of the region's rivers for their resident fish, wildlife, natural and cultural features, and recreation values, as well as existing institutional constraints. The data base also contains information on anadromous fish collected by the Northwest Power Planning Council.

-BPA is working with the U.S. Geological Survey to automate 1 100,000 scale digital hydrography for the entire Pacific Northwest. The Wenatchee National Forest covers parts of Hydrologic Cataloging Units 17020009, 17020011, and 17030001. All unit except 17020010 are complete and available. The remaining unit should be complete within 6 months

For additional information on these sources, please contact Mr. Tom Pansky, (503) 230-3969, or FTS 429-3969. He would also appreciate any additional information you may secure or generate during your planning processes for inclusion in the above data bases. Also, if you discover any errors in these data bases, please inform him so that they can be corrected. Both tabular and graphic data (for our Geographic Information System) would be appreciated, particularly if it could be tied to EPA River Reach code.

Sincerely,

for Nicholas J. Stas
Anthony R. Morrell
Assistant to the Administrator
for Environment





STATE OF WASHINGTON
DEPARTMENT OF WILDLIFE

3860 Chelan Hwy, Wenatchee, WA 98801
telephone (509)663-9711

December 21, 1988

Sonny J. O'Neal, Supervisor
Wenatchee National Forest
301 Yakima St., P.O.Box 811
Wenatchee, WA 98807

re: Draft EIS - Wenatchee National Forest
Proposed Land and Resource Mgt Plan
River Classifications

Dear Sonny:

For the most part I would like to go on record supporting your preferred Alternative C as presented in the Supplemental Draft EIS. I do have, however, some strong reservations regarding the selection process and the final lists of ineligible and eligible streams.

Specifically, while most of the streams judged to be ineligible (Table S-4) are now heavily roaded and their watersheds committed to relatively intense silvicultural activities, there are three streams on that list which I believe are eligible for inclusion in the wild/scenic rivers list. Not only are they eligible by definition, but I would place them even higher on the list of priorities than several streams presently listed. The three streams are the Waptus River on the Cle Elum District and the Mad and North Fork Entiat Rivers on the Entiat District. The very justifications used to include the Entiat River (page S-35) can be applied to each of these three streams.

I find it hard to believe that the combined professional judgment of your evaluation team(s) concluded that these streams have "No outstandingly remarkable value". The simple fact that they are basically unroaded basins is remarkable in itself. The scenic values of each basin are outstanding, particularly going into the Waptus River drainage. Fishery values are at least above average in each stream, and for resident, wild trout, the Mad River is outstanding. I must conclude that there were other, overriding considerations utilized in the selection process which had nothing to do with the actual eligibility criteria. Is it possible that concerns for future silvicultural activities, or for present (and future) use of motorized travel precluded these streams from actually being considered on an even par with the rest of the "potential streams" list?

#1488



1488

Sonny J. O'Neal
Page 2

I suggest that a review of the eligibility determination process is necessary. I strongly urge you to reconsider the above three streams for inclusion, with the very same justifications used for the Entiat River, including the addition of "above average fishery values" for the Waptus River and North Fork Entiat. The Waptus River, in particular, deserves as much consideration as any of the other inclusions for Wild River status where the major portions lie within an existing Wilderness Area.

Sincerely,
THE DEPARTMENT OF WILDLIFE

Larry G. Brown
Area Fish Biologist - Region 3

cc: Jim Cummins, WDW, Yakima
Ted Clausing, WDW, Yakima
Gene Tillett, WDW, Olympia
Ken McDonald, USFS, Lake Wenatchee

K-395

#542L



**BOARD OF COMMISSIONERS
CHELAN COUNTY**

STATE OF WASHINGTON
WENATCHEE, WASHINGTON 98801
TELEPHONE 509/664-5215

January 10, 1989

U.S. Forest Service
Wenatchee National Forest
ATTN: Sunny O'Neal
301 Yakima
Wenatchee, Wa 98801

Gentlemen.

In response to your reconsideration and potential designation of eight rivers in Chelan County as "wild & scenic", we oppose these Federal designations. Chelan County, along with the State of Washington, has multitudes of regulations that serve to protect our rivers, lakes, waterways and other environmental areas. We believe that the needs of our County are best met at the local level.

K-396

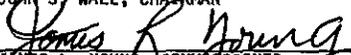
Your management of Forest Service lands in our County has been outstanding. We encourage you to continue to manage your lands and water resources inside your bounds as you always have. However, we ask you to eliminate any rivers or sections of rivers in our County, which may contain or impact private property, from your proposed wild & scenic designation. Further we would ask you to eliminate any rivers or sections of rivers which such designation may now or in the future impact water rights to any of our agricultural lands.

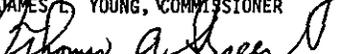
As we agreed, after you have had time to review the comments and County and State Shoreline regulations concerning this matter, we look forward to discussing your conclusions and the direction you plan to take.

Thank you for your attention to this matter.

Sincerely,
BOARD OF CHELAN COUNTY COMMISSIONERS



JOHN S. WALL, CHAIRMAN


JAMES L. YOUNG, COMMISSIONER


THOMAS A. GREEN, COMMISSIONER



THOMAS A. GREEN
COMMISSIONER 1ST DISTRICT
WENATCHEE

JAMES L. YOUNG
COMMISSIONER 2ND DISTRICT
CASHMERE

JOHN S. WALL
COMMISSIONER 3RD DISTRICT
CHELAN

Kittitas County, Washington



BOARD of COUNTY COMMISSIONERS

District One
John S. Perrie

District Two
Ray Owens

District Three
Rich Hocter

O'NEAL
Page 2

Thank you in advance for your consideration on this matter.
Please call if we can answer any questions.

Respectfully,

Rich Hocter, Chairman

Ray Owens, Commissioner

John Perrie, Commissioner

January 25, 1989

Mr. Sonny O'Neal
Forest Supervisor
Wenatchee National Forest
P.O. Box 811
Wenatchee, WA 98801

Dear Mr. O'Neal:

Thank you for your very interesting and informative presentation Monday, January 23, on the wild, scenic and recreational river classification recommendation from the Forest Service. We understand the recommendation and the rationale behind your recommendation to congress on the various rivers mentioned above, and support the concept of good management.

K-397

Due to the tight constraints caused by a January 26 response deadline, we would generally offer the following comments concerning your recommendation to congress on river classification and withhold the right to comment further at a later date concerning the Cle Elum River classification recommendation:

1. We support and encourage local control,
2. We want to be involved in the decision making process in all future river classification actions,
3. We support coalitions that are multiple use advocates and believe that the controlling body for local rivers should be local residents,
4. We oppose restrictions that do not allow for preventative maintenance along streams to prevent erosion of road rights-of-way,
5. We oppose regulations in addition to county ordinances that tend to threaten the livelihood of current or new owners, and
6. We feel that existing ordinances (in Kittitas County) protect the future generations and their right to enjoy the many beautiful rivers in Washington State.



#11698

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION
975 SE Sandy Boulevard Suite 202 Portland Oregon 97214
Telephone (503) 238 0667

11698

January 20, 1989

Mr Sonny O'Neal, Supervisor
Wenatchee National Forest
PO Box 811
Wenatchee, WA 98807

Dear Mr. O'Neal:

Thank you for this opportunity to provide comments on the supplement to the draft EIS for the proposed Wenatchee National Forest Land and Resource Management Plan (SEIS). Unlike several other supplements to draft plans in Region 6, the Wenatchee National Forest's (WNF) SEIS recognizes that Indian treaty rights must be complied with in all alternatives and play an important role in guiding forest management. See SEIS at II-72. This recognition, along with the WNF's relatively more detailed treatment of water quality management bodes well for future dealings between the Columbia River treaty tribes and the Forest.

Although the WNF obviously took greater care than several other forests in the preparation of its analysis of water quality and riparian area management, inconsistencies and gaps remain. For example, the SEIS states that the no change (NC) alternative fully complies with all state water quality standards. SEIS at II-10. However, this appears to be contradicted by the WNF's declaration that fish habitat and population would be decreased over time, *Id.* at II-24, and that the NC alternative may not maintain viable populations of vertebrate species. *Id.* at IV-8. Moreover, it appears that the WNF thinks it is quite possible to cause very extensive impacts on smaller drainages and still comply with state water quality standards. See *Id.* at IV-12. Given these interpretations, promises that future management activities will comply with state water quality standards do little to ease our concern.

Another area that needs clarification is the WNF's assertion that commercial harvest of WNF anadromous fish will increase almost eight-fold over the next 50 years, *Id.* at II-41, yet habitat will only increase by approximately 2%. *Id.* at II-42. If existing habitat capacity for chinook is six-times existing populations, *Id.*, how is it possible to increase these populations eight-fold?

To: Mr. Sonny O'Neal

01/20/89

In its discussion of its minimum management requirements (MMRs), the WNF sensibly notes that "[t]he management requirements from NFMA and its implementing regulations are legal requirements. They represent 'ends' which must be met during forest plan implementation." SEIS at Appendix I-2. Unfortunately, the WNF does not address this issue in this discussion of its water quality and riparian protection MMRs. In addition, the Forest never identifies viable population levels or "ends" for any species of anadromous fish. Given their designation as management indicator species and their treaty-protected status, this lapse is not only unfathomable, it fails to meet the requirements of NFMA regulations. *Id.* at Appendix I-1-2.

Instead of describing the riparian and water quality conditions or "end" to be achieved by the water quality/riparian area MMR, the WNF merely states that the goal is to "protect water quality and riparian habitat." *Id.* at Appendix I-4. As the means to achieve this amorphous "end," the WNF declares that lands within 100 feet of perennial streams must be given "special attention," *Id.*, in order to prevent "unacceptable erosion and sedimentation that would exceed state standard." *Id.* at Appendix I-5. At present, Washington does not have a sediment standard. Regardless, the NFMA requires the Forest Service to prevent "unacceptable erosion and sedimentation." What is "unacceptable?"

It is clear that the WNF has quantified "special attention" and "unacceptable erosion and sedimentation" because it managed to estimate the opportunity costs of two different water quality/riparian habitat protection methods. See *Id.* at Appendix I-35. The WNF's discussion of its two different approaches towards meeting its undefined MMR fails to provide the information that resource professionals need in order to exercise their best professional judgment. For example, in describing the least protective method, which the WNF is tentatively adopting, the Forest states that it would leave trees in the riparian zone that "will provide the necessary woody debris in the streams." *Id.* at Appendix I-34. In addition the Forest states that "[m]anagement position would require an adequate amount of streamside vegetation for shading to be left so that stream temperatures would remain within acceptable limits." *Id.* (emphasis added). These statements may provide reassurance, but they do not inform.

Because of the WNF's failure to identify "ends" for its water quality/riparian habitat MMR, there is no reasonable way to evaluate which of the Forest's two proposed methods best achieve the MMR. Thus, it is unfortunately no surprise that the Forest adopted the method least protective of riparian resources. The

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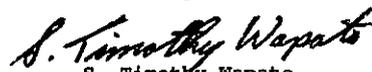
To: Mr. Sonny O'Neal

01/20/89

Forest must revise its discussion of MMRs by specifically identifying its "ends" or objectives and then describing in detail how its proposed methods will achieve those "ends." Second, the Forest must determine the numbers and distribution of individuals that constitute "viable populations" for all anadromous fish species on the WNF.

In developing MMRs for water quality, riparian habitat, and fish population, the WNF must remember that the treaties between the Columbia River treaty tribes and the federal government are binding on the Forest Service. Compliance with the tribes' right to take fish at their usual and accustomed places is no less a requirement on the Forest Service than meeting state water quality standards and complying with the NFMA. The Commission would like to work with the Forest to help remedy these defects.

Sincerely,



S Timothy Wapato
Executive Director

K-399

#1173b

1173b



Confederated Tribes and Bands
of the Yakima Indian Nation

Established by the
Treaty of June 9, 1855

Forest Supervisor
Wenatchee National Forest
PO Box 811
Wenatchee, WA. 98807

January 11, 1989

Dear Mr. O'Neil

The Yakima Indian Nation has reviewed the Supplement to the Draft Environmental Impact Statement for the Wenatchee National Forest Proposed Land and Resource Management Plan. We have the following fisheries related comments:

1. With regard to the No change alternative, aside from the fact that it does not comply with the National Forest Management Act, in that it addresses only a single resource, we are opposed to this alternative in that it fails to protect Treaty reserved fishing rights. The No change alternative fails to provide adequate protection for fisheries and water resources. Because it does not meet Federal Statutes, we do not feel further discussion is warranted.

K-400

2. We appreciate the opportunity of speaking with members of your staff regarding the Wild and Scenic issues developed in the Supplement. It has been our experience that when a water related area receives special designation, particularly with increased recreational opportunities in mind, Tribal fishing and fish protection activities are reduced. A recent example is designation of the Columbia Gorge as part of the Wild and Scenic System. With the advent of the additional windsurfing activities in that area, there have been additional conflicts between the windsurfers and Tribal fisherman. The new designation for the Gorge has made this situation worse, as additional windsurfing sites are proposed that will increase use in these fishing areas. We feel that recreational designation of rivers within the Forest will result in the same outcome, with additional campsites, "vistas", new roads, and loss of riparian vegetation. We therefore are opposed to designating the Chiwawa and Icicle Rivers as Recreational, since they meet the criteria for Scenic. We are also opposed to the Scenic designation for the Entiat River in that portion that meets the Wild designation criteria. We oppose the recreational designation for other rivers proposed for this designation, and support those systems that are proposed for Wild or Scenic designation. We do this if it is understood that we will be involved with any watershed management planning that develops from these designations. These management plans must be consistent with protecting fisheries resources first and foremost. Additional recreational use can not have priority over Treaty protected resources.

3. As you are aware, the Yakima Indian Nation and the Columbia River Intertribal Fish Commission have been working with the Regional Office in defining desired future conditions and

Post Office Box 151 Fort Road Toppenish WA 98948 (509) 865 5121

standards for Region 6 Forests in the Columbia Basin. Our position is that these desired future conditions and standards should be the Management Requirements of the Forest, necessary to protect fisheries resources. The MMR's outlined in the Supplement do not provide the same level of protection that have been provided to the R.O. by the Yakima Indian Nation and the Fish Commission.

If you have further questions regarding these issues, please contact Carroll Palmer, Deputy Director of Natural Resources at 509-865-5121. Thank you very much.

Sincerely,

Don Tahkeal
Don Tahkeal, Secretary
Timber Committee
Yakima Indian Nation

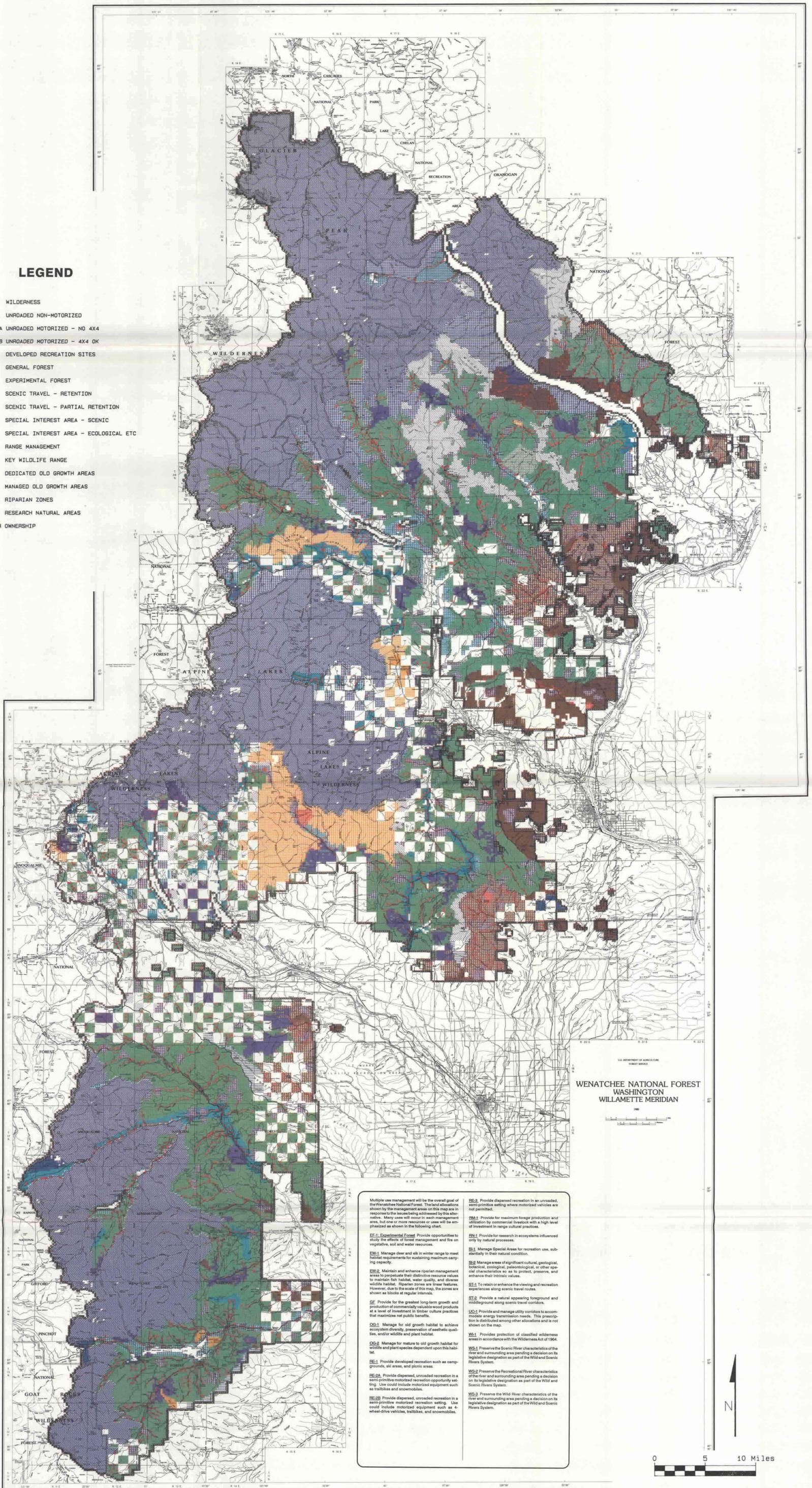
cc Hatcher
Palmer
Fish and Wildlife Committee

SEARCHED
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JAN 11 1989
FBI - WENATCHEE

WENATCHEE NATIONAL FOREST ALTERNATIVE D

LEGEND

- WI-1 WILDERNESS
- RE-3 UNROADED NON-MOTORIZED
- RE-2A UNROADED MOTORIZED - NO 4X4
- RE-2B UNROADED MOTORIZED - 4X4 OK
- RE-1 DEVELOPED RECREATION SITES
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- EF-1 EXPERIMENTAL FOREST
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- ST-2 SCENIC TRAVEL - PARTIAL RETENTION
- SI-1 SPECIAL INTEREST AREA - SCENIC
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- RM-1 RANGE MANAGEMENT
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- OG-1 DEDICATED OLD GROWTH AREAS
- OG-2 MANAGED OLD GROWTH AREAS
- EW-2 RIPARIAN ZONES
- RN-1 RESEARCH NATURAL AREAS
- OTHER OWNERSHIP



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
WENATCHEE NATIONAL FOREST
WASHINGTON
WILLAMETTE MERIDIAN

Multiple use management will be the overall goal of the Wenatchee National Forest. The land allocations shown by the management areas on this map are in response to the issues being addressed by this alternative. Many uses will occur in each management area, but one or more resources or uses will be emphasized as shown in the following chart.

EF-1 Experimental Forest Provide opportunities to study the effects of forest management and the on vegetative, soil and water resources.

EW-1 Manage deer and elk in winter range to meet habitat requirements for sustaining maximum carrying capacity.

EW-2 Maintain and enhance riparian management areas to perpetuate their distinctive resource values to maintain fish habitat, water quality, and diverse wildlife habitat. Riparian zones are linear features. However, due to the scale of this map, the zones are shown as blocks at regular intervals.

GF Provide for the greatest long-term growth and production of commercially valuable wood products at a level of investment in timber culture practices that maximizes net public benefits.

OG-1 Manage for old growth habitat to achieve ecosystem diversity, preservation of aesthetic qualities, and/or wildlife and plant habitat.

OG-2 Manage for mature to old growth habitat for wildlife and plant species dependent upon this habitat.

RE-1 Provide developed recreation such as campgrounds, ski areas, and picnic areas.

RE-2A Provide dispersed, unroaded recreation in a semi-primitive motorized recreation opportunity setting. Use could include motorized equipment such as trailbikes and snowmobiles.

RE-2B Provide dispersed, unroaded recreation in a semi-primitive motorized recreation setting. Use could include motorized equipment such as 4-wheel-drive vehicles, trailbikes, and snowmobiles.

RE-3 Provide dispersed recreation in an unroaded, semi-primitive setting where motorized vehicles are not permitted.

RM-1 Provide for maximum forage production and utilization by commercial livestock with a high level of investment in range cultural practices.

RM-2 Provide for research in ecosystems influenced only by natural processes.

RM-3 Manage Special Areas for recreation use, substantially in their natural condition.

SI-1 Manage areas of significant cultural, geological, botanical, zoological, paleontological, or other special characteristics as to protect, preserve, and enhance their intrinsic values.

SI-2 To retain or enhance the viewing and recreation experiences along scenic travel routes.

ST-1 Provide a natural appearing foreground and middleground along scenic travel corridors.

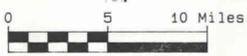
UC-1 Provide and manage utility corridors to accommodate energy transmission needs. This prescription is distributed among other allocations and is not shown on the map.

WI-1 Provides protection of classified wilderness areas in accordance with the Wilderness Act of 1964.

WS-1 Preserve the Scenic River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

WS-2 Preserve the Recreational River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

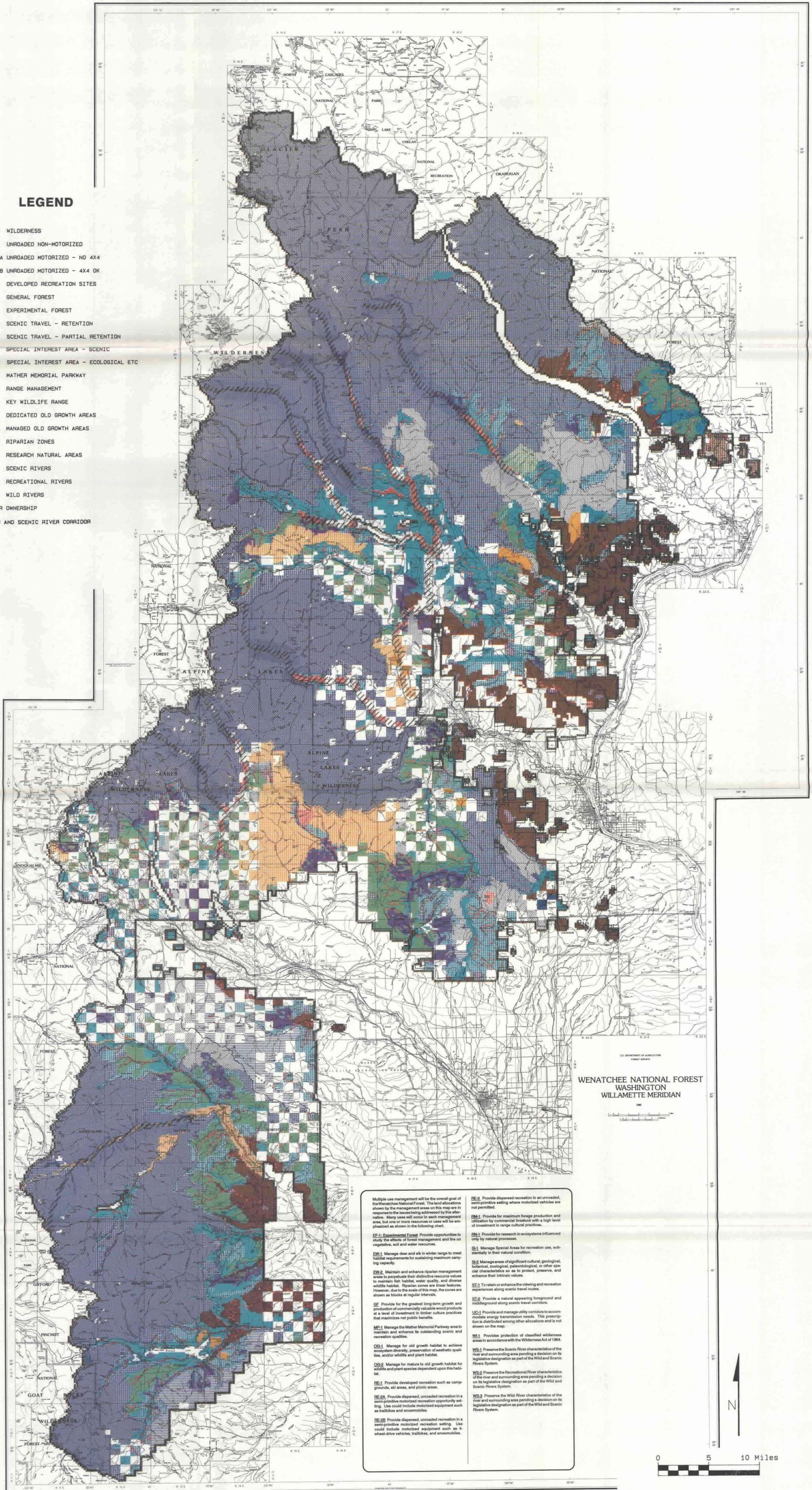
WS-3 Preserve the Wild River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.



WENATCHEE NATIONAL FOREST ALTERNATIVE E

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-  ST-2 SCENIC TRAVEL - PARTIAL RETENTION
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-  MP-1 MATHER MEMORIAL PARKWAY
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-  EW-1 KEY WILDLIFE RANGE
-  OG-1 DEDICATED OLD GROWTH AREAS
-  OG-2 MANAGED OLD GROWTH AREAS
-  EW-2 RIPARIAN ZONES
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
WENATCHEE NATIONAL FOREST
WASHINGTON
WILLAMETTE MERIDIAN



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EW-2 Maintain and enhance riparian management areas to perpetuate their distinctive resource values to maintain fish habitat, water quality, and diverse wildlife habitat. Riparian zones are linear features. However, due to the scale of this map, the zones are shown as blocks at regular intervals.

GF Provide for the greatest long-term growth and production of commercially valuable wood products at a level of investment in timber culture practices that maximizes net public benefits.

MP-1 Manage the Mather Memorial Parkway area to maintain and enhance its outstanding scenic and recreation qualities.

OG-1 Manage for old growth habitat to achieve ecosystem diversity, preservation of aesthetic qualities, and/or wildlife and plant habitat.

OG-2 Manage for mature to old growth habitat for wildlife and plant species dependent upon the habitat.

RE-1 Provide developed recreation such as campgrounds, all areas, and picnic areas.

RE-2A Provide dispersed, unroaded recreation in a semi-primitive motorized recreation opportunity setting. Use could include motorized equipment such as trailers and snowmobiles.

RE-2B Provide dispersed, unroaded recreation in a semi-primitive motorized recreation setting. Use could include motorized equipment such as 4-wheeled vehicles, trailers, and snowmobiles.

RE-3 Provide dispersed recreation in an unroaded, semi-primitive setting where motorized vehicles are not permitted.

RM-1 Provide for maximum forage production and utilization by commercial livestock with a high level of investment in range cultural practices.

SI-1 Provide for research in ecosystems influenced only by natural processes.

SI-2 Manage Special Areas for recreation use, substantially in their natural condition.

SI-3 Manage areas of significant cultural, geological, botanical, zoological, paleontological, or other special characteristics so as to protect, preserve, and enhance their intrinsic values.

ST-1 To retain or enhance the viewing and recreation experiences along scenic travel routes.

ST-2 Provide a natural appearing foreground and midground along scenic travel corridors.

UC-1 Provide and manage utility corridors to accommodate energy transmission needs. This prescription is distributed among other allocations and is not shown on the map.

WE-1 Provides protection of classified wilderness areas in accordance with the Wilderness Act of 1964.

WS-1 Preserve the Scenic River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

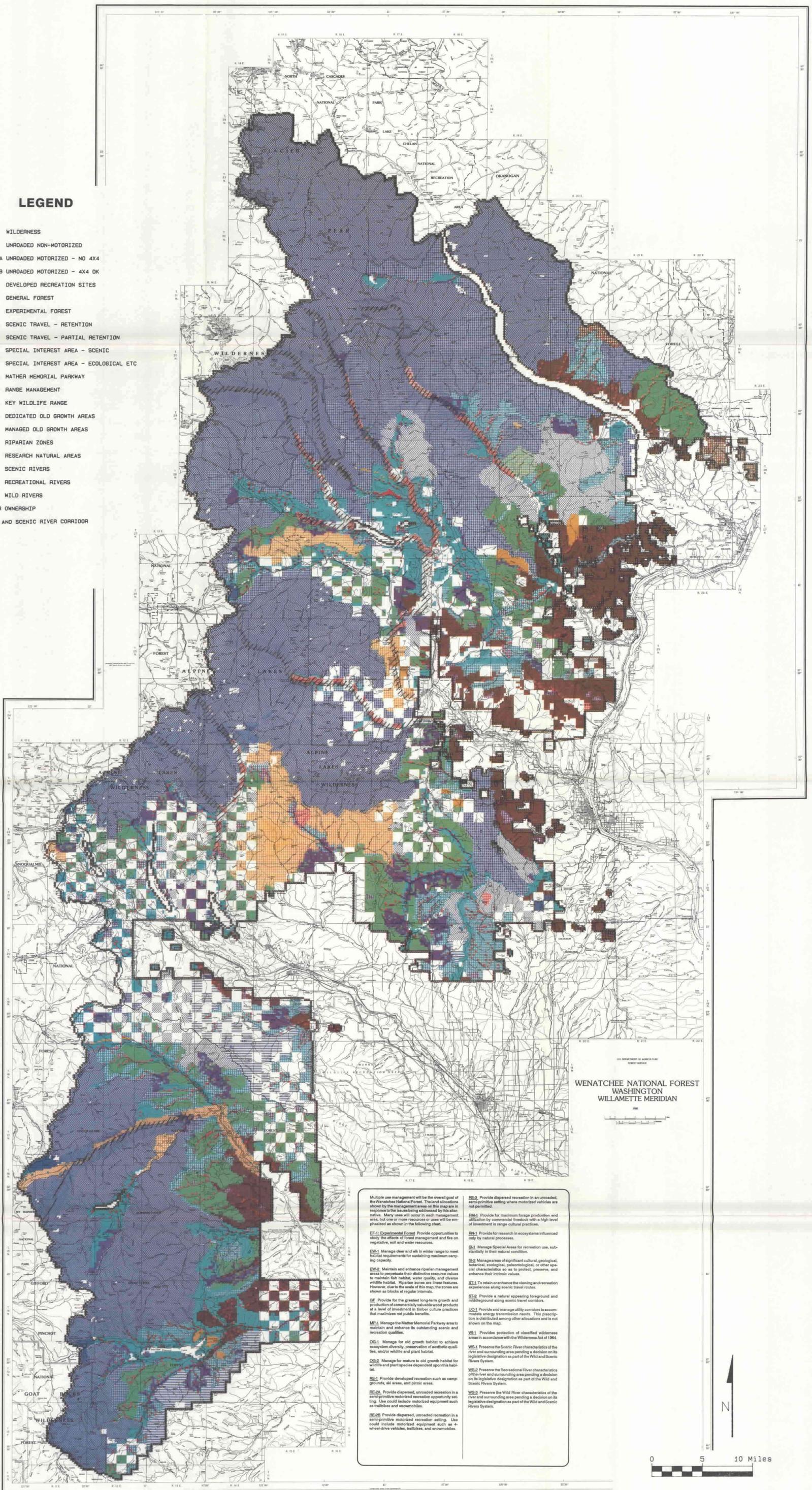
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WENATCHEE NATIONAL FOREST ALTERNATIVE F

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-  WILD AND SCENIC RIVER CORRIDOR



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
**WENATCHEE NATIONAL FOREST
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WILLAMETTE MERIDIAN**

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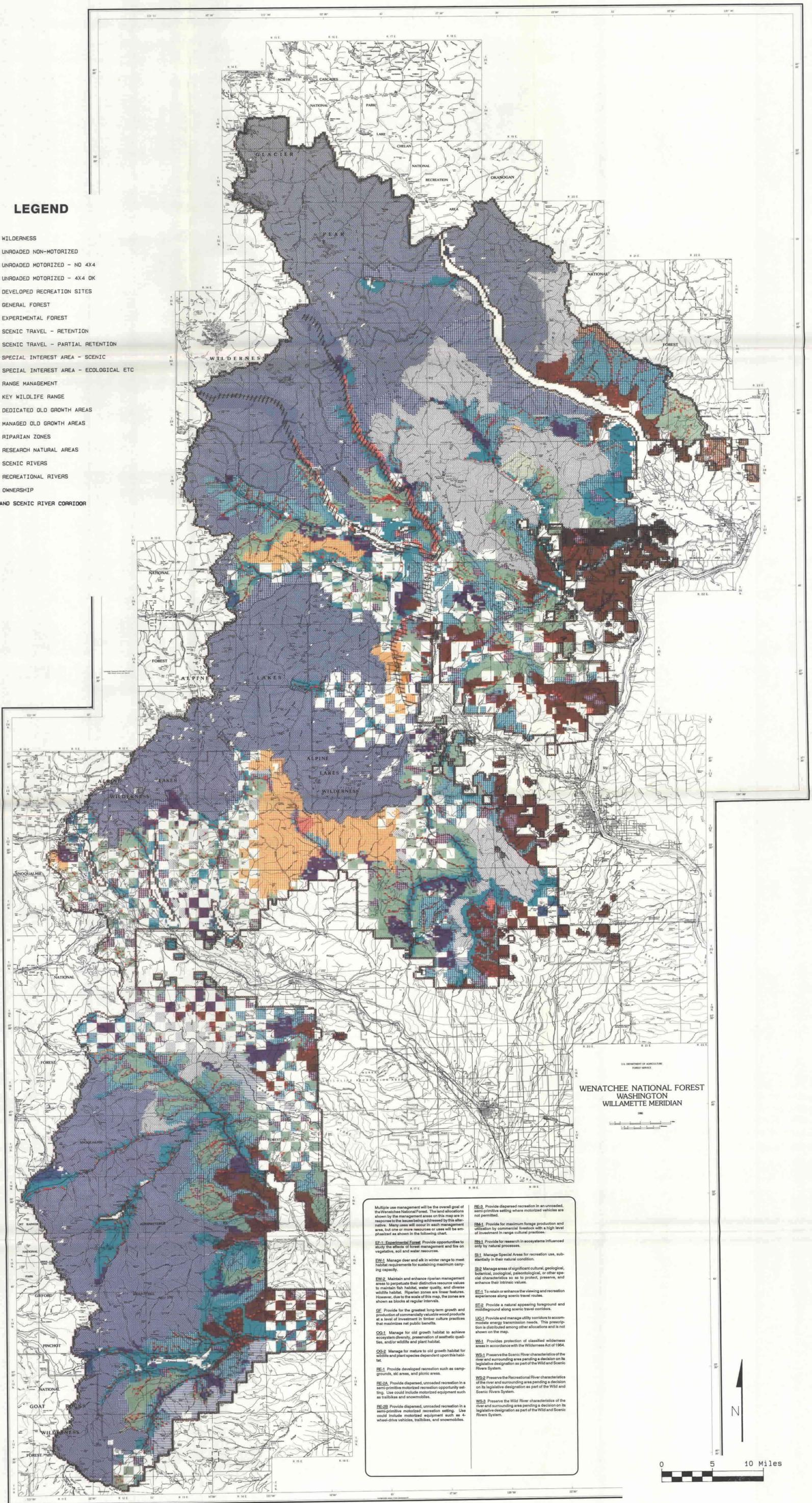
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WENATCHEE NATIONAL FOREST ALTERNATIVE G

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-  WI-1 WILDERNESS
-  RE-3 UNROADED NON-MOTORIZED
-  RE-2A UNROADED MOTORIZED - NO 4X4
-  RE-2B UNROADED MOTORIZED - 4X4 DK
-  RE-1 DEVELOPED RECREATION SITES
-  GF GENERAL FOREST
-  EF-1 EXPERIMENTAL FOREST
-  ST-1 SCENIC TRAVEL - RETENTION
-  ST-2 SCENIC TRAVEL - PARTIAL RETENTION
-  SI-1 SPECIAL INTEREST AREA - SCENIC
-  SI-2 SPECIAL INTEREST AREA - ECOLOGICAL ETC
-  RM-1 RANGE MANAGEMENT
-  EW-1 KEY WILDLIFE RANGE
-  OG-1 DEDICATED OLD GROWTH AREAS
-  OG-2 MANAGED OLD GROWTH AREAS
-  EW-2 RIPARIAN ZONES
-  RN-1 RESEARCH NATURAL AREAS
-  WS-1 SCENIC RIVERS
-  WS-2 RECREATIONAL RIVERS
-  OTHER OWNERSHIP
-  WILD AND SCENIC RIVER CORRIDOR



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
**WENATCHEE NATIONAL FOREST
WASHINGTON
WILLAMETTE MERIDIAN**

Multiple use management will be the overall goal of the Wenatchee National Forest. The land allocations shown by the management areas on this map are in response to the issues being addressed by the alternative. Many uses will occur in each management area. Use of more resources or uses will be emphasized as shown in the following chart.

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EW-1 Manage deer and elk in winter range to meet habitat requirements for sustaining maximum carrying capacity.

EW-2 Maintain and enhance riparian management areas to perpetuate their distinctive resource values to maintain fish habitat, water quality, and diverse wildlife habitat. Riparian zones are linear features. However, due to the scale of this map, the zones are shown as blocks at regular intervals.

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OG-2 Manage for mature to old growth habitat for wildlife and plant species dependent upon this habitat.

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RE-2A Provide dispersed, unroaded recreation in a semi-primitive motorized recreation opportunity setting. Use could include motorized equipment such as trailbikes and snowmobiles.

RE-2B Provide dispersed, unroaded recreation in a semi-primitive motorized recreation setting. Use could include motorized equipment such as 4-wheel-drive vehicles, trailbikes, and snowmobiles.

RE-3 Provide dispersed recreation in an unroaded, semi-primitive setting where motorized vehicles are not permitted.

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RM-2 Provide for research in ecosystems influenced only by natural processes.

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SI-2 Manage areas of significant cultural, geological, botanical, zoological, paleontological, or other special characteristics so as to protect, preserve, and enhance their intrinsic values.

ST-1 To retain or enhance the viewing and recreation experiences along scenic travel routes.

ST-2 Provide a natural appearing foreground and midground along scenic travel corridors.

UC-1 Provide and manage utility corridors to accommodate energy transmission needs. This prescription is distributed among other allocations and is not shown on the map.

WI-1 Provides protection of classified wilderness areas in accordance with the Wilderness Act of 1964.

WS-1 Preserve the Scenic River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

WS-2 Preserve the Recreational River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

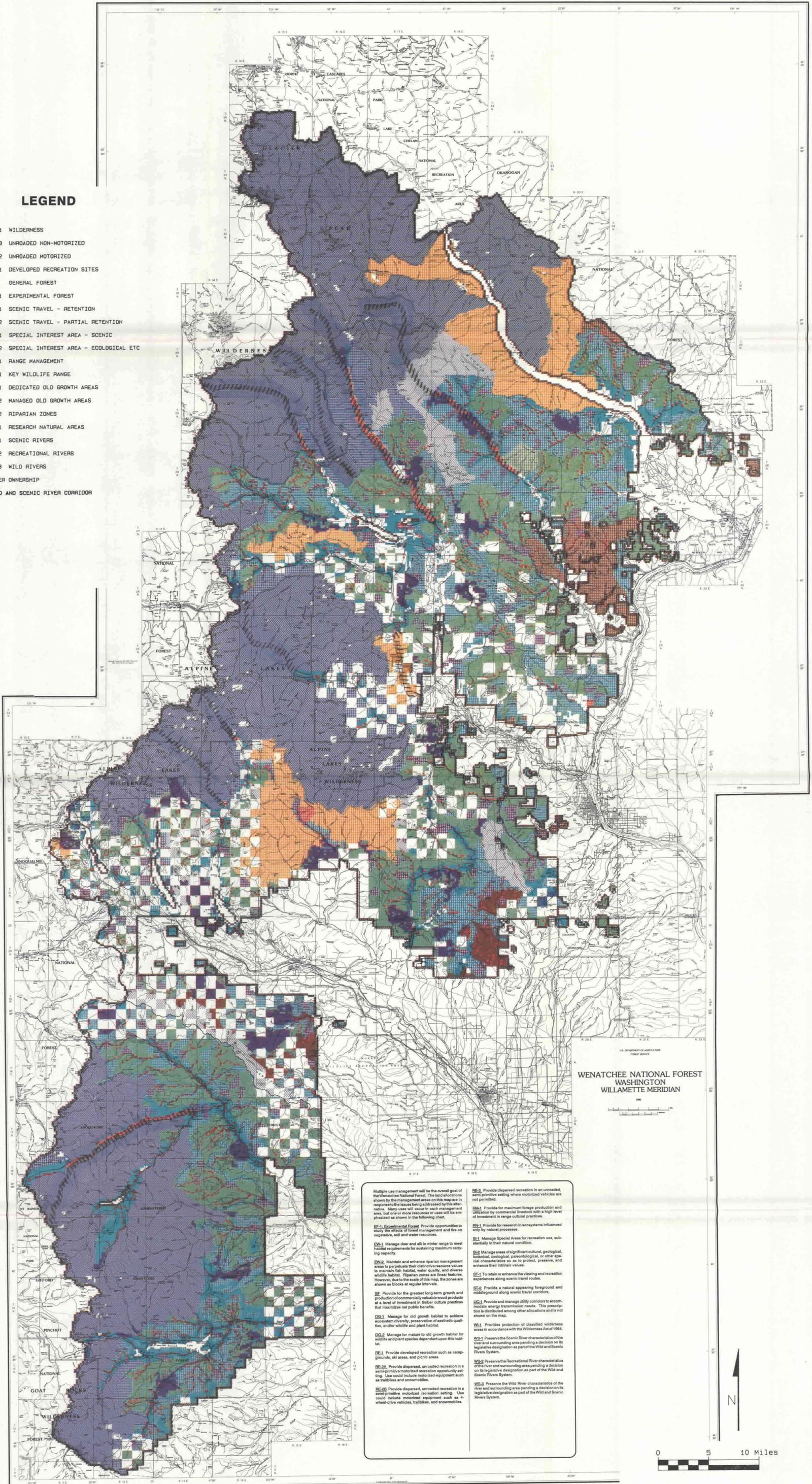
WS-3 Preserve the Wild River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

0 5 10 Miles

WENATCHEE NATIONAL FOREST ALTERNATIVE H

LEGEND

- WI-1 WILDERNESS
- RE-3 UNROADED NON-MOTORIZED
- RE-2 UNROADED MOTORIZED
- RE-1 DEVELOPED RECREATION SITES
- GF GENERAL FOREST
- EF-1 EXPERIMENTAL FOREST
- ST-1 SCENIC TRAVEL - RETENTION
- ST-2 SCENIC TRAVEL - PARTIAL RETENTION
- SI-1 SPECIAL INTEREST AREA - SCENIC
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- OG-2 MANAGED OLD GROWTH AREAS
- EW-2 RIPARIAN ZONES
- RN-1 RESEARCH NATURAL AREAS
- WS-1 SCENIC RIVERS
- WS-2 RECREATIONAL RIVERS
- WS-3 WILD RIVERS
- OTHER OWNERSHIP
- WILD AND SCENIC RIVER CORRIDOR



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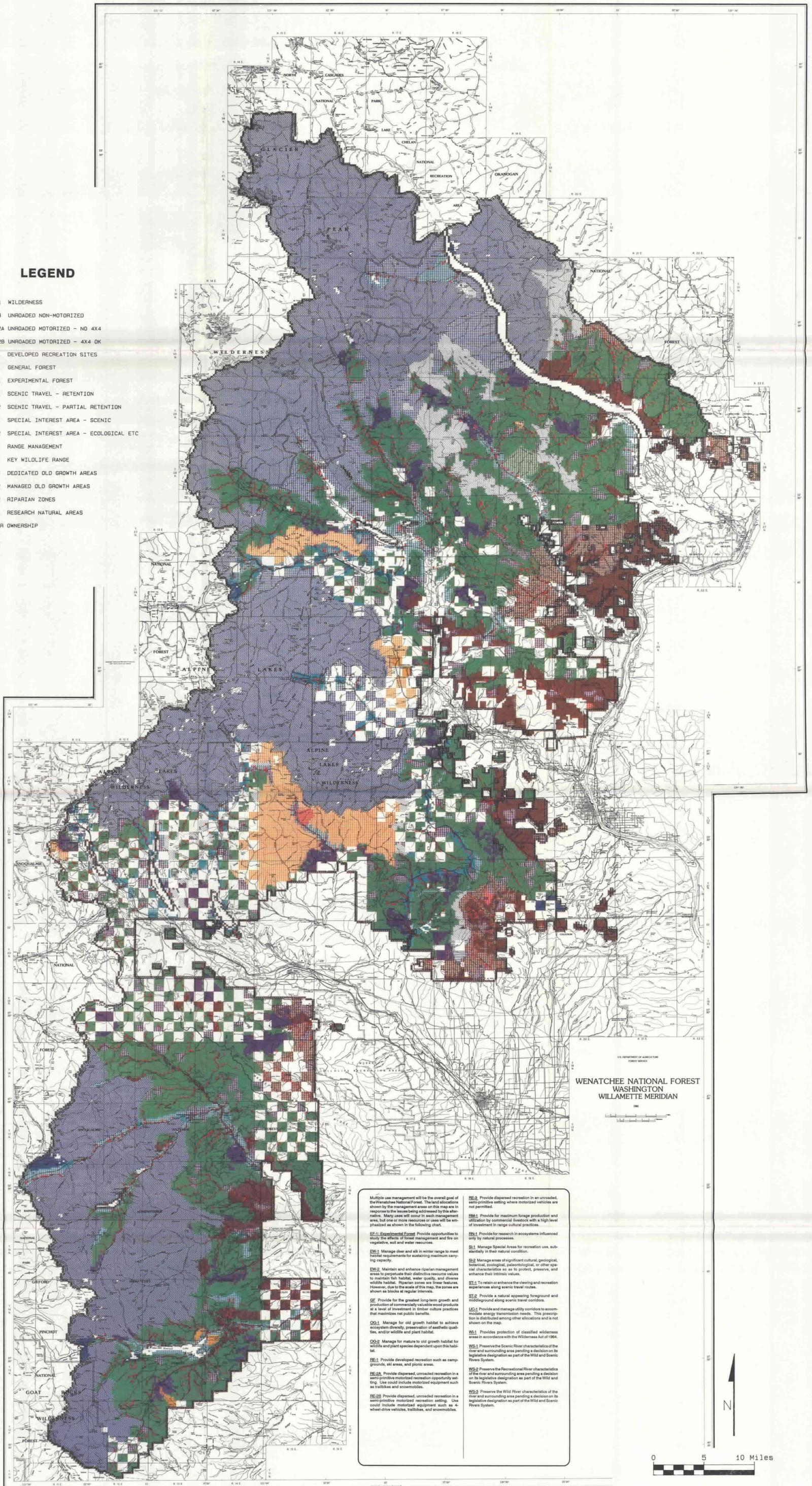
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--	--



WENATCHEE NATIONAL FOREST ALTERNATIVE J

LEGEND

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W-6 Preserve the Wild River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

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FOREST SERVICE
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WASHINGTON
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United States
Department of
Agriculture

Forest Service

Pacific
Northwest
Region

1990



Land and Resource Management Plan

Wenatchee National Forest



PREFACE

This National Forest Land and Resource Management Plan is developed to direct the management of the Wenatchee National Forest. The goal of the Forest Plan is to provide a management program reflective of a mixture of management activities that allow use and protection of the Forest resources; fulfill legislative requirements; and address local, regional and national issues and concerns.

The Forest Plan will be reviewed (and updated if necessary) at least every 5 years. It will ordinarily be revised on a 10-year cycle, or at least every 15 years.

This Land and Resource Management Plan has been prepared according to Secretary of Agriculture regulations (36 CFR 219) which are based on the Forest and Rangeland Renewable Resource Planning Act (RPA) as amended by the National Forest Management Act of 1976 (NFMA).

The Plan has also been developed in accordance with regulations (40 CFR 1500) for implementing the National Environmental Policy Act of 1969 (NEPA). The Forest Plan represents the implementation of the preferred alternative as identified in the Final Environmental Impact Statement (FEIS) for the Wenatchee National Forest.

Additional direction used in developing this Forest Plan came from the Final Environmental Impact Statement for the Pacific Northwest Regional Guide, 1984, as amended December 8, 1988.

If any particular provision of this Forest Plan or its application to any person or circumstances, is held invalid, the remainder of the Forest Plan and its application of that provision to other persons or circumstances shall not be affected.

Further information pertaining to this plan can be provided by:

**FOREST SUPERVISOR
FOREST PLANNER
Wenatchee National Forest
P.O. Box 811
(509) 662-4335
Wenatchee, Washington 98807**

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CHAPTER I

FOREST PLAN INTRODUCTION

A. PURPOSE OF THE FOREST PLAN

The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Wenatchee National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.

The decisions of the Regional Forester in approving a Forest Plan may generally be categorized as:

1. Establishment of forest-wide multiple-use goals and objectives [36 CFR 219.11(b).];
2. Establishment of forest-wide standards and guidelines to fulfill requirements of NFMA applying to future activities [resource integration requirements of 36 CFR 219.13 to 219.26, and the requirements of 36 CFR 219.27];
3. Establishment of management area direction including management area prescriptions and standards and guidelines applying to future management activities in that management area [36 CFR 219.11(c).];

4. Establishment of allowable timber sale quantity and designation of suitable timber land [36 CFR 219.16 and 219.14]; and

5. Establishment of monitoring and evaluation requirements [36 CFR 219.11(d)].

The Forest Plan embodies the provisions of the National Forest Management Act of 1976, its implementing regulations, and other guiding documents. Land use determinations, prescriptions, and standards and guidelines are a statement of the Plan's management direction; however, the project outputs, services, and rates of implementation are dependent on the annual budgeting process.

This Forest Plan establishes the management direction for the Wenatchee National Forest and it will ordinarily be revised on a 10 year cycle, or at least every 15 years.

B. RELATIONSHIP OF THE FOREST PLAN TO OTHER DOCUMENTS

This Forest Plan sets forth the direction for managing the land and resources of the Wenatchee National Forest. The Plan results from extensive analysis and considerations that are addressed in the accompanying Environmental Impact Statement (EIS) and Record of Decision. The planning process and the analysis procedures that were used to develop this Plan are described or referenced in the EIS. The EIS also describes other alternatives considered in the planning process.

Specific activities and projects will be planned and implemented to carry out the direction in this Plan. The Forest will perform environmental analysis on these projects and activities. Project level environmental analysis will use the data and evaluations in the Plan and EIS as its basis. Environmental analysis of projects will be tiered to the Environmental Impact Statement (EIS) accompanying this Forest Plan.

REGIONAL GUIDE

The Regional Guide for the Pacific Northwest Region (June 1984) as amended December 8, 1988 provides direction for National Forest Plans. It includes standards and guidelines addressing major issues and management concerns considered at the Regional Level, to facilitate Forest planning.

ALPINE LAKES MANAGEMENT PLAN

The Alpine Lakes Area Management Act of 1976 (PL 94-357) required that a separate plan be developed for the Alpine Lakes Area. This plan and Environmental Impact Statement was developed with extensive public involvement, and implemented early in 1982. The regulations guiding the development of Forest Plans state that "if, in a particular case, special area authorities require the preparation of a separate special plan, the direction in any such plan may be incorporated without modification in plans prepared under (these regulations)," (36 CFR 219.2(b)).

The area has been managed under the above plan for approximately eight years. To date, neither the Forest Service nor the public have identified any major problems with the allocation or management of that plan. Some minor adjustments have been made in Management Requirements for water, wildlife and fish to meet NFMA standards. Preliminary administrative recommendations will be made for some rivers for consideration under the Wild and Scenic Rivers Act. In good faith to those members of the public who helped develop that plan, the Forest Plan incorporates the land allocations and management as presented in the Alpine Lakes Area Land Management Plan. Both the Wenatchee and the Mt. Baker-Snoqualmie Forests are in agreement with this direction which will allow that plan to stand the test of time. Problems which surface could be handled administratively or when the Forest Plan is revised in approximately ten years.

If direction in this Plan is found not to agree with the direction contained in the Alpine Lakes Management Plan, the Alpine Lakes Plan will take precedence for the Alpine Lakes Management Unit with the exception of some management requirements for water, wildlife and fish and protecting of eligible Wild and Scenic rivers. Copies of the Alpine Lakes Plan are available for review at the Wenatchee National Forest Supervisor's Office, 301 Yakima Street, Wenatchee, Washington.

PROJECT PLANNING

The Forest Plan serves as the single land and resource management plan for the Wenatchee National Forest. All other land management plans are replaced by the direction in this Forest Plan; see Chapter V for a listing of existing plans that this Forest Plan supersedes.

The management direction provided by this Forest Plan comprises the framework within which project planning and activities take place.

C. PLAN STRUCTURE

The Forest Plan is organized into five chapters and seven supplemental sections. They are:

Chapter I - Forest Plan Introduction describes the purpose of the Plan, summarizes its content, illustrates the geographic location, and discusses the Plan's relationship to other documents.

Chapter II - Provides a Summary of the Analysis of the Current Management Situation (AMS). Included are summaries of the current management situation for each resource, potential supply for various resource goods and services, a brief look at demand, and a brief socioeconomic overview of the Forest and related communities and counties.

Chapter III - Contains the Responses to Issues, Concerns, and Opportunities. This chapter shows how the management plan addresses and responds to the major public issues, and management concerns identified during the planning process.

Chapter IV - Forest Management Direction. This chapter is the heart of the Plan and presents the management goals, objectives, and standards and guidelines that constitute direction for resource management covered by the plan.

Chapter V - Implementation Of The Forest Plan - This chapter explains how management direction will be implemented, how implementation activities will be monitored and evaluated, and how the plan can be kept current in light of changing conditions or other findings.

Glossary - This section contains Forest Plan terms that need a common understanding or which have special meanings.

Appendix A - Included are detailed schedules of projected activities by resource.

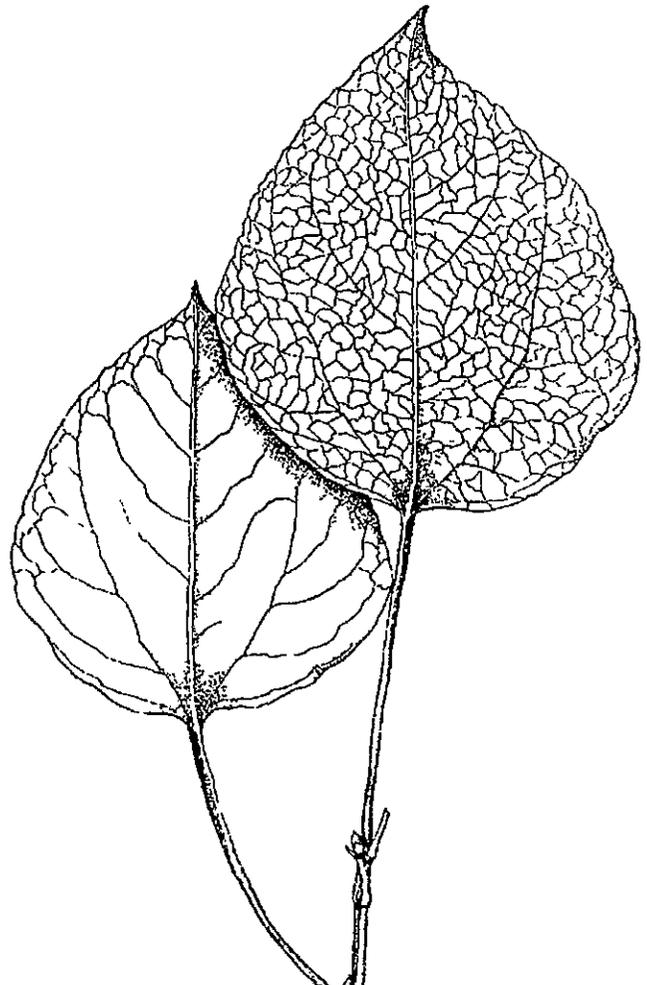
Appendix B - Includes the land classification ownership direction by management prescription

Appendix C - Includes a copy of the Treaty With The Yakima, 1855.

Appendix D - Is a Fire Management Policy Model decision matrix.

Appendix E - Is The Wilderness Management Appendix.

Appendix F - Includes a set of Monitoring Worksheets used to develop the details of the monitoring plan which is summarized in Table V-I of Chapter V.



D. FOREST DESCRIPTION

The Wenatchee National Forest is a publicly owned natural area of marvelous beauty, diversity, and productivity. The Forest includes a net area of 2,164,180 acres. It is about 140 miles long and 25 to 55 miles wide, stretching from spectacular Lake Chelan in the north through the rugged Goat Rocks Wilderness in the south. It begins at the very crest of the Cascade Range in Central Washington State and falls sharply to the breaks of the Columbia River. Elevations on the Forest range from 800 feet to more than 9,500 feet, encompassing three major landforms and more than 30 different geologic formations.

This geologic variety and a wide difference in precipitation across the Forest leads in turn to an unusual diversity in vegetation and an associated richness of wildlife species. The vegetation changes with elevation and moisture as the Forest rises from grass, sage, and bitterbrush in the low-lying eastern areas, through open stands of orange-barked ponderosa pine, and into mixed forests of pine, Douglas fir, and larch. Next it rises into subalpine areas with true firs and lodgepole pine, and finally reaches lush alpine meadows fringed with hardy stands of alpine firs, larch, and whitebark pine.

Areas near the Cascade crest receive up to 140 inches of precipitation and as much as 25 feet of snow accumulation each year. Moisture declines markedly to the east, resulting in near-desert conditions with less than 10 inches of precipitation on the eastern fringes of the forest. However, the generous precipitation and snowpack in the high mountain areas supply hundreds of sparkling alpine lakes and dozens of tumbling streams and rivers. These in turn feed half a dozen large lakes and reservoirs that help water thousands of acres of productive farmland in the fertile valleys of central Washington.

The diversity of the Forest also has led to a great variety of wildlife species. An estimated 394 species of fish and wildlife reside within the forest. These vary from stately elk to the tiny mouse-like pika, from soaring bald eagles to hummingbirds, from leaping salmon to shadowy suckers methodically vacuuming the bottom of lakes and streams.

This wealth of water, wildlife, and scenery plus dependably sunny weather attract millions of recreation-minded visitors to the Wenatchee Forest. Indeed, with nearly 5 million visitor days of use recorded each year, the Forest is one of the half dozen most heavily visited National Forests in the nation. People come to camp, hike, fish, hunt, to take in the scenery, to take pictures, ride horses, drive 4-wheel-drive vehicles and ride motorbikes, to rockhound and pan for gold, to cut firewood, to gather mushrooms, and pick berries. In winter they come to ski (downhill and cross-country), to snowshoe, ride snowmobiles, and play in the snow. This recreation activity is a key ingredient in the tourism industry that has become a cornerstone of the central Washington economy.

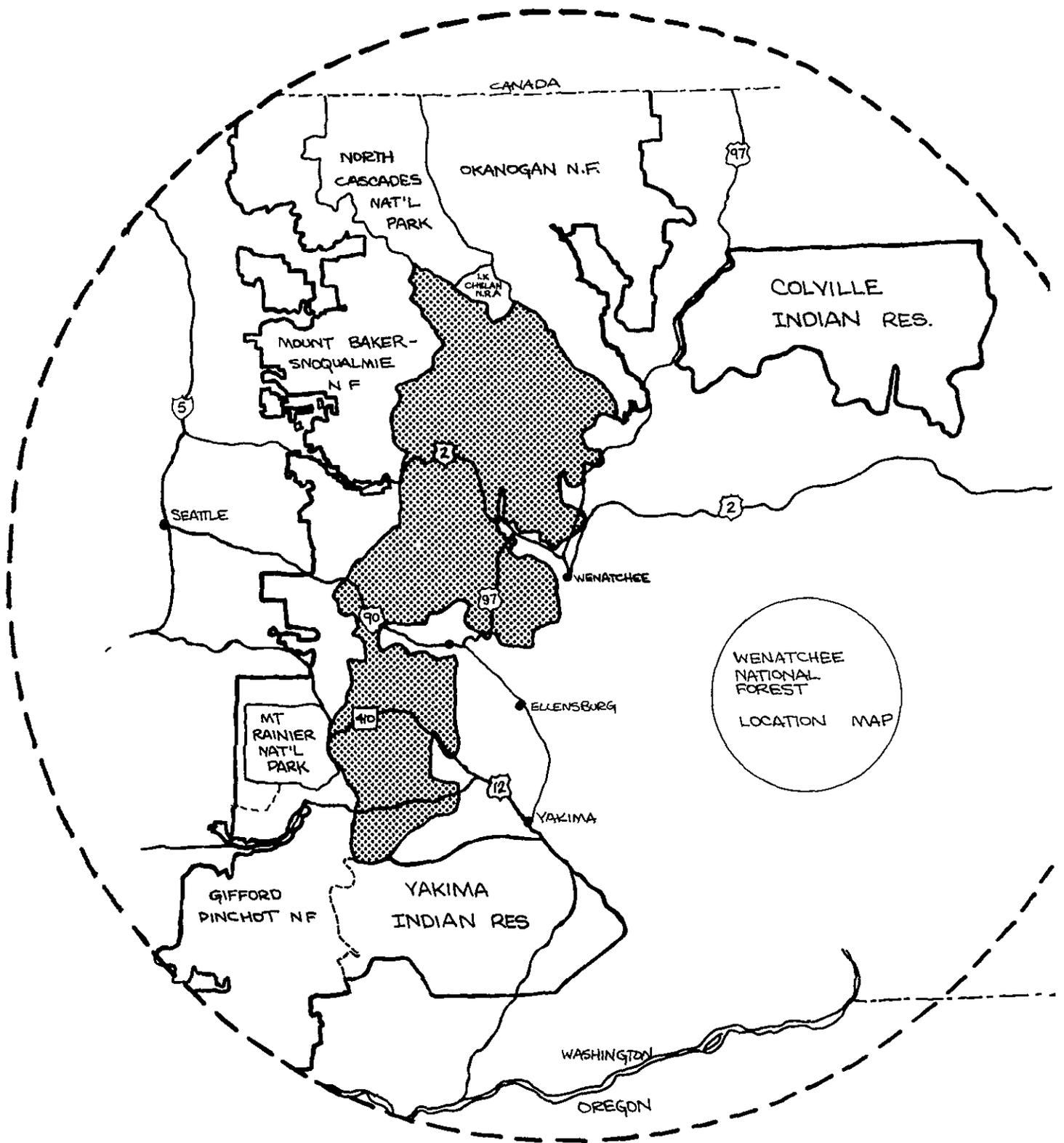
The Wenatchee Forest is also an important producer of sawtimber and other wood products. Trees sold at auction and cut by local companies are mostly processed in Washington State into lumber, plywood, paper, furniture, and firewood. The wood products industry has long been an important employer in many communities within and adjacent to the Forest.

The Forest is also subject to periodic natural disasters like wildfire, floods, windstorms, and insect outbreaks. These occurrences require occasional costly mobilization of people and equipment to minimize damage to forest resources and to rehabilitate impacts which have occurred.

The great diversity of Forest resources and uses translates to complexity in management and Forest planning. The variety of uses also leads to the potential for considerable differences in opinion on which uses should be emphasized in management. These are some of the challenges addressed by this management plan.



WENATCHEE NATIONAL FOREST LOCATION MAP



CHAPTER II

SUMMARY OF THE ANALYSIS OF THE CURRENT MANAGEMENT SITUATION

A. INTRODUCTION

This chapter describes the present condition and current management of the Wenatchee National Forest. It estimates the potential for producing each forest resource, given legal and other requirements. It also describes the supply of market and non-market forest resources and, where possible, the future demand for these resources.

Supply estimates for the current program are based on current management direction for the Forest. The sources of that direction were the Alpine Lakes Management Plan, the Chelan and Kittitas Unit Plans, and Ranger District multiple-use plans. Outputs are based on land allocations contained in these plans, and on up-to-date yield calculations being used in the FEIS.

The production potential for each resource is the amount of goods or services (yields) which could be produced while meeting legal and other minimum requirements. The potential for all resources can not be met at the same time. With few exceptions, when the potential for one resource is maximized, production of another resource will be reduced or eliminated entirely. For example, if maximum timber production is reached, then unroaded recreation and visual quality would be significantly reduced.

Issues, concerns, and opportunities identified by the public and Forest managers during the planning process have helped identify needs for changing current management direction. This change is reflected in the preferred management direction in Chapter IV.

B. ENVIRONMENTAL COMPONENTS

The supply and demand conditions of primary resource elements are detailed under each resource section. Table II-31 which follows the resource narratives, summarizes conditions for these resources.

1. RECREATION SETTING

Overview

A tremendous diversity of elevation, vegetation, and precipitation on the Wenatchee National Forest results in an equal variety of recreation uses and opportunities. The Forest has been the sixth most heavily visited National Forest in the United States for the past several years, and the diversity of uses is unsurpassed.

Recreation is heaviest in the summer months, but occurs in all seasons of the year. In the early spring, hikers, horse users, and trailbike enthusiasts flock to low elevation trails. These activities follow the melting snows upward during the summer until fall storms begin to push users back down into the valleys. Scenic highways and forest roads are equally attractive to visitors, and driving for pleasure is one of the most popular public recreation uses of the Forest. There are 126 campgrounds and picnic areas offering visitors a rustic camping experience for a few hours or for several days.

Because of its size, diversity, and accessibility, the Wenatchee National Forest has a remarkable capacity to absorb recreation use any time of the year. Although recreation use is projected to increase steadily in the future, the Forest has so much to offer that crowding and shortages are expected to be only localized problems.

a. Developed Recreation

1) Current Management Program

The Forest provides a full spectrum of developed recreation opportunities. Table II-1 indicates the kind and number of developed sites now in existence.

**TABLE II-1
KINDS AND NUMBERS OF
RECREATION SITES**

Kind of Site	Number of Each
Observation	3
Boating	7
Trailhead	12
Campground, Family	115
Campground, Organized Group	3
Picnic Ground	8
Hotel, Lodge, or Resort	7
Organization Site	20
Other Recreation Concession	2
Recreation Resident Tract	54
Winter Sports	7
Information	6
TOTAL	244

Most of the use in the developed recreation setting takes place in camp and picnic grounds. These sites were used to near capacity on weekends in 1988.

The resorts, organization sites, and recreation resident tracts which are under special use permits to commercial businesses, organizations, and individuals, provide additional recreation opportunities throughout the Forest.

At the present time, there are 45 campgrounds where a user fee is being charged. This fee ranges from \$3.00 to \$6.00 per day for individual family camp units. There are many multi-family units where the fee is adjusted according to the size of the unit and number of families it will accommodate.

In addition to the family unit campgrounds, the Forest has five group sites that can be reserved in advance at a fee that ranges from \$12.00 to \$50.00.

Seven downhill ski areas offer a variety of skiing opportunities and challenges in alpine, subalpine, and low elevation settings. Stevens Pass, Snoqualmie Pass, and Pac West Ski Areas are administered by the Mt. Baker-Snoqualmie National Forest. White Pass and Mission Ridge are large developments administered by the Wenatchee National Forest that draw skiers from a broad area. Chelan and Leavenworth Ski Areas are modest operations serving local users.

2) Production Potential

The ability of the Forest to produce developed recreation supply is directly related to the potential to expand or develop new facilities. This potential is affected by budgets in addition to the physical capacity for sites. The physical capacity for expanding or developing new sites is not limited for the ten to fifteen years covered by this plan and should not limit the supply through or beyond the 50 year planning horizon.

The Forest Service objective for downhill skiing is to provide the opportunity to the private sector, through special use permits, to develop successful ski areas which enhance the total outdoor recreation spectrum for the general public. There are seven sites on the Forest and current interest is on expansion of the Mission Ridge and White Pass Areas. The Stevens Pass Ski Area has recently expanded by developing an area in the Mill Creek drainage east of Stevens Pass. Additional expansion is expected in that area.

The Chiwaukum Mountains in the vicinity of the Dardanelles on Highway 2 is the most promising potential ski area that has been inventoried. If this potential is pursued, it would be subjected to thorough environmental analysis as required by the National Environmental Policy Act. The analysis would include full public involvement.

3) Demand

The developed recreation sites listed in Table II-1 have a current total capacity of 4,883,000 Recreation Visitor Days (RVD's). Developed recreation use at all sites in 1986 was 2,731,000 RVD's, or 56% of the available capacity. These figures indicate a surplus of 2,152,000 RVD's. However, this surplus is misleading considering the capacity figures include early and late season periods during the use season, and mid-week periods when visitor use is much lower. During most weekends and holidays during the use season, sites are filled to capacity. When sites are operating at full capacity, users crowd into areas, resulting in problems such as strained sanitation systems and water supplies, and conflicts between users and impacts on vegetative and soil resources. Expansion and improvements at many of the sites is planned for the first decade, increasing the capacity of sites to 6,683,000 RVD's. This figure includes proposed expansion of ski areas and other private sector development on the Forest. This capacity is expected to be adequate through the life of this Plan.

Estimated recreation demand through the fifth decade planning period was obtained from the 1979 Washington State-wide Comprehensive Outdoor Recreation Plan (SCORP). This plan estimates that demand for developed recreation activities would increase about 20%, 12%, 7%, 10% and 7% per-year through the five decade planning period. To reach demand estimates, visitor use figures for 1986 were projected by the estimated increase use percentages through the five decade planning period.

b. Dispersed Recreation

1) Current Management Program

Dispersed recreation refers to those recreation activities that occur outside of developed sites such as camp or picnic grounds, resorts, organization sites, etc. It includes such activities as camping in undeveloped areas, hiking, off-road vehicle use (ORV), fishing, hunting, horseback riding, mountain climbing, cross-country skiing, gathering firewood, gathering berries, boating, driving for pleasure, etc.

RECREATION SETTING

There are 2,463 miles of trails on the Forest. Approximately 48 percent of the Forest trails are in wilderness. The Forest Service is currently working with users to develop 4-wheel drive routes, trail bike, cross-country ski, and snowmobile routes. Use of trails by all types of users is steadily increasing. The planning and management of this trail system requires active participation by user groups, a requirement not difficult to achieve in view of the high interest shown. Dispersed recreation outside of wilderness takes place in both a roaded or unroaded setting. Most of the above activities can be enjoyed in either setting, however, some users prefer either one setting or the other for their recreation pursuits. Often recreationists will use both settings during a single visit.

The current management program allocations would retain 261,059 acres outside of wilderness in an unroaded setting. These allocations include:

- a. 64,597 acres in the RE-2 allocation dedicated to unroaded non-motorized recreation.
- b. 59,551 acres in the RE-3 allocation dedicated to unroaded motorized recreation.
- c. 136,911 acres in the SI-1 allocation dedicated to dispersed recreation in a natural unroaded condition.

There were 746,300 RVD's use on these unroaded acres in 1986, or 33% of the total dispersed non-wilderness use.

Roaded dispersed recreation would be available on 1,062,087 acres under current management allocations, however, in 1985 there were 712,900 acres actually in a roaded setting with the remaining 326,842 acres scheduled for development in current land use plans. In 1986 there were 1,514,700 RVD's used on the 712,900 roaded acres or 67 percent of the total dispersed non-wilderness use.

2) Production Potential

The potential of the Forest to provide various settings for non-wilderness dispersed recreation is dependent on the acreage in the roaded and unroaded settings at a given time. The existing setting would provide the maximum unroaded potential and was used as the maximum unroaded benchmark. It would provide 1,365,000 unroaded RVD's capacity. All of this capacity could be dedicated to either unroaded motorized or unroaded non-motorized use. This setting would also produce 17,835,000 RVD's of roaded recreation on the 712,900 roaded acres.

The maximum timber benchmark would approximate the maximum roaded recreation setting. At the end of the 15th decade there would be approximately 1,069,800 roaded acres which would provide 26,746,000 RVD's capacity. This setting would produce 744,000 RVD's capacity on approximately 271,400 unroaded acres, or one-half of the current unroaded capacity.

3) Demand

Table II-2 indicates the estimated projected demand for Dispersed Recreation in terms of Roaded, Unroaded-motorized, and Unroaded-non-motorized uses.

The supply, however, will vary over time as the inventory shifts from an unroaded condition to a roaded condition. The Forest's current supply for each of these categories exceeds the projected demand through the year 2030.

Projected recreation demand was calculated in the same manner as demand for developed recreation, using the 1979 Washington State-wide Comprehensive Outdoor Recreation Plan estimates.

TABLE II-2
DISPERSED RECREATION
Projected Demand
In Millions of Recreation Visitor Days

	DECADE 1	DECADE 2	DECADE 5
Roaded Estimated Projected Demand	1.998	2.126	2.630
Unroaded Motorized Estimated Projected Demand	.279	.301	.405
Unroaded Nonmotorized Estimated Projected Demand	.099	.106	143

The preceding supply and demand figures are based on mathematical formulas and take into account length of stay, season of use, and the concentration of use per-acre for the various ROS settings. Some supply and demand relationships are hard to quantify. Large unroaded areas have a very low visitor use capacity. The assumption is that some users prefer this low density of people and will seek out these opportunities.

There are very few lakes in unroaded areas with motorized trail access. There is an expressed desire by trail bike users for this type of opportunity.

There is a demand for moderate to easy backpacking opportunities for large groups and organizations, in highly scenic, primitive settings. Most of the high quality opportunities are in wilderness, where large party sizes are not permitted.

There appears to be a shortage of similar opportunities for outfitter-guides to take large groups of clients into high quality semi-primitive areas without going into wilderness.

2. WILD, SCENIC, AND RECREATIONAL RIVERS

a. Current Management Program

On October 7, 1968, Congress enacted the Wild and Scenic Rivers Act PL 90-542 which placed eight rivers in the nation under a National Wild and Scenic Rivers System.

As part of the Forest planning process, direction has been given to look at each river on the Nation-wide River Inventory and those not on the inventory, but having public interest expressed in them, to verify that they meet eligibility criteria for inclusion in the National Wild and Scenic Rivers System. This is based upon criteria set forth under sections 1(b) and 2(b) of the Wild and Scenic Rivers Act and as supplemented by USDA-USDI Guidelines.

On the Forest, portions of the Chiwawa, White, and Wenatchee Rivers are included on the current Nationwide River Inventory. Present management of land adjacent to these rivers is guided by Regional direction based on Presidential direction. This states that agencies having rivers listed on the inventory shall take prompt action to protect the rivers and avoid or mitigate adverse effects activities might have on such rivers. Assessment of these rivers is the responsibility of the agency or the State having the largest portion of the river.

As a result of both in-service review and the analysis of comments received from the public during the comment period for the DEIS, the Forest Supervisor formed an interdisciplinary (ID) team to make a reassessment of eligibility for all rivers on the Wenatchee National Forest. The ID Team was also assigned the task of completing a suitability analysis for the resulting eligible rivers.

The ID Team did not conduct an evaluation on the Yakima River, due to the non-Federal ownership of most lands adjacent to the river. The 1.25 miles within the National Forest boundary is not considered eligible because it does not have an outstandingly remarkable feature. National Forest lands make up less than one percent of the ownership of the 102 mile river length. The State of Washington may conduct a study of the Yakima River under the Washington State Scenic Rivers Program.

b. Production Potential

Of the 33 rivers analyzed, 10 were found by the ID Team to be eligible, and were classified as "wild, scenic, or recreational." The following table indicates the highest potential classification for which these river segments qualify.

c. Demand

There has been public support for and against recommendation of the following rivers to Congress for consideration under the Wild and Scenic Rivers Act. Most of the input received against recommendation has come from local residents who live on or near the rivers, and are concerned with excessive government controls and/or acquisition of their property.



TABLE II-3
HIGHEST POTENTIAL RIVER CLASSIFICATION
UNDER THE WILD & SCENIC RIVERS ACT

River	Segment ^{1/}	Classification	Length/Miles		Total
			NF	Other	
AMERICAN	Headwaters to confluence w/Rainier Fork	Wild	6.0	0	6.0
	Confluence w/Rainier Fork to confluence w/ Bumping River	Scenic	16.0	0	16.0
CLE ELUM	Headwaters to Alpine Lakes Wilderness boundary	Wild	4.0	0	4.0
	Alpine Lakes Wilderness boundary to Salmon La Sac Bridge	Scenic	6.0	10.0	16.0
	Salmon La Sac Bridge to head of Lake Cle Elum	Recreational	3.5	1.0	4.5
WAPTUS	Headwaters to confluence with Cle Elum River	Wild	13.0	0	13.0
ICICLE	Headwaters to Alpine Lakes Wilderness boundary	Wild	12.0	0	12.0
	Alpine Lake Wilderness Boundary to 2.5 miles above National Forest boundary	Scenic	7.5	6.5	14.0
	2.5 miles above National Forest boundary to National Forest boundary	Recreational	0.5	2.0	2.5
LITTLE WENATCHEE	Riverside CG Falls to Lake Wenatchee	Scenic	5.5	2.5	8.0
NAPEEQUA	Headwaters to Glacier Peak Wilderness boundary	Wild	15.0	15.0	15.0
	Glacier Peak Wilderness boundary to confluence w/ White River	Recreational	1.0	1.0	1.0
WHITE	Headwaters to Glacier Peak Wilderness boundary	Wild	15.0	0	15.0
	Glacier Peak Wilderness boundary to Lake Wenatchee	Scenic	11.5	7.5	19.0
CHIWAHA	Headwaters to Glacier Peak Wilderness boundary	Wild	5.0	0	5.0
	Glacier Peak Wilderness boundary to Goose Creek	Scenic	22.75	1.25	24.0
	Goose Cr. to confluence w/ Wenatchee River	Recreational	2.75	3.25	6.0
ENTIAT	Headwaters to Cottonwood trailhead	Wild	16.5	0	16.5
	Cottonwood trailhead to private land boundary	Scenic	15.0	0	15.0
WENATCHEE	Lake Wenatchee to National Forest boundary	Recreational	14.75	13.25	28.0

^{1/} Some segments have been combined for this table.

3. CULTURAL RESOURCES

a. Current Management Program

The cultural resource base of the Wenatchee National Forest includes a diverse and unusually rich range of historic and prehistoric artifacts and sites. These include: 1) historic cabins, trails, mines, ditches, railroad grades, emigrant trails, original highway grades, mills, and homesteads; 2) historic Forest Service structures including guard stations, lookout towers, corrals, camps, administrative centers, and Depression-era campgrounds and buildings; and 3) prehistoric campsites, villages, graves, quarries, pictographs, workshops, trails, rock shelters, and religious sites.

In accordance with the National Historic Preservation Act of 1966 as amended, the National Environmental Policy Act of 1969, as well as a series of implementing regulations and policy direction, the Forest has undertaken a program to identify, evaluate, preserve, protect, and interpret the cultural resources. A cultural resource overview, pulling together most of the recorded information relating to the prehistoric and ethnographic uses of the Forest, has been completed, and is available for review at the Forest Supervisor's office. An overview of the historic resources of the Forest still needs to be completed.

Between 1976 and 1985 cultural resources were inventoried on about 123,372 acres of the Forest, or 6 percent of the total Forest acreage. Most field examinations have been done in conjunction with other Forest activities. These surveys have determined the location and nature of cultural sites within potential project areas. At the present rate, project inventory will be completed at a rate of about 30,000 acres per year. Most of this will be in support of the timber sale program.

Inventories have been mostly confined to surface examinations only. Archaeological test excavations have been carried out at five sites on the Forest to determine their subsurface extent and potential eligibility for inclusion in the National Register of Historic Places. These sites were selected for testing because of their relationship to planned timber sales and campground developments. Ultimately the data retrieved may provide important contributions to archaeological research.

Table II-4 is a summary of the known and reported cultural resources of the Forest as of 1985. Historic sites are those associated with the period for which there are written records. In central Washington, the historic era begins at roughly 1805 A.D., with the Lewis and Clark expedition on the lower Columbia River. Prehistoric sites are those predating this period, and are linked to the American Indians and their ancestors.

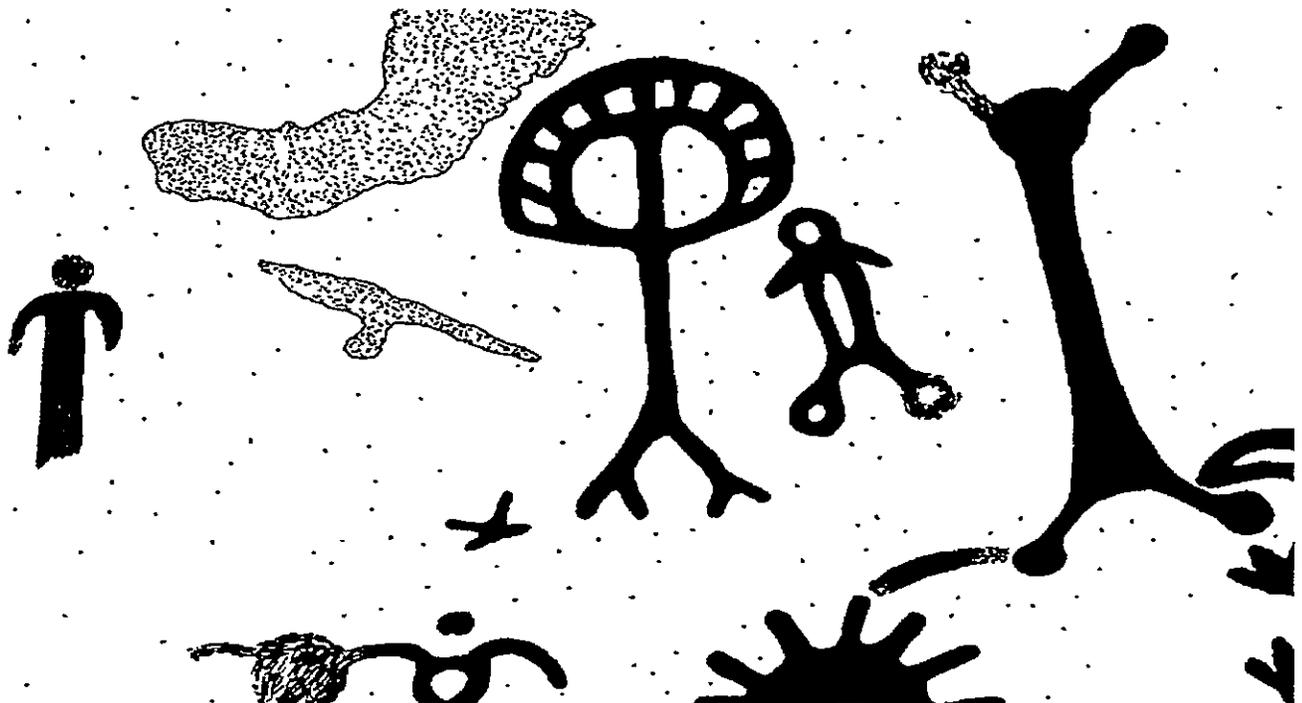


TABLE II-4
INVENTORIED AND REPORTED CULTURAL SITES
1985

Ranger District	Number of Inventoried Sites 1/		Number of Reported Sites and/or Use Areas 2/		Conditions of Remains			Interpretive Value		
	Historic	Prehistoric	Historic	Prehistoric	Poor	Fair	Unknown	Yes	No	Unknown
Chelan	5	2	40	32	20	23	36	23	48	8
Cle Elum	68	11	108	58	97	77	71	52	170	23
Entiat	6	0	38	8	21	17	14	16	26	10
Lake Wenatchee	17	12	83	13	43	47	35	32	83	10
Leavenworth	10	4	78	20	37	42	33	36	63	13
Naches	61	82	25	68	50	76	110	39	182	15
TOTAL	167	111	372	199	268	282	299	198	572	79

1/ Includes Forest Service Site Inventories, University/WARC Inventories, State and National Registers.

2/ These include sites situated on adjacent and intermingled private land.

b. Production Potential

The number of sites known and evaluated may represent only a small portion of the total of cultural resources that actually exist on the Forest. Prehistoric and historic land use patterns suggest a high probability for the occurrence of other significant cultural resources within the Forest.

Approximately 90 percent of the identification and evaluation of cultural resources has been carried out in support of the timber sale program. Hence the number of acres currently managed for cultural resource values, which have been determined on the basis of the number and type of significant cultural resources present, is directly related to the acres of timber prescribed for treatment annually.

Recently, increased recreation funding initiated many projects that may adversely impact cultural resources. As lands are allocated to uses involving land and vegetation modification, the probability of adverse impacts on cultural resources also increases. Studies on the Forest indicate certain locations have the greatest probability for overlap between cultural resources and other management activities (Wenatchee National Forest Sampling Design 1983).

As the dimension of land development increases elsewhere, a correspondingly greater proportion of the physical remnants of our American heritage and a large source of scientific data will be irrevocably lost. As a result, the value of cultural sites on National Forest lands will increase with time, intensifying the need to identify, protect, and manage this irreplaceable resource. At the

CULTURAL RESOURCES

same time, because of conflicts with other resource management needs, management decisions will require a multitude of considerations, including factors such as the level of significance of the property, its condition, its suitability for research or interpretive opportunities, accessibility, compatibility with other resource activities, relationship to the local community and/or American Indian concerns, and the like.

c. Demand

The future demand for cultural resources is likely to be a function of three factors: recreational use, the specific association of a community or ethnic group with an historic site or area, and the development and expansion of archaeological and historical research.

With respect to recreation, the Forest receives approximately 4.9 million Recreation Visitor Days use per year (Recreation Information Management 1986). It is thus likely that interpretive programs and designated historic points of interest would experience substantial public use.

The demand for the protection and preservation of historic/cultural sites and areas because of community associations will probably continue at about the same rate as in the past. Salmon La Sac Guard Station, the Liberty Historic District, and Stevens Pass Historic District were all the products of community efforts to recognize historic values embodied in these properties (Wenatchee National Forest correspondence files). Generally, community associations become known as the Forest Service plans for the disposition of the sites and properties. In addition to the local community interest, there is also a widespread expectation by members of the Colville Confederated Tribes and the Yakima Indian Nation that there will be protection of archaeological sites on the Forest. These properties represent a very special link between the Indians and their ancestors who once occupied the Forest lands. This relationship will continue to reinforce the demand for protection and preservation of these sites.

Research by the scientific community is expanding into the uplands, carrying with it the recognition of the exceptional value of hinterland sites to the reconstruction of prehistoric subsistence patterns. Although requests for research are not anticipated to be frequent, the demand for protection of archaeological and historic sites for future research purposes will likely remain high.

4. SCENERY

a. Current Management Program

The Wenatchee National Forest is well known for its outstanding mountain, valley, and lakeshore scenery.

The Cascades landscapes are distinctive in beauty and nature, with sweeping vistas and a variety of topography, ecotypes, and lifeforms. Natural appearing environments exist on much of the Forest, even where intensive commodity management is occurring. Approximately 63 percent of the Forest, including wilderness areas, are in a natural appearing visual condition.

Visual quality is classified according to the scenic variety of an area and how often it is seen by the viewing public. The most scenic classifications are "preservation", "retention", and "partial retention". Definitions of Visual Quality Objectives and percent of land in each classification under current management are depicted in Table II-5.



TABLE II-5
EXISTING VISUAL QUALITY OBJECTIVES
1985

VQO Objectives	Description	Percent of National Forest Land
Preservation (P)	Areas in which only ecological change has taken place except for trails needed for access. They appear to be untouched by human activities.	42
Retention (R)	Areas in which changes in the landscape are not visually evident to the average person unless pointed out. They appear to be natural.	21
Partial Retention (PR)	Areas in which changes in the landscape may be noticed by the average forest visitor but they do not attract attention. The natural appearance of the landscape still remains dominant. They appear to be minor disturbances.	24
Modification (M)	Areas in which changes in the landscape are easily noticed by the average forest visitor and may attract some attention. They appear to be disturbances but resemble natural patterns.	2
Maximum Modification (MM)	Areas in which changes in the landscape are strong and would be obvious to the average forest visitor. These changes stand out as a dominating impression of the landscape. Yet, they are shaped so that they might resemble natural patterns when viewed from 3-5 miles or more distant. They appear to be major disturbances when viewed at closer distances.	11

The most valuable scenery occurs on lands that are distinctive in character and highly visible. The Forest provides the public with seven wilderness areas, six major reservoirs including Lake Chelan, several large natural lakes including Lake Wenatchee, many free flowing rivers, five Washington State "scenic" designated highways, and numerous main travel routes penetrating the Forest toward recreation areas and wilderness. Thirty-four viewsheds and travel routes have been identified as being important recreational travelways on the Forest. Eighteen lakes and reservoirs have been identified as recreational lakes with high visual sensitivities. All major travel routes and lakes are protected with Preservation, Retention and/or Partial Retention Visual Quality Objectives.

b. Production Potential

Table II-31 shows acres by Visual Quality Objective considered to be the maximum protection of scenic values in addition to the acres under the current program.

The following table shows the existing condition of the Forest landscape which would approximate the maximum potential for scenic quality.

TABLE II-6
EXISTING VISUAL CONDITION
OUTSIDE OF WILDERNESS
1984

Description of Visual Condition	Total Forest Lands
Natural appearing landscape	63%
Activities have slightly altered the natural appearing landscape	15%
Activities have altered or heavily altered the natural appearing landscape	21%
Activities have permanently altered the natural appearing landscape (e.g., powerline corridors)	1%

A natural appearing landscape equates with preservation and retention visual quality objectives.

Activities that have slightly altered the natural appearing landscape are associated with partial retention visual quality objectives.

Activities that have altered or heavily altered the natural appearing landscape are associated with the modification and maximum modification visual quality objectives.

c. Demand

Recreation Information Management (RIM) data indicates that approximately 12 percent of the 4.9 million visitor days of recreational use in 1986 was driving for pleasure and viewing scenery. Public demand for scenic quality and concern for its maintenance is increasing and is expected to continue to increase over the foreseeable future. Visual quality concerns are highest along the major state routes that criss-cross the Forest; along collector roads accessing wilderness; adjacent to lakes, rivers, and streams; and in areas near recreation sites or communities.

Recreationists intensively use the five highways, 4,667 miles of existing forest roads, and 2,463 miles of trails. These facilities traverse a wide variety of forest and non-forest lands. Of all these lands, the least potential for impact on the visual resource will be within roadless and commercial forest areas that are delineated as "retention" and "partial retention" in the Landscape Management Inventory.

5. WILDERNESS

a. Current Management Program

Wilderness on the Forest was designated by Congress with the Wilderness Act of 1964 (Goat Rocks and Glacier Peak Wildernesses), the Alpine Lakes Area Management Act of 1976 (Alpine Lakes Wilderness), and the Washington State Wilderness Act of 1984 (Lake Chelan-Sawtooth, Henry M. Jackson, Norse Peak and William O. Douglas Wildernesses). The 1984 Act also added 56,011 acres to the Glacier Peak Wilderness and 13,314 acres to the Goat Rocks Wilderness.

Glacier Peak, Alpine Lakes, Henry M. Jackson and Norse Peak Wildernesses extend across the Cascade Crest into the Mt. Baker-Snoqualmie National Forest while the William O. Douglas and Goat Rocks Wildernesses extend into the Gifford Pinchot National Forest. In the north, the Wenatchee and Okanogan National Forests share the Lake Chelan-Sawtooth Wilderness. Managers of neighboring Forests worked together to develop uniform direction to be used by each Forest for the management of these shared wilderness areas.

Following is the total area for each wilderness area and the amount that lies within the Wenatchee National Forest.

Wilderness	Total Acres	Wenatchee National Forest Net Acres
Lake Chelan-Sawtooth	145,667	56,414
Glacier Peak	576,865	289,001
Henry M Jackson	103,591	27,221
Alpine Lakes	393,360	244,057
Norse Peak	50,923	36,295
William O Douglas	167,195	151,730
Goat Rocks	105,633	36,316
TOTAL	1,543,234	841,034

b. Production Potential

The passage of the Washington State Wilderness Act of 1984 stated that the Secretary of Agriculture was not required to review remaining roadless areas for a wilderness option in the current Forest Plan. Due to this provision, the potential production or supply of wilderness for the 10 to 15 years covered by this plan will be the same as under the current management direction. The use potential for the Wenatchee National Forest portions of the existing Wilderness is 1,146,500 RVDs.

c. Demand

Table II-7 shows the projected demand compared with the potential supply over the planning horizon

The Forest has the capability to meet the projected demand for wilderness use for some time into the future. However, there are some specific areas in high demand which are currently at or above carrying capacity. One such area is the Enchantments within the Alpine Lakes Wilderness



TABLE II-7

WILDERNESS RECREATION USE
ESTIMATED DEMAND AND CURRENT SUPPLY 1/

	DECADE 1	DECADE 2	DECADE 3	DECADE 4	DECADE 5
Estimated Demand (Thousands of RVD's)	423.5	444.7	454.0	477.0	540.2
Potential Supply (Thousands of RVD's)	<-----1,060,000----->				

1/ Support documents are on file in the Forest Supervisor's Office

6. WILDLIFE

a. Current Management Program

The Wenatchee National Forest provides year around or seasonal habitat for an estimated 394 species of wildlife. Of the 394 species, there are 13 amphibian, 18 reptile, 273 bird, and 90 mammal species. The diversity of vegetation types and plant successional stages on the Forest results in a large variety of wildlife habitats. All of these habitats have been considered in the development of this plan.

Proposed, Threatened, and Endangered Species

Federally listed threatened, endangered and those proposed for listing that can be found on the Forest are the bald eagle, peregrine falcon, grizzly bear, gray wolf and the northern spotted owl. Current management for the bald eagle and the peregrine falcon is intended to provide the habitat needed for recovery as listed in the recovery plans. The management direction for grizzly bears is to assess the effects of projects on habitat. On June 23, 1989 the US fish and Wildlife Service issued a rule that northern spotted owl will be evaluated for Federal listing as a threatened species pursuant to the Endangered Species Act of 1973, as amended. This ruling upgrades the status of the spotted owl from that of a Region Six sensitive species to that of a federally proposed species.

Bald Eagle: One active nest site and two suspected nest sites have been located on the Forest. A number of bald eagles winter in the vicinity of and on the Forest. Habitat for nesting and roosting includes areas with mature and old growth conifer stands within 1/2 mile of water.

Peregrine Falcon: No active nest sites have been located on the Forest. At least ten potential nests sites have been located on the Forest. Sightings of single falcons are reported yearly in August through October.

Grizzly Bears: Grizzly bears were once found throughout the Forest but now there are only occasional sightings. There are no known den sites of the bear on the forest. There have been

no confirmed Category 1 grizzly bear sightings on the Forest in recent years.

Gray Wolf: The Forest has received unconfirmed sighting reports of gray wolf; however, there are no known resident populations on the Forest.

Northern Spotted Owl: The northern spotted owl is the only species with a specific management program. This program is to maintain the sites needed to meet standards and guidelines in the Final Supplemental to the Environmental Impact Statement For an Amendment to the Pacific Northwest Regional Guide. There are 43 sites outside wilderness. Active nest sites will be maintained while they are in use. All projects will be reviewed to insure they meet the direction for the spotted owl.

There are 521,000 acres of suitable spotted owl habitat on the Forest. Over 200,000 of these acres have dominant trees over 20 inches in diameter. About 149,000 acres of the suitable spotted owl habitat is in wilderness.

Inventories of spotted owls have been completed over the last four years. These inventories include planned timber sales that have been inventoried for occupancy. Results of these inventories include: 140 sites with spotted owl occupancy; 41 sites had active nests; 30 sites contained pairs; and 69 sites had a single owl.

Sensitive Species

Wildlife species listed as sensitive by the Regional Forester and found on the Forest include: bighorn sheep, Townsend's big-eared bat, Canadian lynx, California wolverine, ferruginous hawk, Swainson's hawk, and the long-billed curlew.

The current management direction for these species is to maintain viable populations and distribution of suitable habitat to prevent them from being listed as Federally threatened or endangered species.

Bighorn Sheep: Three populations of bighorn sheep are known to use the east edge of the Forest. Their habitat includes the steep, open dry

grass/shrub areas, generally below 4000 feet in elevation. Winter range is composed of south facing, open slopes with nearby forest cover.

Townsend's Big-Eared Bat: Boulder Cave on the Naches Ranger District is the only known site on the Forest where these bats are known to exist. There are many rock cliffs on the Forest near this site that contain caves the bats may be using. Population inventories for this species have not been completed.

Canadian Lynx: Canadian lynx have been trapped or sighted on the Forest for many years. The sightings are uncommon with the most recent being on the Cle Elum Ranger District in 1987. Lynx generally use areas of higher elevation dominated by lodgepole pine and subalpine forest.

California Wolverine: There are few reports of wolverine sightings in the Washington Department of Wildlife information system. The species is a resident of boreal forests and is particularly fond of marshy areas.

Ferruginous Hawk: There have been occasional sightings of ferruginous hawks on the Forest. The latest was in the Taneum Ridge area in the fall of 1988. The habitat for this species is found on the east edge of the Forest in dryer, open habitats.

Swainson's Hawk: Occasional sightings of Swainson's hawks on the Forest have been recorded. The habitat for the Swainson's hawk is found on the east edge of the Forest in the dryer sites of open ponderosa pine and Douglas-fir stands.

Long-billed Curlew: There is a limited amount of available habitat for this species on the Forest. The Forest receives few sighting reports of this bird.

Management Indicator Species

Management indicator species are those whose population parameters appear to show the effects of land management practices on specific types of wildlife habitat. This concept has not been used to manage the Forest previous to this plan.

Rocky Mountain elk, mule deer, primary cavity excavators, northern spotted owl, pileated woodpecker, pine marten, northern three-toed woodpecker, mountain goat, beaver, and ruffed grouse are the wildlife management indicator species for the Wenatchee Forest. Current management direction for big game is found in specific management direction for these species in Chapter IV.

Rocky Mountain Elk: There are an estimated 12,600 elk summering on the Forest. For most of the elk herds, summer range is not a limiting factor, however, the summer range for the Colockum herd is a limiting factor. Winter and spring ranges are limiting for the other elk herds on the Forest. The Washington Department of Wildlife feeds an estimated 15 to 30 percent of the elk wintering near the Forest. An estimated 5,600 elk use National Forest winter ranges.

Open roads and the late hunting season on elk put the animals in a highly vulnerable situation during migration. The Forest and the Washington Department of Wildlife have closed roads on the Naches Ranger District to control hunter access and increase the quality of the hunting experience.

Due to the concerns for elk and elk habitat the Forest Service, Rocky Mountain Elk Foundation, and Washington Department of Wildlife are studying the use of habitats by elk.

Mule Deer: An estimated 25,000 mule deer summer on the Forest. The limiting factor for mule deer population in and adjacent to the Wenatchee National Forest is the availability of winter range. The Forest has approximately 106,000 acres of winter range that is used by mule deer, Rocky Mountain elk, and bighorn sheep. An estimated 10,000 deer utilize winter range on the Wenatchee National Forest.

Primary Cavity Excavators: The Forest has approximately 1,451,000 acres that are capable of providing habitat for primary cavity excavators. Of this acreage approximately 807,200 acres are considered not suitable or unavailable for timber management activities. The amount of dead and defective tree habitat in these areas will remain at natural or near natural levels. The remaining habitat will be affected by other resource management.

In some parts of the Forest where private land and National Forest land are intermingled most of the private lands have or will have little or no dead and defective tree habitat. The primary cavity excavator habitat is currently low and will remain so for several decades.

Pileated woodpecker: There are an estimated 300-500 pairs of pileated woodpeckers on the Wenatchee National Forest. They are often found in mature or old growth conifer habitats. The Forest does not have a population or habitat inventory for this species.

Marten/Northern three-toed woodpecker: For management purposes, these two species have been combined. They are generally found associated with mature or old-growth habitats and are not uncommon. The Forest does not have a population or habitat inventory for this species.

Mountain goat: The population of mountain goats is estimated at 1600. They are well distributed across the Forest in a number of sub-populations. Available habitat is estimated at 400,000 acres. This species is sought after for viewing and hunting.

Beaver and Ruffed Grouse: Beaver and ruffed grouse were selected as the management indicator species for riparian habitats. The Forest has an estimated 159,800 acres of riparian habitat. Over 260 species of wildlife use riparian habitat on the Forest. Most of these species require surface water for survival during summer months. Others such as amphibians use the logs and rocks in intermittent streams where there is enough cover to maintain cool, moist conditions. Both the beaver and ruffed grouse prefer deciduous tree and shrub habitats in riparian areas. The Forest does not have a population estimate for these species.

Unique or Special Habitats and Species

Unique or special habitats and species have been identified because of a need to protect them. The habitats and species in this category are: cliffs and rims, ponds, marshes, springs, great blue heron, osprey, goshawks, sharp-shinned hawk, and barred owls (see Chapter III FEIS, Wildlife for more information).

b. Production Potential

Production potential is directly related to habitat quantity and quality. The potential of a species may be achieved by natural processes, through careful planning of resource activities, by using habitat improvements, or a combination of all three. Increasing habitat for one species may often increase habitat for other species, but may also decrease habitat for another group of species.

Table II-8
Production Potential for Wildlife
Proposed Threatened and Endangered Species

Species Name	Estimated Numbers of Species
Bald Eagle	20-50 nests unknown winter birds
Peregrine Falcon	5+ nest sites
Grizzly Bears	20-50 animals
Gray Wolves	1-3 packs
Northern Spotted Owl	150-200 pair

Table II-9
Production Potential for Wildlife
Sensitive Species

Species Name	Estimated Populations
Bighorn Sheep	50-200 animals
Townsend's Big Eared Bat	10-50 colonies
Canadian Lynx	100-200 animals
California Wolverine	Unknown at this time
Ferruginous Hawk	2-5 nests 20-30 birds
Swainson's Hawk	1-10 nests 20-50 birds
Long billed Curlew	Unknown at this time

Table II-10
Production Potential for Wildlife
Management Indicator Species

Species Name	Estimated Populations
Northern Spotted Owl	150-200 pair
Pileated Woodpecker	3,000-4,000 pairs
Marten	3,000-10,000 animals
Northern Three toed Woodpecker	5,000-20,000 birds
Mountain Goats	5,000 animals
Mule Deer	50,000 animals
Rocky Mountain Elk	20,000 animals
Primary Cavity Excavators	90-100% potential population
Beaver	1,000-2,000 animals
Ruffed Grouse	10,000 + birds

c. Demand

Demand for wildlife species on the Forest varies by the type of interest, such as viewing or hunting, and the species itself, such as mule deer and pileated woodpeckers. The tables below display the relative demand for each of the species listed. The rating of High, Moderate, and Low is based on the following:

High - People design outings or trips to see or harvest a particular species and often remark or keep records of their accomplishments.

Moderate - The species is commonly available for viewing or harvesting. No special trips have to be made to view or harvest the animal. People enjoy and remark often when viewing of the animal.

Low - People would like to see the animal but they choose to view it only if it happens in the course of other activities. Not seeing the animal does not cause any further pursuing to see it.



**Table II-11
Demand for Proposed Threatened and
Endangered Species**

Species Name	Demand for Viewing	Demand for Hunting or Trapping
Bald Eagle	moderate	none
Peregrine Falcon	low	high
Grizzly Bear	low	low
Gray Wolf	low	low
Northern Spotted Owl	high	none

Sensitive Species

Sensitive species are either in high demand because they are rare or in low demand because people rarely see them and they are too hard to find .

**Table II-12
Demand for Sensitive Species**

Species Name	Demand for Viewing	Demand for Hunting or Trapping
Bighorn Sheep	high	high
Townsend's Big Eared Bat	low	none
Canadian Lynx	low	low
California Wolverine	low	low
Fisher	low	low
Ferruginous Hawk	high	none
Swanson's Hawk	high	none
Long billed Curlew	low	none

**Table II-13
Demand for Management Indicator Species**

Species Name	Demand for Viewing	Demand for Hunting or Trapping
Northern Spotted Owl	high	none
Pileated Woodpecker	moderate	none
Northern Three Toed Woodpecker	moderate	none
Marten	low	moderate
Mountain Goat	high	high
Mule Deer	moderate	high
Rocky Mt. Elk	high	high
Primary Cavity Excavator	moderate	none
Beaver	moderate	moderate
Ruffed Grouse	moderate	high



Table II-14
Demand for Unique and/or Special Habitats
and Species

Habitat or Species Name	Demand for Viewing	Demand for Hunting or Trapping
Cliffs and Rims	low	none
Caves and Burrows	low	none
Talus	low	none
Ponds	moderate	high
Marshes	high	high
Springs	moderate	low
Great Gray Owl	high	none
Boreal Owl	high	none
Barred Owl	high	none
Great Blue Herons	high	none
Turkeys	moderate	high
Swifts	low	none
Goshawks	moderate	none
Osprey	high	none
Sharp-Shinned Hawk	low	none
Cougar	high	high
Bobcats	low	high
Moose	high	high

7. FISHERIES

a. Current Management Direction

The Forest has about 241 lakes and reservoirs and 1,770 miles of streams and rivers that support fish. 806 miles of streams and one large lake are available to anadromous fish. Although not confirmed by detailed surveys, it is likely that an additional 260 miles of streams may also provide fish habitat.

Calculation of Recreation Visitor Days (RVD's) in 1986 showed that there were 192,800 days spent fishing or about 580,000 actual fishing trips. Of these, 65 percent or approximately 125,000 days were in roaded areas and 67,000 in roadless areas.

The aquatic habitats support 15 species of cold water game fish and 3 species of warm water game fish (Table II-15). Five species of cold water anadromous and resident salmonoid species account for 95 percent of the angling. Four percent of fishing is distributed among the other cold water species, while less than one percent is spent in warm water fishing.

TABLE II-15

**SPECIES OF GAME FISH
ON THE
WENATCHEE NATIONAL FOREST**

COLD WATER ANADROMOUS	COLD WATER RESIDENT	WARM WATER RESIDENT
Chinook salmon	Kokanee salmon	Smallmouth bass
Sockeye salmon	Mountain whitefish	Largemouth bass
Coho salmon	Pygmy whitefish	Yellow perch
Steelhead trout	Golden trout	
	Cutthroat trout	
	Rainbow trout	
	Lake trout (Mackinaw)	
	Brown trout	
	Brook trout	
	Bull trout (Dolly Varden)	
	Burbot (ling cod)	

A primary management consideration of the Forest is the fishing rights reserved to the Indians by the Yakima Treaty of 1855. The Yakima Indian Nation is concerned that the Forest develops environmental standards which ensure the protection and/or enhancement of the fisheries resource.

-Resident Trout

Resident trout fishing makes up the majority of the recreational fishing on the Forest and, therefore, its continuance is of major concern. Although most Forest streams have very low productivity due to low nutrient content and cold water, recent measurements of rainbow trout in the Yakima River system (mostly below the Forest boundary) indicate one of the best growth rates documented in North America (A Basic Fishery Management Strategy for Resident and Anadromous Trout in the Stream Habitats of the State of Washington, Washington State Department of Game, October 10, 1984). This may be partially due to the long-term reduction in competition with anadromous fish.

Self-sustaining wild populations of resident trout inhabit most of the Forest's streams. Because of heavy fishing pressure on the roaded portions of the Forest, wild resident trout populations are often supplemented with periodic stocking by the Washington Department of Wildlife (WDW). Some popular rivers stocked with catchable adult fish are the Tieton, Wenatchee, Little Naches, Naches, Chiwawa, and Entiat Rivers and Icicle and Peshastin Creeks. WDW also stocks many suitable high altitude and/or previously barren lakes.

There is one sensitive species on the Forest, the bull trout, listed as a Category 2 species by the U.S. Fish and Wildlife Service.

-Anadromous Fish

Four species of anadromous fish, including steelhead trout, chinook, sockeye, and coho salmon, utilize the Forest for spawning and rearing. Numbers of all species except sockeye are less than 10 percent of the historical run levels prior to the construction of irrigation diversions and the mainstem Columbia River dams, and prior to the onset of large commercial fisheries.

The following are the current estimated average anadromous fish escapements attributable to the Forest. Note that some of these returning fish are due to hatchery plants.

TABLE II-16

**ESTIMATED AVERAGE PRESENT
ESCAPEMENT OF ANADROMOUS FISH ON THE WENATCHEE N.F.
(TEN YEAR AVERAGE)**

	Sockeye	Coho	Spring Chinook	Summer Chinook	Steelhead
Yakima River	0	20	865	0	129
Wenatchee River	31,785	0	4,270	1,950	1,104
Entiat River	0	0	859	0	500
Total	31,785	20	5,994	1,950	1,733

b. Production Potential

The Forest has very few detailed stream or lake surveys to evaluate fisheries production and habitat potential. Therefore, numbers or pounds of fish and habitat capability estimates are only a best approximation based on existing knowledge.

It is felt that many streams on the Forest do not have full escapement of anadromous fish, therefore, numbers of returning adults are not necessarily a measure of the ability of the habitat to produce fish. Smolt habitat capability (SHC) is used as an estimate of habitat potential. The following table reflects an estimate of anadromous fish SHC on the Forest.

TABLE II-17

**ESTIMATED EXISTING SMOLT HABITAT CAPABILITY OF ANADROMOUS FISH
WITH FULL ESCAPEMENT ON THE FOREST**

	Sockeye	Coho	Spring Chinook	Summer Chinook	Steelhead
Yakima River	1,500,000 ^{1/}	not	345,000	0	86,000
Wenatchee River	1,795,800	estimated	923,000	645,000	70,000
Entiat River	0		80,000	0	16,000
Total	3,295,800		1,348,000	645,000	172,000

^{1/} Assumes passage provided into Cle Elum system

c. Demand

The demand for fish, and therefore high quality fisheries habitat, is not readily measurable. For anadromous fish, which are commercially harvestable, there appears to be practically an inexhaustible demand. At one time commercial landings of Columbia River fish were over five times their present level, indicating that demand is very high. Treaty rights reserved in the Yakima Treaty of 1855 include considerable demand for increased fish production over the present.

Resident fish demand is also unquantifiable, but very high. To meet a portion of the demand, the Washington State Department of Wildlife has fish planting programs in streams and lakes. There is no indication that there is a limit to the numbers of fish, of appropriate species and size, that could be harvested (Washington Department of Game, James Cummins, personal communication, March 1985).

Due to the high demand for fish, the maintenance, rehabilitation, and enhancement of fish habitat is of primary concern to the public, tribes, and Federal, State, and local governmental agencies.

8a. VEGETATION: TREES

a. Current Management Program

Conifer forest ecotypes occupy approximately 69 percent of the Forest. Elevation, soil types, precipitation and aspect combine to create a wide variety of ecological vegetative types. For simplicity, these can be combined into the three following forest ecotypes which occur on both suitable and unsuitable land:

-Dry Forest

The low elevation, dry sagebrush, bitterbrush, grass type along the east edge of the Forest changes to the ponderosa pine/Douglas-fir zone with increasing elevation and moisture. Pinegrass, elk sedge, kinnikinnick, serviceberry, and ocean spray are some of the common understory plants.

TABLE II-18

**DRY FOREST ECOTYPE
STAND CLASS DISTRIBUTION**

Stand Size Class	Acres	% of Tentatively Suitable Acres ^{1/}
Mature Stands	48,399	6.1
Immature Two-Storeyed Stands	106,828	13.5
Pole Stands	91,013	11.5
Seed and Saplings	47,488	6.0
Bare Ground	1,123	.1
Subtotal	294,851	37.2

-Wet Forest

The wet forest zone is characterized by a wide variety of plant species. Ponderosa pine and Douglas-fir may be present, but without disturbance they will gradually be replaced by shade tolerant grand fir, silver fir, western hemlock, or western red cedar. Less abundant, but highly valued trees because of their wood and aesthetic qualities, are western larch, noble fir and western white pine. At the upper elevations in this zone lodgepole pine, mountain hemlock, subalpine fir, and Englemann spruce become more prevalent.

TABLE II-19

**WET FOREST ECOTYPE
STAND CLASS DISTRIBUTION**

Stand Size Class	Acres	% of Tentatively Suitable Acres 1/
Mature Stands	191,904	24.2
Immature Two-Storeyed Stands	127,201	16.0
Pole Stands	134,323	16.9
Seed and Saplings	37,269	4.7
Bare Ground	8,162	1.0
Subtotal	498,859	62.8

1/ See Table II-22

**-Sub-Alpine Parkland and
Mountain Meadows**

This zone is best known for its wide variety of flowering herbs and forbes. Parklike stands of whitebark pine, Englemann spruce, subalpine fir, and alpine larch adjoin the barren or treeless upper mountain slopes. Much of this zone is in wilderness.

In both the dry and wet zones the most common conifer species is Douglas-fir. However, old-growth ponderosa pine receives the most interest from local sawmills. Douglas-fir and ponderosa pine make up 50 percent of the existing volume of timber on the Wenatchee. The 16 species of conifers in order of standing volume from the 1977 Forest inventory are:



TABLE II-20

**STANDING VOLUME OF WENATCHEE
NATIONAL FOREST CONIFER SPECIES**

Species	% Standing Volume
Douglas-fir	37%
Ponderosa pine	13%
Pacific silver fir	11%
Grand fir	7%
Lodgepole pine	6%
Western hemlock	5%
Subalpine fir	5%
Western larch	5%
Mountain hemlock	4%
Englemann spruce	3%
Western white pine	2%
Western red cedar	1%
Alaska yellow cedar	1%
Noble fir	
Whitebark pine	
Subalpine larch	

The current timber harvest level as revised after the Washington State Wilderness Act is:

	Million Board Feet	Million Cu. Ft.
Annual sale quantity	170.9	31.4
Unregulated volume	5.9	1.0
	176.8	32.4

b. Production Potential

Of the 2,164,180 acres of Wenatchee National Forest, 37 percent or 791,899 are tentatively suitable for timber production. These lands are capable of growing industrial wood and are available and suitable for timber management activities. Table II-22, summarizes Forest land suitability for timber production. (For details of the suitability process see Field Review Timber Land Suitability, Wenatchee National Forest, 1984.)

TABLE II-22
TIMBER LAND SUITABILITY
ACRES

	Not Suited for Timber Production	Totals
I. Total National Forest Area		2,457,379
Other Ownerships		293,199
II. Net National Forest		2,164,180
A. Water	11,024	
B. Non-Forest (not stocked with 10% tree cover)	666,828	
C. Lands developed for other than timber production purposes: Ski areas, developed recreation, administrative areas, improved roads, special uses.	35,230	
III. Forested Lands ^{1/}		1,451,098
A. 1. Wilderness	430,788	
2. Research Natural Areas	1,038	
3. Other such as.		
Tumwater Botanical Area	784	
Entiat Experimental Forest	4,219	
Subtotal	436,829	
B. Lands growing less than 20 cu ft./ac./yr.		
1. Lands classified as unsuitable	137,717 ^{2/}	
2. Lands classified as suitable		(6,148) ^{3/}
3. Lands classified as separate suitability component	0	
C. Irreversible resource damage (219.14(a)(2))	18,720	
D. Regeneration Difficulty (Reforestation cannot be guaranteed) (219.14(a)(3))	65,933	
E. Regeneration difficulty-lands classified as a separate suitability component	0	
IV. Tentatively suitable Forest Land		791,899
V. Total of Nonsuitable Land	1,372,281	

^{1/} Includes Alpine Lakes Management Area Non-harvest land allocations

^{2/} Due to reforestation difficulty

^{3/} Currently producing less than 20 cubic feet, but can be reforested

When legal and other requirements are met, the suitable lands would be reduced to 689,918 acres. These would have a maximum production potential of 36.5 million cubic feet, or 186.6 million board feet, per year (TSPQ). The ASQ is 34.1 million cubic feet, or 173.8 million board feet per year.

c. Demand

The demand for wood products from the Wenatchee National Forest in the 1989-1999 decade is obviously difficult to predict. Such influences as the national economy, Canadian log imports, housing starts, exports to Pacific-rim countries, etc., are outside of regional and local control. Other more specific factors will, or could, affect the Forest's programmed harvest and the local wood products industry. These are the effects resulting from: rulings from "old growth" and "Spotted Owl" appeals and court decisions; significant changes in Congressional and Administration direction regarding budgets and targets (outputs); and delays or constraints from new emerging issues which undoubtedly will surface.

Certain localized situations will also have an effect. These include: the accelerated harvest of commercial timber on the private lands ("checkerboard" ownership) within the Forest by Longview Fibre, Boise Cascade, and Plum Creek Timberlands in the next ten years; the potential phase out of antiquated sawmills and the possible construction of new facilities; the continued sale of large volumes of timber by the Yakima Indian Nation from their reservation lands; and the continued close and intense scrutiny of many Forest Service projects by local publics. The various factors influencing the demand for wood products are often conflicting.

It is very probable that the demand for logs from the Wenatchee for the coming decade will continue to be close to the long-term average cut of about 168.6 million board feet per year. During this same period, the sell volume target was 175.9 million (MM) board feet per year, and the average sell was 173.3 MM board feet. The Forest has an uncut timber volume under contract (as of October 1988) of 370 MM board feet. This is a significant reduction from the 850 MM board feet under contract in 1985. This reduction in volume under contract is due to the Timber Relief Act,

and accelerated harvest to meet increase in demand for wood products.

The accelerated harvest of timber from private lands is affecting, and will continue to affect, the demand for timber from the National Forest. Both Longview Fibre and Plum Creek export a significant amount of their logs to the Pacific-rim countries. The pine, smaller logs, and logs which are not "marketable" to export customers at a particular time, are generally sold locally to purchasers who also rely on National Forest timber. The greater the harvest of the major private landowners, the greater is the supply of logs to others. It is very reasonable to assume their activity will continue at a high rate during the decade.

In addition to the private landowners, the Yakima Indian Nation will continue to make timber readily available to traditional purchasers of National Forest timber. They have harvested heavily in the Yakima Basin and are major suppliers of timber to local industry. Their large timber sales will apparently continue because they have become a very important and lucrative source of income for the Nation. In addition, the Nation could understandably view any increase in National Forest timber sales as competition to their own sales. Bureau of Indian Affairs volume for eastern Washington is estimated to be 479 MM board feet per year. This is down approximately 50 MM board feet per year from harvested volumes of the past decade (Larson, 1982). The Washington Department of Natural Resources (DNR) proposed volume from Eastern Washington is 87 MM board feet annually thru 1993 (DNR, 1983). If stumpage prices increase, there exists a strong potential of an increase in yield from other private lands. The Department of Natural Resources projects a strong increase in volume from other private lands that may equal the decreases in forest industry and public timber supplies.

Because of the long distances to major pulp and paper facilities, demand for low quality and small size material has historically been low. Under the 1963 Wenatchee Working Circle Plan, these materials were not counted in calculating the proposed harvest. Since 1963, new industries utilizing smaller logs have been installed in Entiat, Cashmere, Yakima, Ellensburg and Naches.

There also are small business enterprises engaged in producing house logs for homes and cabins. Current central Washington annual mill capacity is 314 MM board feet. Historically such mills rely on the Wenatchee National Forest for approximately 60 percent of their production. This dependency by individual mills ranges from 40 percent to 100 percent (telephone survey, Walk, 1985). Higher prices for quality timber at west side mills often results in the best quality logs being transported to the Puget Sound area. In addition to the log supply for central Washington, a 1980 mill survey found over 13 MM board feet from the Wenatchee going to Puget Sound area mills annually (Socio-Economic Overview, 1982).

The apparent excess demand over supply as measured by full mill capacity is strongly dependant upon price. At low stumpage prices, this would be a good measure of demand. However, when prices rise, some of the more inefficient capacity is not utilized.

In summary, the best estimate of the future demand for wood products appears similar to the harvest level during the past decade. There are no indications that there will be a surge of new mill capacity developed in the area or new markets developed outside the existing area. Any changes in mill facilities will likely be a replacement of antiquated operations with state-of-the-art mills. The exception would likely be the increased utilization and marketing of lodgepole pine and other small diameter logs. Chelan County would be the logical place for an increase in capacity particularly if it were small businesses. The current situation calls for a high market share for small business, but small business manufacturing limited to small quantities and specialty products. The significant amounts of timber volume available from Longview Fibre, Boise Cascade, and Plum Creek lands, as well as continued sales from the Yakima Nation, should make timber supplies readily and competitively available for the first decade. It appears that the second decade is when demand for National Forest timber may increase significantly.

Public demand for firewood permits increased rapidly on the Forest from 1973 through 1981. Introduction of a charge permit system in 1982 resulted in a temporary decrease in permits.

However, in 1984 nearly 10,000 permits were sold, an 8 percent increase over 1983. Income in 1984 from wood permits (four cords for \$10, with a 10 cord maximum) was \$119,745. In 1985, there was approximately 27,000 cords sold with an income of \$151,000. Demand is projected to level off as the quality of available wood decreases.

8b. VEGETATION: FORAGE

a. Current Management Program

The total annual forage production on the Forest is estimated to be 336,000 tons. One-third, or 112,000 tons, is located on steep slopes and 10 percent of this production is considered available to wildlife only. Of the remaining 224,000 tons, reductions are made for plant survival and soil and watershed protection. The total amount available to wildlife and livestock is 65,000 tons or 130,000 Animal Unit Months (AUM's). In 1988, there were 20,900 AUM's used by livestock which allowed 109,100 AUM's for wildlife.

Of the 2,164,180 acres within the Forest, 18.5 percent, or 401,100 acres, is within vegetation types and on slopes suitable for grazing by livestock. There are an additional 500,871 acres outside of wilderness potentially capable of providing livestock forage following silvicultural practices such as regeneration harvests or thinning. The current management potential of the Forest to provide forage for livestock has been calculated at 37,031 animal unit months annually.

Current inventoried range allotment boundaries do not include all of the available and suitable range resource on the Forest (see Table II-23).

b. Production Potential

After considering legal and other requirements the maximum production potential for livestock is between 38,000 to 43,000 animal unit months annually, depending on the amount of temporary range created through vegetative manipulation.

TABLE II-23
SUITABLE RANGELANDS 1/ AND ANIMAL UNIT MONTHS
AVAILABLE TO LIVESTOCK 2/

	Number of Allotments	Suitable Rangelands (Acres)	Percent of Suitable Rangelands	Percent of Total National Forest Acres	Estimated Livestock Grazing Capacity (AUM)	1988 Actual Use (AUM)	1988 Livestock Numbers
Inventoried Commercial Livestock Allotments (Cattle, Sheep, and Horses)	40	182,742	45.5%	8.4%	23,210	18,499	1,984 Cattle 8,607 Sheep 87 Horses
Inventoried Recreation Livestock Allotments	36	20,719	5.2%	1.0%	4,307	2,377	13,550 Head Recreation Livestock
Sub Total in Allotments	76	203,461	50.7%	9.4%	27,517	20,876	---
Suitable Range Outside Inventoried Allotments and Outside Wilderness	---	197,639	49.3%	9.1%	9,514	---	---
Total Forest	76	^{3/} 401,100	100.0%	18.5%	37,031	20,876	---

1/ Suitable Rangelands are those areas currently producing forage suitable for livestock use on lands less than 60 percent slope.

2/ Animal Unit Month capacities are for livestock only. Total production in pounds per acre have been reduced to reflect needs of wildlife, soil, and watershed protection, in addition to the plant needs.

3/ There are an additional 500,871 acres outside of wilderness that have potential to contribute to the suitable rangeland base after timber has been harvested.

c. Demand

The "Wenatchee National Forest Socioeconomic Overview" discusses the difficulty of projecting demand due to past variability of the livestock industry. However, it estimates the demand for grazing on the Forest will increase slightly above current levels over the next ten years.

Demand for cattle grazing is expected to be greater than the one to two percent projected increase after the first decade.

The demand for sheep forage is more difficult to project. National demand is down and this trend is expected to continue indefinitely. Locally permitted numbers on the Forest have fluctuated year to year over the past six years. Based on the Five Year Grazing Statistical Report, sheep numbers were down slightly between 1975 through 1980. However, numbers for 1984 were higher than the 1975 level. The demand for sheep grazing on the Forest is expected to remain at or slightly above current levels for the next ten years.

8c. VEGETATION: UNIQUE ECOSYSTEMS

a. Current Management Program

The Tumwater Botanical Area was established under Regulation T-9(I) on June 10, 1938, for the protection of Lewisia tweedyi. The 1,104 acres was redesignated in 1971 as a botanical area under 36 CFR 251.22 to be managed in a near natural area to protect plant species which occur there.

Although the area is located along a major highway, it is rather inaccessible due to the steep, rugged terrain. It is usually visited only by people who wish to view or study the unusual species that inhabit the area including: Lewisia tweedyi, Hackelia venusta, Silene seelyi, and Chaenactis ramosa. The area is within Sections 28 and 34, T.25N., R.17E., P.M.W, and is approximately four miles north of Leavenworth, Washington, in the Tumwater Canyon.

b. Potential Areas

The following four additional Botanical Areas and four Geologic Areas are proposed for protection by some publics.

Camas Botanical Area - Located on the Leavenworth Ranger District in Section 32, T. 23 N., R. 18 E., and Section 4, T. 22 N., R. 18 E., and is approximately 800 acres in size. Protection is proposed for Delphinium viridescens, Wenatchee Larkspur, which is one of two State and Federal candidates to the endangered species list.

Gene Creek Botanical Area - Located on the Entiat Ranger District in Sections 8, 17, and 20, T. 27 N., R. 20 E., and is 1,930 acres in size. Protection is proposed for a ponderosa pine ecosystem containing old-growth dependent animals and plants.

Hornet Ridge Botanical Area - Located on the Entiat Ranger District in Sections 4,5,6, and 10, T. 26 N. R. 19 E., and is approximately 2,100 acres. Protection is proposed for the park-like stands of ponderosa pine containing old-growth dependent animals and plants.

Lake Creek Botanical Area - Located on the Entiat Ranger District in Sections 27, 28, 33, and 34, T. 29 N., R. 19 E., this area is 212 acres. Protection is proposed for plants associated with an undisturbed wetland habitat.

Kloochman Rock Geologic Area - Located on the Naches Ranger District in Sections 4, 5, 8, and 9, T. 13 N., R. 14 E., it is approximately 340 acres. Protection is proposed for a unique geologic feature.

Goose Egg Mountain Geologic Area - Located on the Naches Ranger District in Sections 31 and 32, T. 14 N., R. 14 E., and Sections 5 and 6, T. 13 N., R. 14 E., it is approximately 635 acres. Protection is proposed for this unique geologic feature.

Rimrock Geologic Area - Located on the Naches Ranger District in Sections 25 and 36, T. 14 N., R. 13 E., and Sections 30 and 31, T. 14 N., R. 14 E., it is approximately 425 acres in size. Protection is proposed for this unique geologic feature.

Blue Slide Geologic Area - Located on the Naches Ranger District in Sections 28, 29, 32, 33, and 34, T. 13 N., R. 13 E., and Section 4, T. 12 N., R. 13 E., and it is approximately 740 acres. Protection is proposed for this unique geologic feature.

8d. VEGETATION: THREATENED, ENDANGERED, AND SENSITIVE PLANTS

a. Current Management Program

The Forest has a large variety of uncommon and unusual plant species. These species exist here because of atypical geologic substrates, various past glacial activity and the past and present climatic regimes.

Soil parent material formed from serpentinite and sandstone result in unique habitats for plants that are found no where else. The northern part of the Forest was affected by continental glaciation while the southern part was not. This has multiplied the number of possible habitats thereby increasing the variety of plants species. The results of this differential glaciation has made the mountains around Wenatchee the home of some of the most unusual plants in the state. Finally,

climatic regimes on the Forest are numerous; ranging from a near continental climate in some areas to essentially a maritime climatic pattern in other places.

Although there are no known Federally listed threatened or endangered plant species on the Forest there are 50 plants on the Region 6 sensitive plant list (Table IV-10, Chapter IV). Of these 50 species, 7 are candidates for proposal for listing as endangered or threatened and the remaining are listed by the State of Washington.

The extent of the populations of Threatened, Endangered or Sensitive (T, E or S) species on the Forest is not fully known. Therefore, before a project is initiated, inventories to determine the presence and extent of these species in the project area are conducted on a priority basis. Forest Service policy requires the maintenance or enhancement of all populations of T, E or S species. All necessary measures are taken to assure that management activities do not adversely affect these species.

8e. VEGETATION: RESEARCH NATURAL AREAS

a. Current Management Program

Research Natural Areas (RNA's) are part of a Federal system of tracts established for non-manipulative research and educational purposes. Each RNA is a site where some features are preserved for scientific purposes and natural processes are allowed to dominate. Their main purposes are to provide: (1) baseline areas against which effects of human activities can be measured; (2) sites for study of natural processes in undisturbed ecosystems; and (3) gene pool preserves for all types of organisms, especially those which are classified as rare and endangered (Dryness, et al. 1975, also see Forest Service Manual 4063.02).

Prior to establishment, a comprehensive Establishment Record is made. For RNA's proposed on National Forest System lands, the Record is submitted to the Chief of the Forest Service for approval.

Established RNA's

There are two established RNA's on the Forest. Meeks Table RNA on the Naches Ranger District is 64 acres and represents the ponderosa pine/ pine grass plant community with a co-dominance of Douglas-fir. It was established on July 7, 1948, and is now within the William O. Douglas Wilderness.

Thompson Clover RNA located in Swakane Canyon on the Entiat Ranger District is 276 acres in size and exemplifies a plant community characterized by Thompson Clover. It was established on February 17, 1977.

Formally Proposed RNA's

The Research Natural Area Committee for the Pacific Northwest has formally proposed two additional RNA's. Eldorado Creek located in the Teanaway drainage of the Cle Elum Ranger District is 1,336 acres in size and represents a plant community found on serpentine derived soils. The Eldorado Creek area was designated as a Special Area (Proposed RNA) in the Alpine Lakes Management Plan (November 2, 1981).

Fish Lake Bog on the Lake Wenatchee Ranger District is a 106 acre area on the west end of Fish Lake near Lake Wenatchee. This represents a floating bog community.

Preliminary Establishment Records have been made for both of these areas; Fish Lake Bog on July 5, 1979, and Eldorado Creek on August 9, 1972. A supplemental report on the mineral character of the proposed Eldorado Creek RNA was made on November 6, 1974.

b. Potential Program

Recommended RNA's

The Research Natural Area Committee for the Pacific Northwest Region determined that the candidate RNA's listed in Table II-24 represent the best examples of particular kinds of natural ecosystems in the Region and are needed to meet present and future demands. There may be some

future RNA needs that can best be satisfied on the Wenatchee National Forest. When suitable new areas are identified, they will be considered for addition to the Research Natural Area inventory.

TABLE II-24
RECOMMENDED RESEARCH NATURAL AREAS
1984

Name	Area (Acres)	Location (District)	Plant Community Exemplified
* 1. Cedar Creek	2205	Naches	Mixed old-growth conifer/shrub forest and Pacific silver fir forest.
** 2. Icicle/Frosty Creek	784	Leavenworth	Western red cedar/western hemlock forest.
** 3. Chiwaukum Creek	1124	Leavenworth	Grand fir mixed old-growth conifer/shrub
4. Drop Creek	530	Cle Elum	Englemann Spruce/Subalpine fir forest

* Within the William O. Douglas Wilderness

** Within Alpine Lakes Wilderness

Steps in Establishment of RNA's:

1. R-6 Research Natural Area Committee working in conjunction with the Washington Natural Heritage Plan (Department of Natural Resources, 1985) identifies the need for a site representing a specific natural ecosystem.

2. This committee then works with the area ecologist and ranger district personnel to identify several potential representative sites.

3. The committee visit and evaluates the sites and narrows the list down to the most representative site.

4. This site is then recommended through the Forest Plan for establishment as an RNA.

5. If the area is allocated as a proposed RNA by the alternative in the Forest Plan which is implemented, then an establishment report is devel-

oped. In the past, ranger district personnel have worked with personnel from the Pacific Northwest Forest and Range Experiment Station in the development of this report.

6. The approval procedure for an RNA Establishment Report is as follows:

- District Ranger - Review and Recommend
- Forest Supervisor - Review and Recommend
- Pacific Northwest Station Director - Review and Recommend
- Regional Forester - Review and Recommend
- Director of Division of Recreation - Review and Recommend
- Deputy Chief of Research - Review and Recommend
- Chief, U.S. Forest Service - Approve

7. Upon approval by the Chief, the area is designated as a Research Natural Area and will be managed accordingly.

**8f. VEGETATION: ENTIAT
EXPERIMENTAL FOREST**

a. Current Management Program

The Entiat Experimental Forest includes 4,620 acres of Forest lands located within the Entiat River drainage northwest of Wenatchee, Washington. Research has been conducted on the area since 1957; in 1971, it was formally designated as an Experimental Forest. The Pacific Northwest Forest and Range Experiment Station and the Wenatchee National Forest cooperatively administer the area with the primary goal of providing opportunities for studying the effects of forest management and fire on vegetation, soil, and water resources. The area was selected as being representative of steep, forested watersheds occurring along the east slope of the Cascades. It consists of three similar, contiguous watersheds ranging in size from 1,168 acres to 1,393 acres, and in elevation from 1,800 feet to 7,000 feet. The mean slope is 50 percent with slopes as steep as 90 percent.

A major wildfire which burned most of the area in 1970 has had a dramatic impact on Forest vegetation. Pre-fire vegetation was primarily undisturbed, mature forest with small, subalpine grass-forb openings and bare rock. About 75 percent of the Forest was classed as ponderosa pine, with Douglas-fir the main associated species. Thickets of dense lodgepole pine occurred on wetter sites at higher elevations. Important understory species included bitterbrush, snowbrush ceanothus, pinegrass, and numerous forbs. Fifteen years after the fire, the vegetation consists of a mosaic of shrub fields intermixed with planted pine and fir, and dense, young stands of naturally-established lodgepole pine. Scattered remnants of unburned old-growth forest occur on rocky ridges and outcrops.

The original research plan for the experimental watersheds was to develop baseline information on climate and hydrology under natural conditions, then test for changes following the construction of roads and implementation of several timber harvest practices. The collection of this information and the preparation of harvest plans were nearly complete when the watersheds burned.

Fire is a common occurrence in this Forest, hence research objectives were quickly changed to utilize the preburn data to evaluate effects of fire on the environment and the alteration of those effects by the re-establishment of forest vegetation. Initial postfire studies provided land managers, resource specialists, and scientists with a better understanding of the hydrologic response of burned watersheds including water yield and physical water quality; chemical water quality and site productivity in response to wildfire and erosion control fertilization, natural vegetation recovery and the effectiveness of erosion control seeding and fertilization treatments; soil and water responses to several methods of timber salvage; and effects of a large wildfire on local and regional economics.

9. WATER

a. Current Management Program

The Forest is an extremely important source of high quality water for all types of uses. The water produced on the Forest maintains components of the natural ecosystem, including vegetation, fish and wildlife. Water also serves the administrative needs of the Forest Service and is used both on and off Forest for domestic, municipal and industrial purposes, stock watering, irrigation, power generation and recreation.

The majority of the Forest lies within four sub-basins of the Columbia River Basin: Chelan, Entiat, Wenatchee and Yakima Rivers. There are an estimated 3,600 miles of perennial streams on the Forest, with 806 and 963 miles of Class I and II streams, respectively. The Forest contains hundreds of lakes, ponds and springs that receive a variety of uses. There are an estimated 57,000 acres of lakes and reservoirs on the Forest.

Sampling of water quality to monitor background levels and effects of management activities began on the Forest in 1966. Monitoring of the Forest's 25 major watersheds between 1967-1980 involved nearly 20,000 samples. This data suggest that the Forest has been complying with State water quality standards; however, some measurements document conditions outside of these standards.

WATER

Refer to the Forest Water Quality Data Summary (in preparation) for details regarding this water quality data base.

The goal of project planning and implementation on the Forest has been to meet or exceed water quality standards and the State's Forest Practices rules and regulations. Regional recertification of Forest Service management practices is needed now in order to evaluate compliance of these practices with the recent major revisions of the State Forest Practices Rules and Regulations.

b. Production Potential

The Forest annually contributes approximately 4.455 million acre feet of high quality water to area streams, rivers, lakes, reservoirs and ground-water aquifers. Runoff is orderly in most years with two typical annual peak flows--the highest in late May and a secondary peak in July. Maximum peak flood volumes historically occur in December, often associated with temperature inversions and rain-on-snow events. Unregulated runoff during low flows is sustained by the gradual melting of the winter snow pack.

Water benefits and utilization are enhanced through regulation facilities such as reservoirs operated by the Bureau of Reclamation. Summer streamflows are enhanced in several areas on the Forest through releases of stored water from six major reservoirs for irrigation and power production. The mean annual storage for these six impoundments over the 10 year period between 1967 and 1977 was 1,360,800 acre feet.

Water yield increases result from vegetation manipulation, such as timber harvest. However, these increases are only temporary (less than 20 years) unless the land use changes, as with a conversion of timber to pasture land. The amount of change in total yield is often overstated. Yield increases due to timber harvesting are masked by the large magnitude and variability of natural water yield.

c. Demand

Water has a primary importance for all types of uses both on and off the Forest. The water on the Forest is essential for maintaining components of natural ecosystems, including vegetation, fish and wildlife. High water quality is important for a healthy aquatic environment necessary for maintaining populations of resident and anadromous fish on the Forest. Many recreational activities are directly or indirectly water based such as fishing, boating, camping and sight-seeing. Streams and lakes on the Forest are heavily used for sport fishing.

Forest watersheds provide 95 percent of the water used for irrigation and domestic water systems in Chelan, Kittitas, and Yakima Counties. This region has a long growing season with productive soils upon which many potentially valuable crops are grown. The downstream use of water emanating from the Forest has continued to increase dramatically over the past two decades. The Yakima Basin irrigators diverted 2.4 million acre feet of water to produce a crop value of \$234,500,000 from 225,225 acres in 1981. (Source: 1981, Crop Production Reports--Yakima and Columbia Basin, Bureau of Reclamation).

Existing and foreseeable water shortages in the lower Yakima River are being identified through the on-going water rights adjudication in that sub-basin. It is improbable that potential irrigation water requirements on the Yakima Indian Nation Lands will be met with existing water storage facilities. Additional storage development would be required to produce an additional 200,000 acre feet annually. Most of this development would occur on the Forest, affecting a wide range of other resources. At present, conservation measures pose a more cost effective and environmentally sound approach to water use management in the drainage.

Forest watersheds provide domestic water for cities, small communities, organization sites, special use summer homes, and recreation areas. Municipal watersheds on the Forest are managed for the complete range of multiple use activities. Water emanating from these drainages must be suitable for domestic use with cost effective treatment procedures. In most cases, the application

of multiple-use management will provide the needed protection of water quality in municipal watersheds.

Instream flows within the National Forest boundary have not been a critical issue. The Forest currently has sufficient stream discharge emanating from unregulated water sources so that requirements for instream or minimum flows on the Forest are not anticipated in the short term. There has been some concern regarding the potential impact of proposed small hydroelectric projects to reduce streamflows to a volume that could adversely affect channel maintenance processes and aquatic habitat.

Current Forest resource management activities require water use at nearly 825 designated points of use. All non-Reserved Forest water uses have Certificates of Water Rights or have applications pending with Washington State's Department of Ecology.

10. SOILS

a. Current Management Practice

The soils and all related soil properties on the Forest are highly variable, depending on the interaction of climate (precipitation and temperature) topography (slope, aspect, and elevation), parent material, organisms (both vegetative and animal), and the length of time that the soils have been in place. Soil supports and forms the base for all components of the natural ecosystem. Forest soils act as the sponge that holds and cleanses large amounts of water that is so important for the maintenance of natural ecosystems and for public domestic, agricultural, recreational, and power uses.

The soils on the Forest fall into three general categories: those that are residual (formed in place); those that have been transported by ice or water (glacial till, outwash, alluvium, etc.); and those that have been transported by air (pumice, volcanic ash, loess, etc.). Most of the soils on the forest have been influenced by and have at least some volcanic ash in the surface horizon. In the northern part of the Forest (east of Glacier Peak)

there is a large block of soils that have formed in deep deposits of volcanic ash and pumice. Most of the major river basins on the Forest have been influenced by alpine glaciation, the effects of which are much more pronounced in the northern half of the Forest. All of the transported materials overlay something else, so that these soils all tend to be younger than most of the soils that have formed in residuum (formed in place from bedrock). Bedrock materials from which soils have formed include: basalt, andesite, rhyolite, granite, granodiorite, schist, gneiss, sandstones, and pyroclastics. In fact, there are sub-divisions (geologically) of many of these major rock types, so the variation in soil properties caused by geologic differences are wide.

Most of the granitic materials are located in the northern part of the Forest, and most of the extrusive igneous (basalt, andesite, etc.) occur in the southern part of the Forest. The sedimentary (sandstones) occur in the mid and southern parts of the Forest.

b. Demand Potential

The demand is great to maintain productive soils that can support other resources. Maintaining soil productivity is mandated by the National Forest Management Act. Minimizing soil erosion and soil compaction, along with maintaining or enhancing soil nutrient level, is very important if this is to be achieved.

11. AIR

a. Current Management Program

The management of air as a resource for which the Federal Land Manager has responsibility has developed rapidly in the past twenty years. The Clean Air Act (CAA) 1967 and the amendments to the Act (1972 and 1977) have mandated that managers of the National Forests take specific actions in conjunction with other Federal, State, and Local agencies to maintain or improve air quality.

The Environmental Protection Agency (EPA) was assigned the responsibility to develop the National Ambient Air Quality Standards (NAAQS). The states became responsible for developing a State Implementation Plan (SIP) to maintain or improve air quality. The 1977 supplement required the states to add a section to their SIP which addressed the Prevention of Significant Deterioration (PSD) as well as visibility within the Federally designated Class I areas (See Section 162 CAA, August, 1977, for a definition of Class I areas). The continuing evolution of this legislation has guided the development of the Air Resource Management Program on the Wenatchee National Forest.

The managers of the Forest have worked with the State of Washington to ensure our resource management projects are in compliance with the SIP. Most of the work has been to assure that our prescribed fire program complies with the direction outlined in the SIP. One of our major efforts has involved the protection of visibility within the three Class I Areas (Alpine Lakes Wilderness, Glacier Peak Wilderness, and Goat Rocks Wilderness) on this Forest and those Class I areas adjacent to this Forest. These efforts have developed to where smoke management is now an integral part of our prescribed fire program.

During the past two years funding has become available to begin the design of a process to measure Air Quality Related Values (AQRVs). The Alpine Lakes Wilderness has been picked as the pilot Wilderness in the Pacific Northwest for which baseline data on the chemical composition of the atmosphere will be collected. It is expected that the first measurements will occur during the 1989 field season.

The monitoring of visibility has been on going since 1983, and several sites have provided data that is applicable to the Class I areas on this Forest.

Interagency Air Resource Management continues to become a larger part of the Forest Management Program. During the next few years a rapid increase in the site specific data available regarding the chemical composition of the Forest's Air resource is expected.

b. Production Potential

We currently do not have the skills available to attempt to quantify the amount of clean air "produced" on the Forest. Future quantification of the potential to change the chemical composition of the atmosphere may influence our vegetative management practices.

c. Demand Potential

The value of clean air is being realized in our society. As urbanization increases in the Puget Sound the public is expected to demand that the forests be managed in a manner that view air as an essential component of the resource base and mandate that our National Forests be managed in a manner that provides this resource in much the same manner that it is expected to provide clean water.

12. MINERALS

Overview

The geology of the Forest is lithologically, mineralogically and structurally very complex. Because of its geologic complexity, the Forest has potential for the occurrence of a variety of mineral resource commodities including, but not limited to, gold, silver, copper, lead, zinc, geothermal, coal, limestone, asbestos, garnet, pumicite, oil and gas, etc. Because mineral commodities are classified by law into three distinct groups (locatables, leasables, and salables), the way each group is

managed and the authority of the Forest Service to control the exploration for and development of each commodity varies somewhat. However, the management objectives for all three types of mineral resources is the same and is summarized as follows:

1. Encourage and facilitate the orderly exploration, development, and production of mineral and energy resources within the National Forest System in order to maintain a viable, healthy minerals industry and to promote self-sufficiency in those mineral and energy resources necessary for economic growth and the national defense.

2. Ensure that exploration, development, and production of mineral and energy resources are conducted in an environmentally sound manner and that these activities are integrated with the planning and management of other National Forest resources.

3. Ensure, that lands disturbed by mineral and energy activities are reclaimed for other productive uses.

a. Locatable Minerals

1) Current Management Program

Examples of locatable minerals occurring on the Wenatchee National Forest include, but are not limited to, copper, gold, molybdenum, iron, chromite, nickel, zinc, silver, lead and uncommon varieties of limestone, gemstones, and other minerals that have unique and special values. Forest Service control is accomplished by reviewing plans of operation in a timely manner, by approving only those activities that are reasonably necessary for the proposed operation, by ensuring environmental protection standards are met, and by ensuring that prompt reclamation of disturbed areas is accomplished.

The Forest has approximately 11,000 mining claims covering 200,000 acres properly recorded. Only a very limited number of these claims will actually experience exploration and development activities. At present, even though there is a relatively high amount of on-going exploration, prospecting and mineral related recreation activities, mineral production activity from the Forest is relatively minor in scope.

Designated wilderness areas and other withdrawn areas are not open to mining claim location. Such areas presently constitute about 42 percent of the total Forest area. These areas, however, are subject to valid existing rights perfected prior to the date the area was withdrawn. Some of these areas are known to be encumbered by unpatented mining claims. As a consequence, even though the areas are withdrawn, they could be subjected to the possible effects of mining. Before any mining is permitted in these areas, an evaluation will be made to determine if valid rights exist.

2) Production Potential

A mineral resource overview has been prepared to assess the present and future potential for the development of locatable mineral resources on the Forest. Maps depicting the areas of potential are available in the FEIS. In summary, the overview indicates that the Forest has potentially significant occurrences of copper, gold, molybdenum, silver, lead, zinc, tungsten, iron, chromium, nickel, mercury, and manganese, in approximate decreasing order of importance. The Forest also contains potentially commercial deposits of bentonite, feldspar, limestone and garnet. The other nonmetallic minerals of a locatable nature reported either have no apparent commercial potential, or are of interest only to collectors.

Depending upon the results of on-going exploration and development activities and on changes in the volatile nature of the mineral's supply/demand situation, the level of activity could change drastically over a short period of time.

At the present time, it appears that exploration and development activities in the area are concentrating on precious metals, and of these gold appears to be of most interest. The interest can be attributed to two things: (1) anticipation of higher gold prices; and (2) major improvements made in recovery technology. The areas most likely to be explored for gold within the next few years include the Horse Lake Mountain and Blewett areas on the Leavenworth Ranger District, the Swauk Creek area on the Cle Elum Ranger District, the Entiat Ridge area near the Lake Wenatchee Ranger District and the Red Top Mountain and south Mt. Stuart batholith areas of the Cle Elum Ranger District.

Silver-based metal mineral resources on the Wenatchee National Forest, with one exception, appear to be low grade and of small volume relative to grade. These probably will require supply constraints and significant price increases in order for development to take place. The exception is the Chelan-Sawtooth area where evidence is emerging which indicates the occurrence of a medium to high grade silver-lead-zinc deposit.

Nonmetallic mineral resources of possibly a locatable nature include feldspar, garnet, limestone, silica and bentonite deposits. Of these, the Wenatchee Ridge feldspar deposits appear to have the most potential for future development. Actual development of these commodities will depend more upon processing technology, commodity research, and the establishment of markets, than on exploration and development activities.

3) Demand

At present, the Forest processes approximately 100 notices of intent to operate and plans of operation per year. In addition to this, it responds to more than 500 public inquiries concerning mineral resources and conducts numerous administrative reviews and compliance checks. Considering Bureau of Mines predictions of a 1.0 to 2.2 percent increase in demand for mineral commodities, it is assumed that this level of activity will continue or increase slightly over the next 10 years. Should the availability of non-domestic sources of metallics (especially gold, silver, copper and chromium) change, then the demand for the Forest's sources of these commodities would increase significantly. Because of these trends and the vulnerability of non-domestic sources, locatable mineral related activities (claim staking and maintenance, exploration, development, panning, sluicing, suction dredging and rock-hounding) is expected to remain at a relatively high level throughout the next 10 years. Should exploration activities being conducted on the Forest prove positive and mineralization similar to that at the Cannon Mine near Wenatchee be

identified on the Forest, or should the availability of non-domestic sources of metallics change, then larger-scale locatable mineral activity accompanied by production will increase significantly.

b. Leasable Minerals

1) Current Management Program

Leasable minerals are those mineral commodities which may be acquired under the Mineral Leasing Act of 1920, as amended. On the public lands of the Wenatchee National Forest, they include coal, oil, gas and geothermal resources. On "acquired" lands, however, all minerals except salables are leasable. These minerals are subject to exploration and development under leases, permits, or licenses granted by the Secretary of Interior. Leasing is presently administered by the BLM in cooperation with the Forest Service. The following table summarizes Forest Service mineral leasing responsibilities for the public land it administers:

**TABLE II-25
MINERAL DISPOSAL AND ACTIVITY RESPONSIBILITIES**

Commodity	Public Domain - Administered by the FS	Acquired Lands - Administered by the FS	Preliminary Prospecting Permits
Oil and Gas	BLM requests FS consent for leasing	BLM requests FS consent to lease and FS concur	FS has authority to issue a permit
Coal	BLM requests FS consent to lease and permit to operate	BLM requests FS consent to lease and permit to operate	FS permit specifically prohibited
Hardrock Minerals	Locatable--Nondiscretionary	BLM requests FS consent to issue a prospecting permit, to lease and to operate	FS has authority to issue a permit
Geothermal	BLM requests FS consent to lease and to operate	BLM requests FS consent to lease and to operate	FS has authority to issue a permit

As with the locatable minerals, wilderness areas and certain other areas are withdrawn from mineral leasing. On those lands which are not withdrawn from leasing, recommendations concerning their availability for leasing, and concerning the environmental protective measures which should be attached to a lease, will be based on the environmental conditions and the management objectives adopted for the land upon which an application has been received.

2) Production Potential

Even though there are no leasable mineral commodities presently being produced on the Forest, revenue produced from mineral leasing during FY-85 was \$215,676. This represents rental returns only. Should production begin, royalties would increase this revenue substantially.

Portions of the Forest have been classified by the Bureau of Land Management (previously USGS and Mineral Management Service) as being prospectively valuable for oil, gas, coal and geothermal resources. Those areas classified prospectively valuable for leasable minerals are considered to have at least a "moderate" mineral potential for future production until exploration proves otherwise.

As a result of BLM's leasable mineral classification efforts, 212,044 acres on the Forest are considered prospectively valuable for oil and gas resources, 599,902 acres are classified prospectively valuable for geothermal resources, and 540,350 acres are classified prospectively valuable for coal resources. Of the area classified prospectively valuable for oil and gas, 73,565 acres have been identified as an "area of critical mineral potential" for its oil and gas resource potential.

Recent exploration drilling conducted on lands lying to the east of the Forest has encountered very good shows of gas, though apparently not in commercial quantities. Even though oil and gas resources are not presently known to exist on the Forest in commercial quantities, based upon the results of off-forest exploration it is assumed that the Forest does have potential for the occurrence of petroleum resources.

As with oil and gas, geothermal resources are not known to occur on the Forest in commercial quantities. However, parts of the west one-third of the Forest have been classified "prospectively valuable" for the resource. Pending the acquisition of additional subsurface data, it presently appears that the highest potential for geothermal resources is limited to the high Cascades in the southern part of the Forest.

MINERALS

A large portion of the Forest has been classified "prospectively valuable" for coal resources, while a smaller area near Cle Elum has been classified as a "coal resource area". Even though these deposits contain 41,000,000 tons of "measured", "indicated" and "inferred" resources classified as high-volatile "A" bituminous coal, it does not appear that their development is likely in the near term.

3) Demand

None of the existing or terminated leases have been producers, but they do indicate an interest in the area's potential. It appears that the leasing cycle, however, is in a downturn mode and without some important discovery, the area leased is expected to remain below 200,000 acres at least for the foreseeable future. In addition to the oil and gas leases, a total of 24 geothermal lease applications covering 56,350 acres were filed for in the White Pass and Cougar Lakes area. Since most of the applications lie within areas designated as wilderness under the Washington State Wilderness Act of 1984, they have either been rejected or withdrawn. There are presently no coal leases or pending lease applications, and it appears unlikely that there will be any interest in leasing the coal on the Forest over the next 10 years.

Barring any significant discoveries off-Forest, oil and gas activity on the Forest over the short-term is expected to remain relatively low and will be dominated by leasing actions and exploration activities. Based upon available data, it appears that geothermal resource related activities conducted on the Forest in the short-term will be dominated by geophysical investigations and possibly exploration. Relatively small-scale direct use development is possible, but large scale development is not anticipated. In response to changing energy demands, considerable attention has recently been focused on the production of methane from unmined and unmineable coal seams in Washington. Since this type of development will depend on detailed investigations of the resource and on future technological improvements in recovery methods, it is unlikely that such development will occur within the next ten years.

c. Salable Minerals

1) Current Management Program

Salable minerals are common varieties of sand, stone, gravel, pumice, pumicite, cinders and clay. In general, these minerals are of widespread occurrence and are of relatively low unit value. They are generally used for construction materials and for road building purposes, however, they may be used for decorative purposes as well. These minerals are sold, rather than being leased or located, and their disposal is totally at the discretion of the Forest Service (see regulations in 36 CFR part 228). Management of operations on permit areas is similar to the management of leasable mineral activities.

2) Production Potential

The Forest maintains a detailed inventory of rock sources. This inventory, which identifies the location, type, quality and quantity of rock available at each source, is available at Ranger District Offices. The potential for developing this mineral resource is highly controlled by the deposit's geographic location relative to population centers or areas of use (road construction, timber harvesting activities, bridge and dam construction, etc.), and on the availability of funding for construction projects. There appears to be an adequate supply of crushable rock sources throughout the Forest to accommodate any anticipated demand. However, good quality sand and gravel is in short supply.

3) Demand

The total production of sand and gravel and stone during the period from 1973 to 1984 was approximately 3.8 million tons, which has an estimated value of 8 to 10 million dollars. The annual average production since 1973 has been about 320,000 tons. However, demand has lessened the last few years in response to the reduction in road construction activities. The Forest presently issues 50 to 100 permits annually to the public for the removal of 6,000 to 25,000 tons of cinders, pumice, rock, sand and gravel. The dominant market for mineral materials, however, is in

support of the Forest's timber management program and for public works projects. To support these activities, an additional 100,000 to 300,000 tons of various common variety mineral resources are removed annually. Since demand for these mineral commodities is highly influenced by the location of the resource, the health of the timber industry and its associated timber harvesting activities, and on the availability of capital for construction projects, it is difficult to predict what the future demand will be. Based upon available data, however, the demand has lessened over the last 2 years and it appears that the demand on a Forest-wide basis will not increase significantly over the next 10 years. On a local basis, if specific projects are approved and funded, the demand could increase appreciably.

d. Recreational Minerals

1) Current Management Direction

Those collectible minerals of a "locatable" nature are removed from valid mining claims under the authority of the Mining Law of 1872, whereas removal of more than nominal amounts of the common variety minerals requires that a permit be issued. In either case, if significant surface resource disturbance might be caused, a notice of intent or plan of operation must be filed and approved. If suction dredging or stream alteration is involved, hydraulic project approval must be obtained from the State. Since managing this type of activity in the past has not been a significant problem and it is not anticipated to become a problem in the future, current management practices will continue. There does appear to be some interest in the opportunity to allocate lands specifically for rockhounding and mineral collecting purposes. Other than for those areas identified in the Alpine Lakes Management plan (Redtop Mountain area and portions of Peshastin, Negro and Ruby Creeks), no areas will be withdrawn and specifically managed for this type of recreational activity.

2) Production Potential

Even though there are about twenty types of minerals recreationally collected on the Forest, placer gold, agate, quartz crystals, garnet, talc or soapstone, olivine, rhyolite, pyrite, rhodenite and actinolite appear to be the main targets of collectors. The areas experiencing the most activity of this nature appear to be the Red Top, Big Creek, Kachess Lake, White River, Cle Elum Lake, Peshastin, Negro, Ruby and Swauk Creeks, Wenatchee Ridge, Manastash Creek and Deep Creek areas. However, there is also interest in other localized areas. The potential for the mineral resources of this type to accommodate the recreation demand for them has not been assessed.

3) Demand

It is anticipated that the recreational mineral related activities will continue at or increase slightly above the present level. Any large increases in the price of gold, however, would be accompanied by significant increases in panning, sluicing, and suction dredging activities of a recreational nature.

13. LAND STATUS

Background

About 293,199 acres, or 12 percent of the land within the Forest boundary, is not National Forest land. Many of these lands are in a "checkerboard" ownership pattern, affecting about 25 percent of the Forest. Most of this checkerboard ownership is in the center of the Forest in the vicinity of Stevens (U.S. 2) and Snoqualmie (I-90) Passes and along the east side of the Forest. Much of the intermingled private land is managed for timber production by large corporate landowners. Almost all of it is within the roaded portion of the Forest and only a minor amount is within wilderness or other unroaded areas. This pattern is evident on the Forest map.

LAND STATUS

Other agencies also manage land within the Forest. The Washington State Department of Natural Resources manages more than 30 square miles of land scattered throughout the northeast part of the Forest (primarily Sections 16 and 36). The Washington Department of Game manages about 10 square miles of land of the affected sections within the Forest boundaries, and the Washington State Parks Commission manages about one square mile of land--Lake Wenatchee State Park.

In addition, there are many existing withdrawals from mineral entry for power sites, reclamation administration, and recreation. The Bonneville Power Administration has several major energy transmission corridors on the Forest which are managed under Memorandums of Understanding. This need of other agencies (Federal, State, and local) to occupy and use National Forest land with travel and utility corridors requires considerable management attention and interagency coordination.

To improve resource management and reduce the costs of National Forest administration, the Forest continues to be engaged in several land exchanges with owners of intermingled lands.

Although many rights-of-way have been acquired through private land, there is a continuing program for the acquisition of trail and road rights-of-way in order to ensure public access to National Forest lands.

Occasionally it is in the public interest to purchase private lands. This was the case with the private lands within the Alpine Lakes Intended Wilderness and key recreation lands within the Lake Chelan and Lake Wenatchee recreation areas. In the last few years, especially on Lake Chelan, emphasis has shifted from purchase to acquiring recreation or scenic easements. An Icicle Creek composite is being developed. Acquisitions in these composites will continue under this Plan.

a. Land Adjustments

The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) targets for land purchase and exchange for the Forest are about 3,000 acres per year from 1985 through 1990. Under current national direction, little or no purchase can occur outside the Congressionally directed Alpine Lakes acquisitions. Land exchange activities will largely be limited to work under existing agreements with Burlington Northern Inc., the State of Washington Department of Natural Resources, and Longview Fibre Co. A long-term land ownership adjustment program involving these three major landowners could potentially involve about 120,000 acres of private land and a similar acreage of National Forest land. Other small parcels would be acquired by exchange or purchase on a need and opportunity basis.

In order to better accomplish resource management objectives and improve efficiency, the Forest has ongoing land exchange programs with the State of Washington Department of Natural Resources (DNR) and Burlington Northern Timberlands Inc. The agreement with the DNR identifies an eventual adjustment involving about 20,000 acres in each ownership. The program with Burlington Northern Timberland Inc. proposes the study of about 83,000 acres of Burlington Northern lands and about 53,000 acres of National Forest land for possible exchange. The Forest is also working on two exchanges totaling about 23,000 acres of private land and 17,000 acres of National Forest land, with Longview Fibre Company.

In "checkerboard" ownership areas, industrial forest management practices result in much faster harvest of old-growth timber on private land. This rate of cutting and the related roading substantially affect roading and harvest on the public lands because of the cumulative effects of these activities on soil, water quality, and wildlife. It also limits the opportunity to manage the public lands for unroaded uses.

The subdivision and development of private lands within and adjacent to the Forest is accelerating. Current examples are: (1) The Murray Pacific lands in Chelan County above Fish Lake and in the Chiwaukum, Hatchery and Icicle Creek areas; and (2) the Pack River Management Co. lands in

the bottom of the Icicle Creek drainage. Such changes impact public land management in several ways. These include fire protection, access, sanitation (water quality) and trespass. Private land development also increases the recreation use of the Forest in these areas and increases the demand for the use of National Forest lands for water systems, sanitation systems, utilities and access. There are also demands to preserve the natural environment in proximity to summer homes or year-round residences. This creates pressure to restrict management options on activities such as timber harvesting and road, trail and campground construction.

In order to allow maximum utilization and adequate protection of public resources, the ownership pattern requires either: (1) a large, long-term landline survey program; (2) large-scale land ownership adjustments to eliminate the mixed ownership; or (3) a combination of the two.

b. Special Land Uses and Utility Corridors

The Forest provides lands for a wide variety of special uses by private individuals and public agencies. Such uses are authorized by special use permits, mining laws, and withdrawal authority of other agencies. The most common are those covered by special use permits. Examples of permitted uses are recreation residences, pastures, power or telephone lines, fences, irrigation ditches, water transmission pipelines, roads, dams, emergency airstrips, electronic sites, ski areas, and resorts.

There are about 1,469 special uses on the Forest. Seven hundred thirty-nine of these occupying 2,486 acres, are for recreational purposes. Another 730 occupy about 20,752 acres of National Forest land, and are termed non-recreational special uses. These uses produced \$402,505 in fees in fiscal year 1988. The number of permits and acres under permit change as some permits terminate and new uses are added. However, the trend is for more and more uses as time goes on. The uses have the effect of limiting the options in these areas for other uses including public recreation, timber harvest, livestock grazing, and facility construction.

Special uses are periodically inspected to insure compliance with conditions of the permit and to evaluate the appropriateness of continuing such use. Most permittees are charged fees for the privilege to use National Forest lands.

Utility corridors are managed under Cooperative Agreements and Memorandums of Understanding. The Forest maintains about 200 of these documents to administer various uses. Currently, power transmission lines are the major use of utility corridors on the Forest with three major energy utility corridors crossing the Forest through Stevens, Snoqualmie and Stampede Passes. The rights-of-way for these lines are from 100 feet to 1,400 feet in width and they occupy about 1,420 acres of National Forest land. The Western Regional Corridor Study for the State of Washington has also identified one potential corridor. It would cross the crest of the Cascade Range in the area between Tacoma Pass and Pyramid Peak. The corridor would then run southeasterly toward the Hanford and Tri-Cities area. In the short term, additional power transmission needs can be met by increasing the capabilities of existing utility corridors.

A moderate to strong demand can be expected for all special uses in the future. This is based on the number of applications currently received for non-recreation special uses. The right-of-way acquisition, grants of right-of-way and road construction cost sharing are expected to continue at about the current level. As the road system develops over time, these programs should be phased out, except for cost sharing of road reconstruction and maintenance. The need for these activities will also be reduced to the extent that land exchanges with the major landowners within the Forest consolidate ownerships, eliminating the need for cost sharing, granting and acquiring right-of-way, and surveying and marking property boundaries.

c. Hydroelectric Energy Development

There are no major hydroelectric power projects within the Forest. There are several projects adjacent to the Forest on the Columbia River. One project, Chelan Falls, relies on water storage in Lake Chelan. Generation of electric power

results in a 17 foot annual fluctuation in the level of Lake Chelan, and affects National Forest land management adjacent to the shoreline.

There are two minor projects of long standing on the Forest. One is the Holden project on Copper Creek at Holden Village. The other is the Trinity project on Phelps Creek on the Lake Wenatchee Ranger District. Both of these projects have existed for more than 30 years and serve small, isolated camp/organization sites.

Over the last five years, the Forest has had an average of about 25 small hydroelectric proposals pending. Most of these never go beyond the preliminary permit and feasibility study stage. Many are "repeats" where one proponent surrenders a preliminary permit for a proposal and another party applies for a preliminary permit for the same site.

Three proposals have reached the stage of applying for licenses to construct and operate small hydroelectric projects. They are the Tieton, Clear Lake and Railroad Creek projects. The Tieton and Clear Lake proposals involve "retrofitting" existing irrigation storage dams to produce power. The Railroad Creek proposal would be a totally new project to provide power for the Holden Village organization site.

14. ROADS

a. Current Management Program

Currently 33 percent of the total Forest and 53 percent of the non-wilderness acres are considered roaded. In the roaded areas, there are approximately 3.75 miles of road for each square mile of land. Within these sections, the roads actually occupy about 4 percent of the land area.

In 1988 there were an estimated 5,110 miles of Forest Service roads on the Forest. About 18 percent of this total are classified as arterial and collector roads. Forest arterials and collectors access large or popular land areas and usually connect with State and County roads to form an integrated network of primary and secondary travel routes. The system is 98 percent complete,

however, some is in need of reconstruction. About 82 percent of the total system are local roads. These facilities are usually intended to provide access for a specific resource utilization or protection activity, such as a timber sale, a recreation site, or a firebreak. These roads are normally shorter and serve smaller areas of land. Resource service rather than travel efficiency is emphasized in their location, design and operation. The analysis of the management situation indicates that the local road system is about 76 percent complete. Ground slopes influence the choice of logging systems and the logging system determines the local road location and density. Typical permanent road densities (miles/Section) necessary to harvest timber in unroaded areas on the Forest are 3.12 miles for gentle slopes, 2.64 miles for moderate slopes, and 1.10 miles for steep slopes. Approximately 0.4 mile of additional road construction or reconstruction per million board feet is necessary for subsequent entries.

1) Bridges

The analysis of the current management situation has identified approximately 35 bridges that will need replacement or reconstruction in the next 10-15 years. These are log bridges that are greater than 15 years old, treated timber bridges greater than 25 years old, steel or concrete bridges greater than 35 years old, bridges whose capacity is significantly (75 percent) less than current legal loads, or bridges where inspection reports indicate significant damage, corrosion, or decay.

2) Forest Road Management

Road management objectives for all existing roads have been identified and stored in the Transportation Information System (TIS). A system has been developed to identify the resource objectives and the appropriate standard and management of all proposed roads. The existing and proposed levels of service for the arterial and collector roads are found in Chapter IV.

15. FIRE

a. Current Management Program

Fire has played an important developmental role in many of the ecosystems found on the Wenatchee National Forest. As our management of these ecosystems has intensified so has our desire to manage the frequency and amount of change caused by fire. We now separate the fire management program into two different facets. One is the suppression of wildfire, and the second is the application of prescribed fire.

1) Wildfire Suppression

The wildfire protection facet of the Fire Management Program consists of four activities. They are; Presuppression, Prevention, Detection, and Suppression.

Presuppression activities include all the preparation necessary to initiate efficient fire suppression efforts. In recent years this has included the rapid expansion of Interagency Agreements in an attempt to utilize all local fire suppression resources efficiently. The Wenatchee National Forest maintains agreements with many Federal, State, and Local entities which facilitate the management of the fire program on an inter-agency basis.

The current management program allocates approximately two million dollars per year to ensure the readiness of equipment and personnel for fire suppression efforts. Included in this allocation is funding for the following fire suppression resources which are funded by the Forest Service Regional Office and "hosted" on the Wenatchee National Forest (Two Air Tankers, One Helicopter with Rappel crew, One Lead Plane, One Hotshot Crew, and One Regional Fire Cache). The training and development of the fire management personnel is also included in this funding as is the acquisition and maintenance of the fire suppression equipment.

Detection

Detection of wildfires most commonly occurs by the public. About 80% of all wildfire reports come from the general public. The remaining 20% of the fire reports come from a combination of Lookouts, Aerial Detection Systems, and employees of the agencies involved in fire suppression. Increased Interagency cooperation has improved the efficiency of our fire detection efforts in recent years. This has resulted in a reduced number of lookouts being staffed and less hours being flown by aircraft for observation purposes.

Prevention

The Forest has developed and maintained an aggressive fire prevention program to reduce the number of human caused wildfires. A variety of communication and public media systems are used to inform the public of fire prevention activities, current conditions, and fire prevention needs. Throughout the past ten years the emphasis of fire prevention has evolved from efforts to provide individual personal contacts to increased use of public communication systems. Organized and timely use of the media reaches more people in a structured format and is less costly than organizing to accomplish individual contacts.

In addition, the Forest participates with the Washington State Department of Natural Resources and several other agencies, in the Industrial Fire Prevention Program which regulates the industrial activities which can occur on National Forest Lands.

Even with the fire prevention efforts outlined in the preceding paragraphs the Wenatchee National Forest has a history which shows that this area is subject to frequent wildfires some of which become very large. The following two tables show the relationship of fire occurrence and the incidence of large fires on the forest. Table II-26 shows the annual lightning and human caused fire occurrence and acres burned from 1957 through 1985. Table II-27 shows the number and size of the large fires that have occurred from 1960 to 1985 and their acreage.

Suppression

The current direction for the management of wildfires was implemented on the Wenatchee National Forest in May of 1984. It directs the fire manager to implement a fire suppression strategy which is efficient and includes the following considerations; land values of the area, resource values in the area, public and private property, existing and predicted weather and burning conditions, fuel volume and condition, terrain factors, and the availability of suppression resources. It should be emphasized that all wildfires that occur on the Wenatchee National Forest have been managed utilizing a cost-effective suppression strategy and this will continue after the implementation of this plan.

Fire suppression is accomplished utilizing a variety of equipment. Aircraft is utilized when effective. Tractors and other heavy equipment are used when the terrain and management practices allow. But, the primary suppression efforts are made by individuals utilizing handtools to construct fireline and mopup. The techniques for doing this job have not changed radically during the past 50 years.

2) Prescribed Fire

The second facet of the Fire Management Program is the use of prescribed fire. Prescribed fire may be used for a variety of land management objectives which range from site preparation for reforestation activities to browse improvement for wildlife habitat. Each prescribed fire has specific objectives and can only occur given predefined environmental conditions. If the objectives are not being obtained or the environmental conditions are not correct the fire is managed as a wildfire and suppressed.

With the implementation of the Alpine Lakes Wilderness Management Plan the use of natural ignitions (lightning) to initiate prescribed fires became possible. At this point the experience we have gained in managing natural prescribed fire within this wilderness is limited. With the implementation of this plan and after appropriate planning and documentation has occurred, the opportunity to expand the use of natural ignitions exists.

The prescribed fire program on the Wenatchee National Forest currently varies from approximately 4,000 to 8,000 acres per year. These acres are treated utilizing a variety of techniques ranging from broadcast burning to the burning of piled forest debris. The techniques being employed have evolved rapidly in the past ten years with the development of computer based models which have helped predict the amount of fuel consumed, the intensity of the fire, and the dispersion of the resultant smoke. These tools, combined with a well trained workforce have resulted in professional application of prescribed fire.

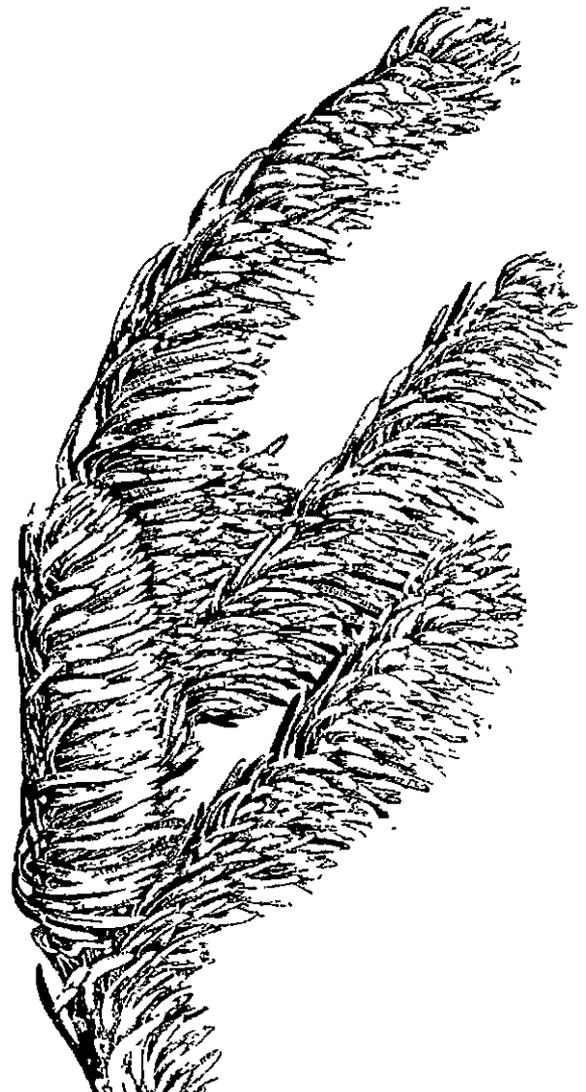


TABLE II-26

ANNUAL FIRE OCCURRENCES BY ACRES AND CAUSE
1957 - 1985

Year	Lightning Caused (Fires)	Human Caused (Fires)	TOTAL (Fires)	Lightning Caused (Acres)	Human Caused (Acres)	TOTAL (Acres)
1957	21	60	81	Unknown		92
1958	111	51	162	Unknown		10,927
1959	7	50	57	Unknown		206
1960	13	111	124	---	1,084	1,084
1961	189	83	272	---	5,773	5,773
1962	63	74	137	388	294	682
1963	132	91	223	185	3,645	3,830
1964	13	67	80	2	2,280	2,280
1965	128	100	223	7	205	212
1966	37	102	139	1,520	124	1,644
1967	8	91	99	---	676	676
1968	18	69	87	10	28,484	28,494
1969	18	113	131	3	213	216
1970	176	255	431	130,407	1,017	131,424
1971	27	132	159	322	45	367
1972	23	90	113	1	59	60
1973	11	191	202	1	183	184
1974	8	175	183	1	845	846
1975	108	88	196	51	145	200
1976	10	145	155	6	10,762	10,768
1977	165	135	300	102	1,087	1,189
1979	59	128	187	83	2,133	2,216
1980	61	74	135	10	246	256
1981	117	56	173	36	7	43
1982	99	49	148	154	35	189
1983	30	61	91	5	7	12
1984	77	45	122	17	31	48
1985	14	58	72	91	1,512	1,603

TABLE II-27
WENATCHEE NATIONAL FOREST -- HISTORY OF LARGE FIRES (1960-1985)

Date	Name of Fire	Ranger District	Cause	Fuel Type	Acres
07/18/60	No 2 Canyon	Leavenworth	Smoking	Grass/Brush	610
06/21/60	Birch Mtn.	Leavenworth	Debris	Grass/Brush	299
06/29/61	Tenas George	Entiat	Equipment	Grass/Brush	3,750
08/11/61	Eagle Creek	Leavenworth	Smoking	Brush/Pine	750
10/01/61	Nahahum	Leavenworth	Children	Grass/Brush	525
08/16/61	Swakane #2	Entiat	Lightning	Brush/Pine	125
07/31/61	Mud Creek	Entiat	Lightning	Pine	150
08/25/62	Skyline Dr.	Leavenworth	Smoking	Grass/Brush	178
07/27/62	Forest Mtn.	Entiat	Lightning	Pine	520
08/07/63	Cashmere RR	Leavenworth	Railroad	Grass/Brush	120
08/25/63	Bear Mtn	Chelan	Lightning	Brush/Pine	114
09/06/63	River Road	Leavenworth	Railroad	Pine	161
09/22/63	Monitor	Leavenworth	Lightning	Grass/Brush	118
10/21/63	Chelan Butte	Chelan	Powerline	Grass/Brush	3,097
08/08/64	Willow Tree	Chelan	Equipment	Grass/Brush	2,370
08/26/66	Hornet Creek	Entiat	Lightning	Mixed Conifer	1,520
07/06/68	Dry Gulch	Leavenworth	Equipment	Grass/Brush	2,000
08/04/68	4th of July Mtn.	Chelan	Unknown	Brush/Pine	27,120
08/05/68	Ardenvoir	Entiat	Burn. Bldg.	Brush/Pine	1,210
08/14/69	Chumstick	Leavenworth	Railroad	Brush/Pine	160
07/07/70	Mills Canyon	Entiat	Children	Brush/Pine	933
08/24/70	White Pine	Lake Wenatchee	Lightning	Timber	124
08/24/70	Hansel Creek	Leavenworth	Lightning	Timber	170
08/24/70	Falls Creek	Lake Wenatchee	Lightning	Timber	500
08/24/70	Shady Pass	Entiat	Lightning	Timber	1,950
08/24/70	Mid Slope	Lake Wenatchee	Lightning	Timber	120
08/24/70	Airport	Lake Wenatchee	Lightning	Timber	3,571
08/24/70	Cold Ridge	Entiat	Lightning	Timber	14,360
07/16/70	Safety Harbor	Chelan	Lightning	Timber	15,715
08/24/70	Mitchell Creek	Chelan	Lightning	Timber	42,280
08/24/70	Slide Ridge	Chelan	Lightning	Timber	7,100
08/23/70	Boulder Ridge	Leavenworth	Lightning	Timber	788
08/24/70	Cougar Mtn.	Entiat	Lightning	Timber	190
08/24/70	Entiat Zone	Entiat	Lightning	Timber	43,118
08/10/71	Goat Mtn	Chelan	Lightning	Timber	322
08/06/74	Eight Mile	Leavenworth	Equipment	Timber	500
08/30/74	Mineral Springs	Cle Elum	Equipment	Brush/Pine	143
08/02/75	Grade Creek	Chelan	Campfire	Grass/Brush	135
07/24/76	Crum Canyon	Entiat	Equipment	Brush/Pine	9,000
07/26/76	Ingalls Creek	Leavenworth	Campfire	Timber	650
07/14/77	Box Canyon	Chelan	Campfire	Brush/Pine	512
07/15/77	Bear Mtn.	Chelan	Burn Vehicle	Brush/Pine	110
07/31/79	Slide Ridge	Chelan	Fireworks	Brush/Pine	866
08/12/79	Spring Water	Leavenworth	Debris	Grass/Brush	340
10/08/79	Nahahum Canyon	Leavenworth	Debris	Brush/Pine	1,050
07/16/80	Silica	Chelan	Campfire	Brush/Pine	210
06/27/85	Cascade	Chelan	Misc.	Brush/Pine	450
07/04/85	Devils Ridge	Naches	Equipment	Slash/Timber	120
07/25/85	Fourth of July	Chelan	Misc	Brush/Pine	740
07/25/85	Lost Lake	Cle Elum	Equipment	Slash/Timber	750
07/28/85	Five-Mile	Leavenworth	Debris	Slash	500
09/03/85	Blewett Pass	Cle Elum	Lightning	Slash/Timber	90

16. SOCIAL/ECONOMIC

a. Current Management Program

1. Social

Communities within and adjacent to the Forest are concerned about a balance of natural and human related resource activities. Many of the residents of the communities in the area of the Forest derive their livelihood from forest related activities and many participate in a wide variety of forest recreational activities. These residents have a keen interest in the management of the Wenatchee National Forest.

The recreational activities and environmental amenities offered by the Forest are important components of life in the small rural recreational and residential communities located in and around the Forest. Examples include the Lake Wenatchee area, Leavenworth, and Chelan. Because the economic base of these communities depends on tourism, they are affected by changes in the pattern of recreational opportunities on the Forest. They are also affected by changes in environmental quality, and benefit from opportunities for free and easy access to forest resources and products. Firewood, fish, game, and water are among forest resources important to local communities. The preservation of these Forest qualities is of great importance to these communities.

Rural communities whose economic life is tied to logging, sawmills, and related transportation and construction are also affected by changes in the supply of timber from the Forest. The productive use of resources and products is an important value of forest management.

In addition to the residents of the three-county (Chelan, Kittitas, and Yakima) area, Forest management affects out-of-area recreationists who live in the metropolitan areas of Washington. These people typically have concern for recreational and visual quality, wilderness, road access, and hunting opportunities. Their ties to the Forest are principally through the recreational activities they engage in.

2. Population

The three counties have an area of 9,503 square miles and a population of almost 250,000 people. Yakima County is the most densely populated (40 people per square mile) while Kittitas County has the least population density (11 people per square mile). Most people live in the larger towns and cities scattered along the east side of the mountains, especially Wenatchee, East Wenatchee, Ellensburg, and Yakima. About 90 percent of the people in the three counties live in the agricultural valleys. Residents in the eastside communities are affected by the Forest through availability of recreation, the payments to County governments from Forest receipts, production of market goods such as lumber and beef, (Table II-28), and other amenities such as enjoyment of the visual character of the Forest.

TABLE II-28
SOURCE OF COUNTY REVENUES - 1984
(In Dollars)

County	1984 Property Tax Revenue Levies	Wenatchee N.F.	25 Percent Funds Given to Counties Based on National Forest Receipts ^{1/}		
			Mt. Baker ^{2/} Snoqualmie N.F.	Gifford Pinchot N.F.	Total National Forest Payments to Counties
Chelan	17,390,291	1,337,183			1,337,183
Kittitas	6,938,570	334,059	176,479		510,538
Yakima	43,938,061		1,490,029	255,616	1,745,645
Totals	68,266,922	1,671,242	1,666,508	255,616	3,593,366

^{1/} 25 percent funds are based on proclaimed National Forest boundaries. This is for Fiscal Year 1984 (October 1983-September 1984)

^{2/} Administered by the Wenatchee National Forest, but the 25 percent funds are based on Mt. Baker-Snoqualmie National Forest receipts.

Sources. Chelan, Kittitas, and Yakima County Assessor's Offices, Personal Communication April 15, 1985.
U S. Department of Agriculture, Forest Service, Wenatchee National Forest, 1984 File Data.

3. Employment

Major employment comes from city, county, State and Federal agencies, trade and service, lumber and wood products manufacturing, and agriculture, especially apples, soft fruits, cattle, hops, potatoes and wheat.

Table II-29 depicts some of the major employment categories considered in Washington State and the three-County area with the numbers of employees in each.

TABLE II-29
EMPLOYMENT
BY STATE AND SELECTED COUNTIES
(NUMBER OF PERSONS)
MARCH, 1984

	Washington	Chelan and Douglas County	Kittitas County	Yakima County
Total Employment	1,575,314	20,649	7,216	56,007
Agriculture, Forestry and Fishing	34,865	2,241	---	8,017
Mining	2,426	43	---	52
Construction	69,606	740	128	1,764
Manufacturing	277,895	2,552	531	6,708
Lumber and Wood Products	40,585	325	82	1,145
Food and Kindred Products	28,224	644	284	2,530
Transportation and Public Utilities	80,363	562	288	387
Wholesale Trade	97,192	2,194	370	4,982
Retail Trade	286,083	3,636	1,629	9,856
Finance, Insurance, Real Estate	90,878	945	200	1,741
Services	317,938	4,276	1,167	11,226
Nonclassifiable Establishments		98	0	169
Federal Government	66,972	438	114	983
State Government	83,801	841	1,406	1,946
Local Government	167,197	2,181	1,214	6,404

Source: Washington Employment Security Department. 1985. Employment and Payrolls in Washington State by County and Industry First Quarter 1984, No. 150.

Unemployment in the three Counties has consistently been greater than the State average (Table II-30).

TABLE II-30
UNEMPLOYMENT RATES 1970, 1975,
1979, 1981, 1983, 1984
(In Percent)

Year	Washington	Chelan-Douglas Counties	Kittitas County	Yakima County
1970	9.1	10.9	9.5	10.7
1975	9.6	10.8	10.5	10.4
1979	6.8	10.5	9.0	9.7
*1981	9.5	12.8	12.7	12.0
*1983	11.2	14.5	13.1	14.9
*1984	9.5	12.3	13.0	14.4

Source: Washington Employment Security Department, Research and Statistics Section. 1980 Personal Communication.

* Washington Employment Security Department, Wenatchee, Personal Communication 1981, 1983, 1984

4. Human and Community Resources

The Forest is part of a nation-wide program of human and community development, which has as its primary goal helping people and communities to help themselves. The program includes activities that provide work and learning experiences for youth, adult employment, training opportunities, and technical assistance to individuals and communities.

The Forest has been actively engaged in a wide variety of manpower and youth training programs. The Youth Conservation Corps (YCC) Program provides employees between the ages of 15 and 18 with employment and experience in a natural resources environment. The Senior Community Service Employment Program (SCSEP) provides part-time employment for senior citizens whose incomes are within poverty levels. Other programs the Forest has been active in include: The Comprehensive Employment Training Act (CETA), College Work Study, and the Young Adult Conservation Corps (YACC) Programs.

The Volunteers in the National Forest Program has become increasingly important as funding levels decrease for some of the above programs. This program, authorized in 1972, has been used extensively to accomplish necessary resource activities such as campground host work, trail construction, wilderness patrol, and many other jobs. Many volunteers are highly qualified individuals who are retired or young people unable to find jobs in their profession, trade, or area of interest because of current economic conditions and the lack of employment opportunities. Volunteer programs are expected to increase.

The Forest has the ability to utilize Human Resource Programs to accomplish many Forest projects. For example, there is a continuing need to improve buildings, campgrounds, and trails, to improve young timber stands through thinning and pruning; and to accomplish soil and water improvement programs. Although there is a backlog of projects that can be accomplished, the funding for these programs varies from year to year because of National budget priorities. Because of this, these programs are not always available when needed.

In 1984, the Forest had the following enrollment in these programs:

	Person Years
YCC	2.11
Campground Hosts	1.85
Volunteers	20.72
SCSEP	10.32
TOTAL	35.00

The outlook is for these programs to continue at about this same level.

Various programs have been implemented for minorities and women to benefit both the Forest and the individuals. This effort is reflected in Forest Service hiring, supervisory, and contracting procedures.

5. American Indian Treaty Rights

Certain rights and privileges are afforded members of the Yakima Indian Nation and the Wenatchi Indian members of the Colville Confederated Tribes under the Treaty of 1855. The treaties provide that on the ceded lands, the Indians will continue to have the rights such as the taking of fish in streams running through and bordering the Reservations and at all other usual and accustomed stations in common with the citizens of the United States; and the privilege of hunting, gathering roots and berries, and pasturing stock on unclaimed lands. These rights will be considered through management of appropriate resources such as fish, wildlife and riparian areas. The entire Wenatchee National Forest is within the area ceded by the Yakima Indian Treaty.

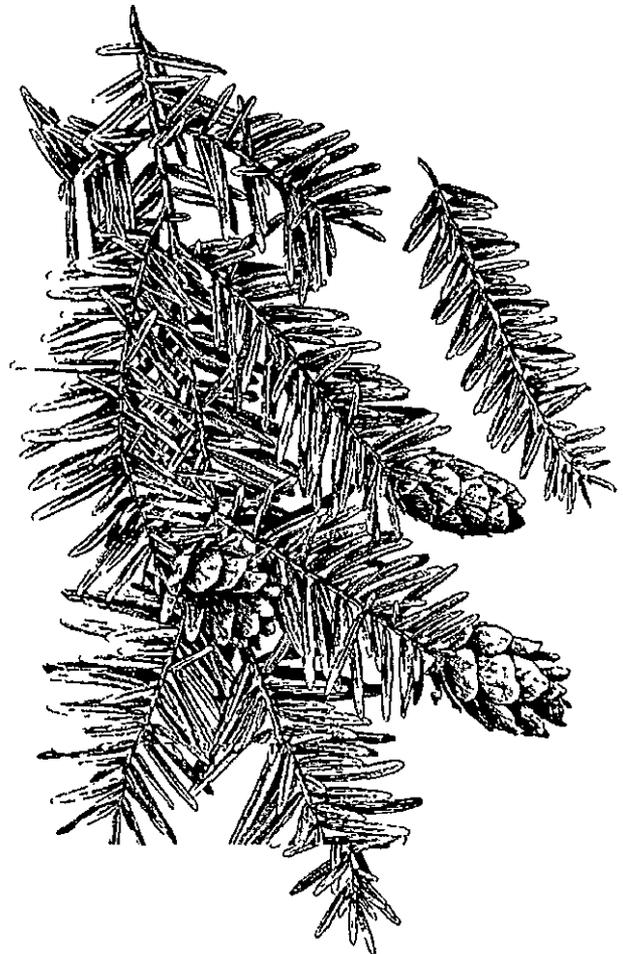


TABLE II-31

CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES

	UNITS	YEAR				
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
DEVELOPED RECREATION						
USE CAPACITY	Thousand RVD's					
Current Program		4,883	4,900	4,900	4,900	4,900
Production Potential		6,853	6,870	6,870	6,870	6,870
Forest Plan		6,683	6,700	6,700	6,700	6,700
Demand		3,141	3,449	3,848	4,647	4,647
DISPERSED RECREATION						
USE CAPACITY						
-Roaded	Thousand RVD's					
Current Program		22,576	23,576	23,829	24,082	24,334
Production Potential		<-----		26,007		----->
Forest Plan		21,884	22,467	22,873	23,279	23,685
Demand		1,998	2,126	2,294	2,462	2,630
-Unroaded, Motorized	Thousand RVD's					
Current Program		873	833	803	773	742
Production Potential		<-----		1,024		----->
Forest Plan		796	752	722	692	663
Demand		279	301	336	371	405
-Unroaded Non-Motorized	Thousand RVD's					
Current Program		147	142	135	128	121
Production Potential		<-----		341		----->
Forest Plan		188	179	174	169	163
Demand		99	106	118	130	143
-Wild and Scenic Rivers	Miles					
Current Program		<-----		45		----->
Production Potential		<-----		230		----->
Forest Plan		<-----		240.5		----->
Demand		<-----		Mixed		----->
VISUAL QUALITY OBJECTIVES						
-Preservation	Acres					
Current Program		<-----		842,751		----->
Potential		<-----		843,281		----->
Forest Plan		<-----		843,281		----->
Demand		<-----		Very High		----->
-Retention	Acres					
Current Program		<-----		485,081		----->
Potential		<-----		828,058		----->
Forest Plan		<-----		521,800		----->
Demand		<-----		Very High		----->

TABLE II-31 (continued)

**CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES**

	UNITS	YEAR				
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
-Partial Retention	Acres					
Current Program		<-----		459,112		----->
Potential		<-----		246,835		----->
Forest Plan		<-----		332,927		----->
Demand		<-----		High		----->
-Modification	Acres					
Current Program		<-----		55,629		----->
Potential		<-----		55,629		----->
Forest Plan		<-----		147,828		----->
Demand		<-----		Low		----->
-Maximum Modification	Acres					
Current Program		<-----		321,607		----->
Potential		<-----		86,941		----->
Forest Plan		<-----		318,344		----->
Demand		<-----		Very Low		----->
WILDERNESS USE CAPACITY	Thousand RVD's					
Current Program		<-----		1,060,000		----->
Production Potential		<-----		1,060,000		----->
Forest Plan		<-----		1,060,000		----->
Demand		423.5	444.7	475.8	507.2	540.2
WILDLIFE HABITAT						
-Big-Game	Acres					
Current Program		<-----		17,151		----->
Production Potential		<-----		148,189		----->
Forest Plan		<-----		118,742		----->
Demand		<-----		148,189		----->
-Old-Growth	Acres					
Current Program		307,300	295,800	284,400	272,900	261,600
Production Potential		<-----		310,600		----->
Forest Plan		307,300	295,700	284,200	272,700	261,200
Demand		<-----		Very High		----->
BIG GAME ESTIMATES						
-Deer (summer)	Numbers					
Current Program		25,200	25,100	25,000	24,900	24,700
Production Potential		<-----		28,100		----->
Forest Plan		25,100	24,900	24,800	24,600	24,400
Demand		<-----		High		----->

TABLE II-31 (continued)

**CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES**

		UNITS		YEAR		
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
-Elk (summer)	Numbers					
	Current Program	12,500	12,500	12,400	12,400	12,300
	Production Potential	<-----14,000----->				
	Forest Plan	12,500	12,400	12,300	12,200	12,100
	Demand	<-----High----->				
FISHERIES						
-Cutthroat Trout	Numbers					
	Current Program	201,000	202,000	203,000	204,000	205,000
	Production Potential	206,000	218,000	230,000	242,000	254,000
	Forest Plan	204,000	212,000	220,000	229,000	238,000
	Demand	<-----Very High----->				
-Anadromous Commerical Harvest	Lbs (with increasing escapements)					
	Current Program	328,000	941,000	946,000	950,000	955,000
	Production Potential	328,000	1,002,000	1,028,000	1,054,000	1,080,000
	Forest Plan	328,000	970,000	1,012,000	1,012,000	1,033,000
	Demand	<-----Exceeds Supply----->				
VEGETATION: TREES						
-Timber Offered	Thousand Cubic Feet					
	Current Program	<-----32,400----->				
	Production Potential	<-----36,500----->				
	Forest Plan	<-----26,100----->				
	Demand	30,940	<-----Exceeds Supply----->			
-Timber Offered	Thousand Board Feet					
	Current Program	<-----176,800----->				
	Production Potential	<-----186,600----->				
	Forest Plan	<-----146,000----->				
	Demand	168,600	<-----Exceeds Supply----->			
-Allowable Timber Sale Quantity--	Thousand Cubic Feet					
	Current Program	<-----31,300----->				
	Production Potential	<-----34,100----->				
	Forest Plan	<-----24,300----->				
	Demand	30,940	<-----Exceeds Supply----->			
-Allowable Timber Sale Quantity--	Thousand Board Feet					
	Current Program	<-----170,800----->				
	Production Potential	<-----173,800----->				
	Forest Plan	<-----136,800----->				
	Demand	168,600	<-----Exceeds Supply----->			

TABLE II-31 (continued)

CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES

	UNITS	YEAR				
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
-Fuelwood Availability						
	Thousand Cubic Feet					
Current Program		<-----	4,396	----->		
Production Potential		<-----	4,396	----->		
Forest Plan		<-----	3,400	----->		
Demand		<-----	Not Estimated	----->		
VEGETATION: FORAGE						
-Grazing Capacity (Livestock)						
	AUM's					
Current Program		36,400	37,700	37,600	37,800	38,300
Production Potential		<-----	42,900	----->		
Forest Plan		38,700	39,900	40,000	40,400	41,100
Demand		23,000	25,500	29,000	32,000	36,000
-Expected Permitted Use						
	AUM's					
Current Program		23,000	23,000	22,000	21,000	20,000
Production Potential		<-----	42,900	----->		
Forest Plan		23,000	24,000	24,000	24,000	24,000
Demand		23,000	25,500	29,000	32,000	36,000
WATER YIELD INCREASE						
	Acre Feet					
Current Program		13,800	18,900	19,500	19,200	21,600
Production Potential		<-----	40,600	----->		
Forest Plan		15,500	21,000	21,500	22,700	23,800
Demand		<-----	Very High	----->		
ACTIVITY SEDIMENT YIELD						
	Tons					
Current Program		94,900	69,200	69,200	38,800	38,800
Maximum Program		96,600	96,600	96,600	54,100	54,100
Forest Plan		72,400	72,400	72,400	40,500	40,500
MINERALS						
-Locatable Minerals						
Current Program	Plans of Operation	100-170	130-200	130-200	130-200	130-200
	Notices of Intent					
Potential Program	Acres Available for Mineral Development					
	High Potential	<-----	14,204	----->		
	Moderate Potential	<-----	46,538	----->		
	Low or Unknown	<-----	1,253,377	----->		
-Leaseable Minerals						
Current Program	Leases/Permits Plans of Operation	35	35	40	50	60
Potential Program	Acres Available					
	Oil and Gas	<-----	205,854	----->		
	Coal	<-----	425,657	----->		
	Geothermal	<-----	182,385	----->		

TABLE II-31 (continued)

**CURRENT OUTPUTS, AND SUPPLY POTENTIAL
BY RESOURCE OR ACTIVITIES**

		UNITS	YEAR				
			Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
-Salable Minerals	Tons						
Current Program		90,000	90,000	80,000	70,000	60,000	
Potential Program		142,000	129,000	100,000	80,000	60,000	
ROADS							
-Arterial and Collector	Miles						
Construction & Reconstruction							
Current Program		17	2	2	2	2	
Maximum Program		19	2	2	2	2	
Forest Plan		18	2	2	2	2	
-Timber Purchase Roads	Miles						
Construction & Reconstruction							
Current Program		74	74	4	4	4	
Maximum Program		111	92	8	8	8	
Forest Plan		83	68	5	5	5	
FUEL TREATMENT	Acres						
Current Program		3,400	4,800	4,800	4,800	4,800	
Maximum Program		11,300	11,500	6,200	7,000	6,600	
Forest Plan		6,700	5,800	3,200	6,800	7,800	
TOTAL BUDGET	Thousand Dollars						
Current Program		23,000	22,000	21,500	20,900	20,600	
Maximum Program		34,200	31,800	30,000	29,000	27,500	
Forest Plan		29,000	25,400	24,000	23,500	22,800	
RETURNS TO TREASURY	Thousand Dollars						
Current Program		12,500	13,700	13,100	16,000	14,500	
Maximum Program		15,300	16,300	15,900	24,200	25,700	
Forest Plan		14,000	15,100	10,400	17,500	14,300	
PAYMENTS TO COUNTIES	Thousand Dollars						
Current Program		3,000	3,000	2,600	2,900	2,400	
Maximum Program		3,700	3,300	3,200	4,400	4,200	
Forest Plan		3,300	3,300	2,100	3,200	2,400	
CHANGES IN JOBS	Number						
Current Program		39	-	-	-	-	
Maximum Program		629	-	-	-	-	
Forest Plan		203	-	-	-	-	

C. INFORMATION NEEDS

This subsection addresses the information, inventory, or research needs that have been identified by the Forest Supervisor in the EIS.

The Information Needed by Resource or Use include:

Recreation

1. Geographic Information System layers for roads and trails to aid in further refinement of Recreation Opportunity Spectrum (ROS) mapping and capacity coefficient accuracy. Data is needed by the first plan revision.
2. Follow-up on research done on Dispersed Recreation activity preferences in the Taneum-Manashtash area. This is needed by plan revision to aid in discussing any changes in demand for different dispersed recreation activities.
3. A uniform method for determining and applying demand for various forms of recreation. This will be tied to the ROS system. This is needed for the next round of planning to aid in improving estimated recreation demand.
4. Forest and site/area specific information is needed to have more localized data concerning Off Road Vehicle impacts on wildlife and their habitats.
5. Further research is needed to develop guidelines for use in determining an appropriate mix of Outfitted versus Non-outfitted visitors to wilderness and in establishing party sizes compatible with various wilderness ecosystems. This will be tied to the Wilderness Recreation Opportunity Spectrum system. This information should be developed during the plan implementation period.
6. An inventory of campsites in wilderness is needed to aid in planning and monitoring the impacts of recreation use.

Cultural Resources

1. Completion of the cultural resource overview of the Forests historic resources. Overview should be completed by 1990.
2. Completion of the cultural resource inventory, including data pertaining to site content, condition, location, and range of types existing on the Forest. Inventory of all manipulated acres is needed by the first plan revision. Remaining Forest acres should be completed by the fifth decade.
3. Refine the cultural resource field sampling survey strategy through comparison of known site distributions to the predictive model developed for the Forest (areas of High, Moderate, and Low probability for the occurrence of cultural resources). Revision should be completed by 1990, and every five years thereafter.
4. Establish the major cultural themes that are represented on the Forest, and identify the range of cultural properties that is associated with each. This will form the foundation for decisions concerning their significance and treatment. Should be completed by the first plan revision.
5. Identify the specific areas of archaeological research needed to close current information gaps, and to aid in evaluation and management. Identify the classes of prehistoric sites that exist, the known or estimated frequency of occurrence, and their relationship to the full range of Forest environments. Should be completed by first plan revision.
6. Determine those sites for which American Indian religious concerns may exist in addition to the standard National Register considerations. This may take precedence over any research values inherent in the property, and may prompt a different type of management prescription than would otherwise apply. To the extent the relevant American Indian groups are willing to share this information, it should be completed by the first plan revision.

INFORMATION NEEDS

7. Tie in the Forest cultural resource data base with the State-wide historic preservation plan and determine the specific relationship of the Forest properties to the regional research design. This will affect decisions regarding significance and long-term management of cultural resources. Should be completed by the first plan revision.

Wildlife

The Forest Service manages habitat but is also concerned that habitat is occupied even though the Washington Department of Wildlife is responsible for the animals.

The information available on indicator, threatened, endangered and sensitive species needs to be upgraded to provide management with reliable information and assessment.

The upgrade of information is planned to be accomplished by:

1. Development of Species Management Guides. Species Management Guides will gather known information, identify inventories needed, research needs, models and costs for doing each. Each indicator, threatened, endangered or sensitive species will have one or more Species Management Guides developed in the next 10 years.

The "Forest Plan Monitoring Worksheets" identify the general areas of information needs in the "Remarks" section.

Fisheries

Many general interactions of fish and other resources are known from research that has been conducted around the world. Much of the research on cold water species, both anadromous and resident, is probably valid on the Wenatchee National Forest. However, complete inventories of the Forest have never been done so the research is difficult to apply. Many of the numbers and projections in this Forest Plan are therefore best estimated with only limited inventories. Furthermore, some basic questions about the Forest, cannot be answered reliably. For instance, some of the answers to the following questions are not known:

1. Are Forest-wide riparian standards valid? Will they provide conditions necessary to maintain or improve fish habitat and are the standards valid for streams on the Wenatchee National Forest?

2. Where are the fish-bearing streams located?

3. What habitat factors are limiting fish production?

4. What are the effects of clearcutting large percentages of drainages on fish? Especially, cumulative effects in intermingled ownerships?

5. How much are management activities contributing to the degradation of aquatic habitat, if at all, and how can we better predict the effects of management activities on fish habitat?

6. What is the smolt habitat capability for anadromous fish on Forest Service managed streams?

7. What is the potential to produce resident fish?

8. What lakes have fish, what species, and how many?

9. Where are the opportunities for habitat improvement?

10. How many culverts on fish streams are not adequate for fish passage and what are the effects?

11. What is the status, distribution and habitat preference for bull trout? What is limiting production?

The answers to these questions are needed to adequately monitor the effects of Forest Plan implementation and for the first plan revision. Methodology will have to be developed to address the 10 questions. Much of the information necessary will become available upon implementation of the stream inventory program, and the monitoring plan.

Threatened, Endangered and Sensitive Species

Threatened, Endangered and Sensitive (T, E and S) plants and animals by their nature are uncommon and often inhabit unique or unusual habitats. Consequently, it is not unusual that little is known about Threatened, Endangered or Sensitive species and it is difficult to apply knowledge from other closely related species.

Plants and Animals

Inventories of T, E and S species and their habitat are necessary to provide adequate management guidelines and evaluations. Actual population locations or potential habitat should be mapped on high quality maps of at least 1:24000 scale. Although sightings are currently sent to the Washington Natural Heritage Program or Washington Department of Wildlife and project areas are being inventoried, there currently is no systematic process for mapping all populations and appropriate habitat. A plan is required to complete this mapping. As a geographic information system looms as a valuable management tool in the near future, these maps would serve as a data source to develop an important data layer.

Many unanswered questions about T, E and S species will require research to answer. These questions concern (among other things): habitat requirements; population biology; genetic variability; reproductive biology; effects of fire; population trends; extent of range; effects of natural succession; and effects of management practices. It is important to know more about these things so that the future needs of T, E and S species can be predicted and planned for.

Species Management Guides or Recovery Plans are required for all T, E and S species and will be used to direct management activities thereby reducing the possibility that a species of concern is negatively impacted.

Plants

Once a vegetation classification has been completed for the Wenatchee there is a need to determine the plant associations that represent typical habitat for the T, E and S species. Once

done this will allow a much more accurate prediction of the kind of habitat required by any given rare plant or animal and be an aid in project planning and execution.

It is impossible to inventory all National Forest Lands in sufficient detail to locate all populations of rare plants. Consequently, there is a need to train all types of field personnel to be able to identify T, E and S species. In this way the days spent on the ground by all types of people as they do their normal jobs can also serve to help locate rare plants.

Vegetation: Research Natural Areas

There is a constant need for suitable areas to fill needed cells in the Research Natural Area (RNA) system. This is especially true of low elevation forest and forest-margin sites. Completion of a plant association classification of the Forest is a real need and will help to delineate the types of potential natural plant communities present. As cell needs are updated using this soon to be completed plant association guide there will likely be a number of additional RNA's proposed for the Wenatchee. The Research Natural Area "Yellow Book" should also be updated to reflect the new information provided by the completion of a number of plant association classifications in the Pacific Northwest.

Location of potential sites for Research Natural Areas should be encouraged. The Forest will consult with the regional RNA scientist on potential sites and receive proposals for suitable areas from the RNA committee. After proposal, an establishment record is required as part of the establishment process for an RNA. This record includes a description of the proposed area, its features, the objective for management and the management direction. A survey of the area will be necessary to gather the information required to complete this report.

Biological diversity

The issue of ecosystem or biological diversity is a complex one that touches many attributes of forest planning. Biological diversity is difficult to quantify, especially on a National Forest of over 2 million acres.

Some of the topics related to diversity that require additional information include: old growth, sensitive species, and forest fragmentation; among others. Consequently, more information is needed on how to define and measure diversity, including a model to provide quantitative diversity index. How much diversity is "normal". How much old growth is required to maintain diversity and meet the needs of a concerned public. What definition(s) of old growth will be used; then, how much old growth is there and where is it? How much fragmentation is normal and how does artificially caused fragmentation relate to natural conditions. Where are the sensitive plant species on the Forest and what is the status of their populations? All of the above questions will require inventory and/or research to answer.

Vegetation: Trees

More specific data is needed on the expected results from management activities on the various vegetative types. The area ecologist is expected to complete an area guide covering the Forest types in 1989. Of particular concern is the productivity of upper elevation conifer stands and potential results of intensive management.

A second major concern is the accuracy of yield predictions for areas managed with emphasis on other resources including scenery, old-growth and mature dependent species, big game, and riparian protection.

Vegetation: Forage

Forage production information is needed for transitory forage types, both inside and outside of existing allotments. More Forest specific information is needed on production by decades following silvicultural activities or fire, to better predict production potential through the planning horizon.

A more definitive method is needed to calculate Forest-wide forage production. A method using satellite imagery (Land Sat) keyed to Forest specific production is recommended.

Water

The information needs for the water resource are closely tied to those described in the sections for fish habitat and soils. A primary need exists to develop a stream inventory data base in conjunction with fisheries. A revision of the Forest's Watershed Improvement Needs Inventory is needed to improve the focus of this capital investment program.

A need exists to develop/validate models used to analyze the cumulative effects of timber harvest and road construction on water quantity, quality and stream channel stability.

Research is needed on rain-on-snow events for the east slope of the Cascades. The results of similar studies conducted in Western Oregon may not fit the conditions that are found on this Forest.

Research is needed to develop a better understanding of sediment routing (transport and storage) over a range of stream types in differing geology. This information is needed to improve our abilities to predict the amount and effect of fine sediment deposition on fish habitat.

A need exists to develop improved inventory and monitoring techniques used for water and related resources. New methods will be needed to facilitate the shift from traditional water quality sampling toward evaluation of stream channel and watershed condition.

Soil

The Forest has identified the following as new or continuing research needs for the soil resource.

1. Natural erosion/sedimentation rates from forested landtypes over a variety of parent materials, soil textural classes, and slopes.
2. Erosion and sedimentation rates from road construction, timber harvest, mining, fire, and grazing over a range of landtypes.

3. Short and long term effectiveness of erosion control measures applied to a variety of practices and soil types.

4. Continued research into logging, machine piling, and fire effects on long term soil productivity (especially in regards to site prep., compaction, nutrient loss, etc.).

5. Effects of soil compaction on soil erosion and site productivity over a variety of slopes and soil types.

6. Cumulative effects studies to develop and/or evaluate existing models with the objective being to come up with a predictive model that really reflects cumulative effects and can be validated.

7. Studies that will determine long term soil productivity and show trends over time for at least the major soil types on the Forest.

Mineral Resources

The mineral resource data may need to be updated according to newly implemented standards for mineral input to land management planning (draft *Procedural Guide for Integration of Energy and Mineral Resources in Forest LMP Process*, dated December, 1985). Accomplishment of the following will assist in meeting the objectives:

1. All active mineral operations should be inventoried and identified (including name of site, location, commodity, annual production in appropriate units).

2. Identify information inadequacies (eg., commodity and annual production).

3. Rate management areas according to their activity favorability. This should be by locatable, leasable, and salable mineral resources.

4. Rate the management areas according to their probability for occurrence of mineral resources.

5. Inventory outstanding and reserved mineral rights.

6. Inventory existing withdrawals.

7. Inventory acquired lands.

8. Solicit industry input, and rate management areas according to industry interest.

9. Re-analyze supply/demand forecast situation.

10. To the extent practical, determine probability of activities, their location, the level of exploration and development under the management situation, and the economic conditions necessary to trigger the activity.

11. Develop mineral cost and benefit information.

Roads

There is a need to know more about the effects of road construction and operation on the physical environment: soil, air, water.

There is a need to know more about the effects of road construction and operation on recreation use and patterns of use.

There is a need to know more about the effects of road construction and operation on fish and wildlife.

Fire Management

1. More information is needed on the effects of prescribed burning on timber yields.

2. More information is needed on the effects of prescribed fire on soil erosion, soil productivity and water yields on the Entiat, Wenatchee, Chiwawa, Icicle, Yakima, Naches, and Tieton River drainages.

3. There is a need to develop best predictive methods for smoke dispersal - Eastside Cascades.

CHAPTER III

RESPONSE TO ISSUES, CONCERNS AND OPPORTUNITIES

A. INTRODUCTION

A major step in the development of this plan was the identification of issues and concerns related to management of the Wenatchee National Forest. These issues and concerns were identified through citizen participation including public meetings, interagency coordination, personal contacts with individuals and groups, and the comments to the DEIS and proposed Forest Plan. In this chapter, these issues are summarized and a brief description of their disposition in this plan is provided. The reader is encouraged to read Appendices A and K of the Environmental Impact Statement (EIS) for a more detailed description of the issues and concerns, and for how comments to the DEIS were handled. Chapter I of the EIS describes how the issues evolved since the release of the DEIS. The issues and concerns are listed as follows:

Recreation Opportunities and Use Conflicts
Management of Areas That Are Presently Undeveloped
Wild, Scenic, and Recreational Rivers
Water Quality and Quantity
Wildlife and Fish Habitats
Old Growth Forests
Management of the Scenic Resources
Timber Production
Range Management
Management of Cultural Resources
Cumulative Effects of Management Activities
Social Economics

B. RESPONSE

1. RECREATION OPPORTUNITIES AND USE CONFLICTS

Discussion of the issue

The Forest receives about 5 million visitor days of use a year. It is one of the most heavily visited National Forests in the United States. Use is continuing to increase, and conflicts between recreational user groups (off-road vehicles, hikers, horses, snowmobilers, cross-country skiers, etc.) are becoming more evident. For instance, there are issues about noise pollution from off-road vehicles in narrow canyons, such as Devil's Gulch, and in areas like the Teanaway, and Lake Clara. In addition, some recreation activities can cause resource damage because of the level, type, or location of use. There is also a demand to separate different types of recreation use by areas, and to separate uses within some areas such as hikers and off-road vehicles. Regulation of commercial use is included in the issue.

Recreational use at certain times of the year in such key wildlife habitat areas as Swakane Canyon and Oak Creek may disrupt wildlife. Timber harvest access roads can increase roaded dispersed recreation opportunities but reduce primitive and semi-primitive recreational opportunities. The potential effect of road development on trails is an issue.

There are opportunities to reduce user conflicts by separating uses through land allocations. Scenic areas, unroaded dispersed recreation areas, areas for motorized or non-motorized use, and classified Wild, Scenic or Recreational rivers are all potential allocations that would separate use. It is also possible to eliminate or reduce damage or conflicts through information programs and by applying seasonal or year-long restrictions on uses of trails or areas.

The Forest has an opportunity to develop or expand recreation sites, and ski areas, such as Mission Ridge and White Pass. There is an opportunity to use project design to encourage maintenance of recreational trails when timber is harvested.

Response to the issue

There are 6,021 acres allocated to developed recreation sites including; campgrounds, picnic areas, ski areas, resorts, recreation resident tracts, boat docks, observation sites and trailheads. The plan provides for expansion of this capacity when demand exceeds the existing supply. Some 13,717 acres along the Mather Memorial Parkway are allocated to developed and roaded recreation use without management activities such as scheduled timber harvests.

Approximately 933,700 acres of dispersed recreation opportunity in a roaded setting will be provided. The setting for a part of this recreation opportunity is modified through timber harvest and other management activities which have emphasis in a portion of the roaded allocations. Some roads not needed for management activities will be closed which will help diversify recreational opportunities. Within the roaded setting important travel routes have reduced timber harvests levels in order to retain scenic values on 83,635 acres allocated to retention visual quality and 174,880 acres allocated to partial retention visual quality.

There are 96,355 acres allocated for unroaded, motorized use, while 116,092 acres outside of wilderness (841,034 in wilderness) are allocated to unroaded, nonmotorized use. In addition there are 70,512 acres in classified special interest areas which permits motorized use to the extent it is

compatible with the management intent. There will be some trails, either existing or to be constructed, within the unroaded, motorized allocations which will be managed for nonmotorized use.

The total miles of trails will not be decreased as a result of management activities. Trails that are affected by roads will be reconstructed.

A preliminary administrative recommendation will be made on 230 miles of rivers and streams contained in some 73,600 acres to be considered by Congress for inclusion in the Wild and Scenic Rivers system.

Recreation opportunities to meet demand, reduce conflicts, and minimize resource damage will be accomplished in this plan by allocating the following amounts to recreation emphasis management: developed recreation - 0.3 percent of the total Forest; dispersed, roaded recreation - 45 percent; dispersed, unroaded, motorized recreation - 5 percent; dispersed, unroaded, non-motorized recreation - 5 percent; special interest sites - 6 percent, and wilderness - 39 percent.

The Plan's allocations result in the Forest's settings being 45 percent roaded, 16 percent unroaded, and 39 percent wilderness.

2. MANAGEMENT OF AREAS THAT ARE PRESENTLY UNDEVELOPED

Discussion of the issue

A total of 556,272 acres of the Forest outside of designated wilderness are presently roadless.

Some of these areas could continue to be managed in a roadless condition, while others could be roaded to provide easier access for the enjoyment of scenic and recreational values as well as for the development of other resources. Areas which can provide unroaded types of recreation, both motorized and non-motorized, are becoming more scarce. People are concerned about how much of these areas should be managed for timber as opposed to management for roadless recreation and wildlife habitat.

Others would like to see some of these areas roaded to provide scenic drives or campgrounds. There is also a concern about how quickly these areas should be entered and the effect roading and management activities have on soils, water quality, old-growth forests, and wildlife and plant species dependent on old-growth forests.

There is an opportunity to provide for a variety of uses in the presently undeveloped areas. These could include unroaded recreation, roaded recreation, commodity production, and special area classification. The selected use would determine which lands would be roaded and how soon roading might occur. There are opportunities to help meet national and regional targets for timber and mineral production.

There is also an opportunity to use roadless areas to help meet management goals or targets for research natural areas, endangered, threatened and sensitive plant and wildlife habitat, and old-growth stands for dependent species such as the spotted owl. These land allocations could be made in wilderness or unroaded recreation areas rather than in timber management areas whenever possible. There are opportunities to maintain the future suitability of roadless areas as potential wilderness additions.

Response to the issue

In order to reach the most appropriate mix of resource management for these non-wilderness undeveloped areas, this plan will allocate 313,677 acres or 56 percent of the current inventoried roadless areas to continued unroaded status. In addition there are 79,840 acres, dispersed throughout the roaded areas, which are dedicated to spotted owls and other old growth/mature dependant wildlife species, where timber harvest will not occur. The remaining unroaded areas will be entered for various resource management activities at a gradual rate.

3. WILD, SCENIC AND RECREATIONAL RIVERS

Discussion of the issue

This issue was considered a part of issue Number 1. (recreation opportunities and use conflicts) in the DEIS and Proposed Plan, but due to public response to the DEIS, the Wild and Scenic Rivers section was greatly expanded in the 1988 Supplement to the DEIS.

In the DEIS three rivers on the Nationwide Rivers Inventory were proposed for further study in the preferred alternative. The Entiat River and two tributaries were analyzed but not recommended for proposed study in the preferred alternative. An eligibility evaluation was made on twenty rivers and streams in the 1988 Supplement to the DEIS and an additional thirteen streams were evaluated after responses from the public were received. A total of thirty-three rivers and streams on the Forest have been evaluated for eligibility. Ten rivers and streams have been determined to be eligible.

Responses to the Draft and the Supplement indicated that some people believe that all of the rivers and many streams on the Forest should be included in a preliminary administrative recommendation to Congress for consideration under the Wild And Scenic Rivers Act. Other people are strongly opposed to the recommendation of some or all rivers and streams (or certain segments), particularly rivers or segments of rivers with private lands within the river corridor. Some are also concerned with the level of classification proposed for those river segments outside wilderness.

There is an opportunity to provide for a variety of uses on eligible rivers and streams on the Forest through preliminary administrative recommendations to Congress for consideration under the Wild and Scenic Rivers Act.

Response to the issue

Of the thirty-three rivers and streams analyzed, nine of the ten eligible rivers and streams will be recommended to Congress for consideration under the Wild and Scenic Rivers Act. The nine streams total 230 miles within 73,600 acres (60,126 acres of National Forest). Of the 230 miles, 82.5 miles are proposed for Wild River classification, 29 miles are proposed for Scenic classification and the remaining 118.5 miles for Recreational River classification.

4. WATER QUALITY AND QUANTITY

Discussion of the issue

The Forest currently produces more than 4.5 million acre feet of water runoff annually. A number of cities and towns near the Forest use water coming from National Forest lands for domestic purposes. This use will increase as communities grow, and the demand for sediment-free irrigation water will increase as new lands are cultivated. At the same time, increases in most uses (recreation, timber management, roading) will make it more difficult to maintain water quality and meet the demands for increased water quantity. The maintenance of enough clean, cool water for human use and fish and wildlife needs is a fundamental concern. An issue here, also, is protection of water quality and anadromous fish habitat. It is also important to assure that Forest responsibilities are met in regard to the Yakima Indian Treaty fishing rights.

Riparian zone (streamside) management provides the opportunity to enhance wildlife, recreation, scenic values, and fish habitat by providing hiding cover and thermal protection. There is also the opportunity to minimize ground disturbance while at the same time protecting water quality and soil productivity. There are also opportunities to improve the condition of some of the watersheds on the Forest.

Response to the issue

The 55 percent of the Forest allocated to wilderness and to unroaded areas are located in the higher precipitation zones and will not be subject to vegetative manipulation.

Within the roaded portion there are 47,361 acres allocated to riparian and aquatic habitat protection zone management. An additional 428,795 acres in the roaded portion have reduced management activities in allocations for Scenic and Recreational Rivers, Experimental Forest, Scenery, and Old Growth. Water quality will be maintained or enhanced by the plan adhering to the Forest Standards and Guidelines and Best Management Practices. Water quantity will be increased by 15,500 acre feet due to acres allocated to lands subject to vegetative manipulation through timber harvest.

5. WILDLIFE AND FISH

Discussion of the issue

The Wenatchee National Forest sustains a wide variety of fish and wildlife species because of its variety of habitats. Activities that affect habitat (trees, grass, shrubs, soil, and water) can have a direct influence on fish and wildlife.

This issue includes the maintenance and management of essential habitats and maintenance or enhancement of animal diversity. The issue also involves identification and protection of threatened and endangered species and recognition of wildlife needs for old-growth forest stands. Management activities that affect fish and wildlife habitat are timber harvest, recreation, livestock grazing, road management, and fire management.

Small hydroelectric projects and irrigation impoundments may alter the quantity and quality of available fish habitat. This issue includes maintaining quality of available fish habitat. It also includes maintaining habitat quality for anadromous fish, although the existing habitats are now generally under-utilized. The presumption is that, as a result of the Fish and Wildlife Program of the

Pacific Northwest Electric Power Planning and Conservation Act of 1980, anadromous fish levels should increase to fully utilize the existing habitat.

There are opportunities to manage key habitat specifically for wildlife (e.g., winter ranges, key summer range, old-growth, fawning and calving areas) and for fish (e.g., riparian protection zones) through management area designations. There are opportunities to work more closely with the Washington State Departments of Game and Fisheries, the U.S. Fish and Wildlife Service, and the Yakima Indian Nation, to improve the management of fish and wildlife habitat on the Forest.

Response to the issue

The 55 percent of the Forest allocated to wilderness and to unroaded areas will be retained in a natural habitat condition, including old-growth habitat.

In areas outside of wilderness and roadless areas there are 128,855 acres allocated to old-growth and mature habitat, 47,361 acres allocated to riparian and aquatic protection zone management and 118,742 acres allocated to big game management all of which have key wildlife and/or fish habitat objectives. An additional 299,940 acres in roaded areas have reduced management activities in allocations for Scenic and Recreational Rivers, Experimental Forest, and Scenery. Wildlife and fish habitat will be maintained or enhanced by the plan adhering to the Forest Standards and Guidelines, habitat improvement projects and Best Management Practices.

This plan is highly responsive to the need to maintain and improve resident and anadromous fish habitat.

6. OLD-GROWTH FORESTS

Discussion of the issue

This issue was considered a part of issue Number 5. (wildlife and fish) in the DEIS and Proposed Plan, but due to public response to the DEIS and the growing national concern for old-growth, this issue has been handled as a separate planning problem in the FEIS.

This issue includes the maintenance and management of essential habitats, viewing old-growth, and maintenance or enhancement of vegetative diversity. The issue also involves identification and protection of threatened and endangered species and recognition of wildlife needs for old-growth forest stands. Management activities that affect old-growth are timber harvest and the amount of timber that can be harvested, road management, some types of recreation and fire management.

Some people believe that all existing old-growth on the Forest should be preserved for, biological diversity, dependent wildlife species, scenery or aesthetic values, and/or because they feel that no more old-growth forest will remain in a few years. Others believe that old-growth, both existing and potential, within designated wilderness is more than enough to meet all future needs.

Response to the issue

The 55 percent of the Forest allocated to wilderness and to unroaded areas will be retained in a natural habitat condition, including old-growth habitat. In areas outside of wilderness and roadless areas there are 128,855 acres allocated to old-growth and mature habitat.

Of the 105,900 acres of existing old-growth on allocations available for timber harvest, 85,800 acres are on suitable timber lands. There are 11,500 acres expected to be harvested in the first decade, and an additional 11,600 acres in the second decade. Of the 318,800 acres of existing old-growth, over 307,300 acres (96%) would remain at the end of this ten year period.

7. MANAGEMENT OF SCENERY

Discussion of the issue

The Forest is well known for its sweeping vistas, variety in topography, diverse ecotypes, life forms, and overall natural appearing environment. About 13 percent of the recreational use on the Forest is driving for pleasure and viewing scenery. As more demands are placed on the Forest for timber and other uses, it becomes more difficult to maintain a pleasant forest atmosphere and a natural appearance. Timber management can complement the scenic resource, and visual management can complement wildlife habitat and recreation management. The issue involves the degree of protection scenic values should be given and the cost and impacts of visual management on other Forest activities, such as a reduction in the annual timber harvest and the cost of implementing visual management practices.

There are opportunities to complement other management goals through the creative management of Forest scenery. There are also opportunities to maintain and enhance the scenic quality of the major travel corridors. Finally, there is an opportunity to rehabilitate previously modified landscapes for improved scenic values.

Response to the issue

The natural appearance of some landscapes will be moderately reduced under the plan. The management direction needed to maintain the key or unique visual resources are contained in this plan.

The land allocations will result in 39 percent of the forest appearing natural, 39 percent of the forest appearing natural to slightly modified and 22 percent appearing modified. Acres by visual quality objective are:

Preservation -	
843,281 acres	39 percent of the Forest.
Retention -	
521,800 acres	24 percent of the Forest.
Partial Retention -	
332,927 acres	15 percent of the Forest.
Modification -	
147,828 acres	7 percent of the Forest.
Maximum Modification -	
318,344 acres	15 percent of the Forest.

8. TIMBER MANAGEMENT

Discussion of the issue

Timber management is a major activity on the Forest. How much timber should be produced in the future and where it should be produced is one of the principal planning problems addressed by this plan. Increasing demands for other uses and implementation of management direction for other resources will reduce future harvests below historic levels. This reduction results from a combination of incorporation of management requirements, increased visual resource management, allocation of areas to roadless management, and additions to the wilderness allocation. For example, the 1984 addition of 340,795 acres of land to wilderness also reduced the acreage available for timber management by about 51,500 acres.

This issue involves other issues such as wildlife habitat, recreation opportunities, road densities, visual and cultural resource management, water quality, and range management. Timber management activities may be in competition with some of these issues such as the need for old-growth forest for dependent wildlife and the need for unroaded recreation areas. This plan responds to these issues through allocation to old-growth and unroaded recreation.

There are opportunities to allocate the most suitable, productive timber lands, where management activities are most cost effective (such as Meadow Creek and the Little Naches) to long-term, high-intensity timber production. There are also opportunities to benefit other resources at little or no extra cost. These include improvement of big-game cover/forage relationships, development of temporary forage for wildlife and livestock, and selective timber removal to improve the visual condition of travel corridors, open views of surrounding landscapes, and promote increased vegetative diversity. These opportunities are responded to through various allocations and management direction contained on Chapter IV.

Another opportunity is the replacement of stands where the heaviest timber mortality and disease is occurring. Per acre timber productivity is expected to increase by 12 percent in the next 50 years as a result of harvesting these stands and planting genetically superior seedlings, as directed by the guidelines in this Plan.

There is a sizable existing and potential supply of cull timber material and small round wood which present marketing opportunities. The main source is from cull material not utilized for sawlogs, and undersized wood from logging residue, precommercial thinning, disease and insect mortality, and stagnated stands. This material has a wide variety of present and potential uses for specialty building materials, energy production, pulp and fiber products, and home firewood.

Response to the issue

This plan schedules harvest on 576,074 acres which includes 73 percent of the tentatively suitable timber production land. Of the 576,074 acres, 303,897 are in prescriptions which will approximate full yield and 272,177 acres will yield from 50-90% of full yield. From these acres, timber harvests are planned averaging 26.1 million cubic feet per year (146.0 MM board feet per year) during the next five decades.

This Plan will provide the best balance between timber management and other resources.

9. RANGE MANAGEMENT

Discussion of the issue

Livestock grazing presently takes place on the Forest through grazing permits issued to 36 local livestock owners. Permitted livestock use has declined in recent years although it is still a significant activity on the Forest. As other uses have increased, potential conflicts with domestic grazing have become more apparent. At the same time, managers are concerned about future development and management of grazing resources for use by livestock.

Livestock grazing has the potential to conflict with recreation, water quality, wildlife, fish, and timber. When livestock use the same meadows, streams, and trails that recreationists use, conflicts may result. Unmanaged livestock use of streamside (riparian) areas may cause compaction of soils and reduced water quality due to stream-bank disturbance. There may be competition between livestock and big game for available forage.

Livestock grazing can complement other activities including recreation, wildlife, and timber. Sheep grazing can retard brush growth in meadows and along trails. Wildlife forage areas can be maintained or improved through intensive grazing systems. Timber management activities such as clearcuts, partial cuts, and thinnings may provide temporary forage areas. Grazing use can also reduce brush and grass competition which will enhance tree establishment and growth.

Response to the issue

The management direction needed to improve vegetative conditions and reduce conflicts is provided for in this Plan. Land allocations with the corresponding standards and guidelines reduces conflict and/or competition between livestock and other resources or uses. This Plan provides for the continuation of permitted livestock use within existing allotments only. There are 406,872 acres of tentatively suitable grazing land within existing allotments and approximately 203,400 acres will be suitable for use in any given

decade. Permitted livestock grazing will be occur on approximately 9 percent of the total Forest acreage.

The level of livestock grazing will increase 1,000 Animal Unit Months in the first decade and will remain constant at approximately 24,000 Animal Unit Months through the duration of this plan.

10. CULTURAL RESOURCE MANAGEMENT

Discussion of the issue

There is an ongoing program to identify and evaluate the historic and prehistoric cultural resources which exist on National Forest lands. To date, over 800 cultural resource sites (archeological sites, historic structures, etc.) have been reported within or adjacent to the Wenatchee National Forest. These sites represent a broad cross-section of uses, spanning a period of several thousand years. Decisions about how best to manage these sites relate to such issues as historic significance; local community interest; American Indian concerns; accessibility, recreational, research, or interpretive values, and compatibility with other management activities.

As land-modifying activities and public use increase within the Forest, so does the possibility of loss or degradation of the cultural resources. The degree of potential impact will depend upon the location and extent of land alteration, the nature of the site, and the concentration of public use. In these instances, appropriate mitigation methods may be necessary to reduce or eliminate the undesirable effects or to recover the historic values of the properties prior to their alteration. The most desirable management prescriptions, however, are those which effectively protect the site in place, are economically prudent, and are compatible with other resource management needs and uses. A central concern is to provide a balance between these other uses and the protection of cultural sites so as to provide adequately for their preservation.

Several opportunities exist in the management of cultural resources. Timber harvesting can complement the cultural resource program by providing opportunities for the identification of previously unknown cultural properties. Field reconnaissance accelerates in proportion to the number of acres scheduled for harvesting. In addition, in heavily vegetated environments, removal of the understory and organic duff layer may provide the only means of locating archaeological sites (Lake Wenatchee, for instance).

Recreational use increases opportunities for interaction between the public and cultural resources. Interpretive programs through which the Forest visitor can both enjoy and appreciate the cultural resources can be planned and developed with community involvement. One such area is the Stevens Pass Historic District. An active effort to solicit public opinion well in advance of the development of a management direction for an area or property could help to define the level of anticipated demand for its use and preservation.

There is also an opportunity, in those instances where on-site preservation is not possible, to carry out data recovery which could contribute locally and regionally to significant research questions and, in some cases, could build a deeper awareness of the contributions of American Indians to the public heritage.

Response to the issue

Cultural and Historic resources will be protected in place on the 55 percent of the Forest allocated to wilderness and to unroaded areas. For the remaining 45 percent of the Forest the Forest-wide Standards and Guidelines should offer protection from the moderate to high level of impact on cultural resources from other land uses and management activities.

This Plan provides for a variety of management options and opportunities for enhancement of cultural resources. The number of sites identified will be high. Good accessibility of managed sites to the public will also be provided.

11. CUMULATIVE EFFECTS OF MANAGEMENT ACTIVITIES

a. Water Quality and Quantity Cumulative Effects

Cumulative effects of timber harvest activities on watersheds (on water quality, quantity, and runoff timing and on fish habitat) in intermingled ownerships is a major concern. Unfortunately, activities, especially the rate and method of timber harvest, of neighboring land owners are unknown. Indications are that most commercial timber on the intermingled lands will be harvested within the next 10-15 years. Under the Forest's selected management scheme, the Upper Yakima River, Swauk/Naneum Creeks, Taneum/Manastash Creeks, and Little Naches River watersheds are the most likely to experience impacts from cumulative effects. On a case-by-case basis, these watersheds will need to be analyzed for possible impacts. Management activities on National Forest lands may need adjustment as a result of detailed sub-drainage analysis.

Overall, water quality should be maintained with adherence to the Plan's Standard and Guidelines and the Region's Best Management Practices. Water quantity will be increased by 15,500 acre feet, primarily due to 576,074 acres of suitable timber lands subject to vegetative manipulation through timber harvest.

b. Intermingled Ownership and Scenery Cumulative Effects

Travel corridors that have a significant amount of private land could have cumulative effects upon the scenic quality. Areas where timber harvest on private land could affect scenic quality are: Lower Entiat Valley, Icicle Valley, Blewett Pass area, Lower Ingalls Creek, Shaser Mountain area, Stevens Pass (Highway 2), Cle Elum Valley, Kachess Basin, Cooper Lake Basin, Taneum-Manastash--Quartz Mountain, upper end of South Fork Tieton, Naches Pass north along the crest to Snoqualmie Pass, and Quartz Mountain north along the ridge to Blowout Mountain. Large blocks of these "checkerboard" landscapes will not likely be kept in a natural appearing condition. These areas will definitely have increased

alteration of the landscape with the areas being seen from the travel routes, from recreation roads and trails, and high vista points within the viewshed.

12. SOCIAL ECONOMIC

a. Forest Influence Zone

The Forest Influence Zone is the geographic area where the majority of forest resources such as recreation, range, timber, water, and wildlife are first used and where public concern is concentrated. Chelan, Kittitas, and Yakima Counties comprise the Forest Influence Zone for this analysis.

b. Population

The 1983 population of the Forest Influence Zone was 248,400 persons. This is almost 6 percent of the State's population. About one-half of the population lives in rural settings; the other half lives in urban settings. This area has an older age distribution than the State average. Chelan and Kittitas counties have proportionately lower minority populations than the State. Yakima County has a proportionately higher minority population due to the Yakima Indian Nation and a large Mexican-American population. The rate of population growth in the three-county area has been slower than State-wide over the last 40 years.

c. Economy

Economic activities in Chelan, Kittitas, and Yakima Counties are closely tied to the activities of the Wenatchee National Forest. A large proportion of the residents of this area rely on the commodity and amenity resources of the Forest. Economic activities affecting local individuals include logging, sawmill operations, commercial livestock operations, tourism, and various recreational pursuits. Residents of the study area participate in nearby forest recreation activities such as hunting, fishing, hiking, and a range of winter sports, thereby generating demand for recreation-related goods and services.

The economy in the area east of the Wenatchee National Forest rests heavily upon agricultural production. Yakima County is the State's leading agricultural county with a diversified farm base. Its principal products include apples and soft fruit, cattle, hops, potatoes, and wheat. The economy of Chelan County depends primarily upon deciduous orchard crops, with apples being the predominant crop. Kittitas is primarily an agricultural county producing crops and livestock.

The central Washington area is very important to the State's economy because of its agricultural base. These counties support 36 percent of the State's agricultural employment with Yakima County alone supporting 27 percent (ESD 1984).

The agricultural sector will remain the dominant force in the economy of central Washington. The strong demand for agricultural products abroad, as well as the anticipated strength of domestic demand will, if anything, increase the importance of agriculture in central Washington. This trend should continue at least through 1990 and may become even more pronounced in the future.

The lumber and wood products industry in the Forest Influence Zone represented 3.7 percent of the State's employment for that industry in 1983 (ESD 1984). Yakima County has the largest lumber and wood products work force among the Central Washington counties, with 1,048 workers in 1983. This represented 17 percent of manufacturing employment in the county, and 2 percent of total employment. Chelan County's lumber and wood products industry employed 293 workers in 1983, for respective manufacturing and total county employment shares of 14 percent and 1.5 percent. The lumber and wood products work force of 72 in Kittitas County was much smaller in absolute terms, but still accounted for 17 percent of all manufacturing jobs in the county and 1.1 percent of total employment.

The forest products sector of the economy will likely decrease in importance in the future. The extent of this decline, however, will be influenced by several factors. Most notably, the reduction in timber available from private land may cause an overall slump in timber production in the region, and could very likely contribute to a reduction in

capacity or closure of local mills. This reduction could lead to further pressure for increasing the harvest from National Forest System lands. This pressure should become particularly intense in the 1990's, or earlier, should housing demand rebound substantially from its low levels in the early 1980's.

Visitors to the Wenatchee National Forest have an impact on the local economy because of expenditures they make for goods and services at establishments nearby. Data on the number of retail trade establishments are available from the U.S. Census Bureau for States and counties. The variables selected as indicators of local economic dependency on recreational use include the following: 1) hotels, motels, and recreational vehicle parks; and 2) eating and drinking establishments. While these components of the service industry receive a significant amount of business from nontourists, trends in these two service industries reflect growth or decline in the tourist industry.

A particularly active sector of the regional economy will be the tourism sector. An increase in summer and winter recreation activities, particularly along the major travel routes, is expected in the 1990's. The increase in the cost of energy will likely focus the greatest recreational demand near the transportation corridors leading from the Puget Sound area population centers. Recreational demand will be greatest in those areas close to the Everett-Seattle-Tacoma metropolitan area.

The importance of the agricultural sector in the Forest Influence Zone is recognized through protection of water quality. The Wenatchee National Forest will provide riparian zone (streamside) management practices to protect this important resource.

The Plan provides for a harvest of 146 MM board feet per year. This recognizes the importance of the forest industry while providing for and protecting other resources.

Additional areas are allocated to roadless areas, wildlife habitat, and recreation in recognition of the changing demands of society on the Wenatchee National Forest.

CHAPTER IV

FOREST MANAGEMENT DIRECTION

A. INTRODUCTION

This chapter presents the management goals, objectives, and standards and guidelines that constitute direction for resource management covered by the Plan. Included in this chapter are:

1. Forest Management Goals

- Multiple use and other goals established in the planning process to develop the Plan. All goals are written within the context of the land's capability to provide resources.

2. Desired Future Condition of the Forest

- What the Forest should look like at the end of 10 years, and at the end of 50 years if the management direction is implemented.

3. Forest Management Objectives

- The level of goods and services which are anticipated as the Plan, with projected budgets, is fully implemented. This display is followed by a narrative summary of resource outputs and schedules.

4. Forest-wide Standards and Guidelines

- These establish the bounds or constraints within which all practices will be carried out in achieving the objectives of this Plan.

5. Management Prescriptions

- These contain a goal, a description, and standards and guidelines by Resource Element for each management area. The standards and guidelines shown will meet management Goals and Objectives; higher ones may be achieved.

B. FOREST MANAGEMENT GOALS

Forest Management goals are statements describing a desired condition to be achieved sometime in the future. They are expressed in general terms and are timeless in that they have no specific date by which they are meant to be completed. The goals for the Wenatchee National Forest by resource are:

Recreation

Provide a well balanced array of recreation opportunities across the breadth of the recreation opportunity spectrum in accordance with resource capability, public demands and expectations for outdoor recreation.

Provide a diverse system of safe, well-maintained trails for the enjoyment of all users.

Respond to new opportunities to develop partnerships and joint ventures with other agencies and the private sector to magnify our abilities to meet expanding public demand for outdoor recreation.

Provide an information program to assist the public in understanding management of various resources and to assist them in their search for a variety of challenging and pleasing experiences.

Provide for the identification, protection, interpretation, and management of cultural resources so as to preserve their historical, cultural, archaeological, and/or architectural values for the benefit of the public.

Maintain and enhance the visual landscape character of the Forest.

Provide to the Forest visitors a variety of landscape character with visually appealing scenery.

Wild, Scenic and Recreational Rivers

Maintain recommended rivers and streams to protect their highest classification level until Congress takes action on the preliminary administrative recommendation.

Wilderness

Manage designated wilderness to perpetuate wilderness character, natural ecologic processes and to provide outdoor recreation opportunities appropriate in wilderness.

Wildlife, Fish, and Sensitive Plants

Manage critical wildlife habitat to improve the status of threatened and endangered species to a point where they no longer need protection under the Endangered Species Act of 1973.

Enhance habitat to prevent the need for listing species on the Regional Forester's sensitive species list.

Manage fish and wildlife habitats to provide for recreation opportunities for fishing, hunting, and viewing.

Protect, restore, and enhance current and long-term fish habitat capability.

Riparian Areas

Maintain and enhance riparian management areas to perpetuate their distinctive resource values to: (a) achieve and maintain habitat conditions necessary to ensure long-term natural production opportunities for desired fish species, (b) maintain water quality that meets or exceeds State AA Water Quality Standards, and (c) provide diverse wildlife habitat.

Range

Develop, protect and manage the range resource to maintain and improve vegetative conditions compatible with the management area goal.

Provide opportunities to enhance other resource values through the use of livestock to shape desired plant communities.

Timber

Provide for timber harvest to help meet local and national demand for wood products and provide an economic benefit to the American people.

Use silvicultural techniques that insure prompt and adequate regeneration of appropriate species. Optimize growth, minimize disease and insect losses, and protect or enhance long-term site productivity.

Manage vegetation to maximize total net public benefits compatible with management area objectives.

Provide information about the opportunities available through the Timber Management Program including firewood, Christmas trees, greenery, post and poles, transplants, and other specialty products.

Provide silvicultural advice and information through the Cooperative Forestry Program to local private forest landowners.

Use silvicultural techniques to provide a diversity of forest ecosystems

Water

Maintain watershed conditions and favorable streamflow to insure meeting or exceeding Federal and Washington State water quality standards.

Soil

Manage the soil resource of the Forest by using management practices that will maintain or enhance its productive properties.

Air

Prevent significant adverse effects of air pollutants and atmospheric deposition on Forest resources through compliance with the Clean Air Act and State and local regulations.

Minerals

Help meet the demand for mineral resources by *encouraging and facilitating the exploration, development, and production of mineral and energy resources, while ensuring that these activities are integrated with the use and protection of other resources.*

Lands

Strive towards a land ownership pattern that will provide for better management, protection and access to the forest.

Provide for occupancy and use of National Forest System land consistent with this forest plan and applicable laws and regulations.

Provide energy and transportation corridors to meet Regional and National needs

Facilities

Develop a transportation system that is designed and operated to standards appropriate to the planned uses, considering safety, cost of transportation, and effects upon lands and resources.

Provide for the development, betterment, and maintenance of fire and general purpose administrative facilities in support of National Forest System needs.

Maintain Forest facilities for the safety, enjoyment, and well-being of the user.

Protection

Implement an efficient fire protection program which is responsive to resource management objectives and prioritizes the protection of life, improvements, and private property.

Use prescribed fire to meet resource and land management objectives, as appropriate.

Protect Forest resources and facilities, and cooperate with State and local law enforcement agencies in the protection of visitors and protection of their property from theft, vandalism, or destruction.

Prevent or reduce losses due to insect and disease by treatment of vegetation to reduce the risk of epidemic outbreaks.

Research Natural Areas

Protect existing and nominated areas for the Research Natural Areas System to provide:

1. Baseline areas against which effects of human activities can be measured.
2. Sites for study of natural process in undisturbed ecosystems.
3. Gene pool preserves for all types of organisms, especially rare and endangered types.

Biodiversity

Maintain representatives of native and desirable non-native plant and animal species and the plant communities in which they are found. Provide for all successional stages of terrestrial, aquatic and riparian plant associations in a distribution and abundance to accomplish this goal. Maintain or enhance ecosystem function to provide for long-term integrity and productivity of biological communities.



C. DESIRED FUTURE CONDITION OF THE FOREST

It is likely to be several decades before effects of the management direction contained in this chapter are apparent throughout the Forest. The following descriptions of physical and biological settings assume that direction from this plan will remain constant through the 50 year horizon.

THE FOREST IN TEN YEARS

Recreation

There will continue to be a diverse array of recreation opportunities and settings available to the public as described in the Recreation Opportunity Spectrum Classes. Only slight changes in recreation opportunities will have occurred over 10 years time as management activities have progressed, new roads have been constructed, and vegetation managed.

Developed recreation sites in the more modified and developed end of the spectrum will have higher standards of development with more facilities for user comfort and convenience than present sites.

Most recreation sites that receive moderate to heavy recreation use will be rehabilitated or reconstructed to a high quality level to better serve the recreating public.

There will be about 1,250 People-At-One-Time (PAOT) capacity added to the developed recreation sites. This will include expansion of existing sites and construction of new sites. Additional capacity may be provided by the ski areas and other private sector development on the Forest. The number of Recreational Residences and Organization Sites will remain about constant.

Visitor use fees will be charged at the more highly developed recreation sites to help defray costs of administration and maintenance.

Management of dispersed recreation areas such as undeveloped access points on rivers and undeveloped camping sites along forest roads, will become more challenging in the next ten years. Popular

areas will continue to see increasing visitor use. Over crowding and user conflicts will become more common. Visitors in greater numbers will seek out opportunities to enjoy activities related to specialized recreation equipment. Use of boats, rafts, other water craft, motorcycles, bicycles, mountain bikes and ORV's will continue to grow. Maintenance and administration of dispersed areas will need greater management attention and put greater pressure on recreation budgets. Many visitors will experience decreased satisfaction with crowding and conflicts and will seek out new opportunities. Less popular and lightly used areas will receive increasing visitor use.

There will be approximately 388,000 acres of non-wilderness unroaded areas remaining at the end of the first decade.

Winter sports and snow related recreation activities will increase in the next ten years. Visitor use at developed Alpine skiing areas will steadily increase. Mission Ridge, White Pass and Stevens Pass Ski areas are all addressing plans for some expansion. Cross-country skiing and snowmobile use is increasing dramatically. Management activities, and recreation use will require greater coordination, particularly winter use of the Forest Road System.

Increased demand for very specific recreation pursuits will result in allocation of specific areas to specific activities in order to avoid serious user conflicts. Education of users in "light on the land" principles and stressing of user ethics will be employed.

The scenic and recreation qualities of the Mather Memorial Parkway will be retained through the implementation of a management prescription. Recreation sites and facilities in the Parkway will be given high priority for upgrading and rehabilitation.

New technology will bring new recreation equipment and activities to the Forest. Adjustments will be necessary in recreation use patterns and recreation facilities to manage new activities in coordination with existing uses. Greater coordination will be occurring to minimize user conflicts in recreation areas. New regulations will be necessary to manage new activities within land use constraints.

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Greater coordination will be occurring to achieve the appropriate balance between commercial recreation activities and individual recreation use by the general public.

Use of road and trail systems by motorized recreationists will continue to grow, generating the need for more intensive transportation planning and management. Opportunities for ATV use will be considered.

Use for all types of trails will increase. Many trails will receive heavy maintenance work or reconstruction to keep up with the impact of heavy recreation use. Approximately 400 miles of new trail will be constructed in this decade. About 120 miles of this new construction will provide improved opportunities for motorized use on loop trails.

The variety in recreation settings will be retained through integrated resource project planning, resulting in special recreation settings in the Forest being protected and retained.

Vegetation management plans will be developed for all developed sites to perpetuate the desired vegetative characteristics and to provide for user safety.

Wild and Scenic Rivers

The rivers and streams recommended for classification under the Wild and Scenic Rivers Act will be protected to retain their attributes at the highest possible classification.

Wilderness

The acreage of designated Wilderness will not change under this management plan. The 841,034 acres will be managed to retain 207,920 acres in Pristine WROS class, 258,820 acres in Primitive WROS class, 117,220 acres in Semi-Primitive WROS class and 11,540 acres in Transition WROS class.

Wilderness resource values will be somewhat improved through management of recreation visitor use and increased user knowledge of proper use ethics. Although 10 years is barely sufficient time to

see substantial improvement, a general upward trend should be apparent in monitoring results.

The expected increase in visitors will result in more management actions employed to reduce use in heavily impacted areas, disperse use into areas that can accommodate more use, and more regulations to alleviate specific problems.

Wilderness user education programs will continue to be a major tool in improving the social and biological wilderness resource conditions.

Restoration and revegetation of heavily impacted areas will be on-going in areas where visitor use has resulted in loss of vegetation and unnatural or accelerated soil erosion.

The existing wilderness entry permit system may be expanded and/or new systems installed to restrict use to the appropriate carrying capacity of a specific wilderness, or portion of wilderness, where visitor use approaches or exceeds the "limits of acceptable change".

The current trail system will continue through the ten-year period. A few miles of trail may be taken off of the inventory to meet wilderness management objectives. There will also be some reconstruction of trails with short rerouting to mitigate resource impacts.

Natural occurring fire will be allowed to have a more natural effect on wilderness ecosystems. However, Wilderness fire management objectives may require that some fires that threaten other Wilderness resources or resources outside Wilderness, be suppressed.

Resource activities authorized as prior existing rights will continue under the provisions of the Wilderness Acts.

Cultural Resources

Over the next 10 years, the Forest will continue its efforts to identify, evaluate, preserve, protect, and interpret the cultural resources present within the area administered by the Forest. In addition to legislative mandates, there is recognition that, as a

non-renewable resource and a fragile, irreplaceable link with past human life, special consideration must be given to cultural properties in the course of any land management activities.

Ideally, over the next 10 years, a systematic inventory will be carried out well in advance of Forest projects, based on a professionally sound survey strategy.

As these inventories are completed, a data bank will be developed and organized so as to facilitate comparisons of individual cultural properties, provide a basis for evaluations of significance, and aid in the evaluation of cultural resource needs against other resource management goals so that informed decisions can be made. This basic data base should be available by the end of the 10 year planning period.

In the next decade, the bulk of the inventory will continue to be in support of the timber sale program. Of the 630,494 acres of suitable timberland on the Forest, it is estimated that about 450,000 acres will have cultural resource inventories completed. Approximately 25 percent of these acres will require further investigation due to known site distributions, or because of high cultural resource sensitivity. The remaining 75 percent will be cleared of the need for any further cultural resource considerations. There will continue to be substantial inventory needs on those Forest acres (such as wilderness) that are not part of the scheduled timber harvest base. Approximately 81,500 acres of these lands will have an inventory completed by the end of the decade.

The SI-2 prescription will allow for specific management for cultural values. Within these areas, management activities will be directed to the protection, preservation, and enhancement of the cultural resources present on those acres.

Cultural resource management plans will be developed over the next decade for the Salmon La Sac Guard Station, Stevens Pass Historic District, Naches Trail, American Ridge Ski Bowl, and the Leavenworth Ski Hut. See Appendix A for a full listing of these projects. These plans will specify overall management objectives, adequate measures for protection, and a program of work to accomplish these.

Small data recovery operations may be necessary over the next 10 years, particularly in the Naches watershed. Here conflicts between the management of archaeological resources in place and timber management needs are likely to be more frequent than at present. It is also possible that by the end of the decade, there will have been two major data recovery efforts on the Forest--at Lake Wenatchee and on the Naches Ranger District. The purpose of these efforts will be to recover archaeological material that is currently threatened by river action and/or vandalism. Several data recovery projects may be necessary to mitigate the effects of campground rehabilitation or construction. The data recovery projects may significantly contribute to current archaeological research by helping to refine research goals and by developing a Regional context within which to evaluate and manage other similar or associated sites.

The degree to which the above conditions are met by the end of the next decade will depend, of course, upon a sustained investment of time, expertise, and funding.

Scenery

The Wenatchee National Forest will remain well known for its outstanding mountain, valley, and lakeshore scenery. It is characterized by a natural appearing environment with a multi-level vegetative character. Large, old trees exist along most recreational use areas and viewsheds.

The Forest will continue to retain, maintain, enhance, rehabilitate, and perpetuate the scenic qualities through visual resource management practices of key areas.

The natural appearance of landscapes seen from major viewsheds and recreation sites will be changed by a variety of vegetative manipulation practices. In these areas, changes will provide an attractive, visually pleasing forest setting, emphasizing the natural appearance of the area. Vegetative management will change existing Forest stands to more open, less dense stands. It will be characterized by small openings and areas of shelterwood type treatment, leaving clumps

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and individual large trees. These will be intermixed with different size trees and blended with the existing vegetation.

Within areas of intermingled ownership, nonfederal lands will have undergone timber harvest with limited consideration for the visual resource. The adjacent National Forest lands will appear altered but will blend into the landscape. Boundaries between private and federal ownership will have a diverse and contrasting form, line, color, and texture.

Most recreation sites and travel routes will retain their present scenic character. The general atmosphere along scenic travel routes, viewpoints and high recreation use areas will continue to have a feeling of a natural forest environment.

Sightseeing will be enhanced by using timber management to open up views to distant peaks, unique rock forms, unusual vegetation, or other features of interest.

Wildlife and Sensitive Plants

During the first decade, active bald eagle nest sites are expected to increase from one to five or six. Bald eagle populations are expected to increase in summer and winter as fish and waterfowl habitat improvements are completed and populations increase State-wide.

Peregrine falcon sightings are expected to increase as the population of this species increases nationally. Peregrine falcons may be re-established on the Forest in cooperation with the Washington Department of Wildlife. As these populations increase, one or two of the potential nest sites on the Forest could become occupied.

Sensitive plants and animals will be inventoried during this decade and information gathered to develop Species Management Guides. Activities that threaten these species will be reduced from the previous decade. Habitat improvements to benefit sensitive plants and animals are commonly evaluated with some being applied to enhance populations.

The number of deer and elk are expected to change because of the change in habitat from managing winter range, spring range habitat improvements, increased concern for elk and deer in timber sales, and partnership with other agencies and groups (Elk Foundation; Washington Department of Wildlife, Chelan County Public Utilities District, etc.). These increases will result in more hunting opportunities. Road closures will increase and result in increased quality hunting opportunities. Opportunities and demand for viewing of big game, small game, and non-game species will increase.

Some types of old growth habitat will increase in the first decade (Subalpine). Other old growth types are expected to decrease in acreage (ponderosa pine, Douglas-fir, grand fir). Spotted Owl habitat areas will have about a 5% reduction. Opportunities to see spotted owls and old growth will be maintained. Adequate old growth will be preserved to provide for species and community diversity of these environments.

The Forest-wide potential population of primary cavity excavators will decrease due to past practices and slow accumulation of new snags in young stands. Woodcutting of standing dead trees will be more closely regulated, timber sales will leave additional live cull or dead trees, salvage sales will give dead trees priority for wildlife, and habitat improvements for primary cavity excavators will occur. These activities will begin to change the downward trend of this habitat and reduce distribution problems that presently exist.

Mountain goat habitat will be more intensively managed during the first decade. This will either maintain or increase the number of animals. Recreational viewing sites of mountain goats will be designed to have minimum or no effects on goats. Road closures will be adopted to reduce the impacts of improved access on these species.

Old growth and mature habitat for marten and pileated woodpeckers will decrease as logging of this habitat occurs. A network has been established to maintain distribution and viable populations for these species. Even though the habitat will be decreasing, no threat to viability is anticipated.

The group of species sought for in trapping uses a wide array of habitats. These species have been abundant in the past and are expected to remain so. Some species will increase and some decrease in numbers.

There are three species of grouse on the Forest that have been found in abundance in the past. These species have experienced a general downward trend due to improved access which has resulted in increased disturbance. Habitat improvements for these species will be done to halt the downward trend.

Special habitats such as some ponds, caves, and cliffs will be inventoried and management plans developed to maintain their associated values.

Raptor nests will be protected from site disturbing activities.

Old Growth

At the end of the first planning decade it is estimated that there will be 307,300 acres of old growth on the Forest (this does not include ingrowth). Old growth acres will have declined somewhat by the end of the decade, but not as much as Table IV-2 indicates (because ingrowth of stands to an old-growth condition was not included in the table values). In wilderness and other non-harvest acres there should be more stands becoming "old growth" than those that are set back successional as a result of disturbance.

There should be adequate old growth for biological diversity, preservation of aesthetic qualities and for wildlife and plant habitat by the end of the first decade. The importance of old growth on National Forest System Lands will increase as private old growth acres are harvested.

Fisheries

Ten years from now, fish habitat within the Forest will be in at least as good condition as the current situation and should be improving. Implementation of Best Management Practices, forest-wide standards and guidelines, and the Riparian Prescription is maintaining excellent water quality and providing the stream structural components necessary for diverse, high quality aquatic habitat. While riparian areas along many Class IV channels and some seeps, springs and Class III streams have converted to early seral stages, management practices have maintained channel stability and water quality, thus protecting downstream fish habitat. Fish habitat quality has also improved due to integration of fish habitat management into other resource activities and implementation of fish habitat and watershed improvement projects.

Anadromous fish production should begin to increase during the period. The increase will be primarily tied to improvement in upstream and downstream survival, and as a result of actions initiated through the Northwest Power Planning Council, Bonneville Power Administration, mitigation settlements such as for Rock Island dam and the U.S. Bureau of Reclamation. The Forest Service will be a full partner with other state and federal fish management agencies, the Yakima Indian Nation and Confederated Tribes of Colville and private organizations in the management of fish and fish habitat.

An ongoing habitat inventory and monitoring program will be in place with initial inventories of most fish-bearing streams and many lakes on the Forest complete. This knowledge will allow Forest managers to better predict effects of management of the various resources on fish and fish habitat, quantify changes in habitat over time and minimize/avoid any negative impacts. Inventories will also be the basis for habitat rehabilitation and enhancement.

By the end of this period a habitat management plan including habitat improvement priorities should be in place for most sub-basins. These plans will be based on inventories and coordinated with other agencies, tribes and private groups. The Forest will have an active habitat and watershed improvement program.

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Resident trout habitat quality should be stable to improving as is the anadromous fish habitat. Habitat maintenance and improvements combined with some improved access, especially in areas designated for roaded recreation and timber production could improve fishing opportunities. However increased fishing pressure may produce a need for special regulations to prevent over-fishing of wild stocks.

During this period, it is anticipated that a large percentage of private timberland within the National Forest boundary will be harvested. The potential effects of intensive timber management in these drainages on fish habitat are better understood and land managers are better able to identify impacts when making management decisions. Cooperative monitoring of the cumulative effects issue continues between the Forest, State and Tribal Agencies and private companies.

Riparian Areas

Ten years from now, riparian areas on the Forest will exhibit an overall improving trend. Previously degraded habitat will be recovering, while areas of good riparian habitat will be maintained. Implementation of the Forest-wide Standards and Guidelines and the Riparian Prescription will maintain excellent water quality and provide the structural components necessary for diverse, high quality riparian habitat. Riparian management objectives for projects will be established based upon site-specific conditions and on the analysis of riparian conditions within the sub-drainage. Management decision will be made in favor of riparian dependent resources where conflicts exist.

Riparian areas associated with Class I and II streams, lakes and wetlands will be characterized by vegetative conditions that emphasize advanced seral stages. Riparian areas along many Class IV channels and some seeps, springs and Class III streams will have been converted to early seral stages using management practices that maintain channel stability and water quality, thus protecting downstream fish habitat. Riparian habitat associated with Class III and IV streams, seeps and springs will provide diverse wildlife habitat conditions necessary to maintain viable wildlife populations distributed by sub-drainage.

Forest inventory and monitoring efforts during the first decade will have provided information essential to improve the management of these sensitive areas. In addition, research sponsored by Forest Service, Timber-Fish-Wildlife, and other programs will be providing information needed to validate standards and management techniques. The standards used to evaluate riparian areas will have been refined. Over most of the Forest, the interim values assigned to the riparian standards in this Plan may need to be revised or replaced by values that have been established on a sub-drainage basis.

The following statements describe the desired future condition for the major elements of Riparian Areas for details regarding the management standards applicable to each element.

Sediment - The sediment budget in each sub-drainage on the Forest is well within the range and frequency adapted to by indigenous aquatic communities.

Temperature - Summer stream temperature regimes are well-moderated with limited day to night variation. The generally cool summer water temperatures found in streams throughout the Forest are well within the tolerance levels of aquatic organisms historically found in the system.

Channel Morphology - Inherent (historic) channel forming/maintenance processes continue to operate without substantial long-term or drainage wide modifications. Relatively large pools are frequent and well distributed even during low flows. Frequent and well-distributed complexes of large wood (long and large diameter) interact over time, through a wide range of flows, to create a diversity of aquatic habitat types. A combination of these features provides a variety of functions that are important for maintaining the general health of riparian ecosystems.

Floodplain/Riparian Management Area - Floodplains and riparian management areas are fully occupied by historic plant community types. The structural and functional properties of these dynamic, multi-age communities are maintained, promoting floodplain, bank, and channel stability, resiliency to disturbance, and habitat diversity. Floodplain and wetland management promotes

the capability for detention storage of water during flood events and inherent ability to provide long-term stability of critical summer base flows.

Properly functioning floodplains also act as sites for storage of large woody debris and sediment, making this material available to maintain a relatively stable distribution, quality, and quantity of fish and wildlife habitat through time that is characteristic of the area potential. Dead/defective tree habitat, critical to the survival of many wildlife species, is maintained at least 80% of the theoretical biological potential level within riparian habitats associated with perennial streams, lakes and wetlands in sub-drainages.

Fish Passage - Access to all natural/historic fish habitat is maintained so that habitat availability is not reduced by man's activities.

Vegetation: Trees

The plan will implement a timber harvest rate that is reduced from the present. Areas harvested in the past 30 years will continue to develop through seedling, sapling, and pole stand stages. The oldest of these areas will be nearing the age when commercial thinning may begin.

Reduced numbers of large defective logs and snags will be available for fuelwood. Access into previously unroaded areas will provide fuelwood, but at longer haul distances.

Seed orchards will begin to produce genetically superior reforestation seed that will produce faster growing and disease resistant trees. Timber related vegetation management practices that are expected to occur include; clearcutting, shelterwood seed cutting, partial removal methods and final removal.

Approximately 57,900 acres of mature and two-storied stands will be harvested using clearcutting and shelterwood methods. These acres will be re-vegetated using a diversity of trees, shrub and forb species.

Age class distribution changes will reflect the shift from mature and two-story stands to seedlings. It is anticipated all stands will be reforested within five years through planting and natural regeneration.

Vegetation: Forage

In the first 10 years, emphasis on management of forage will be placed on revision of outdated range allotment plans, and more intensive administration of existing range allotments. With updated management plans, enhancement of other resources through use of livestock will begin, but results will not be readily apparent until near the end of the decade. Increases in livestock use will be accommodated through more intensive management on existing allotments, or through conversion of existing sheep allotments to use by cattle.

Vegetation: Research Natural Areas

A viable network of Research Natural Areas will be recognized for the purposes of: Monitoring change; maintaining biodiversity (biological community, ecological and geological process maintenance), and researching natural ecosystems.

Water

During the next decade, the significance of water-related issues on the Forest will continue to build. The quality and quantity of water on the Forest will be significant concerns for diverse interests. Irrigation will continue to be one of the major uses of water from the Forest. Major emphasis will be placed on the protection and improvement of fish habitat both on the Forest and downstream.

In ten years intensified efforts will be underway on National Forest System lands to improve watershed conditions in some drainages, while existing conditions will be maintained in others. Factors promoting improved watershed management will include a greater emphasis in planning on a drainage basis, increased technical support, improved resource inventories, improved management practices, more aggressive watershed

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and fish habitat improvement programs, and increased coordination of management activities with other ownerships and agencies. A primary objective will be to keep pace with State and Federal water quality management direction as it continues to be refined through the decade.

On the National Forest, water resource inventories will be scheduled and accomplished to meet the needs of project and Forest planning. A baseline and project level monitoring program will be in place to begin meeting the feedback requirements of both the Forest and the State in regards to management and environmental regulation. Watershed improvement projects will be identified and accomplished based on an updated needs inventory. For example, rehabilitation of the Holden Mine site on Lake Chelan will have been completed. Water rights necessary to achieve the multiple-use objectives of the Forest will be obtained in response to water resource developments and adjudications. All of these activities will be coordinated with other resources and management entities to a much greater extent than they are at present.

The overall condition of the water resource on the east side of the Cascades will be determined by the health of individual watersheds. These conditions will be the result of both management activities on National Forest System Lands, and management activities on other ownerships, both intermingled with and downstream from the National Forest. The net effect of these activities on area watersheds will be in large part dictated by efforts to achieve coordinated resource management planning among the various ownerships.

Air

Application of statutes contained in the Clean Air Act and compliance with State and Local regulations will have resulted in no significant deterioration of air quality. Base level values for Air Resource Management will have been established.

Soil

By the end of the decade, Forest-wide soil productivity will be about the same as it was in 1989. Ten years is too short a time frame to detect any significant changes in soil productivity. Also, by this time some long-term soil productivity study sites will have been established on the forest. (PNW research - F.S. coop studies).

Best management practices (B.M.P.'s) are well accepted and are clearly understood by everyone on the forest. The B.M.P.'s will have been completely reviewed and revised at least once by the end of the first decade. Project work plans will call for more monitoring to ensure that Forest wide standards and guidelines have been met. The Order II level soil survey for all National Forest Lands outside wilderness, and the Order III level soil survey for all National Forest Lands inside wilderness, will have been completed by 1992. This soil information will have been installed into the Forest GIS data system, where it is readily available and can be easily updated as new or better information becomes available.

Minerals

Locatable minerals: Since the Forest Service has little influence on the demand for locatable mineral resources, the conditions it desires to achieve is that of being able to meet the established goal for mineral resource management no matter what the demand is. That goal is to encourage and facilitate mineral activities over the Forest, while ensuring those activities are integrated with the use, conservation, and protection of all other resources.

Without new major discoveries, technological improvements, or substantial changes in the supply/demand situation, the number of mining claims will probably decline from 11,000 to the pre-Wenatchee gold rush number of about 4,000. The remaining claims should concentrate on areas having a known potential for the occurrence of locatable mineral commodities. Those claims will more accurately indicate where mining activities can be anticipated. This will be supplemented by an up-to-date mineral resource inventory and evaluation, and by industry's response to an

inquiry about where future mineral activities will occur. With this information, the Forest will be in a better position to appropriately plan and provide for future locatable mineral resource activities.

Leasable Minerals: As with the locatable minerals, the interest in these mineral commodities is likely to decline. Without a return to the energy shortages of the 1970's, the number of oil, gas and geothermal lease applications will decline and interest in leasing coal will remain negligible. Geophysical surveys and exploratory drilling for oil and gas in the Columbia Basin area will provide better information as to where and if oil and gas resources are likely to be found on the Wenatchee National Forest. Geothermal investigations may also be performed, which will better delineate areas having geothermal resource potential. Based upon this newly acquired data, the remaining leases will concentrate on areas with a high potential for the occurrence of energy minerals. The Forest will then be in a position to concentrate its management efforts on those areas where full scale development is anticipated.

Common Variety Minerals: The public's interest in these mineral commodities will continue at about the present level. The resource will continue to be inventoried to identify sources needed for specific projects. Where shortages are identified, the resource will be preserved to ensure adequate supplies are available to serve the needs of the Forest. A Forest-wide appraisal of mineral materials will be completed, and up-to-date fair market values for sales of a small scale will be established. The result will be better service to those demanding the use of this resource, and a better return to the public for the use of the resource.

Recreational panning, sluicing, dredging and rockhounding: The demand is expected to continue to grow in the future. Areas which would provide land that are available for such activities will be identified within the next 10 years, and management plans for managing the activities will be developed and implemented. The program will provide an opportunity for a type of recreational experience which has been extremely difficult to achieve. The implementation of a management plan will effectively mitigate the

impacts of activities which are often detrimental to the fisheries habitat and the riparian environment. It will also help eliminate civil conflict presently arising as a result of persons conducting such activities in areas already encumbered by mining claims, and it will allow such activities to be carried out legally.

Lands

Landline Location: About 90 percent of the Forest's property lines will be surveyed, marked, and posted to Forest Service standard, and will be on a maintenance schedule.

Cost Sharing: All major joint roads will have been identified with Plum Creek Timber Company and the Longview Fibre Company. Cost sharing on these roads will be completed. New work shared will be limited to reconstruction and occasional short segments of spur road.

Rights-of-Way Acquisition: If no significant changes in landownership occur, purchase of road and trail easements will still be in progress at the rate of about four per year.

If the major landowners within the Forest dispose of significant portions of their holdings, and these become small ownerships, the number of easements needed to provide adequate public and administrative access will multiply.

Purchases: The need for acquisitions within the Chelan, Lake Wenatchee, and Icicle Composites will continue. The purchase of the land in fee and the purchase of partial interests, such as scenic easements, which meet both the private and public needs, will both occur.

Land Exchange: All current land exchanges will have been completed.

The final phase of the program with the Washington State, Department of Natural Resources, will be nearing completion.

Further exchange with the Longview Fibre Company will be to "clean-up" any remnant of the two ongoing exchanges or to meet some site specific public need.

DESIRED FUTURE CONDITION

Small, site specific exchanges, involving areas where public and private needs coincide will continue with BN Inc. and other land owners.

Mixed Ownership Land Management: The current changes in the ownership and use of intermingled private lands will be much advanced and ongoing. Much of the larger ownerships within and adjacent to the Forest will be broken down into small (1-20 acre) ownerships. Uses will have changed from farm/ranch and timberland to primary and recreation residence or other types of recreation development. This change of land use will probably include those Plum Creek Timber Company and Longview Fibre Company lands which have highest and best use other than growing commercial timber crops. Their continued ownership and timber management efforts can be expected to be limited to those lands best suited to timber production.

The impacts of the "urban-wildland interface" will have multiplied. The Forest will be increasingly impacted by the fire, water, traffic, and pollution impacts of the thousands of small landowner neighbors. Close coordination with county road and planning departments will be a major factor in National Forest management.

These neighbors will be extremely sensitive to the management of the National Forest lands around them. Areas of particular sensitivity will be timber harvest, visual quality, road management, and soil and water quality.

Interchange: There is an existing proposal for public domain lands managed by the Bureau of Land Management in the State of Washington to transfer to National Forest management early in the 10 year period. If this becomes a reality, these lands should be completely incorporated into the National Forest system by the end of the 10 year period. Ideally, the Forest Service will also take over the management of the mineral resources on both the transferred lands and the existing National Forest lands.

Utility Corridors: It is anticipated that the existing corridors will meet regional needs through the next 10 years. The carrying capacity of these existing corridors will be increased. The proposed corridor, which will utilize a "window" in the

Sheets Pass to Pyramid Pass area, will not be needed during this period.

Small Hydroelectric Development. Two or three of the existing proposed developments will be completed. These will probably all be "retrofits" of existing water storage projects. The most likely candidates are the Tieton and Clear Lake projects and one of the Keechelus/Kachess/Cle Elum projects.

Asset Management Programs: Within the first 10 year period, the Forest will be asked to identify saleable parcels of National Forest land. The study will focus on small, isolated parcels of land, difficult to manage and not well suited to National Forest management. Before the end of the 10 year period, the study will be completed and sale of surplus parcels will have begun.

Encroachment and Title Claims: The current cases requiring litigation will be resolved. The current backlog of cases will be resolved. New cases will be resolved promptly using a variety of methods, depending on the circumstances of each case.

Roads

The level of road building activity will be comparable to the current level of approximately 80 miles of timber purchaser and 18 miles of arterial and collector road construction and reconstruction.

About the same amount of the Forest will be accessible to passenger cars and high clearance vehicles as today. Most newly constructed roads will be closed.

Biodiversity

Biodiversity will be an important issue at the end of the first planning decade. The concepts of preserving biodiversity on National Forest System Lands will be better understood and the establishment of quantitative goals will be possible. The Forest will be actively pursuing the goal of biodiversity maintenance or enhancement. Assessment of biodiversity will be commonplace and

regularly done in project planning. Geographic Information Systems will be on board and heavily used in this assessment process. Efforts will be ongoing to better quantify and classify diversity needs. It will be recognized at the end of the first planning period that land allocation changes will be required to maintain or enhance biodiversity.

THE FOREST IN FIFTY YEARS

Recreation

The overall management of the Forest will be strongly influenced by the recreation demands and needs being placed on it as the National Forests, in general, play a much expanded role in the national recreation picture. The economic benefits related to recreation will have considerable influence on Regional and local economics. There will be a wide diversity of both developed and dispersed recreation opportunities as described by the Recreation Opportunity Spectrum Classes. The acres managed in each class may vary depending on changing priorities over 50 years, however, there will be a balance of opportunities based on recreation demand.

Additional developed recreation sites will be added and existing sites expanded to meet growing needs of the public for outdoor recreation. There will be a wide variety in levels of development provided, based on changes in recreation activities and increased sophistication of public desires and expectations.

The PAOT capacity of developed recreation sites will have increased significantly. By the end of the second decade the capacity of Forest recreation sites will increase by 3,300 PAOT. Comparable increases can be expected in the private sector facilities as well.

Recreation use may be expected to be more balanced between winter and summer as the demands for more developed winter recreation opportunities continues to grow.

Dispersed recreation sites and areas will continue to provide the greatest capacity for recreation use of the Forest and play a more significant role in

the recreation program. Visitor use can be expected to reach or approach carrying capacities in many areas in the later decades of the next 50 years. Rationing of use through people-at-one-time quotas, entry permits, controlled entry stations, and reservation systems will likely be much more common. Special programs will have been developed to assist users in obtaining reservations and to help them find a location for the recreation experience the desire. Marketing studies and analysis will be an integral part of recreation planning and management.

Unroaded areas will be more important in the spectrum of recreation opportunities as a result of their gradual decrease in size due to roading for management activities. In the the third, fourth and fifth decades the allocated unroaded areas will remain constant at 298,115 acres.

The Forest will be used by a greater cross-section of the American people and foreign visitors. The biggest increase will likely be in people living in urban centers of large cities as they learn more about their National Forests. The Forest will receive a less proportionate increase in use from local users and will be much more a National resource.

Commercial enterprises and private investment will provide a greater portion of the developed recreation sites and facilities. User fees will continue to be a primary means to support administration and maintenance of recreation sites.

Reservation sites and increasing facilities for group recreation will be developed to improve public service.

New technologies and improved equipment will generate new recreation activities. These in turn will generate a need for more intensive management of people and activities, as well as much more complex administration.

Management actions designed to allow for the greatest mix of activities to occur without conflict will be implemented. These may include: special zoned areas for specific uses; rotation of uses and users on the same site, trail, or within the same area; and more use of assigning where, when, and how long visitors can use the Forest through the

DESIRED FUTURE CONDITION

issuing of passes, permits, et cetera. Some sites or areas may be "rest rotated" to allow for natural healing or for major maintenance. Vegetation management will be practiced in many sites to provide for the long-term succession of the desired vegetation.

Improved transportation systems will enable more distant visitors, both foreign and domestic, to enjoy the Forest's varied offerings. Perhaps these visits will be part of tour packages designed to sample a broad spectrum of experiences across the country over a relatively short period of time. "State of the art" high-tech monitoring devices will be in place to aid in data gathering, surveillance, control, and management of many resources including recreation activities.

Wilderness

The acreage of designated Wilderness will likely be the same, or very similar to the current designation. Some potential additions or declassifications are possible depending on changing priorities or demands for Forest resources.

Increasing levels of visitor use in most accessible areas will necessitate greater restriction of visitor activities. Most Wildernesses will be under permit systems or some other means to strictly control numbers of people in each Wilderness at one time. The exact carrying capacities will fluctuate over time based on users ability to practice low impact techniques. Changes in Wilderness resource conditions will be stable to improving as a result of education programs, regulation and restriction of visitor use, and biological resource rehabilitation.

Forest Wildernesses will continue to provide a wide variety of recreation activities and opportunities compatible with management of Wilderness.

Fire will return to its natural role in Wilderness ecosystems through management of prescribed fire and the gradual deterioration of natural fuel accumulations. Perhaps only fires that threaten life, property, or resources outside of Wilderness will be suppressed.

Cultural Resources

The future of the cultural resource program 50 years from now is difficult to project. Within the second decade, it is likely that all suitable timber lands will have been surveyed for cultural resources. As mentioned in the 10 year projection, about 25 percent of these acres will require further investigation--additional surveys, project monitoring, or subsurface testing. These efforts are likely to locate sites that were not identified in the initial survey efforts. Furthermore, an additional 50 years of history will have augmented what is currently recognized as the cultural resource base with a number of new historic sites and structures. This may require reevaluation of some lands and modification of proposed project plans.

Whereas site avoidance was more easily practiced in the first harvest entries, successive entries in areas of known cultural resources may require more extensive mitigation measures than were needed in the first decade. By the end of the fifth decade, the number of non-significant sites initially identified will have decreased due to project impacts, after adequate documentation has taken place.

Provided funding is available, a systematic inventory will have extended beyond those lands suitable for timber harvest, ideally covering an additional 600,000 acres of backcountry and wilderness. Knowledge of site types and distributions will be greatly enhanced. The Forest will be closely linked with the rest of Washington State in cultural resource management through coordination of its program with the Washington State Historic Preservation Plan. Emphasis will be on thematic, geographic, and/or chronological groupings of sites, so that individual sites can be assessed and managed within the appropriate historic context. This context will have State-wide perspective, and will be the result of long-term coordination with other Forests, agencies, and institutions in the State, as well as with the Washington State Office of Archaeology and Historic Preservation.

The backlog of sites on the Forest requiring adequate documentation will be completed. The SI-2 prescription may cover as many as 7,300

acres of cultural sites on the Forest (depending upon the amount of area needed to preserve and enhance cultural values). Management plans will be completed on all National Register eligible sites that are known today and, with the help of interested volunteer groups, there will be some interpretation of these sites.

Some areas of the Forest (particularly the south end) will continue to be of special concern to the American Indian community. Expanding development and pressures on the Reservation may encourage increased Indian use of the Forest lands and resources for traditional subsistence and religious purposes. Unless there is Congressional action to the contrary, treaty rights will remain paramount. By the end of the fifth decade, those geographic localities and resources of special concern and interest should be clearly defined and understood. There should be a smooth process for coordination with the Indian groups, an understanding of their heritage values, and a reflection of this in the implementation of management practices on the ground. There may continue to be some areas of disagreement where compromise will be necessary. Depending upon the management practices carried out on intermingled private land on the south end of the Forest, some adjustment in land management allocations may be necessary.

Fifty years of studying, reflecting upon, and managing the cultural resources of the Forest should greatly enhance our awareness of the human dimension within the forested environment. It may contribute to an appreciation of our own unique history as a land managing agency. And on a larger scale, it will make an inestimable contribution to the story of human development through time and across the diverse geographic spaces of the Cascade Mountains.

Scenery

The maintenance, enhancement, rehabilitation, and perpetuation of scenic qualities through visual resource management in key areas will continue.

Most existing, natural appearing landscapes in recreation sites and recreation viewsheds will be protected through careful management. The managed appearance will retain a high degree of naturalness with a wide variety of vegetative composition. Some areas will appear relatively unchanged. A variety of small openings, areas of shelterwood timber harvest, clumps, and individual large trees intermixed with smaller ones will be blended with the unmanaged vegetation. A two story or multi-level appearance will be characteristic of timber stands in areas where harvest has previously occurred.

The Forest will begin to change from the dense natural wild condition to a variety of stand densities. Large mature trees will be accentuated along scenic viewsheds and travel routes. A variety of age classes, species, and multi-level stand compositions will be evident. These managed tree compositions with associated understory vegetation will be very pleasing visually. Mosaic patterns of texture, line, color, and form changes will be interspersed throughout the existing textural patterns. Viewsheds within areas of intermingled ownership will be more visually appealing as these areas become forested with young trees.

Non-timbered areas will remain basically unchanged in appearance. Where forest and natural openings are intermingled, the general visual character as viewed from a distance will be similar to today.

The general appearance of the rest of the managed forest outside important viewsheds will be a mosaic of cutting patterns of varying size, shape, and arrangement. This area will have the appearance of an intensively managed, smaller diameter, renewed young forest.

Wildlife and Sensitive Plants

Bald eagle nests are expected to increase to 8 or 9 sites on the Forest in 50 years. Roost sites will be located and protected, and feeding areas managed for the eagles. Bald eagle sightings will be common due to increased habitat and increases in fish and waterfowl numbers from habitat improvements.

Peregrine falcon sightings will not be unusual and one to three nest sites may be active on the Forest.

Sensitive plants and animals will have Species Management Guides. This direction should reduce conflicts and reduce threats to these species. Most sensitive plants have been located. All known sites are mapped and are entered on the Forest Geographic Information System. The Wenatchee National Forest is recognized for the high number of unusual plant species existing on the Forest. Recreationists will be able to visit some of the sensitive species sites and enjoy knowing these species are being maintained or increased in population.

The habitat carrying capacity for deer and elk will decrease slightly from 1989. Changes will be due to management prescription for winter range, habitat improvements, and sensitivity of activities to spring and summer habitat. Hunting opportunities will have increased but quality of the hunt may decrease.

Old growth habitat will have decreased to near its lowest levels for ponderosa pine, Douglas-fir, and grand fir. Spotted owl numbers will decrease to the level that will be maintained in the future. From research and monitoring of the old growth habitat, most people will be confident that species dependent upon old growth will be here for another few hundred years. Means of viewing these species will be highly developed and many recreationists will visit the Forest to see spotted owls and the species dependent upon old growth.

Primary cavity excavator habitat will be at its lowest level or already beginning to increase in Forest-wide amounts. Habitat will be well distributed. Forest visitors will be able to enjoy seeing and hearing this group of species no matter where they go on the Forest. Recreation developments such as trails, blinds, and viewpoints will have provided an abundance of opportunity for viewing.

Forest-wide standards and guidelines provide for maintaining habitat for mountain goats. Seventy-five percent of the mountain goat habitat is in wilderness and the populations there will either maintain or decrease slightly as activities increase. The other 25 percent of the habitat will have increased activities. This will decrease populations, but habitat improvements will offset losses of habitat. This direction will limit conflict and allow for at least maintaining the mountain goat populations. If populations suffer from unanticipated problems, additional goats can be reintroduced to maintain populations.

Old growth and mature habitat will be abundant in wilderness and roadless areas. The roaded part of the Forest will have islands that are interconnected into a network that maintains distribution and species viability. These islands will stand out when viewed from high points or airplanes. They will enhance the diversity of vegetation and texture seen. Some recreation development may have been done to allow enjoyment of these areas by wildlife watchers.

Trapping of furbearers will have declined due to public pressure, but viewing of these species will have increased. Some species will be low in numbers but not near to being listed as sensitive.

Grouse management will be advanced and high numbers are anticipated. Long hunting seasons and viewing opportunities will be common. Habitat manipulation and improvements will be common. Demand will, at some point, exceed potential to produce these species.

Limited habitats such as ponds, caves, and cliffs will have intensive management plans that call for maximum recreational use and high populations of wildlife in their natural setting. Tours will be in high demand and population viability will not be threatened.

Owl and hawk nests will mostly be known and managed. Sightings of owls and hawks will be common due to design of timber sales, roads, trails, and habitat improvements.

Old Growth

It is estimated that by the end of the fifth decade there will be 261,200 acres of old growth remaining on the Wenatchee. In the next fifty years there should also be some ingrowth that will increase the actual acres of old growth on the Forest above this amount. By that time there will be a good understanding of the old growth ecosystems and their role in maintaining such things as long-term forest productivity and biological diversity. The rate of ingrowth of natural stands to an old growth condition will have been quantified (Currently none of the estimates of old growth remaining on the Forest have included ingrowth). Changes in standards and guidelines to reflect increased knowledge of old growth will assure that biological diversity, aesthetics and wildlife and plant habitat that the old growth ecosystems provide will be maintained.

Fisheries

Fifty years from now, demand for both anadromous and resident fish and fishing opportunities will remain high. Fish production goals established fifty years ago will have been met. Actual production levels will depend upon society's demand for various resources including irrigation, timber, recreation and power. The state of technology for fish and fish habitat management has advanced greatly since the 1980's providing managers with improved predictive ability when considering trade-offs between resources. Due to continued high demand for fish and good water quality, riparian areas will be in conditions which will provide habitat for fish production goals. Desired fish and riparian habitat conditions will be well described. The Forest will be in a mode of monitoring past and present actions. There will have been numerous refinements in management practices and prescriptions based upon monitoring and research. Habitat improvement projects will continue into the future and the Forest will be rebuilding and maintaining structures constructed in this time period.

Riparian Areas

By the end of the fifth decade, riparian management objectives for sub-drainages on the Forest will be highly refined. The trends established during the first decade in regards to inventory, monitoring and refinement of management techniques will have continued, resulting in the maintenance of excellent water quality and provision of diverse, high quality riparian habitat. This habitat condition will maximize the production potential of riparian dependent species. The desired future condition for the major elements of riparian habitat listed in the "Forest in Ten Years" section will have been achieved, although major improvement in the process and standards used to evaluate this will have been made.

Vegetation: Trees

One of the biggest changes will be the forested appearance of the large areas denuded by fire in 1970 and 1988 on the Chelan and Entiat Districts. Where wide vistas now occur on these Districts, trees 60 to 80 feet tall will be present. Some limited commercial thinning may be taking place where economics and technology permit.

Almost all stands suitable for timber harvest will have some level of harvest. An estimated additional 348,000 acres will have been changed from wild to managed stand conditions. This is 73 percent of the existing suitable mature and two-storied stands. See Table IV-1 for a listing of harvest acres by watershed.

Reforestation seed will be primarily from select trees that have shown disease resistance, and better form and growth qualities.

Average tree growth rates will be increased, with much less defective down woody debris being available for fuelwood gathering. Wildfire potential and damage will be greatly reduced in roaded areas. Accumulations will continue to build in unmanaged areas with some presently large open areas in wilderness completely overgrown with trees.

Some new openings created by wildfires may be present especially in unroaded recreation and wilderness areas.

Vegetation: Forage

By the end of the 50 year planning horizon, most of the 200,000 acres of suitable livestock range within allotments will be under some form of grazing management. Resource managers will be using livestock as a tool to manage the vegetative resource. Analysis of allotments will be ongoing with about 10 percent of the existing allotments reanalyzed annually.

Over 85 percent of the suitable livestock range will be in an improved forage condition with an upward trend in ground cover and species composition. These improved forage conditions will contribute to the protection of soils and watersheds. Not all of the suitable livestock range will be used each year. On key big game range for example, livestock will be used only to maintain the already improved big game forage, or occasionally to utilize forage in excess of game needs. Forage production on the Forest will still exceed the amount needed for big game and livestock, even though the numbers of big game and livestock using the Forest have increased each decade.

Permanent range improvements will still be installed and maintained. However, many fences and water developments will utilize materials which can be easily moved from one location to another. These temporary improvements will allow managers more flexibility in treating site specific areas, such as riparian zones and forage areas created through timber harvest.

Vegetation: Research Natural Areas

A viable network of Research Natural Areas (RNA) will exist on the forest and will be used to meet the goals listed in the Forest Service Manual. Additionally, RNA's will be used for monitoring change in commonly harvested natural plant associations, and will be recognized for fulfilling part of the needs for biodiversity.

Water

Within five decades, water-related issues will have become a dominant factor in Forest management. Upland water quality and riparian area condition will be major issues due to many factors, including the levels of recreational use along Forest streams, lakes, and rivers. Increased demands for quality fish habitat will place great emphasis on watershed protection and maintenance of minimum flows. Although irrigation demands will probably be about the same as they were in 1988, there will be a conversion from commercial orchards toward urban use. The overall demand for water for human use will increase, and adjudication of the water rights on nearly every major drainage on the Forest is expected.

Fifty years from now, watershed conditions on National Forest System Lands should be improved over current conditions. The factors promoting this improvement will be much the same as indicated for the first decade, although the effect of the factors over time will increase as a greater emphasis is placed on watershed resources. Management standards and guidelines will have changed significantly to satisfy refinements in State and Federal water quality standards and other environmental regulation.

By the end of the fifth decade, several revisions of the water and other resource inventories will have been completed over the entire Forest. Resource information of a much greater quality will be available for use in making management decisions. Feedback from the Forest monitoring program will have resulted in numerous refinements in management practices and prescriptions. The backlog of watershed improvement projects will have been eliminated, and newly identified improvement needs will be treated. Water rights adjudication will have been completed on many of the major watersheds on the Forest. The identification of instream flow needs for channel maintenance, fish habitat, and other purposes will have received much greater emphasis than in the past. Coordination of management activities with other resources and management entities will receive greater emphasis.

TABLE IV-1
ACRES AND PERCENTAGES OF LAND ALLOCATIONS BY WATERSHED 1/

Watershed	Total Acres (Gross)	Private		Wilderness		Intensive Harvest		Other Harvest		Non Harvest	
		Acres	%	Acres (Net)	%	Acres	%	Acres	%	Acres	%
Stehekin River	91,097	0	0	91,097	100	0	0	0	0	0	0
Lake Chelan	285,079	7,462	3	110,517	39	40,747	14	52,258	18	74,095	26
Entiat River	174,202	9,095	5	25,398	15	34,556	20	55,799	32	49,354	28
Chiwawa River	119,188	4,918	4	37,652	32	20,861	17	21,264	18	34,493	29
White, Little Wenatchee R	173,354	5,745	3	105,407	61	11,003	6	28,599	17	22,600	13
Nason Creek	68,752	14,904	22	19,335	28	64	0	22,324	32	12,125	18
Wenatchee River	160,676	45,771	29	30,337	19	23,129	14	48,317	30	13,122	8
Mad River	61,035	5,851	10	0	-	29,214	48	12,084	20	13,886	22
Icicle Creek	135,236	16,939	13	100,701	74	0	0	6,551	5	11,045	8
Cle Elum River	126,650	24,762	20	56,393	44	2,650	2	19,631	16	23,214	18
Yakima River	128,282	51,962	40	14,056	11	8,671	7	34,491	27	19,102	15
Teanaway River	78,420	14,840	19	0		2,862	4	10,982	14	49,736	63
Peshastin Creek	78,992	14,459	18	23,129	29	8,798	11	24,995	32	7,611	10
Mission Creek	40,959	3,201	8	0	0	11,088	27	15,964	39	10,706	26
Columbia R Minor Tribs.	44,245	7,081	16	0	0	5,152	12	29,426	66	2,586	6
Swauk- Naneum Creeks	81,748	8,183	10	0	0	13,568	17	40,810	50	19,187	23
Taneum- Manastash Creeks	54,485	19,038	35	0	0	5,088	9	14,925	28	15,434	28
Little Naches River	94,023	11,151	12	22,112	23	33,094	35	21,243	23	6,423	7
American River	50,838	212	1	39,708	78	85	0	2,141	4	8,692	17
Bumping River	71,529	148	0	53,743	75	636	1	14,395	20	2,607	4
Minor Naches River Tribs	74,413	8,353	11	0	0	36,062	48	22,833	31	7,165	10
Wenas Creek	11,109	3,010	27	0	0	6,190	56	1,378	12	530	5
Rattlesnake Creek	75,430	0	0	48,972	65	13,950	19	9,370	12	3,138	4
Upper Tieton River	122,347	6,551	6	52,937	43	18,571	15	30,825	25	13,463	11
Lower Tieton River	55,290	9,964	18	6,296	11	10,006	18	27,306	50	1,718	3

1/ See FEIS, Appendix F for explanation of headings

DESIRED FUTURE CONDITION

Watershed conditions in the region fifty years from now will be determined by the net result of management activities on all ownerships. Public interest will have fueled major efforts in coordinated resource management planning. Watersheds in which these efforts were successful will be characterized by some level of multiple use output on all ownerships. Watersheds in which efforts at coordinated management planning were less successful may be subject to much more heavily constrained outputs on some or all ownerships. See Table IV-1 for a listing of the acreages and percentages of land allocations in the 25 Forest watersheds.

Soil

By the end of the 50 year planning horizon, there will be less soil erosion and less delivered sediment entering the streams, lakes, rivers, and reservoirs, because the Best Management Practices (B.M.P.'s), along with the Forest Wide Standards & Guidelines are being closely followed. Both the B.M.P.'s and the Forest Wide Standards and Guidelines will have been revised and fine tuned to the point that soil degradation is well within commonly accepted levels. Maintaining or enhancing soil productivity will be an important issue in most land management decisions.

There will be increased emphasis on soil productivity, so the Forest will be requiring the use of timber harvest systems and techniques that minimize soil degradation. Land managers will be familiar with the location and extent of the more productive soils, so that they can take full advantage of intensive forest management practices on those soils. (ie. thinning, fertilizing, etc.).

By the end of this period, there will be more detailed soil information available (higher order soil survey information, more laboratory data, and more flexibility for developing site-specific interpretations for the land managers). The availability of this kind of information will be very important, because the land managers will probably be under more pressure to protect the environment, particularly water quality and soil productivity.

The Forest Soil Scientist will be using the GIS data management system for developing interpretative information for the Forest Land Managers.

Research and Forest personnel will be periodically monitoring the selected long-term productivity sites on the Forest. The fifty year results of this monitoring will not (according to researchers) be a long enough period of time to obtain any significant results. In fact, because of the importance of this issue for management, it may well be that there will be some additional soils added to this study.

Air

Continued monitoring and enforcement of National, State, and Local regulations will show a significant improvement of the Air Quality Related Values above the base level. Research into Air Quality problems will be at a high level.

Burning forest residues on-site will probably be done only in special cases. Specialized markets for forest residues will probably be created that will end up being the preferred use for this material. Also, burning constraints will probably be imposed on homeowners that will make wood stoves and fireplaces much more expensive and less desirable to use.

Minerals

Locatable minerals. The supply/demand situation will have changed considerably, accompanied by a number of technological improvements in mining, recovery, and reclamation methods. As a consequence, more locatable mineral-related activities can be expected. The Forest will have completed an up-to-date mineral resource inventory, and will have established good communication with those interested in mining on the Forest. As a result, the Forest will have a thorough knowledge of what, when, and where mineral activities will occur, and will be in a position to pro-actively manage for these activities. Successful reclamation techniques will have been identified. There will be no undue or unnecessary degradation of the environment caused by mining; the adverse impacts caused by these activities will be short-term; and mineral activities will have been ac-

cepted by the public in general as a land use that is not only necessary, but totally compatible with other resource uses.

Leasable minerals: We will have returned to an energy shortage situation, and will be in the process of developing marginal or newly discovered oil and gas resources as well as alternative sources of energy such as coal and geothermal. Those areas having a high potential for development will have been identified, and full-scale development of the resource will proceed in a manner consistent with this plan.

Common variety minerals: The Forest will intensify its materials resource inventories in areas where mineral materials are scarce. Resources critical to the Forest Service road construction and maintenance activities, critical to other public works projects, and necessary to meet anticipated demand by the public sector will have been identified and reserved for future use.

Withdrawals: All withdrawals will be periodically reviewed at 5 to 20 year intervals. The review will consider any new land management regulations which would provide adequate protection, as well as any new mineral resource information (exploration data, economic data, supply/demand data, etc.). All unnecessary withdrawals will have been eliminated.

Recreational panning, sluicing, dredging and rockhounding. The demand for recreational panning, sluicing, dredging and rockhounding activities will continue to grow. However, our ability to provide for the demand may not increase because the areas where such activity can be conducted are limited by the occurrence of mineral resources and the legal status of lands. The management plans implemented for this activity will have been in place and any problems with the management of the activity will have been resolved. As a result, we will be able to better serve the public who has an interest in conducting these activities.

Lands

Landline Location: All needed property lines will be surveyed, marked, and posted to Forest Service standard. Maintenance will be ongoing under a maintenance plan and will be current. Where needed, wilderness and other designated area boundaries will also be surveyed, marked, and posted, and on an adequate maintenance schedule.

Cost Sharing: Activity will be limited to reconstruction and maintenance of jointly used roads.

Right-of-Way Acquisition: All necessary road and trail right-of-ways will have been acquired.

Purchase: Purchases will be limited to infrequent, small, site specific needs--usually to facilitate a special need or project requirement.

Land Exchange: Land ownership adjustments via exchange will be completed except for infrequent, small, site specific cases needed for the same purposes as Purchase, above.

Mixed Ownership Land Management: This situation will have stabilized. The Forest's working relationship with neighboring landowners, and local and State agencies, will be well-defined and ongoing.

Interchange: Land transfers with other Federal agencies will be completed. Questions of management authorities and direction will have been resolved.

Utility Corridor: Existing corridors will have been developed to capacity. The proposed corridor will have been developed and will be in use.

Small Hydroelectric Development: All viable small hydroelectric sites will have been developed. Output from these sites will be ongoing.

Asset Management Programs: Land ownership adjustments via this program will be complete before the fifth 10 year program.

Encroachment And Title Claims There will be very little activity in this area by the fifth 10 year period. It will probably be limited to an occasional exchange of a quitclaim deed to remove a cloud on the title of either a National Forest parcel or an adjacent private land parcel.

Roads

The road system should be completed and under management. Only an occasional short road will need to be constructed for managing the surface resources.

Access may still need to be granted to utilize mineral resources.

The level of residential development within and adjacent to the Forest will have progressed to the point that county agencies will manage a portion of the current Forest road system to provide for mail, school, commercial, and other public road uses.

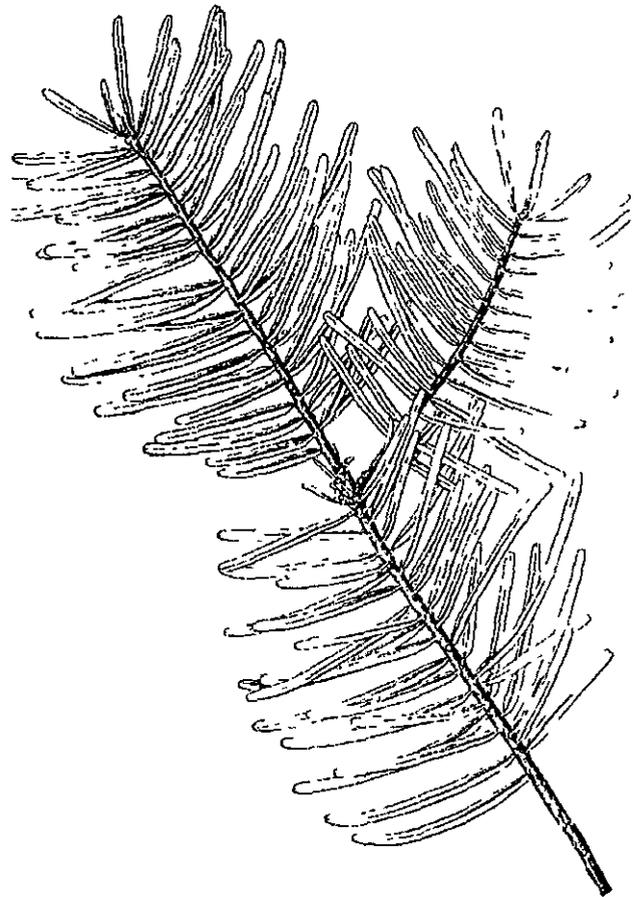
Biodiversity

Biodiversity will be recognized as a very critical issue in National Forest System Lands management. The interrelationships of biodiversity and subordinate issues such as forest fragmentation, old growth, long-term productivity, rare plant conservation and flow of genetic material will be understood and applied in forest planning and management. A classification and inventory system will be well developed and heavily used as tools to assure maintenance of biodiversity. The Wenatchee National Forest will be recognized for its role in maintaining the animal and plants found there and the communities in which they are a part.

D. FOREST MANAGEMENT OBJECTIVES

The annual levels of goods and services are estimates of what may be produced from the Forest when this plan is implemented, are summarized in Table IV-2. These outputs and activities are resource management objectives for the Forest. Table IV-2 also contains the annual funding levels necessary to meet the proposed outputs and activities. If final budgets are significantly different than those contained in the table, the final outputs of goods and services will vary according to the funding level.

A narrative description by resource follows the Table summaries.



**TABLE IV-2
RESOURCE OUTPUTS AND ACTIVITY SUMMARIES**

	UNITS	DECADE				
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
<u>Developed Recreation Use</u>						
	M RVD's /yr	3,140.9	3,449.3	3,848.7	4,248.1	4,647.5
Developed Site Construction or Reconstruction	PAOT	721	100	100	200	300
<u>Non-Wilderness Dispersed Recreation Use</u>						
Roaded	M RVD's/yr	1,977.8	2,125.9	2,294.0	2,462.1	2,630.2
Unroaded Motorized	M RVD's/yr	278.6	300.6	335.4	370.2	405.0
Unroaded Non-Motorized	M RVD's/yr	98.6	105.7	118.0	130.2	142.7
<u>Acres Remaining In Unroaded Areas</u>						
	M Acres	387.8	298.1	298.1	298.1	298.1
<u>Trail Construction and Reconstruction</u>						
	Miles	81.6	81.6	44.0	44.0	44.0
<u>Wild & Scenic Rivers Proposed</u>						
	Miles					
Wild		-----82.5----->				
Scenic		-----29----->				
Recreational		-----118.5----->				
<u>Cultural Resource Management</u>						
Inventoried Acres	M Acres/Dec.	400	352	270	190	102
Site Documentation	Sites/Decade	500	250	200	120	50
Site Evaluations	Sites/Decade	100	150	200	150	100
Testing/Data Recovery	Sites/Decade	5	10	20	10	7
Management Plans	Plans/Decade	5	5	5	5	5
Interpretive Projects	Number/Dec.	13	15	15	15	15
<u>Visual Quality Objectives</u>						
Preservation	M Acres	-----843.3----->				
Retention	M Acres	-----521.8----->				
Partial Retention	M Acres	-----332.9----->				
Modification	M Acres	-----147.8----->				
Max Modification	M Acres	-----318.3----->				
<u>Wilderness Use</u>						
Acres Managed	M RVD's/yr	423.5	444.7	476.5	508.2	540.2
	M Acres	-----841.0----->				
<u>Wildlife and Fish Use</u>						
Wildlife	M WFUD's/yr	753.8	836.5	925.0	965.0	1,084.0
Fish	M WFUD's/yr	550.4	732.0	841.0	951.0	1,062.0

TABLE IV-2 (continued)
RESOURCE OUTPUTS AND ACTIVITY SUMMARIES

	UNITS	DECADE				
		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Anadromous Fish						
Commercial Harvest	M Pounds	328	970	991	1,012	1,033
Habitat Improvement over present	M Pounds	0	33	54	75	96.5
Management Indicator						
Species						
Chinook Salmon						
Spring Chinook	M Adults	6.0	12.2	12.4	12.6	12.8
Summer Chinook	M Adults	2.0	4.7	4.7	4.7	4.7
Sockeye Salmon	M Adults	31.8	40	40	40	40
Summer Steelhead	M Adults	1.7	3.6	3.7	3.7	3.8
Cutthroat Trout	M Adults	203	212	220	229	238
Mule Deer						
Summer	Number	25,100	24,900	24,800	24,600	24,400
Winter	Number	10,100	10,200	10,200	10,300	10,400
Elk						
Summer	Number	12,500	12,400	12,300	12,100	12,100
Winter	Number	5,600	5,700	5,700	5,800	5,800
Mountain Goats	Number	←-----1,600----->				
Beaver	Number	←-----350----->				
Ruffed Grouse	Number	3,200	3,400	3,500	3,700	3,800
Bald Eagle						
Active Nest Sites		4	6	7	9	10
Recovery Nest Sites		←-----8----->				
Peregrine Falcon						
Active Nest Sites		2	3	5	7	10
Recovery Nest Sites		←-----10+----->				
Primary Cavity Excavators	% Potential	73	70	68	65	62
Spotted Owl	Pairs	120	110	105	102	100
Piliated Woodpecker	Pairs	380	355	340	320	300
Marten/ N. 3-Toed Woodpecker	Pairs	1200	1100	1050	950	900
Old-Growth	M Acres	307.3	295.7	284.2	272.7	261.2
Wildlife Habitat Improvement	Acre Equiv. Structures	←-----1,900----->				
		←-----400----->				
Range						
Grazing Capacity	M AUM's	38.7	39.9	40.3	40.9	41.1
Permitted Use	M AUM's	23.0	24.0	24.0	24.0	24.0
Improved Allotments	% upward trend	45	70	78	82	85
Fence Const/Reconst.	Miles Annually	9.0	9.0	8.0	7.0	6.5
Springs Const/Recon.	Number Annually	12	11	10	9	8
Noxious Weed Control	Acres Annually	375	375	100	100	100
Suitable Acres	M Acres	←-----406.9----->				

TABLE IV-2 (continued)
RESOURCE OUTPUTS AND ACTIVITY SUMMARIES

		UNITS	DECADE				
			Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Timber							
Suitable Lands	Acres		<-----630,514----->				
Acres Harvested by:							
Clearcut	Avg. Acres Annually		<-----3,433----->				
Shelterwood	Avg. Acres Annually		<-----2,360----->				
Partial cut	Avg. Acres Annually		<-----2,896----->				
Timber Offered							
ASQ	MM CF/yr		<-----24.3----->				
	MM BF/yr	136	--	--	--	--	
Programmed Quantity	MM CF/yr		<-----26.1----->				
	MM BF/yr	146.0	--	--	--	--	
Long-term Sustained Yield							
	MM CF/yr		<-----27.2----->				
Fuelwood							
	M CF/yr (37 cords=1 M CF)		<-----3,400----->				
Reforestation							
Plant	M Acres	4.3	3.8	1.3	3.6	5.4	
Timber Stand Improvement							
	M Acres	4.2	4.4	1.9	5.5	4.7	
Water Yield							
Background	M Acre Feet		<-----4,455----->				
Increase over background	M Acre Feet	15.5	21.0	21.5	22.7	23.8	
Sediment							
Background	M Tons		<-----930.5----->				
Activity over background	M Tons	72.4	72.4	72.4	40.5	40.5	
Improved Watershed Conditions							
	Treated Acres	1,800	1,000	800	700	500	
Energy Minerals							
	Billion BTU's Produced	0	137	290	415	619	
	Permits, Leases, Plans Processed	35	45	50	55	60	
Area Available Classified Prospectively Valuable For							
Oil and Gas	Acres		<-----205,854----->				
Coal	Acres		<-----425,657----->				
Geothermal	Acres		<-----182,385----->				

TABLE IV-2 (continued)
RESOURCE OUTPUTS AND ACTIVITY SUMMARIES

UNITS	DECADE					
	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5	
Non Energy Minerals						
Locatable	% Produced <-----Negligible Decrease (< 0.5%)----->					
	Under 1985 Management					
	Notices of Intent, Plans Processed and Administered					
	100-170	130-180	120-180	130+	130+	
Leasable Minerals						
Program Activity	Leases/Permits Plans of Operation					
	35	35	60	60	60	
Area Available For Leasing						
Oil and Gas	Acres Available <-----205,854----->					
Coal	Acres Available <-----425,657----->					
Geothermal	Acres Available <-----182,385----->					
Area Available for Location						
High Potential	Acres <-----14,204----->					
Moderate Potential	Acres <-----45,538----->					
Low Potential	Acres <-----1,253,377----->					
Common Variety Minerals						
	Tons Produced	90,000	90,000	80,000	70,000	60,000
	Pits assessed for FS use	17	15	10	8	5
	Permits issued	60	75	75+	75+	75+
Property Line Survey	Miles	<-----70----->				
Arterial and Collector Roads						
	Miles					
Construction		20	0	0	0	0
Reconstruction		16	2	2	2	2
Timber Purchaser Roads						
Const. & Reconst.	Miles	83	68	5	5	5
Roads Suitable for Public Use						
Passenger car	Miles	<-----1,031----->				
High Clearance Vehicle	Miles	<-----3,202----->				
Closed (Year-round)	Miles	1,703	<-----2,364----->			
Fire Management						
Fuel Treatment	Acres	6,700	5,800	3,200	6,800	7,800
Social/Economics						
Operational Costs	Million \$	17.2	17.0	17.0	17.0	16.7
Cap Investment Costs	Million \$	11.8	8.4	7.0	6.5	6.1
Total Forest Budget	Million \$	29.0	25.4	24.0	23.5	22.8
Returns to Treasury	Million \$	14.0	15.1	10.4	17.5	14.3
Payments to Counties	Million \$	3.3	3.3	2.1	3.2	2.4
Changes in Income	Million \$	+5.14	<-----Not Estimated----->			
Changes in Jobs	Number	+203	<-----Not Estimated----->			

RESOURCE NARRATIVES

1. RECREATION SETTING

a. Recreation Opportunity Spectrum

The goal of the recreationists in visiting the Forest is to obtain satisfying experience and to *meet expectations in recreation activities*. An objective of the Forest Manager is to provide the opportunities for these expectations to be realized. Recreation opportunities can be broken down into three components; activities, the setting, and the experience. The quality of the setting available for the activity plays a key role in the outcome of visitor's expectations.

The Forest has the potential to provide a wide variety of recreation settings. In order to help identify, quantify and describe these settings, the Recreation Opportunity Spectrum (ROS) has *been developed*. The ROS system *arranges the possible combinations of activities, settings, and probable experience opportunities across a continuum or spectrum*. The spectrum ranges from primitive to urban and has the following seven classes:

1. ***Primitive:*** An area characterized by an environment essentially natural and unmodified by human influence and development. Here there is a *high probability of experiencing solitude and isolation from the sights and sounds of human activity*. The area is located at least 3 miles from all roads, railroads and trails with motorized use, and is at least 5,000 acres in size. Few people will be seen or encountered here and regimentation and on-site controls are few.

2. ***Semi-Primitive Non-motorized:*** An area characterized by a predominantly natural or natural appearing environment. Here there is a high probability of experiencing solitude and isolation. The area is located at least 1/2 mile, but not generally further than 3 miles, from all roads, railroads or trails with motorized use. The area is at least 2,500 acres in size. Other people may be seen or encountered in this area, but not frequently. On-site controls and regimentation will be present but subtle.

3. ***Semi-Primitive Motorized:*** An area characterized by a predominantly natural or natural appearing environment. Here there is evidence of other users, but concentrations of users are low. There is a moderate probability of experiencing isolation and solitude. The area is located within 1/2 mile of primitive roads or trails used by motor vehicles, but not closer than 1/2 mile to roads of a higher standard than primitive. The area is at least 2,500 acres in size. Other people will be seen or encountered but not frequently. On-site controls and regimentation will be present but subtle.

4. ***Roaded Natural:*** All area predominantly natural appearing. Vegetation management and resource modifications are present but harmonize with the natural environment. A moderate opportunity exists for isolation and undisturbed activities. The area is located within 1/2 mile of better than primitive roads and railroads. There is a moderate to high probability of contact with other people on roads; low to moderate probability off roads and on trails. On-site regimentation and controls are generally noticeable.

5. ***Roaded Modified:*** An area that is generally natural appearing but has significant vegetation management and resource modification. Modifications generally harmonize with the natural environment. A moderate opportunity exists for isolation and undisturbed activities. The area is located within 1/2 mile of better than primitive roads and railroads. There is a moderate to high probability of contact with other people on roads; low to moderate probability off roads and on trails. On-site regimentation and controls are generally noticeable.

6. ***Rural:*** An area characterized by a substantially modified natural environment. Vegetation management and facility development is dominant. Here there is a moderate to high frequency of contact with other users in developed sites, on roads and trails, and on water surfaces. Many facilities are present to handle groups as well as individual users. Regimentation and managerial controls are numerous; but largely in harmony with the natural environment.

7. Urban: An area characterized by a substantially urbanized environment, although the background areas may have natural appearing elements. Developed sites will have the highest standard of development with many user conveniences. The setting is strongly structure dominated. Large numbers of users will be present on site and in nearby areas. Regimentation and management controls will be obvious and numerous.

b. Developed Recreation

The Developed Recreation sites and facilities will be significantly upgraded and improved over the life of this plan. Major emphasis will be placed on:

1. Rehabilitation and reconstruction of developed sites that need extensive repair and refurbishing. Sites with high visitor use will receive highest priority. Sites that currently have user conflicts will also be high priority when redesign and reconstruction can help solve user problems.

2. Improvement in the quality of facilities provided at developed sites and the type of facilities provided. Improvements will be designed to provide a high level of user satisfaction and user preferences will dictate the type of facilities constructed, and what activities are possible at each site.

3. Expansion of existing developed sites where overcrowding of the sites and adjacent areas has resulted in health and sanitation problems, undesirable loss of vegetation and soil compaction and user conflicts.

4. Construction of new sites where recreation area planning indicates sufficient public demand exists and where high quality opportunities are present.

Under this emphasis, most of the popular campgrounds, picnic areas, and interpretive sites on the Forest will be upgraded. Major trailheads will be upgraded with more user facilities. More interpretive sites will be developed. Campgrounds where fees are charged will continue on the fee system. Many of the upgraded facilities will be

added to the fee system (refer to Appendix A for a list of sites planned for rehabilitation, upgrade, or expansion during the next 10 years).

There will be more emphasis on partnerships, cooperative efforts, and joint ventures with other agencies, organizations, clubs, and private businesses in the planning and financing of developed sites. When economically efficient and service effective, more sites will be considered for operation under contract by concessionaires. Maximum opportunities will be sought to expand facilities and services through Challenge Grants, Cooperative Funds, Foundations, and Federal Capital Investment. The use of volunteers will continue to provide a significant benefit to the management of programs.

Ski area expansion is under consideration and in planning stages at Mission Ridge and White Pass. Further expansion will be commensurate with growth of demand for skiing recreation.

Timber sale activities will continue to provide opportunities to expand and improve trails, trailheads, dispersed camping, viewpoints, and parking areas for recreation activities.

Management of other types of developed recreation, organization, and club sites, Recreation Residences, etc., will continue. Any increase in activity or new proposed development will be analyzed in terms of recreation opportunities, recreation user demand, and public service.

c. Dispersed Recreation

The dispersed recreation program will receive the same emphasis as the developed recreation program, of establishing partnerships, joint ventures, and cooperative efforts in providing high quality recreation opportunities for Forest visitors.

Dispersed recreation opportunities will be planned to provide potential for a wide diversity of activities for the recreating public. The management of dispersed areas and the construction of facilities to support dispersed recreation activities will conform to the Recreation Opportunity Spectrum class to provide a consistent setting.

Winter sports activities such as snowmobiling, cross-country skiing, snowshoeing, dog sledding, and snowplay will continue to grow in popularity and receive management emphasis. Trail marking, grooming, and track setting will continue to be done in cooperation with the State Parks Division and user groups as well as under permit.

Many dispersed recreation activities will be supported or made possible by cooperators or the private sector, such as recreation organizations, clubs, and commercial outfitter-guides. In activities such as river rafting, fishing, backpacking, hunting, climbing, and ski touring, experienced guides or outfitters will continue to provide these opportunities for the public.

Transportation planning and management will continue to recognize driving for pleasure as a major activity on the Forest Road System. Estimated recreation use and recreation opportunities will receive greater consideration in the construction design and maintenance standards for the road systems. More roads will be located and constructed primarily for recreation management objectives, and more in conformity with Recreation Opportunity Spectrum setting criteria. Appendix A contains a list of proposed recreation road construction projects for the next 10 years.

d. Trails

The Forest Trail System will provide a full array of recreation activities and experiences and will provide access to a wide range of destination and focal points of interest. The trail system also will provide access for Forest Administrative actions. There are 2,463 miles of trail on the Forest in Recreation Opportunity Classes from Primitive to Rural. Trail maintenance will be performed on all of the 2,463 miles of trail each year, depending on budget and the availability of volunteers.

Major reconstruction, rerouting, and relocation work is planned on the trail system to provide improved recreation experiences, correct problems with excessive soil erosion and water sedimentation, and to meet recreation opportunity spectrum and wilderness management objectives.

It is expected that about 400 miles of new trail will be constructed by the end of the first decade. About 120 miles of this new construction will allow motorized use and about 280 miles will be constructed for non-motorized users. This will result in a net increase for motorized and non-motorized trails when both the existing trail system and future trails are taken into account. Motorized trails will show a net increase of about 65 miles and non-motorized trails will show a net increase of about 335 miles. Although not mandated by law or required by previous agreement, all trails that have been improved with Inter-agency Committee for Outdoor Recreation funds will remain open to motorized use.

The addition of new winter trails is planned to respond to growing demand for winter sports activities. Many new summer trails will also be added to improve conditions for existing visitor use and solve user conflicts. A list of planned trailheads, sno-parks, and trail projects is included in Appendix A.

Trail project planning and accomplishment will involve partners and cooperators to extend the financial scope of projects and provide greater recreation values.

e. Special Interest Areas

Special interest areas will provide places as needed to exhibit some of the unique attributes of the Forest. The Tumwater Botanical area and the Nason Ridge recreation area are two such places.

Formal classification and management plans will be developed for the following areas:

Area Name	Approximate Area	Recommended Classification
Teaway	47,900	Dispersed Recreation
Nason Ridge	10,000	Dispersed Recreation
Annette Lake	1,400	Dispersed Recreation

The establishment of these areas is recommended in the Alpine Lakes Area Management Plan and until formal classification and specific management plans are completed, their management will be directed by that plan.

2. WILD, SCENIC, AND RECREATIONAL RIVERS

Formal designation for selected rivers as Wild, Scenic, and/or Recreational will be pursued through implementation of this plan. The river segments listed below were found to be eligible and will be recommended to Congress as candidates for inclusion in the Wild and Scenic River system.

Designation of these rivers will preserve and protect scenery, recreational, geologic, fish, wildlife, historical, cultural, and ecologic resource

values within these stream corridors. The degree of protection will be commensurate with the classification. These rivers have been determined to provide high quality recreation opportunities and exhibit at least one outstandingly remarkable resource value. Recreation activities including water sports, viewing scenery, and camping would be enhanced through these designations. There would also be significant economic benefits generated through increased tourism and recreation visitor use.

TABLE IV-3

River	Segment	Recommended Classification	Miles
American	Headwaters to confluence with Rainier Fork	Wild	6.0
	Confluence with Rainier Fork to confluence with Bumping River.	Scenic	16.0
Cle Elum	Headwaters to Alpine Lakes Wilderness boundary	Wild	4.0
	Alpine Lakes wilderness boundary to above Lake Tucquala.	Scenic	2.0
	Above Lake Tucquala to Lake CleElum	Recreational	18.5
Waptus	Headwaters to confluence with Cle Elum River.	Wild	13.0
Icicle	Headwaters to Alpine Lakes Wilderness boundary.	Wild	12.0
	Alpine Lake Wilderness boundary to above Leavenworth city water intake.	Recreational	14.0
Napeequa	Headwaters to Glacier Peak Wilderness boundary.	Wild	15.0
	Glacier Peak wilderness boundary to confluence with White River.	Recreational	1.0
White	Headwaters to Glacier Peak Wilderness boundary	Wild	15.0
	Glacier Peak wilderness boundary to above Tall Timbers Ranch.	Scenic	7.0
	Above Tall Timbers Ranch to Lake Wenatchee.	Recreational	12.0
Chiwawa	Headwaters to Glacier Peak Wilderness boundary.	Wild	5.0
	Glacier Peak wilderness boundary to confluence with Wenatchee River.	Recreational	30.0
Wenatchee	Lake Wenatchee to Wenatchee Forest boundary.	Recreational	28.0
Entiat	Headwaters to Glacier Peak Wilderness boundary.	Wild	12.5
	Glacier Peak Wilderness boundary to Cottonwood Trailhead.	Scenic	4.0
	Cottonwood Trailhead to above the confluence with Burns Creek.	Recreational	15.0

3. CULTURAL RESOURCES

There will be close coordination between the cultural resource program and other resource management activities on the Forest throughout all decades. Approximately 400,000 acres of National Forest land (in addition to that already investigated) will be surveyed over the next 10 years in project support (i.e. surveys that precede any ground disturbing activities). Since most of this will be linked with the timber sale program, the annual increments will depend in large part upon the location and total land area included within anticipated timber sale areas. In addition, inventory will extend beyond the lands suitable for timber harvest, covering some 67,500 acres of high sensitivity areas, backcountry and wilderness. Information collected during all of these inventories will be used to refine the cultural resource sampling strategy used on the Forest.

Not all acres examined will be cleared of necessary cultural resource considerations. Approximately 25 percent of these acres will require further investigation due to known site distributions or because of high cultural resource sensitivity. Heavy monitoring emphasis will be given these localities.

The number of acres inventoried for timber support will drop in subsequent decades. By the fifth decade, inventory of all suitable timber lands will have been completed. A small number of inventories will continue in conjunction with Recreation, Minerals and Grazing, and Land Adjustments, and will probably remain at the current level through the second decade. Systematic surveys carried out as part of the cultural resource inventory program (not as project support) will continue to examine approximately 10,000 acres per decade.

In addition to the inventory of sites located during project-related survey, inventories will be prepared to Regional standards for the current backlog of unrecorded or insufficiently recorded cultural resources. The process will add approximately 15 sites per year will be added to the inventory base. This will enable the Forest to complete documentation of all existing properties by the end of the second decade. The resulting data base will contribute to State-wide efforts in

preservation planning, will facilitate the development of appropriate research strategies, will provide the basis for evaluations of significance, and will aid in the formulation of informed management decisions. This data base will allow the land managers to more adequately assess the uniqueness, cultural importance, regional associations, and ultimate worth of any cultural resources existing on the Forest.

As documentation of known sites is completed, site inventories will concentrate on newly discovered sites, resulting in a significant drop in the number of annually recorded sites by the fifth decade.

An assessment of significance is pivotal to management of cultural resources. It will influence the selection of sites meriting further considerations or investigation, as well as the decision as to whether to preserve or ultimately permit alteration or destruction of the resource. Approximately 12 sites per year through the second decade will be formally evaluated as individual properties, as thematic groups, or as historic districts. By the fifth decade, this number will drop, reflecting the decline in the number of sites remaining to be evaluated.

In the case of archaeological sites on the Forest, some test excavations will be necessary to determine the boundaries, depth of deposits, and/or basic nature and condition of the properties. Depending on the results of the testing, data recovery will be carried out on those sites where vandalism, project impacts, or natural degradation are occurring. Approximately five sites per decade may be excavated in consultation with interested American Indian groups, utilizing a professionally sound research design. This number may increase in future decades as avoidance of project impacts becomes less feasible.

Cultural resource management plans will be developed for selected National Register sites and districts on the Forest, in consultation with the Washington State Historical Preservation Office (SHPO). An average of 5 plans per decade will be completed, which will detail the management objectives for the subject properties, the treatment and actions necessary to achieve those objectives, interpretive opportunities, and the

costs involved. Two top priorities in the first decade will be the Stevens Pass Historic District and Salmon La Sac Guard Station.

The ultimate goal of the cultural resource program will be the scholarly use and/or interpretation of appropriate cultural resource properties for the benefit of the public. Forty such projects will be undertaken in the first decade. Additional projects will be added in subsequent decades, while existing interpretive facilities will continue to be maintained and updated. By the end of the fifth decade, there may be over 100 fully interpreted cultural resource properties on the Forest.

4. SCENERY

Visual quality is to be maintained at a high level for all major scenic highway viewsheds, the Alpine Lakes Management Unit, and most major wilderness portals. Maintenance and protection of the scenery of these areas is of high importance on the Forest.

Lands within view of scenic travel routes will be managed under Retention and Partial Retention visual management standards. Visual quality is considered as one of the most important resources to be protected under these land allocations. A total of 854,700 acres are allocated to Retention and Partial Retention Visual Quality Objectives to protect scenery. Of the 630,514 acres suitable for timber management, 364,150 acres will have Retention and Partial Retention Visual Quality Objectives to protect visual quality.

Unnatural landscape patterns will occur in some major viewsheds. These are Cooper Mountain to South Navarre, Shady Pass, Taneum/Manastash/Quartz Mountain, Little Naches, Cash Prairie, Little Rattlesnake, and South Fork Tieton. Landscape settings adjacent to some lakes will be altered by management activities. These are Antilon, McDaniel, and Bear Lakes.

A total of 266,364 acres of General Forest will be managed under Modification and Maximum Modification Visual Quality Objectives. The natural appearance of these lands as viewed from Forest roads would be altered to heavily altered.

Even though alteration of the natural appearance of these lands is permitted, visual management principles are to be applied.

These principles are contained in National Forest Landscape Management, Volumes 1 and 2. Published handbooks within The Visual Management System, include "Utilities", "Range", "Roads", "Timber", "Fire", "Recreation", and "Ski Areas". These handbooks are to be used in managing the visual resource.

Application of the visual management system in wilderness administration is necessary for maintenance of high quality scenery. Construction, rehabilitation, or reconstruction of trails or campsites require application of the Visual Absorption Capacity concept to protect and maintain scenic values.

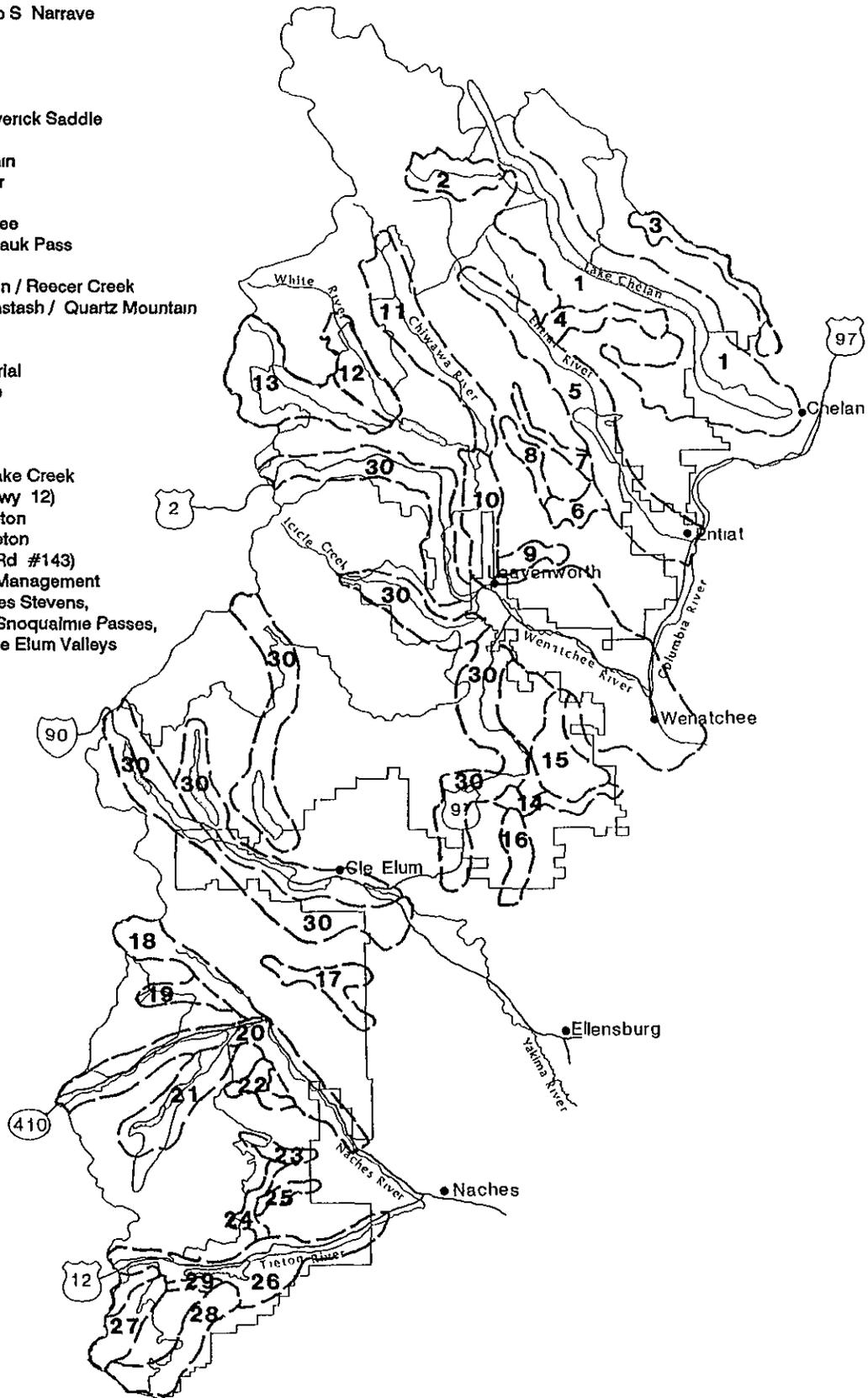
The visual management system is to be used in all resource programs to maintain high levels of scenic quality. Past applications of the system on the Forest have provided high quality end results when landscape architectural design concepts and visual management principles are applied during the Environmental Analysis stages of project design. Continued integration of visual concerns into project management is necessary to enhance and retain high visual quality. National Forest Landscape Management Handbooks are available as users guides in management of the visual resource and should be consulted. The Swauk and Entiat viewshed plans are available to provide further direction for management of the visual resource in those areas. Other viewshed plans are to be done during the next decade.

With the proper application of visual management direction set forth in the Management Prescriptions, Standards and Guidelines, and handbooks, the predicted visual appearance of inventoried viewsheds is as indicated on the following tables. A location map is also provided for their identification.

Monitoring will be conducted to ensure that the predicted conditions are being met.

**FIGURE IV-1
INVENTORIED VIEWSHEDS AND LOCATIONS**

1. Lake Chelan
2. Railroad Creek
3. Cooper Mtn to S Narrave
4. Shady Pass
5. Entiat Valley
6. French Corral
7. Mad River
8. Sugarloaf-Maverick Saddle
9. Eagle Creek
10. Chumstick-Plain
11. Chiwawa River
12. White River
13. Little Wenatchee
14. Beehive to Swauk Pass
15. Mission Creek
16. Table Mountain / Reecer Creek
17. Taneum-Manastash / Quartz Mountain
18. Little Naches
19. Ravensroost
20. Mather Memorial
21. Bumping Lake
22. Little Bald
23. Rattlesnake
24. Cash Prairie
25. Little Rattlesnake Creek
26. White Pass (Hwy 12)
27. North Fork Tieton
28. South Fork Tieton
29. Tieton Road (Rd #143)
30. Alpine Lakes Management Plan (includes Stevens, Swauk and Snoqualmie Passes, Icicle and Cle Elum Valleys)



**TABLE IV-4
VISUAL CONDITION OF VIEWSHEDS**

Present Inventories			Visual Quality Objectives			
No.	Viewshed or Travel Routes	Existing Visual Condition	Alternative C	Foreground	Middleground	Approx. Acres
1	Lake Chelan	Natural Appearing	Natural Appearing	Retention	Partial Retention	84,800
2	Railroad Creek	Natural Appearing	Natural Appearing	Retention	Preservation	14,600
3	Cooper Mtn. to S Narrave	Altered	Altered	Modification	Modification	3,300
4	Shady Pass	Natural Appearing	Altered	Partial Retention	Partial Retention	18,800
5	Entiat Valley	Natural Appearing	Slightly Altered	Retention	Partial Retention	73,300
6	French Corral	Altered	Slightly Altered	Partial Retention	Modification	3,800
7	Mad River	Natural Appearing	Slightly Altered	Retention	Not Seen	15,700
8	Sugarloaf-Maverick Saddle	Slightly Altered	Slightly Altered	Partial Retention	Not Seen	4,700
9	Eagle Creek	Slightly Altered	Slightly Altered	Retention	Modification	5,600
10	Chumstick-Plain Rd. 209	Natural Appearing	Slightly Altered	Partial Retention	Modification	26,600
11	Chiwawa River	Natural Appearing	Natural Appearing	Retention	Partial Retention	59,200
12	White River	Slightly Altered	Natural Appearing	Retention	Partial Retention	20,200
13	Little Wenatchee	Slightly Altered	Slightly Altered	Retention	Modification	28,500
14	Beehive to Swauk Pass	Natural Appearing	Slightly Altered	Partial Retention	Modification	6,900
15	Mission Creek	Natural Appearing	Slightly Altered	Modification	Modification	6,400
16	Table Mountain Reecer Creek	Slightly Altered	Natural Appearing	Retention	Partial Retention	9,600
17	Taneum-Manastash Quartz Mountain	Slightly Altered	Altered	Partial Retention	Modification	12,000
18	Little Naches	Slightly Altered	Altered	Partial Retention	Modification	6,900
19	Ravens Roost	Slightly Altered	Slightly Altered	Partial Retention	Modification	5,500

**TABLE IV-4 (continued)
VISUAL CONDITION OF VIEWSHEDS**

Present Inventories			Visual Quality Objectives			
No.	Viewshed or Travel Routes	Existing Visual Condition	Alternative C	Foreground	Middleground	Approx. Acres
20	Mather Memorial (Hwy-410)	Natural Appearing	Natural Appearing	Retention	Retention	22,500
21	Bumping Lakes	Natural Appearing	Natural Appearing	Retention	Preservation	22,200
22	Little Bald	Altered	Slightly Altered	Partial Retention	Modification	2,000
23	Rattlesnake Creek	Slightly Altered	Slightly Altered	Partial Retention	Modification	4,300
24	Cash Prairie	Slightly Altered	Altered	Partial Retention	Modification	4,500
25	Little Rattle-snake Creek	Slightly Altered	Altered	Modification	Modification	2,300
26	White Pass (Hwy-12)	Natural Appearing	Natural Appearing	Retention	Partial Retention	53,900
27	North Fork Tieton	Altered	Slightly Altered	Partial Retention	Partial Retention	12,200
28	South Fork Tieton	Slightly Altered	Altered	Partial Retention	Modification	8,500
29	Tieton Road	Natural Appearing	Natural Appearing	Retention	Not Seen	6,400
30	*Stevens Pass (Hwy-2)	Altered	Slightly Altered	Retention	Partial Retention	50,600
31	*Swauk Pass (Hwy-97)	Slightly Altered	Slightly Altered	Retention	Partial Retention	31,100
32	*Snoqualmie Pass	Heavily Altered	Altered	Retention	Partial Retention	21,500
33	*Icicle Valley	Altered	Slightly Altered	Retention	Partial Retention	18,300
34	*Cle Elum Valley	Slightly Altered	Slightly Altered	Retention	Partial Retention	31,500

* Visual alterations due to land ownership patterns and other land uses

**TABLE IV-4 (continued)
VISUAL CONDITION OF LAKES**

Present Inventories		Visual Quality Objectives		
Lakes and Surrounding Landscape	Existing Visual Condition	Alternative C	Foreground	Middleground
Antilon Lake	Altered	Altered	Modification	Not Seen
Domke Lake	Natural Appearing	Natural Appearing	Retention	Preservation
Fish Lake	Slightly Altered	Natural Appearing	Retention	Modification
Lake Wenatchee	Natural Appearing	Natural Appearing	Retention	Partial Retention
Beehive	Altered	Slightly Altered	Partial Retention	Not Seen
Manastash Lake	Natural Appearing	Natural Appearing	Retention	Not Seen
Bumping Lake	Natural Appearing	Natural Appearing	Retention	Preservation
Granite Lake	Natural Appearing	Slightly Altered	Partial Retention	Not Seen
Leech Lake	Slightly Altered	Natural Appearing	Retention	Not Seen
Dog Lake	Natural Appearing	Natural Appearing	Retention	Not Seen
Clear Lake	Natural Appearing	Natural Appearing	Retention	Partial Retention
Rimrock Lake	Natural Appearing	Natural Appearing	Retention	Partial Retention
McDaniel Lake	Slightly Altered	Altered	Modification	Modification
Bear Lake	Natural Appearing	Altered	Modification	Modification
Lost Lake	Natural Appearing	Slightly Altered	Partial Retention	Not Seen
*Cooper Lake	Natural Appearing	Slightly Altered	Retention	Partial Retention
*Cle Elum Lake	Slightly Altered	Slightly Altered	Retention	Partial Retention
*Kachess Lake	Slightly Altered	Slightly Altered	Retention	Partial Retention
*Keechelus Lake	Altered	Altered	Partial Retention	Retention

5. WILDERNESS SETTING

The seven wilderness areas of the Forest, totaling 831,034 acres, provide a vast variety of recreation opportunities and possible experiences in a remote and wild recreation setting. The variety of settings and experiences possible are identified and categorized in the Wilderness Recreation Opportunity Spectrum System. All areas of each wilderness, except Alpine Lakes, are delineated into one of the four classes: *Pristine, Primitive, Semi-Primitive or Transition*. Each of these classes exhibit different physical, biological and social characteristics and managerial settings. Each have different levels of visitor use.

Pristine: The area is characterized as an extensive, unmodified natural environment. Natural processes and conditions have not been measurably affected by the influence of humans. Opportunities for solitude, isolation and challenge are high. Visitor use is very low. There are no managed trails in this class.

Primitive: The area is characterized by an essentially unmodified natural environment, with little influence of man noticeable in natural processes and conditions. The opportunities for solitude and isolation are high. Visitor use is low and density of managed trails is very low.

Semi-Primitive: The area is a predominantly unmodified natural environment. Evidence of man is noticeable in some areas. Opportunities for solitude and isolation are good. Trails and campsites are present. Visitor use is low but other users will generally be encountered during the primary use seasons.

Transition: The area is classified semi-primitive in most aspects of wilderness setting and resource conditions. Social encounters can be expected to be higher than semi-primitive during high use periods of the primary use season. Transition areas are close to major trail heads and areas that receive more of the single day use mixed in with users traveling into or out of the other classes.

The acreage in each Wilderness Recreation Opportunity Spectrum (WROS) class for all wilderness except Alpine Lakes is:

WROS class	Acres
Pristine	207,920
Primitive	248,820
Semi-Primitive	117,220
Transition	11,540

For more detailed information concerning Management for each WROS class see the Standards and Guidelines for Wilderness in this Chapter.

6. WILDLIFE

The objective of the wildlife program is to maintain and improve wildlife habitat with a program larger than any in the past. Growth is due to the demands for wildlife viewing and hunting, and the laws regarding threatened and endangered species and viable populations. The wildlife program is anticipated to expand to achieve the following:

1. Thirty percent or more of the program will be support to other resource activities. This support will be in the form of coordination with other management activities in order to avoid or mitigate adverse effects and identify opportunities to improve wildlife habitat. Support will be mostly to timber and recreation with a small percent spent on land exchanges and mining activities. There is planned development of combined wildlife/recreation projects for nonconsumptive use of wildlife.
2. Thirty percent or more of the program will be the development and maintenance programs and partnerships. Emphasis will be placed on maintaining and developing partnerships with the Yakama Indian Nation and the Confederated Tribes of Colville, Washington Department of Wildlife, U.S. Fish and Wildlife Service, timber organizations and State and local environmental groups to meet public demands for wildlife.
3. Monitoring programs will be developed to make up at least ten percent of the workload.

4. The 1,900 acres of nonstructural and 400 structural habitat improvements planned per year is anticipated to become thirty percent of the wildlife program. This activity will emphasize habitat improvements for Threatened, Endangered and Sensitive wildlife species to maintain viable populations. Second in priority to the T.E. and S. wildlife are improvements to increase recreation use of wildlife.

7. OLD GROWTH

The primary old growth forest habitat objective is to conserve enough old growth forest with adequate distribution to provide for biological diversity, wildlife and plant habitat and aesthetic values. It is the goal of this plan that old growth ecosystems and their attendant attributes be maintained to meet the needs and desires of the public. At the end of the first decade it is estimated that there will be 307,300 acres of old growth remaining and by the end of the fifth decade 261,200 acres (assuming no ingrowth).

To achieve these goals and objectives will require a better understanding of what old growth ecosystems really are--how do you define them. Once a definition can be agreed upon, an inventory of old growth will tell us how much we really have and the rate at which that amount is changing by type of site. In a word, old growth will need to be monitored. This will include monitoring of activities to determine if the Standards and Guidelines and Management Prescriptions are being implemented, and if when implemented, are meeting management objectives. Monitoring will also provide feedback for corrective actions.

To meet old growth management objectives will require cooperation both in and out of the Forest Service. Management partnerships between state, federal and private parties will be needed to facilitate the accomplishment of the goals and objectives for old growth management on the Wenatchee National Forest. Coordination with other resource management activities are needed to identify and avoid adverse impacts to old growth areas within harvest prescriptions that are needed within each sub-drainage to maintain adequate distribution of old growth for biological diversity and wildlife and plant habitat.

8. FISHERIES

The primary fish habitat management objectives are to maintain and improve fish habitat capability, develop an aggressive habitat management program, integrate fish and riparian habitat management into the other multiple-use activities and to develop management partnerships with State and Federal fish management agencies, the Yakima Indian Nation, the Confederated Tribes of Colville and private groups. It is the goal of this plan that fish habitat, quantity and quality, be at least maintained at existing levels and both the availability and quality of habitat should show an increasing trend.

Fish habitat goals and objectives will be accomplished through:

1. Coordination with other resource management activities in order to identify and avoid or mitigate potential adverse impacts and identify opportunities to improve fish habitat;
2. Implementation of a coordinated fish habitat and watershed improvement program based on inventories and drainage management objectives. It is anticipated that approximately four miles of anadromous fish stream would be treated each year;
3. Implementation of all activities using Forest-wide Standards and Guidelines, Best Management Practices and the Riparian Habitat Management Prescription (EW-2) to protect water quality and fish habitat;
4. Monitoring of activities to determine if the Standards and Guidelines and Management prescriptions being implemented are meeting management objectives and to provide feedback for corrective actions;
5. Implementation of an accelerated stream/watershed survey program to quantify current habitat conditions and develop management objectives by drainage. It is anticipated that approximately 250 miles of stream will be surveyed every year for the first few years;

6. Development of Five Year Action Plans, to be updated annually, to prioritize work and establish program direction; and

7. Development of management partnerships with State and other Federal fish, water quality, and environmental agencies, the Yakima Indian Nation, the Confederated Tribes of Colville, and private groups to facilitate the accomplishment of the above goal and objectives.

A major emphasis in the early stages of Plan implementation will be to determine the current condition of riparian habitat and to more fully develop desired riparian habitat conditions by sub-drainage.

Other objectives and specific outputs associated with riparian areas are incorporated in the discussions for related resources in this section of the Plan.

9. RIPARIAN AREAS

The primary objective for riparian areas will be to maintain and enhance long-term productivity to provide for riparian dependent resources including water quality, fish, wildlife and plant habitat. Decisions regarding management of other resource elements such as timber, grazing and recreation will be made in favor of riparian dependent resources where use conflicts exist.

10A. VEGETATION: TIMBER

Suitability

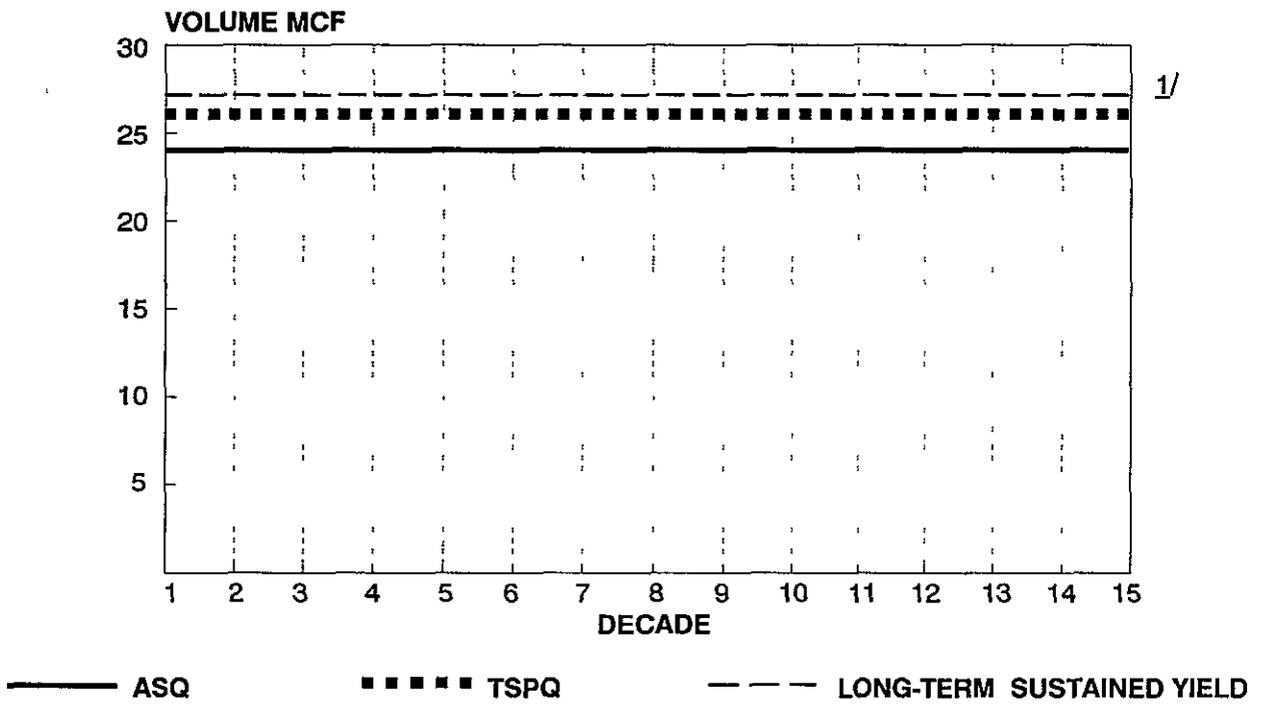
Timber harvest is scheduled from a base of 630,494 acres of suitable Forest lands. Table IV-5 shows a summary of the Forest land classification.

**TABLE IV-5
LAND CLASSIFICATION**

Classification	Acres
1. Non-Forest land (includes water, roads, and administrative sites)	713,082
2. Forest land	1,451,098
3. Forest land withdrawn from timber production	436,829
4. Forest land not capable of producing crops of industrial wood (not restockable within 5 years and less than 20 cu. ft. production)	137,717
5. Forest land physically unsuitable: --irreversible damage likely to occur	18,720
--not restockable but greater than 20 cu. ft production	65,933
6. Forest land--inadequate information	-0-
7. Tentatively suitable Forest land (item 2 minus items 3, 4, 5, and 6)	791,899
8. Forest land not appropriate for timber production	161,405
9. Unsuitable Forest land (items 3, 4, 5, and 8)	820,604
10. Total suitable Forest land ^{1/} (items 2 minus item 9)	630,494
11. Total National Forest land (items 1 and 2)	2,164,180

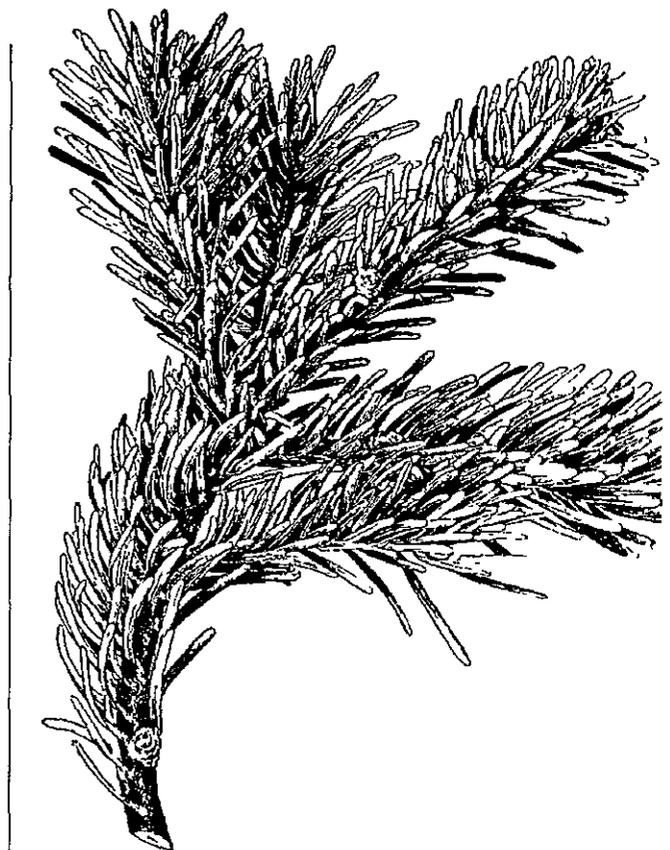
1/ The 630,494 acres are those available fo harvest in FORPLAN. Approximately 54,000 of these acres did not go into solution due to economic reasons

**FIGURE IV-2
PLANNED TIMBER SELL LEVELS**



1/ Planned sell level remains below potential harvest because wildlife trees are not included in sell but are included in long-term sustained yield.

Table IV-6 shows how the suitable land base is distributed by Management Area for this Plan. Scheduled timber harvest will come only from those allocations with suitable acres. All of the Management Area allocations with suitable lands will contribute to the ten year harvest program in the first decade.



**TABLE IV-6
SUITABLE ACRES BY MANAGEMENT AREA**

		Acres	
Management Area		Suitable	Unsuitable
EF-1	Experimental Forest ^{1/}	0	4,770
EW-1	Key Deer and Elk Habitat	47,700	71,042
EW-2	Riparian-Aquatic Habitat Protection Zone	33,963	13,399
EW-3	Key Big Game Habitat, Unroaded	0	19,059
GF	General Forest	251,201	67,141
MP-1	Mather Memorial Parkway ^{3/}	0	13,717
OG-1	Old-Growth Habitat, Dedicated	0	79,840
OG-2	Old Growth Habitat, Managed	40,683	8,332
RE-1	Developed Recreation ^{2/}	0	6,020
RE-2a	Dispersed Recreation, Unroaded Motorized ^{3/} (W/O 4x4 Routes)	0	79,607
RE-2b	Dispersed Recreation, Unroaded Motorized ^{3/} (W/4x4 Routes)	0	16,748
RE-3	Dispersed Recreation, Unroaded Nonmotorized ^{3/}	0	116,092
RE-4	Dispersed Recreation, Unroaded, Harvest	2,841	3,774
RM-1	Intensive Range Management	7,823	9,879
RN-1	Research Natural Areas	0	2,247
SI-1	Classified Special Areas - Scenic ^{3/} and/or Recreation	0	70,511
SI-2	Classified Special Areas - Other ^{3/}	0	2,799
ST-1	Scenic Travel - Retention	61,311	31,397
ST-2	Scenic Travel - Partial Retention	172,188	64,364
UC-1	Utility Corridor	^{4/}	^{4/}
WI-1	Wilderness	0	841,034
WS-1	Scenic River (Proposed)	4,346	1,208
WS-2	Recreational River (Proposed)	8,438	2,926
WS-3	Wild River (Proposed)	0	23,426 ^{5/}
Water		0	7,780
TOTAL		630,494	1,533,686

^{1/} Some Harvest is expected in future years for experimental reasons. Any volume generated would be nonchargeable to the annual sale quantity.

^{2/} Nonscheduled harvests of danger trees and removals to manipulate the vegetation within recreation areas is expected. However, because this harvest is nonscheduled it is not chargeable to the annual sale quantity but is a part of the planned programmed harvest if financing is available.

^{3/} Some limited harvest for catastrophic damage or recreation improvements is possible, but is not expected to be significant or programmable.

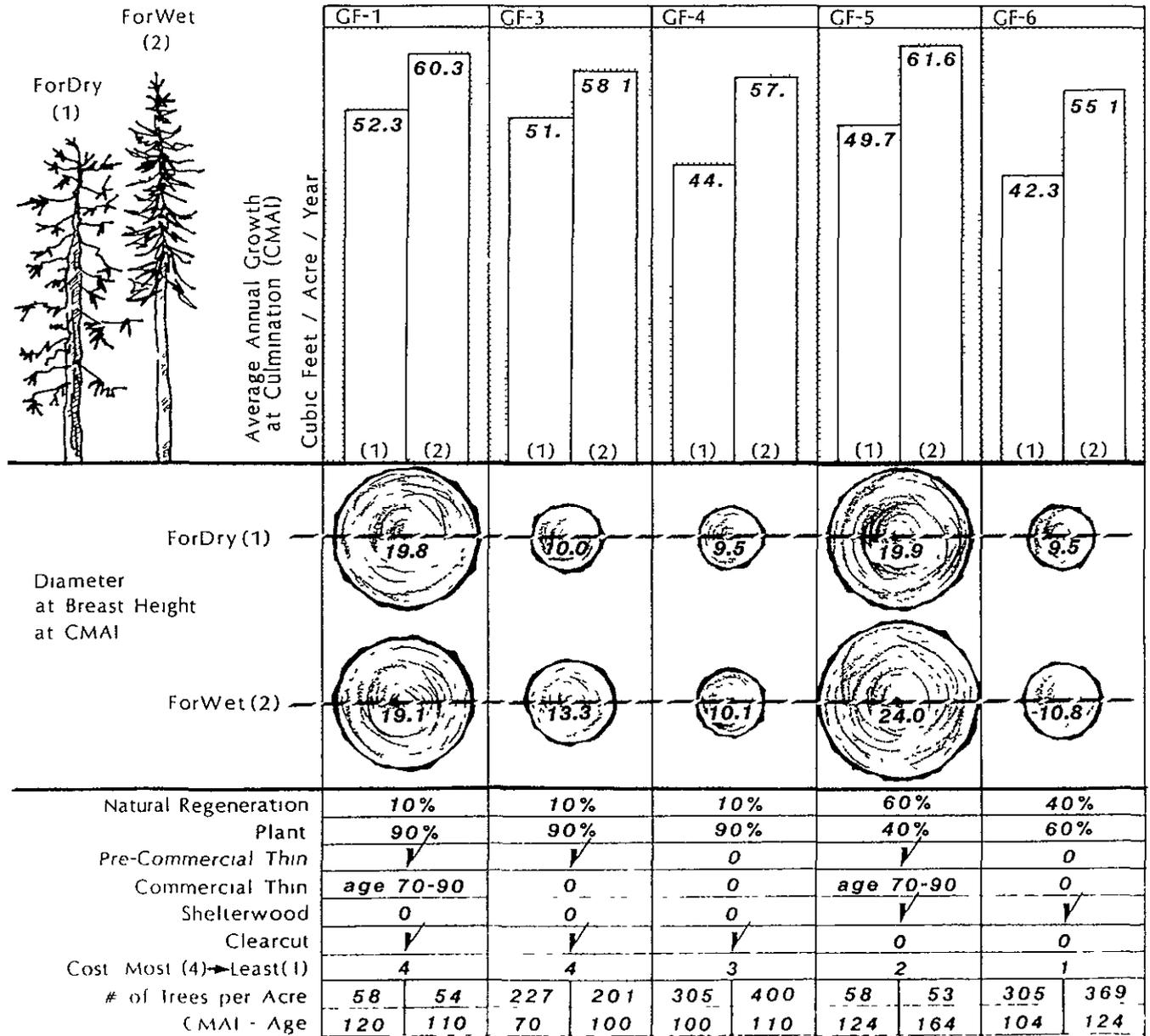
^{4/} Acres distributed among other management areas.

^{5/} Acres are also included in WI-1 wilderness management area, except 170 acres.

YIELD

Figure IV-3 depicts the General Forest Prescription timber regimes.

**FIGURE IV-3
TIMBER YIELD TABLES - GENERAL FOREST**



Management emphasis other than General Forest were restricted to silvicultural regimes designed to achieve specific resource objectives such as wildlife habitat or scenic viewsheds.

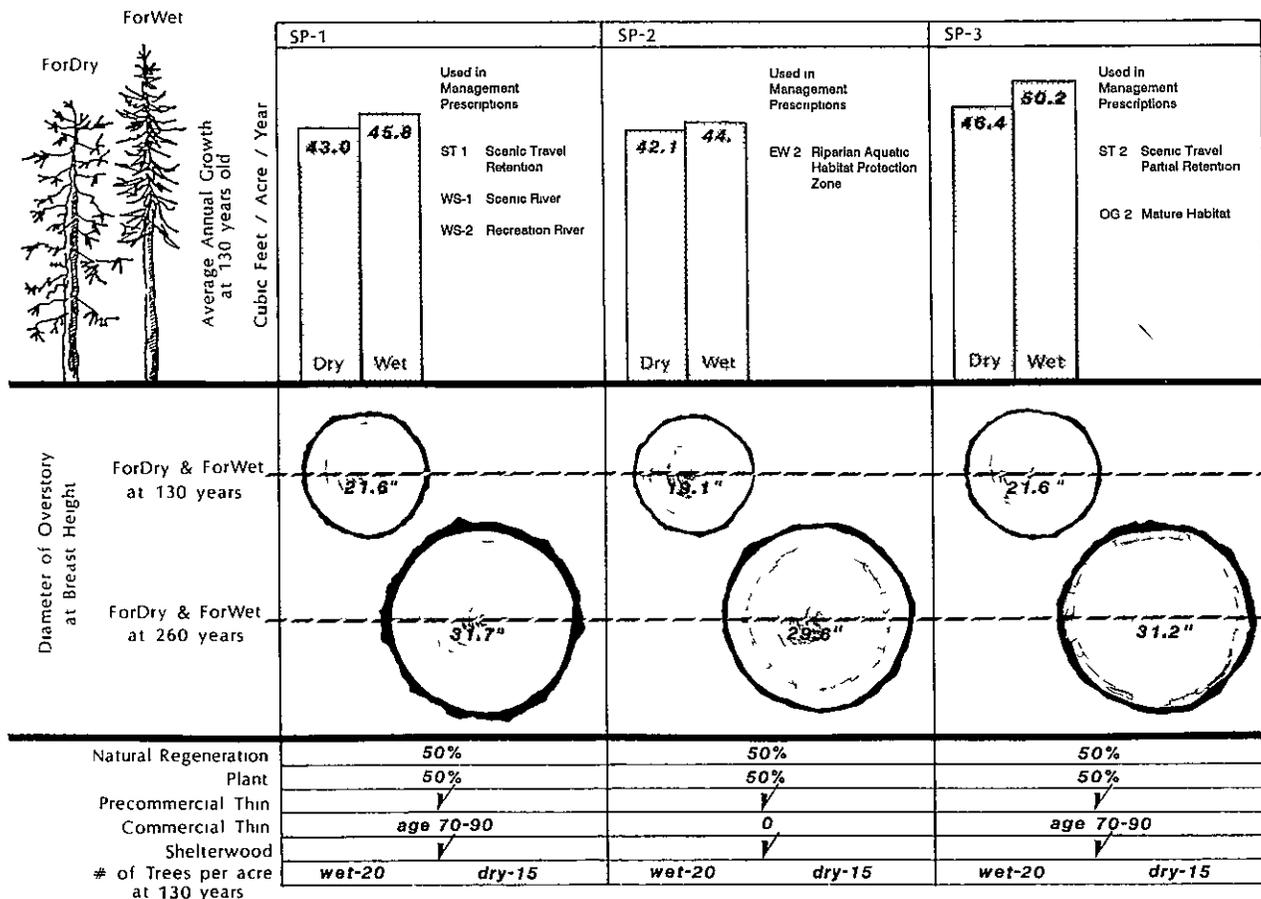
The intensive Range Management (RM-1) Prescription assumes the same silvicultural practices as GF-1, but with a 10 year regeneration lag. Three extended-rotation timber yield regimes were developed for use with the following prescriptions:

TABLE IV-7

Prescription	Yield Table
Key Big Game Habitat (EW-1)	RM-1
Riparian-Aquatic Habitat Protection Zone (EW-2)	SP-2
Mature Habitat (OG-2)	SP-3
Scenic Travel-Retention (ST-1)	SP-1
Scenic Travel-Partial Retention (ST-2)	SP-3
Scenic River (WS-1)	SP-1
Recreational River (WS-2)	SP-1
Dispersed Recreation, Unroaded, Timber Harvest (RE-4)	SP-2

Figure IV-4 depicts the extended-rotation timber yield regimes.

FIGURE IV-4
TIMBER YIELD TABLES - SPECIAL



Productivity

Most of the area not restockable within 5 years is within the less than 20 cubic foot productivity class. An approximation of timber productivity classification is shown in Table IV-8.

**TABLE IV-8
TIMBER PRODUCTIVITY CLASSIFICATION**

Potential Growth (Cubic Feet/Acre/Year)	Suitable Lands (Acres)
Less than 20	6,008
20-49	220,672
50-84	315,247
85-119	69,354
120-164	19,231
165-224	0
225+	0
Total	630,494

The average growth potential of trees measured during the 1977 inventory was site index 70 for ponderosa pine (dry ecotype) and site index 83 for Douglas-fir (wet ecotype). Site index is a measure of the height of trees at age 100 of the dominant or largest trees in the stands. This correlates to an average potential productivity of 52.3 cubic feet per acre per year on dry sites and 60.3 cubic feet per acre per year for wet types with intensive management.

Annual Sale Quantity

The annual sale quantity calculated from the suitable acres is 24.3 million cubic feet or 136 million board feet. In addition, there is 0.3 million cubic feet of sawtimber and 1.5 million cubic feet of other products. The sawtimber will come from unregulated acres including campgrounds, Experimental Forest, Mather Memorial Parkway, and/or salvage cutting from unsuitable lands. The other products are expected to be removed from down, defective, or trees too small to be included in the allowable sale quantity. See Table IV-9.

There is an estimated 54,000 acres of economically unsuitable lands that could become suitable if economic conditions and demand for forest products change the stumpage values. These are now handled as economically inefficient lands within the harvest prescriptions by the FORPLAN model. It is estimated that this could increase the annual allowable sale quantity by approximately 10 million board feet. This increase would be the maximum if all currently inefficient acres became economic. It is not likely that all currently inefficient acres would become suitable at the same time. It is reasonable to expect that there will always be some acres which are biologically suitable but not economic. Site specific evaluation may find somewhat more or less than the current estimate.

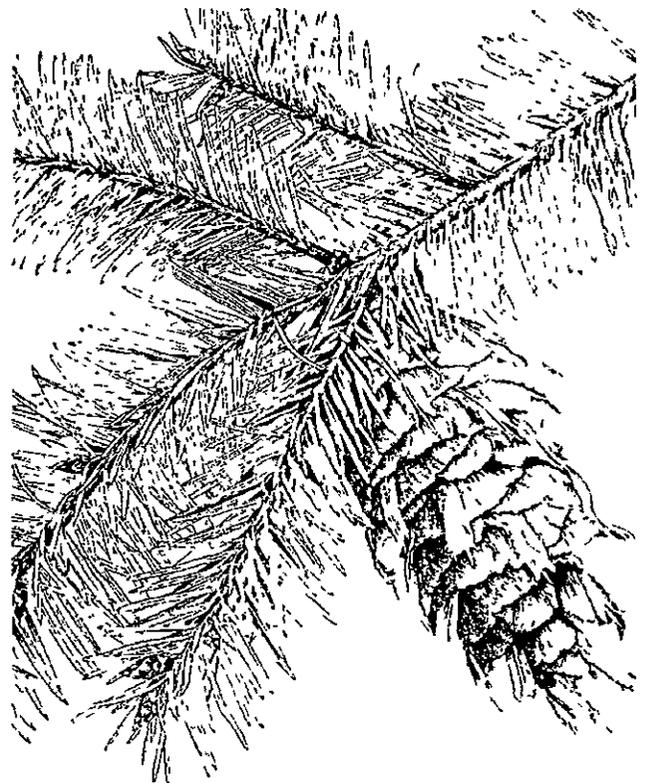


Table IV-9
Allowable Sale Quantity and Timber Sale Program Quantity
(Annual Average for First Decade) 1/

Allowable Sale Quantity <u>2/</u>		
Harvest Method	Sawtimber (MMCF)	Other Products (MMCF)
Regeneration harvest:		
Clearcut	11.8	1.1
Shelterwood and seed tree		
- Preparatory cut	0.1	
- Seed cut	3.8	0.1
- Removal cut	4.5	0.2
Selection	0.1	0.1
Intermediate harvest:		
Commercial thinning	0.1	0.1
Salvage/sanitation	2.1	0.2
Totals	22.5	1.8 <u>6/</u>
	Sawtimber	Additional Sale <u>3/</u> Other Products
Total for all harvest methods	.3 <u>7/</u>	1.5

Allowable sale quantity: 24.3 MMCF and 136 MMBF 4/
 Timber sale program quantity 5/: 26.1 MMCF and 146 MMBF 4/

- 1/ Expressed to nearest 0.1 MM board and cubic feet
- 2/ Includes only chargeable volumes from suitable lands.
- 3/ Includes only nonchargeable volumes from suitable and/or unsuitable lands
- 4/ Based on local unit of measure.
- 5/ Total of allowable sale quantity and additional sales.
- 6/ Chargeable fuelwood, house logs, and "Big Toy" roundwood products
- 7/ Campgrounds and Experimental Forest potential yield. Includes danger tree removal and experimental cutting.

Present and Future Forest Conditions

Table IV-10 presents the estimates of timber volumes for the present and future forest growing stock. Standing volumes will decrease, but annual net growth will increase as more acres of managed stands are created.

**TABLE IV-10
PRESENT AND FUTURE FOREST CONDITIONS**

	Unit of Measure	Suitable Land	Unsuitable Land	Total
Present forest: Growing stock	MMCF	1,807	971 ^{1/}	2,778
	MMBF	9,848	5,292	15,140
Live cull	MMCF	4.2	3.5 ^{2/}	7.7
	MMBF	22.9	19.0	41.9
Salvable dead	MMCF	27.3	22.7 ^{2/}	50.0
	MMBF	148.7	123.7	272.4
Annual net growth	MMCF	12.5	7.7 ^{1/}	20.2
	MMBF	141.1	42.0	183.1
Annual mortality	MMCF	10.2	8.5 ^{2/}	18.7
	MMBF	55.4	46.1	101.5
Future forest: Growing stock	MMCF	1,658		
Annual net growth	MMCF	16.6		
Rotation age	Years	70 ^{3/} to 120		
Age class distribution acres (suitable lands)	Age Class	Present Forest	Future Forest	
	0-30	54,340	55,878 ^{4/}	
	50	349,844	155,089	
	100	90,061	320,051	
	150+	136,249	99,476	
Total		630,494	630,494	

^{1/} Based on Timber Resource Statistics (Bassett 1983).

^{2/} Based on 1969 Timber inventory statistics.

^{3/} Average rotation age for regenerated stands on lands with timber emphasis by major forest types

^{4/} Based on FORPLAN acres by age class.

TABLE IV-11
VEGETATION MANAGEMENT PRACTICES
(Annual Average in First Decade for Suitable Lands)

PRACTICE	ACRES
Regeneration Harvest :	
Clearcut	2,719
Shelterwood and Seed Tree	
-Preparatory Cut	100
-Seed Cut	2,697
-Removal Cut	2,320
Selection	112
Intermediate Harvest:	
Commercial Thinning	252
Salvage/Sanitation	210
Timber Stand Improvement	4,200 1/
Reforestation	4,300 2/

1/ Based on 10 year Action Plan.

2/ Based on reforestation/timber stand improvement needs report.

Table IV-11 shows all planned methods of timber harvest from clearcut to light volume removal, thinning and sanitation salvage.

Although all harvest methods can apply to all site conditions and management prescriptions, some combinations are more likely to occur than others. A little more than half of the volume harvested on the forest in the next decade will come from clearcutting, see Table IV-11. The remainder of the harvest volume will come from silvicultural prescriptions that leave various amounts of trees on the site.

The various stages of shelterwood cutting: preparatory cut, seed cut, and removal cut, occur on the greatest number of acres, totalling 5,229 acres per year. As these treatments can occur at different time frames on a given stand, each step is shown separately on Table IV-11.

Selection harvest systems will be used especially on the driest and highest elevation suitable sites. Ponderosa pine stands on south slopes, especially if free of mistletoe are especially adaptable to uneven-aged management. This is due to the

characteristics of the species including: (1) wind firmness, (2) ability to respond to partial harvest with increased growth and, (3) resistance to fire and logging damage due to thick bark (USDA 271, Bulletin number 1965). At elevations above 5,000 feet, the selection harvest system may be appropriate, also this is especially true in stands where natural regeneration of species such as Pacific silver fir is occurring.

Mid-elevation stands on north and west facing slopes containing grand fir and/or mistletoed Douglas-fir are commonly clearcut. Grand fir and Douglas-fir are highly susceptible to Phellinus weirrii a root rot, and defoliating insects such as western spruce budworm and the tussock moth. Attempts at uneven-aged management and partial cutting tends to favor increased disease and insect losses in these particular species types. Currently, heavy mortality is occurring in old partial cut and overstocked grand fir stands due to Scolytus ventralis, a bark beetle that prefers grand fir. Past spruce budworm treatment areas were primarily located on grand fir and Douglas-fir sites. As much as 200,000 acres were defoliated by the budworm on the forest between 1970 and 1978

Clearcutting, although effective in alleviating many of the current insect, disease, and fuel buildups, is not acceptable to much of the public unless the clearcuts are very carefully designed. Therefore, a shelterwood system designed to maintain large, older trees of the most desirable species and vigor will be used on the foreground of most scenic travel ways. Also see Appendix H of the FEIS for a detailed discussion of the selection of harvest cutting methods.

10 B. VEGETATION: FORAGE

In the first decade permitted livestock grazing (Table IV-2) will average 23,000 AUM's which is the same as the current use, and leaves a livestock grazing capacity of approximately 15,700 AUM's unused. In addition to the excess livestock capacity, the Forest's total forage production allows for approximately 94,700 AUM's of forage for big game. Actual permitted use for livestock will not exceed the production potential on existing allotments and will allow for expected increases in big game numbers.

Existing range allotments have an estimated livestock grazing capacity of over 27,000 AUM's, on 203,500 acres of suitable range, and will accommodate all of the expected increase in permitted use. However, many of the existing allotment plans are outdated, and in order to meet the potential outputs these plans require reanalysis. It is through full implementation of these reanalyzed plans that livestock numbers will be increased, and that other outputs such as improved range conditions and enhancement of other resource will be attained. A schedule of allotment analysis needs can be found in Appendix A under range management detailed project schedules.

Although the existing allotments may carry the expected livestock increase in the first and second decades, some areas outside of these allotments containing suitable range may be incorporated into the allotments in order to meet all resource objectives. Some of the existing sheep allotments may be converted to cattle allotments if current trends in the livestock industry continue.

As discussed above, meeting the goals and objectives of this Plan is contingent on full implementation of the allotment plans. These allotment plans contain schedules for structural improvements such as fences and water developments, and non-structural improvements such as noxious weed control. In order to fully implement allotment plans, accomplishment of improvement schedules become imperative. Table IV-2 show outputs of 9 miles of fence, 11-12 spring developments, and about 375 acres of noxious weed control which will be required annually to fully implement the forage management program. Approximately one-half of these are reconstruction of existing improvements while the remainder are needed to implement existing plans. Detailed project schedules are found in Appendix A and show type, location, amount, and year scheduled. This detailed schedule will be updated periodically to reflect changes resulting from reanalysis of allotments.

The final step in meeting the objectives of this Plan is monitoring the forage management program. The monitoring requirements are found in Table V-1 in Chapter V.

10 C. VEGETATION: UNIQUE ECOSYSTEMS

The Tumwater Botanical Area was established under Regulation T-9(I) on June 10, 1938, for the protection of Lewisia tweedyi. The 1,104 acres were redesignated in 1971 as a botanical area under 36 CFR 251.22 to be managed in a near natural condition to protect plant species which occur there.

Although the area is located along a major highway, it is rather inaccessible due to the steep, rugged terrain. It is usually visited only by people who wish to view or study Lewisia tweedyi. The area is within Sections 28 and 34, T.25N., R17E., P.M.W., and is approximately four miles north of Leavenworth, Washington, in the Tumwater Canyon.

One additional Botanical Area (Lake Creek) is proposed by this Plan.

Lake Creek Botanical Area - Located on the Entiat Ranger District in Sections 27, 28, 33, and 34, T. 29 N., R. 19 E., this area is 212 acres. Protection is proposed for plants associated with an undisturbed wetland habitat.

Several additional unique areas are included in this Plan as special interest (SI-2) allocations. They include the following: The west end of Lake Wenatchee allocated for its aquatic habitat, Twin Lakes Ponds; Wenatchee River Indian Site for its cultural sites; a special botanical area near Ponderosa Estates; Upper Naneum Meadow for its ecosystem; Boulder Cave, Kloochman Rock, Goose Egg Mountain, and Blue Slide for geological as well as botanical features.

The Plan also includes old growth preserved for wildlife habitat, ecosystems diversity, and aesthetic reasons in addition to the spotted owl network. These areas include Hornet Ridge, Rattlesnake Springs, Heather Lake Trailhead, upper end of the Little Wenatchee River, and the "Sanctuary" cedar grove.

10 D. VEGETATION: THREATENED, ENDANGERED, AND SENSITIVE PLANTS

There are no known Federally listed threatened or endangered plant species on the Forest.

There are 50 plant species on the Forest that are on the Region 6 sensitive plant list (Table IV-12). Of the 50 species, 7 are candidates for the Federal list and the remaining 43 are listed by the State of Washington. The extent of the populations of these species on the Forest is unknown.

Before a project is initiated, inventories for populations and distribution of threatened, endangered, and sensitive species will be conducted on a priority basis. Some general inventories of species and their habitat will be required and research completed as needed to meet management goals.



Hackelia venusta

TABLE IV-12
SPECIAL PLANT SPECIES IN THE WENATCHEE N.F.

LIST OF SENSITIVE SPECIES

Date Last Revised 5/23/88

<u>PLANTS</u>	<u>Status</u>	<u>Occurrence</u>
<u>Scientific Name</u> common name		
<u>Agoseris elata</u> tall agoseris	RF - S	D
<u>Anemone nuttalliana</u> pasque flower	RF - S	D
<u>Astragalus arrectus</u> Palouse milkvetch	RF - S	D
<u>Antennaria parvifolia</u> Nuttall's pussy-toes	RF - S	D
<u>Botrychium lunaria</u> lance-leaved grape-fern	RF - S	S
<u>Botrychium minganense</u> Victorin's grape-fern	RF - S	D
<u>Botrychium montanum</u> mountain moonwort	RF - S	D
<u>Calamagrostis tweedyi</u> Cascade reedgrass	Cat 2	D
<u>Carex bauxbaumii</u> Bauxbaum sedge	RF - S	D
<u>Carex camosa</u> bristly sedge	RF - S	D
<u>Carex interrupta</u> green-fruited sedge	Cat. 3c	D
<u>Carex macrochaeta</u> large-awn sedge	RF - S	S
<u>Carex proposita</u> smokey mountain sedge	RF - S	D
<u>Carex scopulorum</u> var. <u>prionophylla</u> saw-leaved sedge	RF - S	D
<u>Cicuta bulbifera</u> bulb-bearing water hemlock	RF - S	D
<u>Chaenactis ramosa</u> branching chaenactis	Cat. 3c	D
<u>Chaenactis thompsonii</u> Thompson's chaenactis	Cat. 3c	D
<u>Cryptogramma stelleri</u> Stellar's rock-brake	RF - S	D
<u>Cypripedium calceolus</u> var. <u>parviflorum</u> yellow ladyslipper	RF - S	S
<u>Cypripedium fasciculatum</u> clustered ladyslipper	Cat. 3c	D
<u>Delphinium viridescens</u> Wenatchee larkspur	Cat. 1	D

TABLE IV-12 (Continued)
SPECIAL PLANT SPECIES IN THE WENATCHEE N.F.

LIST OF SENSITIVE SPECIES

<u>PLANTS</u>	<u>Status</u>	<u>OCCURRENCE</u>
<u>Scientific Name</u> common name		
<u>Eleocharis atropurpurea</u> purple spike-rush	RF - S	S
<u>Epipactis gigantea</u> giant helleborine	RF - S	D
<u>Erthrichium nanum</u> var. <u>elongatum</u> pale alpine forget-me-not	RF - S	D
<u>Gentiana douglasiana</u> swamp gentian	RF - S	S
<u>Geum rossii</u> var. <u>depressum</u> Ross' avens	RF - S	D
<u>Githopsis specularioides</u> common bluecup	RF - S	D
<u>Hackelia hispida</u> var. <u>disjuncta</u> rough stickseed	RF - S	D
<u>Hackelia venusta</u> showy stickseed	Cat 2	D
<u>Iliamna longisepala</u> longsepal globemallow	RF - S	D
<u>Limosella acaulis</u> southern mudwort	RF - S	S
<u>Mimulus suksdorfii</u> Suksdorf's monkey flower	RF - S	S
<u>Nicotiana attenuata</u> wild tobacco	RF - S	D
<u>Orobanche pinorum</u> pine broomrape	RF - S	D
<u>Oryzopsis hendersonii</u> Henderson ricegrass	RF - S	S
<u>Pellaea brachyptera</u> Sierra cliff-brake	RF - S	D
<u>Pellaea breweri</u> Brewer's cliff-brake	RF - S	D
<u>Pedicularis rainierensis</u> Mt. Rainier lousewort	RF - S	D
<u>Petrophytum cinerascens</u> Chelan rockmat	Cat. 2	S
<u>Platanthera sparsiflora</u> Canyon bog-orchid	RF - S	D
<u>Poa nervosa</u> var. <u>nervosa</u> Wheeler bluegrass	RF - S	S
<u>Ribes irriguum</u> Idaho gooseberry	RF - S	S
<u>Salix vestita</u> var. <u>erecta</u> rock willow	RF - S	D

TABLE IV-12 (Continued)
SPECIAL PLANT SPECIES IN THE WENATCHEE N.F.

LIST OF SENSITIVE SPECIES

PLANTS	Status	OCCURRENCE
Scientific Name common name		
<u>Saxifraga debilis</u> pygmy saxifrage	RF - S	D
<u>Saxifraga integrifolia</u> var. <u>apetala</u> swamp saxifrage	RF - S	D
<u>Sidalcea oregana</u> var. <u>calva</u> Wenatchee checker-mallow	Cat. 2	D
<u>Silene seelyi</u> Seely's silene	Cat. 2	D
<u>Spiranthes romanzoffiana</u> var. <u>porrifolia</u> western ladies-tresses	RF - S	D
<u>Tillaea aquatica</u> pigmy-weed	RF - S	S
<u>Trifolium thompsonii</u> Thompson's clover	Cat 2	D

Key to Abbreviations Used Above

Federal Candidate Species

- Cat. 1 = Category 1 Species (US Fish and Wildlife Service has enough information to support the appropriateness of proposing the species to the list of Endangered or Threatened species)
- Cat. 2 = Category 2 Species (Needs further information to confirm the appropriateness of proposing the species to the list of Endangered or Threatened species)
- Cat. 3 = Category 3 Species (No longer being considered for listing as Endangered or Threatened and are not regarded as candidate species:
 - a. Taxon extinct
 - b. Not a taxonomic entity
 - c. Taxon more abundant and/or widespread than previously thought and/or not subject to any identifiable threat)

RF - S = Regional Forester Sensitive Species

D = Documented occurrence

S = Suspected occurrence

10 E. VEGETATION: RESEARCH NATURAL AREAS

Research Natural Areas (RNA's) are part of a Federal system of tracts established for non-manipulative research and educational purposes. Each RNA is a site where some features are preserved for scientific purposes and natural processes are allowed to dominate. Their main purposes are to provide: (1) baseline areas against which effects of human activities can be measured; (2) sites for study of natural processes in undisturbed ecosystems; and (3) gene pool preserves for all types of organisms, especially those which are classified as rare and endangered.

Prior to establishment, a comprehensive formal report is made. For RNA's proposed on National Forest System lands, the report is submitted to the Chief of the Forest Service for approval.

a. Established RNA's

There are two established RNA's on the Forest. Meeks Table RNA on the Naches Ranger District is 64 acres and represents the ponderosa pine/pine grass plant community with a co-dominance of Douglas-fir. It was established on July 7, 1948, and is now within the William O. Douglas Wilderness.

Thompson Clover RNA located in Swakane Canyon on the Entiat Ranger District exemplifies a plant community characterized by Thompson Clover. It was established on February 17, 1977.

b. Formally Proposed RNA's

The Research Natural Area Committee for the Pacific Northwest has formally proposed two additional RNA's. Eldorado Creek located in the Teanaway drainage of the Cle Elum Ranger District is 1,336 acres in size and represents a plant community found on serpentine derived soils. The Eldorado Creek area was designated as a Special Area (Proposed RNA) in the Alpine Lakes Management Plan (November 2, 1981). Fish Lake Bog on the Lake Wenatchee Ranger

District is a 106 acre area on the west end of Fish Lake near Lake Wenatchee. This represents a floating bog community.

Preliminary reports have been made for both of these areas; Fish Lake Bog on July 5, 1979, and Eldorado Creek on August 9, 1972. A supplemental report on the mineral character of the proposed Eldorado Creek RNA was made on November 6, 1974.

c. Recommended RNA's

The Research Natural Area Committee for the Pacific Northwest Region determined that the candidate RNA's listed in Table IV-13 represent the best examples of particular kinds of natural ecosystems in the Region and are needed to meet present and future demands. There may be some future RNA needs that can best be satisfied on the Wenatchee National Forest. When suitable new areas are identified, they will be considered for addition to the Research Natural Area inventory.

TABLE IV-13
RECOMMENDED RESEARCH NATURAL AREAS
1984

Name	Area (Acres)	Location (District)	Plant Community Exemplified
• 1 Cedar Creek	2205	Naches	Mixed old-growth conifer/ shrub forest and Pacific silver fir forest
** 2 Icicle/Frosty Creek	784	Leavenworth	Western red cedar/western hemlock forest
** 3 Chiwaukum Creek	1124	Leavenworth	Grand fir mixed old-growth conifer/shrub
4 Drop Creek	530	Cle Elum	Englemann Spruce/Subal- pine fir forest

* Within the William O. Douglas Wilderness

** Within Alpine Lakes Wilderness

10 F. VEGETATION: ENTIAT EXPERIMENTAL FOREST

a. Current Management Program

The Entiat Experimental Forest includes 4,770 acres of Forest lands located within the Entiat River drainage northwest of Wenatchee, Washington. Research has been conducted on the area since 1957; in 1971, it was formally designated as an Experimental Forest. The Pacific Northwest Forest and Range Experiment Station and the Wenatchee National Forest cooperatively administer the area with the primary goal of providing opportunities for studying the effects of forest management and fire on vegetation, soil, and water resources. The area was selected as being representative of steep, forested watersheds occurring along the east slope of the Cascades. It consists of three similar, contiguous watersheds ranging in size from 1,168 acres to 1,393 acres, and in elevation from 1,800 feet to 7,000 feet. The mean slope is 50 percent with slopes as steep as 90 percent.

A major wildfire which burned most of the area in 1970 has had a dramatic impact on Forest vegetation. Pre-fire vegetation was primarily undisturbed, mature forest with small, subalpine grass-forb openings and bare rock. About 75 percent of the Forest was classed as ponderosa pine, with Douglas-fir the main associated species. Thickets of dense lodgepole pine occurred on wetter sites at higher elevations. Important understory species included bitterbrush, snowbrush, ceanothus, pinegrass, and numerous forbs. Fifteen years after the fire, the vegetation consists of a mosaic of shrub fields intermixed with planted pine and fir, and dense, young stands of naturally-established lodgepole pine. Scattered remnants of unburned old-growth forest occur on rocky ridges and outcrops.

The original research plan for the experimental watersheds was to develop baseline information on climate and hydrology under natural conditions, then test for changes following the construction of roads and implementation of several timber harvest practices. The collection of this information and the preparation of harvest plans were nearly complete when the watersheds burned.

Fire is a common occurrence on this Forest; hence research objectives were quickly changed to utilize the preburn data to evaluate effects of fire on the environment and the alteration of those effects by the re-establishment of forest vegetation. Initial post-fire studies provided land managers, resource specialists, and scientists with a better understanding of: the hydrologic response of burned watersheds including water yield and physical water quality; chemical water quality and site productivity in response to wildfire and erosion control fertilization; natural vegetation recovery and the effectiveness of erosion control seeding and fertilization treatments; soil and water responses to several methods of timber salvage; and effects of a large wildfire on local and regional economics.

11. WATER

The goal for water resource management under this Plan is to maintain favorable conditions of streamflow in regards to water quality, quantity and timing of flows. The dominant objective will be to insure meeting or exceeding Federal and Washington State water quality standards during implementation of this Plan. Accomplishment of the goal will be achieved through a number of objectives that emphasize maintenance or improvement of watershed condition.

Existing data indicate that most streams on the Forest exceed Washington State water quality standards. Water quality will meet the Washington State Class AA (excellent) standards in all decades of the Plan. This will require numerous actions including increased technical support in management decisions, improved resource inventories, application and continuous improvement of best management practices, improvements in riparian area management, aggressive watershed and fish habitat improvement programs, and increased coordination of management activities with other landowners and management entities.

Land management activities must be planned and conducted in a manner so that watershed conditions provide for the protection of the beneficial uses of water. Technical support for water resources will be provided at a level of detail

sufficient to facilitate sound management decisions that minimize the potential for damage to watershed resources, while meeting other multiple-use objectives. Coordinated resource management planning will be promoted, especially in watersheds in which resources are at risk.

Water resource inventory and monitoring will be conducted, in cooperation with other resources and management entities. Inventory will provide information on watershed condition needed for the development of management objectives by sub-drainage. Monitoring will provide feedback for determining if the practices and prescriptions being implemented are meeting management objectives and for identifying corrective action.

The watershed improvement program will be aimed at eliminating the backlog of improvement projects and assuring that project maintenance and treatment of newly identified needs occurs in a timely manner. Improvement projects will be completed in cooperation with other resources and management entities. Refer to Table IV-2 for an estimate of the number of acres treated by decade under this Plan.

The water rights program will be directed at obtaining water rights for all on-Forest water uses. Water uses on National Forest System lands will be protected.

The development of cooperative relationships with State and other Federal agencies, the Yakima Indian Nation, the Confederated Tribes of Colville, and private groups will facilitate the accomplishment of the above goals and objectives.

Coordination of these activities will be facilitated through a Five Year Action Plan designed to provide program direction, in cooperation with the soil resource program.

12. SOIL

The goal for the soils program under this Plan is to maintain or enhance the productive properties of the soil resource. This basic goal will be achieved by following Forest-wide Standards and Guidelines for the analysis and implementation of projects in a manner designed to protect soil productivity.

A primary component of the soils program will be to provide technical support to other resource activities at a level of detail sufficient to make management decisions that minimize the potential for damage to the soil resource. It is readily apparent that negative soil impacts (i.e. compaction, displacement, erosion, puddling, etc.) can occur within a very short period of time. However, soil building processes occur very slowly over long periods of time. Soil rehabilitation efforts seldom restore soils to their original condition; therefore, it is better to avoid, wherever possible, management practices that have a negative impact on the soil resources. In many cases, minimizing the amount of land affected by a given management activity, may be the only option available.

Another major emphasis for the soil program will be the completion and update of the Forest Soil Resource Inventory Program and the development of GIS capabilities. By 1992, remapping of the Wenatchee National Forest to the National Cooperative Soil Survey (NCSS) standards for Order II and Order III levels of intensity will be accomplished with the completion of the Naches area survey. The Order II level was used for all NF lands outside of wilderness areas, and the Order III level was used for the less intensively managed lands inside the wilderness areas. Kittitas County soil survey was completed in 1980 under a cooperative agreement with the State of Washington and the Soil Conservation Service. That survey was known as a "land grading soil survey", primarily designed to establish values of private forest lands in the State of Washington. Chelan County was mapped under the Cashmere Mountain cooperative agreement between the SCS, Washington State University, and the Forest Service. This soil survey was completed in May, 1989.

Soil survey maps and the accompanying interpretative information will be an important data layer for the GIS system, because the use and management of many other resources are often affected by soil characteristics. Emphasis will be placed on the input of this information into the GIS system as soon as it becomes available.

Another major component of the soils program will be Forest and project-level monitoring, conducted in cooperation with other resource and management entities. Monitoring will provide feedback for determining if the projects and practices being implemented are meeting management objectives and for identifying corrective action.

The Forest-wide watershed improvement inventory will be reviewed and revised by the end of the 1990 field season. The review and update of this inventory will be done on a district basis. Forest priorities will be re-established and the implementation schedule will be revised. Each district will be responsible for the development and update of rehabilitation plans so that work can be accomplished efficiently as funds become available.

The development of cooperative relationships with State and other Federal agencies, the Yakima Indian Nation, the Confederated Tribes of Colville, and private groups will facilitate the accomplishment of the above goals and objectives. This will be especially important in regards to coordinated resource management planning in watersheds in which resources are at risk.

Coordination of these activities will be facilitated through a Five Year Action Plan designed to provide program direction, in cooperation with the water resource program.

13. MINERALS

Because of the nature of the mining and mineral leasing laws, the management of mineral resource activities will continue to be largely reactive in nature. As a consequence, predicting the level of mineral resource activity, outputs and funding levels is difficult. However, some activity levels have been estimated and are shown on Table IV-2, and mineral program funding will be used to accommodate at least that level of activities. This will include but not be limited to; the processing of 35 to 100 leases and permits per year, the processing of and monitoring of 100 to 180 notices of intent and/or plans of operation, and the geologic evaluations needed to accommodate the timber sale programs. As the local, regional and National demand for mineral resources increases, however, it is expected that the mineral related activity conducted on this Forest will also increase. It is also assumed that increased activity will probably accompany any new developments industry makes in exploration, mining or mineral processing technology, or when new information is acquired which indicates that the Forest has a potential for the occurrence of previously unknown mineral resources. If this happens the mineral management funding will have to increase to accommodate the increased activities.

Under this plan, the area withdrawn as Wilderness will not change, and only 2,547 acres (less than 1 percent of the total Forest area) will be proposed as new withdrawals. The only mineral activity that will occur within the withdrawn areas will be limited to that conducted under rights which are confirmed to have existed prior to the date of withdrawal. It is assumed that activity will be relatively negligible. Of the remaining Forest area in which mineral activities will be generally encouraged and facilitated, twenty percent (436,915 acres) will be managed as highly sensitive areas (e.g., experimental forest, old growth dependent species habitat, developed recreation sites, dispersed recreation areas, special areas or as Wild and Scenic rivers), and the remaining will be managed under relatively unrestrictive management direction.

Since the Forest has little influence on the demand for mineral resources and little to do with the technological factors associated with the mining industry, it will have very little actual influence on the amount of activity that is conducted on the Forest. It is assumed that withdrawals and highly restrictive management prescriptions will have some effect on the type of activity that is actually conducted, but predicting what that effect will be is difficult (see Chapter IV of the FEIS). However, using available demand information and past activity as a basis, mineral resource activity and production estimates have been made and are shown on Table IV-2. As this table indicates, the energy mineral related workload will be dominated by the processing of lease applications and the processing of prospecting, exploration and development proposals. Based primarily on past leasing activity and demand projections provided by Donald A. Hull (November 30, 1982), the number of these types of actions is estimated to be about 35 increasing to possibly 60 during the last decade; and that activity may be accompanied by the production from 104 billion BTU's of energy in the first decade to 607 BTU's in the last decade.

Since little information concerning the energy mineral resources of the Forest is available, it is difficult to predict exactly where the activity will occur. However it is assumed that this activity will concentrate primarily on the Naches, Cle Elum and Leavenworth Ranger Districts. It will be dominated by interest in oil and gas resource exploration and development. However, should the energy situation return to that of the 70's, that return could be accompanied by an increased interest in the geothermal and coal resources of the Forest.

As with the energy mineral related activity, the non-energy locatable mineral related workload has been estimated using past activity and anticipated increases in the demand for both precious and base metal resources. This workload will consist of processing notices of intent and plans of operations for proposed prospecting, exploration and development activities, and will also include the conducting of mineral evaluations needed to respond to patent applications, conflicts between mineral resource development and other resource uses, or to proposed land disposal actions. It

appears that most interest will focus on the precious metals (e.g. gold and silver) and possibly on some industrial mineral commodities (e.g., limestone, industrial-grade garnet deposits and some building stone deposits). However, an increase in base metal prices could renew interest in those commodities as well. Estimates of the volume or value of these mineral commodities have not been made.

The demand for common variety mineral resources, especially those associated with Forest road construction activity, is expected to decrease somewhat. However, there may be some increase in the demand for these resources by private industry as is indicated on Table IV-2. This private demand will be primarily for highway construction, building or landscape purposes. However, as with locatable mineral commodities, predicting the future demand for these minerals is very difficult.

14. LANDS

Existing utility corridors will be continued. Capacity would be increased to the degree feasible to accommodate increased energy needs (i.e., 115 KV line might be increased to 230 KV). One potential new corridor is identified. This corridor would utilize a "window" in the Sheets Pass to Pyramid Peak area and then run southeasterly toward Hanford and the Tri-Cities area.

For this Plan, it is estimated that the number of small hydroelectric proposals would be about 25. Three or four of these could be expected to reach the application for license stage.

Landownership guidance is provided in each management prescription. Overall priorities for landownership adjustments are: (1) those that make possible improved resource management, and (2) those that increase management efficiency and reduce management costs.

A landownership classification plan based on the guidance in the prescriptions may be found in the Plan Appendix B.

Additional guidance is to be found in the Chelan, Lake Wenatchee, and Icicle Composite Plans.

15. ROADS

The overall road management and development programs necessary to implement this alternative are as follows.

a. Management

The road management strategy in this plan is to reduce the cost and impact of roads, to provide road access to developed sites to a service level comparable with their development level, to correct chronic sediment sources and prevent fish barriers, to maintain the current pattern of dispersed recreation, and to not improve access to wilderness areas to the extent that wilderness values are reduced. In order to implement this plan, the following has been done.

1. The proposed management for all existing Forest Development Roads is documented in the Forest Development Transportation Plan (FDTP). The FDTP includes elements for maintenance, service level, etc., for each individual road on the Forest. In addition, all known Forest roads are shown on primary base series maps at 1:24,000 scale. These maps and inventories, including the bridge inventory, and a map of the Forest Highway system comprise the Forest Development Transportation Plan (FDTP) that is referred to in NFMA.
2. A method for identifying the road management objectives for the new construction and reconstruction is found in FSH 7709. This process (resource elements-design criteria-design standards) is intended to ensure that all new roads are designed and operated to standards that are responsive to the resource objectives of this plan.
3. Table IV-14 identifies the proposed service levels for the arterial and collector system. A map of these service levels and road segments is available in the Supervisor's Office.

b. Development

The strategy for development will be to provide local roads as necessary for timber management and resource protection, to reconstruct the arterial and collector system to provide for safe joint use, and to minimize the total cost of operating the existing system by reducing the user and maintenance costs associated with high traffic volumes over gravel surfaced roads. Following, are the proposed levels of development.

1. Local Roads

Approximately 1,468 miles of new road are expected to result from the implementation of this Plan. Some 706 miles of this are in areas that are currently unroaded, but allocated to timber harvest prescriptions in this Plan. It is assumed that the majority of this construction will occur in the next 18 years. Most new roads will be closed after timber management activities unless there is an overriding need to keep them open.

2. Arterial/Collector Roads

The proposed construction and reconstruction of the arterial and collector system to meet the resource objectives of this plan are found on Table IV-14. It is estimated that 18 miles will be constructed, and 162 miles will be reconstructed at an average annual rate of 18 miles a year for the next 10 years.

3. Issue Roads

The Forest Service has no need of a road across Naches Pass for management purposes and has no plans to construct such a road. However, land allocations in the "pass area" do not preclude roading and the possibility exists that another government agency or private entity could propose a road through the pass, although, there are no proponents at present. Any road project proposal of this nature would be subject to the appropriate site-specific environmental analysis, including public involvement and proper documentation.

15. FACILITIES

The Facilities Master Plan identifies Forest facilities needs and sets priorities to construct or reconstruct buildings and utility systems in order to provide facilities which are safe, efficient, cost effective, and attractive. Due to the significant increase in permanent employees in the past 3 years, many of the existing administrative facilities on the Forest are not adequate to meet current needs. The most critical facilities needed currently and for the next 10 years include increased office space, adequate housing for temporary employees, and renovation of public contact areas.

**TABLE IV-14
PROPOSED SERVICE LEVELS FOR ARTERIALS AND COLLECTORS**

Road Name and Number	Road Miles	Current Service Level/	PROPOSED				Remarks	
			SL	Const Mi	Const M \$	Reconst Mi		Reconst M \$
ENTIAT VALLEY 5100	5.1	D	B			5.11	250	RECREATION ROAD
ENTIAT VALLEY 51	10.1	A						
ENTIAT SUMMIT 5200	35.9	D						
TYEE RIDGE 5700	15.8	C	B			4.0	100	ASPHALT SURFACE
FRENCH CORRAL 5800	9.0	C						
SHADY PASS 5900	24.1	D	C			15.8	725	PROVIDE SAFE JOINT USE
LOWER CHIWAWA 6100	4.1	C						
DEEP CREEK 6101	3.1	C						
DEEP CREEK 6101	2.6	D						
CHIWAWA 62	8.4	A						
CHIWAWA 6200	1.5	B						
CHIWAWA 6200	11.5	D	C			4.0	500	RECREATION ROAD
BIG MEADOW CREEK 6300	4.3	B						
BIG MEADOW CREEK 6300	5.4	C						
WEST CHIWAWA 6306	7.6	D	C	5.0	250	3.6	135	TIMBER ACCESS
WHITE RIVER 6400	4.0	D						
LITTLE WENATCHEE 65	6.9	B						
LITTLE WENATCHEE 6500	5.2	C						
LITTLE WENATCHEE 6500	2.4	D						
RAINY CREEK 6700	13.5	C	B			1.1	61	ASPHALT SURFACE
LABYRINTH MOUNTAIN 6701	4.6	C	B			4.6	255	ASPHALT SURFACE
MISSION CREEK 7100	12.7	D	C			12.7	315	SAFE JOINT USE
CAMAS LAND 7200	5.8	C						
MTN. HOME RANCH 7300	11.0	D						
BLEWETT ROAD 7320	6.0	B	B			6.0	120	SEAL COAT
VAN CREEK 7520	5.9	C						
ICICLE 76	8.6	A						
ICICLE 7600	5.8	C	A			4.6	400	RECREATION ROAD
COOPER MOUNTAIN 8020	21.1	D						
ANTOINE 8140	10.6	C						
GRADE CREEK 8200	39.1	D	D			4.2	205	RECREATION ROAD
LIBERTY-BEEHIVE 9712	22.4	D	C			2.1	100	RECREATION ROAD
LIBERTY-BEEHIVE 9712	10.6	C						
DERBY 7400	13.0	C	A			0.7	100	SAFE JOINT USE
TIETON 12	17.4	A	A			1.0	400	COOP WITH YAKIMA CO
NACHES PASS 19	14.7	A						
NACHES PASS 19	1.6	C						
N F TIETON 1207	5.2	C						
WILDCAT 1306	0.7	B						
WILDCAT 1306	3.1	C						
OAK CREEK 1400	12.8	C						
BETHEL RIDGE 1500	7.7	B						

TABLE IV-14 (continued)

PROPOSED SERVICE LEVELS FOR ARTERIALS AND COLLECTORS

Road Name and Number	Road Miles	Current Service Level1/	PROPOSED				Remarks	
			SL	Const.		Reconst		
				Mi	M \$	Mi	M \$	
BETHEL RIDGE	1500	18.0	C					
BETHEL RIDGE	1500	3.0	D	C		3.0	200	RECREATION ROAD
S.F. TIETON	1000	5.8	B					
S.F. TIETON	1000	7.7	C	B		7.3	960	ASPHALT SURFACE
LOST LAKE	1201	4.9	B					
LOST LAKE	1201	2.6	C					
DEVIL'S CANYON	503	3.4	B					
DEVIL'S CANYON	1503	4.4	C					
BUMPING LAKE	18	10.9	A					
BUMPING LAKE	18	6.9	C	B		0.3	40	ASPHALT SURFACE
LITTLE RATTLESNAKE	1501	5.5	B					
LITTLE RATTLESNAKE	1501	4.8	C					
NILE LOOP	1600	6.1	C	C		6.1	400	SAFE JOINT USE
NILE LOOP	1600	18.5	C	B		3.0	250	ASPHALT SURFACE
ROCK CREEK	1702	11.3						
ROCK CREEK	1702	0.5	B					
MILK CREEK	1708	8.1	C					
DEVIL CREEK	1709	8.6	C					
SWAMP CREEK	1706	9.2	C					
RIGHT HAND	1720	5.2	C					
RAVEN'S ROOST	1902	15.8	C					
MANASTASH DR	3100	10.5	B	B		10.5	115	COST SHARE RSR
MANASTASH DR	3100	2.3	D	C		2.3	30	MINOR RECONSTRUCTION
MANASTASH DR.	3100	2.2	C					
MANASTASH DR	3100	4.0	D					
TANEUM	33	6.8	B	A		6.8	270	ASPHALT SURFACE
TANEUM	3300	1.4	A					
TANEUM	3300	12.4	C					
CABIN CREEK	4100	1.7	A					
CABIN CREEK	4100	13.4	B	B		6.4	80	COST SHARE RSR
STAMPEDE PASS	5400	3.7	B					
STAMPEDE PASS	5400	1.1	A					
KACHESS	4900	2.0	A					
COOPER	4600	4.8	A					
COOPER	4600	4.8	C	C		2.2	25	COST SHARE RSR
TABLE MOUNTAIN	3500	9.0	B					
TABLE MOUNTAIN	3500	3.1	C					
TABLE MOUNTAIN	3500	4.2	D	C		4.2	50	MINOR RECONSTRUCTION
COW CAMP	3111	3.6	C					
COW CAMP	3111	3.0	D	C		3.0	40	MINOR RECONSTRUCTION
TAMARACK SPRS.	3120	6.4	C	C		2.1	22	COST SHARE RSR
TAMARACK SPRS.	3120	0.2	D	C		0.2	4	MINOR RECONSTRUCTION

TABLE IV-14 (continued)

PROPOSED SERVICE LEVELS FOR ARTERIALS AND COLLECTORS

Road Name and Number	Road Miles	Current Service Level1/	PROPOSED					Remarks
			SL	Const.		Reconst		
				M ₁	M \$	M ₁	M \$	
GNAT FLAT 3330	8.5	C						
S CLE ELUM RIDGE 3350	11.1	C	C			7.7	85	COST SHARE RSR
LOG CREEK 4110	11.3	C	C			4.1	45	COST SHARE RSR
LOG CREEK 4110	0.4	D	C			0.4	5	MINOR RECONSTRUCTION
YAKIMA PASS 5480	1.7	B						
YAKIMA PASS 5480	5.7	C						
COLD CREEK 9070	5.6	C	C			4.2	50	COST SHARE RSR
KEECHELUS FRNT 4832	2.0	A						
KEECHELUS FRNT. 4832	7.5	C						
KEECHELUS RIDGE 4934	9.3	C						
GALE CREEK 4948	6.7	C						
BOX CANYON 4930	4.1	C						
BOX CANYON 4930	1.6	D						
THETIS CREEK 4936	4.0	C						
THETIS CREEK 4936	0.4	D						
EAST KACHESS 4818	6.8	C	C	3.8	150			TIMBER ACCESS
FRENCH CABIN 4308	7.4	C						
FRENCH CABIN 4308	2.0	D	C			2.0	30	
LITTLE SALMON LASAC 4315	5.3	C						
STAVE CREEK 4613	5.7	C						
CLE ELUM VALLEY 4330	0.2	B						
CLE ELUM VALLEY 4330	13.0	C						
N. FORK TEANAWAY 9737	10.0	C	C			10.0	575	RECREATION ROAD
BLUE CREEK 9738	7.0	B	B			7.0	80	CHIP SEAL
BLUE CREEK 9738	7.6	C						
BLEWETT 7320	4.1	B						
HURLEY CREEK 9711	6.6	C						
COUGAR GULCH 9718	5.7	C						
SWAUK MEADOWS 9716	3.8	C						
POLE PATCH 3507	6.7	B						
TACOMA PASS 4112	1.3	C						
S FK. TANEUM 3320	0.0	C	C	9.0	500			TIMBER ACCESS

E. FOREST-WIDE STANDARDS AND GUIDELINES

These Forest-wide Standards and Guidelines when used in conjunction with the management prescriptions for the management areas, state the bounds or constraints within which all practices will be carried out in achieving the planned objectives. They are intended to be used with national and regional policies, standards and guidelines contained in Forest Service manuals and handbooks, and the Pacific Northwest Regional Guide.

RECREATION

Recreation Planning and Inventory

1. Develop management plans for newly classified special areas.
2. Review Recreation Composite, Forest Trail and ORV Plans annually for adequacy, and update as needed.
3. Visual quality objectives shown represent *minimums, higher ones may be achieved.*
4. Mitigation measures to reduce the visual impacts upon the landscape will be considered and used to meet the visual quality objective.
5. Harvest units must be located and designed to blend with the natural landscape character to the extent practicable.
6. Evaluate the visual absorption capacity (a function of: slope, vegetative character, soil color contrast, productivity) and apply landscape architectural design arts principles in land form manipulation and vegetation management.
7. Landscape architectural concepts will be used to design and blend structural elements (buildings, fences, poles, utility lines, culverts, bridges, microwave towers, roads, trails, etc.) into the landscape to meet visual quality objectives.

8. Design roads, waterways, and trail systems to be consistent with adopted Recreation Opportunity Spectrum class and Visual Quality Objectives indicated by the management prescriptions.

9. Manage the setting of Forest openings such as meadows, lakes, ponds, and reservoirs in a manner to retain their natural appearing character.

10. Rehabilitation actions will be planned and scheduled in management areas where the existing visual condition does not meet the adopted visual quality objective.

11. Update the Forest Existing Visual Condition (EVC) and Visual Quality Objective (VQO) mapping every five years, in the Forest database or in a Geographic Information System (GIS).

12. Evaluate existing developed and dispersed recreation sites to determine if they meet present and future public expectations, needs, and desires, and if they have the resource capability of sustaining present or future levels of visitor use.

13. Recreation facility development or improvement planning will conform to and be consistent with the applicable ROS Class criteria for level and scale of development, setting, experience level, and social interaction.

14. Recreation site or dispersed area planning on a site specific or area basis will be done through the Environmental Analysis process in accordance with ROS Class criteria, visual quality objectives and other applicable management objectives.

15. Plan new developed and dispersed winter recreation opportunities in response to the growing demand for winter sports areas and developed facilities. Seek maximum opportunities for partnerships and joint ventures with private developers and other agencies in providing recreation development.

16. Complete area wide or composite recreation management plans for logical planning areas where:

- A. Conflicting uses and activities are creating Forest-level issues and controversies.
- B. Major construction or reconstruction of developed sites and facilities is necessary, and recreation uses and activities need to be coordinated.
- C. Multiple activities and use patterns have created highly complex situations needing careful detailed planning.

17. Evaluate selected scenic travel viewsheds for possible future nomination and/or designation as National Forest Scenic Byways.

18. Complete and maintain a cultural resource overview of the Forest. The overview should summarize all previously recorded cultural resource information for the Forest; provide a framework for evaluating cultural resources identified through the inventory process; develop a preliminary research design to guide future surveys, inventories, and scientific investigations; and identify opportunities for interpretation of a range of cultural properties.

19. Conduct cultural resource inventories (survey and site recordation) according to strategies and consultation procedures established on the Forest. Emphasis will be given to all areas where ground disturbing activities are planned, to ensure discovery of all reasonably locatable cultural resources. These inventories should be supervised by a cultural resource professional.

There are also substantial inventory needs on those Forest acres (such as wilderness) that are not affected by anticipated project activities. Priorities for non-project related inventory will be:

- A. Areas experiencing degradation through natural processes or intensive public use.
- B. Areas of reported but unverified sites.
- C. Areas where cultural resources are highly probable as determined by known land use patterns, terrain features, resource distributions, and the nature and extent of previous landscape modifications.

20. Develop management plans, in consultation with the Washington State Historic Preservation Office (SHPO), for all sites listed in the National Register of Historic Places. These plans should specify measures to protect and maintain the cultural integrity of the sites, objectives for management of the visual setting, levels and types of other resource uses compatible with the historic values of the sites, an interpretive design if so desired, and a program to carry out the objectives of the plan. Adaptive or compatible modern uses of historic properties, such as use as Forest Service administrative facilities or under special use permit with protective stipulations, should be encouraged.

Cultural Resources Evaluation and Assessment

1. Evaluate the significance of inventoried sites by applying the criteria for eligibility to the National Register of Historic places. Sites may be treated as individual properties, thematic groups, or historic districts. Efforts should be made to look at the local or regional context of the cultural resource and to determine the relationship of the property to others within the same historic context and/or specified geographic area. Give priority to those properties that may be affected by project activities. Develop a plan to evaluate all other cultural resources through cost effective means as the Forest-wide inventory nears completion.

2. Nominate cultural resources that meet the appropriate criteria for eligibility to the National Register of Historic Places. Nominations will be scheduled incidentally until completion of the Forest-wide inventory of cultural resources.

3. Consider the effects of all Forest Service undertakings on significant cultural resources, and assure the development of measures to avoid or mitigate any adverse effects.

Cultural Resource Protection and Enhancement

1. Develop measures, in consultation with the Washington State Historic Preservation Office (SHPO) and, if necessary, the Advisory Council on Historic Preservation (ACHP), to protect significant sites from adverse effects due to project activities. These measures may range from complete avoidance of the site and corresponding protection of its environmental setting, to mitigation procedures which conserve the historic values of the resources. American Indian religious values are also important elements to be considered when addressing decisions as to site preservation, protection, or alteration/removal. Among alternatives to consider are:

A. Adjustment of project boundaries to ensure complete avoidance of the site as well as protection of its environmental setting, where necessary.

B. Adoption of methods or techniques that will minimize disturbance to the site and its environmental setting.

C. Meeting "The Secretary of the Interior's Standards for Historic Preservation Projects" for projects involving historic structures.

D. Removal of the cultural property (historic) to another appropriate location after documentation of the property in place.

E. Mapping, photo-documentation and scaled drawings of historic properties before proceeding with project implementation.

F. Excavation of archaeological sites utilizing a professionally sound research design in keeping with the State-wide research plan, and carried out in consultation with interested American Indian groups. Such excavation would be undertaken through contract.

2. Protect eligible cultural resources from degradation due to public use and natural deterioration. Protection plans may include, but are not limited to, scientific study and collection, the use of fences and barriers, proper use or removal of signs, stabilization techniques, closure orders,

patrol and site monitoring, maintaining site anonymity, and gaining public understanding and support through education.

3. Buildings listed on the National Register of Historic Places or buildings eligible for listing, will be maintained to the maximum extent practical.

4. Provide opportunities for scholarly/scientific use of designated prehistoric and historic sites. This may require "banking" of sites for future use, coordination with American Indian groups, and processing of antiquities permits for testing and excavation of sites by qualified professionals.

5. Apply the SI-2 prescription to future cultural properties based on National Register eligibility, scientific values, and/or American Indian concerns.

6. Interpret suitable cultural resource properties for the recreational use and educational benefit of the general public. The measure of suitability should be based on accessibility to the public, feasibility for protection, condition of the property, compatibility with other resource management activities within or adjacent to the area, thematic representation, and value to public groups. Interpretive services and facilities should be compatible with the nature, quality, and integrity of the cultural sites selected for enhancement. Preferred methods include brochures, signs, and self-guided tours. Handicapped access to interpreted sites should be provided wherever practicable. Coordination with the American Indian community and involvement of interested volunteer groups and appropriate educational institutions will be encouraged.

Recreation Facility and Site Reconstruction

1. Prior to converting a qualifying campground to a fee site designation or expending capital investments to convert unqualifying campgrounds to fee site standards through reconstruction, an analysis will be made to assure such a conversion is justified. Some basic considerations to be used are: public demand, current and 10-year projected use, and other recreation facilities and opportunities present in the general area.

STANDARDS AND GUIDELINES

2. Recreation site reconstruction and improvement will be accomplished through partnerships and cooperative ventures to the maximum extent possible.

3. Recreation site reconstruction will be completed to high quality standards in harmony with development scale of the site, ROS Class, and public desires and expectations for the site.

Recreation Facility and Site Construction

1. New campground development will generally be constructed to full service standard and to the development scale level and the Recreation Opportunity Spectrum Class criteria that is appropriate for the site considering its location and setting.

2. Construction of new sites will be based on an analysis of user demand, use of currently available facilities, projected future demands, and expressed public interest.

Recreation Facility and Site Management

1. Manage recreation sites to provide a high degree of security, safety, and sanitary conditions for recreation visitors.

2. Provide high quality maintenance of facilities that assures a positive public image and a high degree of visitor satisfaction.

3. Keep abreast of visitor's needs and desires at recreation sites and adjust management programs to meet these needs.

Visitor Use Administration

1. Information programs such as recreation reports, news releases, radio and television reporting, video productions, and information tours will continue to be emphasized as means to keep the public informed of management activities.

2. Contacts with the public will anticipate management problems. Contacts will be based on

high quality public service and positive and effective communication. Contacts will seek to improve user land use ethics, encourage "light on the land" use techniques, and minimize conflicts.

3. Regulations to restrict or limit use will be employed only after all reasonable means have been exhausted to resolve conflicts between users and user groups.

4. Regulations and restrictions on Forest visitors will be well coordinated between Districts and adjacent Forests to avoid unnecessary contradiction or needless public confusion. However, logical deviation and flexibility will be maintained in user administration.

5. Incorporate interpretive and outdoor environmental education programs into activities available at appropriate developed sites.

Trail Reconstruction

1. Trail reconstruction will be accomplished in accordance with established objectives for each trail.

2. Meet visual management objectives and applicable ROS Class criteria in reconstruction design to assure appropriate recreation experience of the trail.

Trail Construction

1. Construct new trails to meet specific recreation management objectives, provide additional opportunities, solve user conflicts, and meet public demand where development of new trails is compatible with other land uses.

2. Newly constructed trails will meet visual management objectives and applicable ROS Class criteria for the areas accessed by the trails.

3. Design trails to provide a variety of recreation experiences as well as to access destinations or complete loop opportunities.

4. Plan the development and location of winter trails for snowmobile, cross-country skiing, snowshoeing, dog sledding, etc., to coordinate

with other resource values, management activities, and various management prescription criteria.

Trail System Maintenance and Operation

1. The Forest trail system will provide for use by all specified modes of transportation as contained in the management prescriptions.
2. Trail closures will be made only where needed to minimize disturbance to wildlife; prevent user conflicts; to protect soil, water, visual, vegetative, and cultural resources; control heavy use or to meet legislative requirements; and provide for public safety.
3. Trail maintenance will be performed to a standard or level that is compatible with established trail objectives for that trail and in conformity with ROS Class criteria.
4. All trails in the system will be protected from impact, or restored to at least the pre-existing condition, from all Forest management activities. Trails may be bisected by new road construction when no reasonable alternative exists, but mitigation will be completed to restore the usability of the trail.
5. Winter trails will be added to the system, and receive protective mitigation considerations equal to the summer Forest Trail System.
6. In trail system planning and inventory, establish objectives for each system trail identifying purpose, intent, or role of the trail, opportunities provided by the trail, use levels, and public expectations of the trail. Use trail objectives as a guide in construction or reconstruction planning and in establishment of maintenance levels.

WILDERNESS

Wilderness Recreation Opportunity Spectrum Classes

The Wilderness Recreation Opportunity Spectrum (WROS) provides a way to describe the variations in the degree of isolation from the sounds and influences of people, and the amount of recreation visitor use. There are four WROS classes; Pristine, Primitive, Semi-Primitive, and Transition.

1. Pristine

The area is characterized as an extensive, unmodified, natural environment. Natural processes and conditions have not been measurably affected by the actions of users. The area will be managed as free as possible from the influences of human activity. Terrain and vegetation allow extensive and challenging cross-country travel.

a. Physical-Biological Standards

(1) Vegetation

- (a) Area of vegetation loss, and compacted bare mineral soil at any campsite, should not exceed 225 square feet.
- (b) Trampled area of vegetation with season recovery should not exceed 400 square feet.
- (c) No loss of trees, or trees with exposed roots at any campsite.
- (d) No noticeable modifications of natural plant succession due to stock grazing or human activity.
- (e) No loss of dead trees or noticeable loss of dead, woody debris due to campfires.

(2) *Soils*

(a) Displacement and erosion of soil resulting from human activity will be limited to a rate that approximates the natural process.

(b) Soil compaction should not occur in this class outside existing established campsites.

(3) *Water Quality*

There should be no measurable change in water quality due to human activity.

(4) *Air Quality*

Air quality will not be degraded as a result of campfire smoke, or Forest Service Management activities outside of wilderness in Class I areas.

(5) *Fish and Wildlife*

Visitor use shall seldom and only temporarily displace wildlife populations.

(6) *Scenery*

(a) No campsites should be visible from any other campsite.

(b) Human activity inside Wilderness should remain subordinate in foreground viewing and not be recognizable in middle-ground viewing areas.

(7) *Livestock Allotment*

This class should not include commercial livestock allotments so that the area is free as possible from human influences and to maintain the total integrity of natural ecological processes.

b. Social Standards

(1) *Encounters*

There should be an 80 percent probability that not more than one individual or party will be encountered per day during the primary use season.

(2) *Party Size*

The maximum party size shall not exceed a combination of 12 people and/or livestock, (12 people and 18 animals in the Lake Chelan-Sawtooth Wilderness). A total of not more than six people will be encouraged in this class, and use of stock will not be encouraged for cross-country travel.

(3) *Campsites*

There shall be no other campsites visible or audible from any campsite. New user developed campsites will not be allowed to become established. When found, fire rings and tent frames will be disassembled and dispersed.

(4) *Pets*

Pets must be under reliable voice control or physical restraint. Pets may be banned from this class for protection of wildlife or to avoid other resource impact.

c. Managerial Standards

(1) *Regulations and Information*

(a) Posting of information and regulations regarding this class will be located at trail-heads.

(b) Formal orders and permits may be required to achieve management objectives in this class.

(c) Ranger patrols and administrative contacts should be rare in this class and kept to the minimum necessary to meet management objectives.

(d) Signs will generally not be present, but may be used in rare circumstances to protect Wilderness resources.

(e) Recreation visitor travel routes will not be readily noticeable or may appear to be wildlife trails.

(2) Trails

There shall be no system trails in this class. User travel should be managed so that travel routes are not readily apparent or appear to be wildlife trails.

(3) Resource Protection Facilities

Facilities such as stock holding corrals are not appropriate in this class. Areas receiving visitor use numbers sufficient that facilities are necessary to protect resources should not be classified Pristine, or use should be controlled to maintain pristine conditions.

Temporary signs may be necessary to inform visitors of soil and vegetation rehabilitation projects.

2. Primitive

The area is characterized by an essentially unmodified, natural environment. Concentrations of visitors are low and evidence of human use is minimal. The area has high opportunity for isolation, solitude, exploration, risk, and challenge.

a. Physical-Biological Standards

(1) Vegetation

(a) Area of vegetation loss, and compacted bare mineral soil at any campsite should not exceed 400 square feet.

(b) There should be no loss of trees at any site and fewer than four trees with exposed roots per impacted site.

(c) No noticeable, long-term modification of natural plant succession as a result of livestock grazing or human activity.

(d) Dead trees or dead, woody debris may be utilized for campfires in amounts that can be replaced annually through natural accumulation.

(2) Soils

(a) Displacement and erosion of soil resulting from human activity will be limited to a rate that approximates natural processes.

(b) Soil compaction should not exceed limits which will prevent natural plant establishment and growth except at well established campsites.

(3) Water Quality

There should be no change in water quality except for temporary changes that return to normal when activity ceases.

(4) Air Quality

Air quality will not be degraded as a result of campfire smoke, or Forest Service Management activities outside of wilderness in Class I areas.

(5) Fish and Wildlife

Visitor use may temporarily displace wildlife, but should not displace wildlife from critical habitat during critical periods. (Such as fawning and winter range.)

(6) Scenery

(a) Campsites will occasionally be visible from other campsites.

(b) Human activity should remain subordinate in foreground viewing and not recognizable in middle-ground viewing.

STANDARDS AND GUIDELINES

(7) *Livestock Allotments*

Commercial livestock is permitted in this class under approved management plans to the extent that this use is compatible with Wilderness resource values.

b. Social Standards

(1) *Encounters*

There should be an 80 percent probability that not more than either seven parties or seven individuals traveling alone will be encountered per day during the primary use season.

(2) *Party Size*

The maximum party size shall not exceed 12 people and/or livestock combined, (12 people and 18 animals in the Lake Chelan-Sawtooth Wilderness).

(3) *Campsites*

There shall be no more than one campsites visible or audible from any campsite, or closer than 500 feet in open country.

(4) *Livestock*

Grazing stock is permitted except in established camp areas. Repeated stock use in cross-country travel by a single route shall be discouraged.

(5) *Pets*

Pets must be under reliable voice control or physical restraint. Pets may be banned from this class for protection of wildlife or to avoid other resource impact.

c. Managerial Standards

(1) *Regulations and Information*

(a) Posting of information and regulations regarding this class will be located at trail-heads.

(b) Formal orders and permits may be required to achieve management objectives in this class.

(c) Ranger patrols and administrative contacts will occur periodically. Personnel involved in project work or monitoring will be present. Management personnel should conform to party size limitations and social standards for this class.

(d) Signs will be kept to the minimum to protect Wilderness resources. No signs will be provided to indicate destinations.

(e) Visitor travel routes may be noticeable, but should appear as wildlife trails.

(2) *Trails*

System trails are present in this class generally at low density. Some user developed trails may exist, but are not encouraged for use and rarely upgraded to system trails. If user-developed trails become well established, management action should be taken to rehabilitate damage and discontinue use. Reroutes of existing trails may be done to protect resources or to meet wilderness objectives. New trail construction in trailless drainages or to new destinations must be considered in the Forest Planning process.

(3) *Resource Protection Facilities*

Facilities that are essential for resource protection and visitor safety are appropriate in this class. Only native or natural appearing construction materials will be used. There will be no facilities provided for user comfort or convenience.

3. Semi-Primitive

The area is characterized by a predominantly unmodified environment of at least moderate size. System trails and campsites are present and there is evidence of other uses. A minimum of on-site controls and restrictions are implemented to protect physical, biological, and social resources. Some facilities may be present to reduce visitor impact.

a. Physical-Biological Standards

(1) *Vegetation*

(a) Area of vegetation loss, and compacted bare mineral soil at any campsite, should not exceed 625 square feet.

(b) There should be no loss of trees at any site and only six trees per site with roots exposed or which show signs of human use impact.

(c) There should be no long-term modification of plant succession and only short-term modification due to human activity or livestock grazing that can recover in one growing season.

(d) Dead trees or dead, woody debris may be utilized for campfire wood in amounts that can be replaced annually through natural accumulation.

(2) *Soils*

(a) Displacement and erosion of soil resulting from human activity will be limited to a rate that approximates natural processes.

(b) Soil compaction should not exceed limits which will prevent natural plant establishment and growth, except at desired campsites, and in designated trail treads.

(3) *Water Quality*

There should be no change in water quality except for temporary changes that return to normal when activity ceases.

(4) *Air Quality*

Air quality will not be degraded as a result of campfire smoke or Forest Service Management activities outside of wilderness in Class I areas.

(5) *Fish and Wildlife*

(a) Visitor use should not displace wildlife from critical areas during critical periods.

(b) Riparian areas should appear to be unchanged by human or livestock use.

(c) Displacement of wildlife due to visitor use may be significant but should be of short duration to assure a natural ecosystem is maintained. Visitor use should not decrease habitat effectiveness for one species more than 20 percent.

(6) *Scenery*

(a) Campsites will be visible at times from other campsites.

(b) Human activity in wilderness, should remain generally subordinate in foreground viewing and not recognizable in middle-ground viewing.

(7) *Livestock Allotments*

Commercial livestock is permitted in this class under approved management plans to the extent that such use is compatible with all resource values.

b. Social Standards

(1) *Encounters*

There should be an 80 percent probability that not more than either ten parties or ten individuals traveling alone, will be encountered per day during the primary use season.

STANDARDS AND GUIDELINES

(2) *Party Size*

The maximum party size shall not exceed 12 people and/or livestock combined, (12 people and 18 animals in the Lake Chelan-Sawtooth Wilderness).

(3) *Campsites*

There shall be no more than two campsites visible or audible from any campsite, or closer than 500 feet in open country.

(4) *Livestock*

Grazing of stock is permitted except in established camp areas.

(5) *Pets*

Pets must be under reliable voice control or physical restraint. Pets may be banned from this class for protection of wildlife or to avoid other social or biological impact.

c. Managerial Standards

(1) *Regulations and Information*

(a) Posting of information and regulations regarding this class will generally be done at trailheads. Some regulatory signing may be posted at key locations such as lakeshores and campsites to help gain user compliance.

(b) Formal orders and permits may commonly be used to achieve management objectives in this class.

(c) Ranger patrols and administrative contacts will occur more frequently in this class, particularly at popular destination points and on weekends during the primary visitor use season. Personnel involved in project work or monitoring activities will be present. Major work projects should be planned as much as possible during low visitor-use periods. Management personnel should conform to party size limitations and be aware of their potential to impact visitor experiences.

(2) *Trails*

The managed trail system should be maintained or constructed toward more and most difficult trail standards (FSH 2309.18). However, trails classified easiest may exist in areas of gentle terrain and valley bottoms. A variety of user restrictions may be implemented to resolve negative resource impacts.

(3) *Resource Protection Facilities*

Facilities will be as natural appearing as possible or will be constructed out of native material. No facilities will be constructed for user convenience or comfort. Facilities will be placed so as to concentrate heavy impact on areas previously impacted and on sites capable of withstanding high impacts.

4. Transition

The area is characterized by a predominantly unmodified environment, however, the concentrations of visitors may be moderate to high at various times. The area is characterized as having a large number of day users who are often mixed with overnight and long-distance travelers on trails near trailheads and wilderness boundaries.

a. Physical - Biological Standards

(1) *Vegetation*

(a) Area of vegetation loss, and compacted bare mineral soil at any campsite, should not exceed 1000 square feet.

(b) There should be no loss of trees at any site and only ten trees per site with roots exposed or which show signs of human use impact.

(c) There should be no noticeable long-term modification of plant succession and only short-term modification due to human activity or livestock grazing, that can recover in one growing season.

(d) Dead trees, or dead woody debris, may be utilized for campfire wood in amounts that can be replaced annually through natural accumulation.

(2) *Soils*

(a) Displacement and erosion of soil resulting from human activity will be limited to a rate that approximates natural processes.

(b) Soil compaction should not exceed limits which will prevent natural plant establishment and growth, except at desired campsites, and on designated trail treads.

(3) *Water Quality*

There should be no change in water quality except for temporary changes that return to normal when activity ceases.

(4) *Air Quality*

Air quality will not be degraded as a result of campfire smoke, or Forest Service Management activities outside of Wilderness in Class I areas.

(5) *Fish and Wildlife*

(a) Visitor use should not displace wildlife from critical habitat areas during critical periods. If conflicts occur, management actions should be implemented to reduce the impact.

(b) Riparian areas should appear to be unchanged by human or livestock use.

(c) Displacement of wildlife due to visitor use may be significant but should be of short duration to assure a natural ecosystem is maintained. Visitor use should not decrease habitat effectiveness for one species more than 20 percent.

(6) *Scenery*

(a) Campsites will be visible at times from other campsites.

(b) Human activity should remain generally subordinate in foreground viewing and not recognizable in middle-ground viewing.

(7) *Livestock Allotments*

Commercial livestock is permitted in this class under approved management plans to the extent that grazing use is managed to protect wilderness resource values.

b. Social Standards

(1) *Encounters*

There should be an 80 percent probability that not more than either 10-20 parties or 10-20 individuals traveling alone, will be encountered per day during the primary use season. Generally encounters should not exceed 10, however, in unique situations, encounters may reach 20 per day.

(2) *Party Size*

The maximum party size will not exceed 12 people and/or livestock combined, (12 people and 18 animals in the Lake Chelan-Sawtooth Wilderness).

(3) *Campsites*

There shall be no more than three campsites visible or audible from any one campsite, or closer than 500 feet in open country.

(4) *Livestock*

Grazing of stock is permitted except in camp areas.

(5) *Pets*

Pets must be under reliable voice control or physical restraint. Pets may be banned from this class for protection of wildlife or to avoid other biological or social impact. Visitors will be encouraged to leave pets at home in areas of higher visitor use.

c. Managerial Standards

(1) *Regulations and Information*

(a) Posting of information and regulations will generally be posted at trailheads but some regulatory signing may be necessary in key impact areas, or areas where there is potential for use conflicts.

(b) Formal orders and permits will commonly be used to achieve management objectives and visitor compliance in this class.

(2) *Administrative Presence*

(a) Ranger patrols and administrative contacts will occur most frequently in this class, particularly in high day-use areas and popular destination points. Personnel involved in project work and monitoring activities will be present.

(b) Work projects should be planned to be completed during low visitor use periods to minimize impact on visitors.

(c) Management personnel should conform to party size limitations and be aware of their potential to impact visitor experiences.

(3) *Trails*

The managed trail system should be maintained or constructed toward more and most difficult trail standards (FSH 2309.18). Trails classified easiest may exist in areas of gentle terrain and valley bottoms. A variety of user restrictions may be implemented to resolve negative resource impacts.

(4) *Resource Protection Facilities*

Facilities will be natural appearing or will be constructed out of native material. No facilities will be constructed for user convenience or comfort. Facilities will be placed so as to concentrate heavy impact on areas previously impacted and at sites capable of withstanding high impacts.

Limits Of Acceptable Change

Table IV-15 lists the key indicators that will be measured in monitoring the physical, biological, and social conditions and the standards for each Wilderness Recreation Opportunity Spectrum Class.

TABLE IV-15
LIMITS OF ACCEPTABLE CHANGE STANDARDS

Indicators	Pristine	Primitive	Semi-Primitive	Transition
Vegetation loss and bare, compacted mineral soil at campsites (square feet)	225	400	625	1,000
Number of Trees with roots exposed, or percent (whichever is less)	0 0%	4 25%	6 25%	10 50%
Encounters--80% Probability--Maximum number of encounters per day when traveling--primary use season.	1	7	10	10-20 (Generally 10, but up to 20 on a case by case basis)
Party size-- People and stock combined.	12 (Encourage 6 or less people, 0 stock). 12 people and 18 animals in the Lake Chelan Sawtooth Wilderness	12	12	12
Campsites visible when occupied	0	1	2	3
Dead woody debris available for firewood	Appears to be natural levels compared to adjacent similar areas			



**PROPOSED THREATENED,
ENDANGERED, OR SENSITIVE SPECIES**

(Plants and Animals)

1. Threatened, endangered, and sensitive species will be identified and managed in cooperation with the USDI Fish and Wildlife Service and Washington Department of Wildlife (animals), and Washington Department of Natural Resources and Washington Natural Heritage Program (plants) for all projects.

2. All proposed projects that may involve significant habitat disturbances or changes, or have the potential to alter habitat of threatened, endangered, or sensitive plant and animal species, shall be inventoried to determine if any of these species are present.

3. Biological evaluations that indicate an activity may have an impact on threatened, endangered, and sensitive species should be reviewed with the state agency that is responsible for the species and recommendations considered in finalizing mitigation requirements for a project proposal.

4. Maintain and update lists and maps of plants and animals periodically as new information is collected. Maps will be high quality topographic maps, at 1:24,000 scale or larger. Submit pertinent Forest information to the Regional Office for updating Regional Forester's Sensitive Species lists, and to the appropriate agency for inclusion in state-wide data bases.

5. All Project Environmental Analyses will evaluate the effects of the project on threatened, endangered, and sensitive species.

Proposed Threatened and Endangered

1. Habitat for existing Federally classified threatened and endangered species shall be managed to achieve objectives of recovery plans.

2. Where a threatened or endangered species or suitable habitat is present in a project area, follow the Biological Assessment Process and the Consultation Procedures.

Proposed Sensitive Species

1. When sensitive species are present in a project area, follow the objectives in the Species Management Guide.

2. Species Management Guides shall be developed for each sensitive species. These plans should be developed on a regular basis by highest priority so that all guides are completed by the tenth year after approval of the Final Forest Plan (approximately six plans per year). Species Management Guides will more specifically identify by species the area to be managed, and contain more information for each species.

Although not protected by the Threatened and Endangered Species Act, sensitive species will receive special management consideration under Forest Service policy. All necessary actions will be taken to assure that management activities do not jeopardize the continued existence of a sensitive species through adverse modification of their essential habitat until their status is determined.

Plants

General standards and guidelines for plants are discussed above under the "Threatened, Endangered, and Sensitive Species" section.

Research is done to obtain information about habitat requirements, population biology, genetic variability, reproduction biology, etc. Research projects will be done on a cost-share basis in cooperation with the U.S. Fish and Wildlife Service, the Washington Natural Heritage Program, interested agencies, and private groups. Priorities for research will be developed cooperatively. Generally, the species most threatened will be given highest priority.

All habitat improvement projects for T, E, or S species will be small-scale and experimental in nature until such time as species responses are better understood. When species response to a specific improvements project can be predicted, projects can be larger in scale and practical in nature. Species management guides will be updated every other year.

AnimalsBald Eagle

1. Bald eagles and their habitat shall be protected and managed in accordance with the Pacific States Bald Eagle Recovery Plan. The following are the potential nest sites. Lake Wenatchee 1, Bumping Lake 1, Cle Elum Lake 1, Kachess Lake 1, Lake Chelan 2, Rimrock Reservoir 1, and Wenatchee River 1. Occupied bald eagle habitat will be monitored to determine the effectiveness of planned action and recovery efforts. The location of potential nest sites will be identified before new projects are implemented.

2. Informal consultation shall be initiated with the USDI Fish and Wildlife Service to discuss the question of "effect" when a project involving site disturbance is within one mile of a bald eagle nest (FSM 2670, Bald Eagle Management and Consultation).

3. Within two years of approval of the Forest Plan, prepare a Species Management Guide for the potential bald eagle habitat on the Forest. Consult the Bald Eagle Recovery Plan (Brown 1985), the "Bald Eagle Management Guidelines for Oregon and Washington" (USDI Fish and Wildlife Service 1981), and FSM 2670 for specific management guidelines.

4. Interim requirements for management of bald eagle habitat shall include completion of Bald Eagle Management Area (BEMA) plans for each nesting, foraging and roosting area.

5. Active bald eagle nest sites shall be protected. Manage each area under the territory zone concept until a BEMA plan is completed and the management area is established (Brown, 1985)

A. Primary zone. The primary zone will be not less than 1/4 mile from the nest, with actual size and shape of zone adjusted to include all the area near the nest tree that is actually utilized. Zone size can vary, reflecting local topography, potential for blowdown, and location of important habitat components. There will be no timber harvesting in the primary zone unless designed to enhance stand characteristics for the benefit of nesting eagles. Human activities in

the primary zone will be controlled year-round to insure that the site remains suitable as nesting habitat.

B. Secondary zone. The secondary zone extends from the primary zone out to a minimum of 800 meters from the nest; it minimizes disturbance and protects the primary zone. Zones need not be circular, but will reflect local physiographic conditions and the tolerance of the nesting pair to disturbance factors (Brown 1985). The width of the zone could be considerably wider, depending on the degree to which vegetation or topography screens the nest from potential disturbance. The zone will contain important roosting sites, perching sites, and alternative nest sites. Timber may be harvested in the secondary zone, provided eagle habitat requirements take precedence. Human activity in the secondary zone will be controlled only during the period when the birds are present, normally between January 1 and August 31.

6. Feeding and Roosting Sites. Regularly used feeding and roost sites shall be protected. Human activities will be controlled if they adversely affect the eagles use of a feeding area. Only those Forest practices that maintain the suitability of the area for eagle roosting will be used. The area encompassed will have at least a 400 meters radius, possibly up to a one-fourth mile radius.

7. Maintenance of Potential Nesting Habitat. Forest lands within one mile of foraging habitat (such as anadromous fish streams and lakes over 50 acres in size) are potential bald eagle nesting habitat. Potential nest sites will be surveyed for active nest sites.

Peregrine Falcon

1. Peregrine falcons are not known to nest on the Forest. However, nesting and feeding habitat exists. Sufficient existing nesting and feeding habitat will be protected to meet the objectives of the Pacific Coast Recovery Plan for the American Peregrine Falcon (USDI Fish and Wildlife Service 1982). The following are the potential located nest sites that will be maintained: Oak Creek/Teepee Creek, Tieton River, Kloochman Rock, Goose Egg Mountain, Rimrock, and

STANDARDS AND GUIDELINES

Stroback Ridge. Additional sites may need to be maintained.

2. Any nest found will be protected. Associated habitat (such as feeding areas) will be maintained, and enhanced when opportunities occur.

3. Within three years after implementation of the Forest Plan, an inventory should be completed cataloging suitable peregrine falcon habitat. When the inventory is completed, the Forest should complete habitat management and nest site management plans for peregrine falcons.

4. Occupied peregrine falcon habitat will be monitored to determine the effectiveness of planned action and recovery efforts.

Grizzly Bear

1. Send reports of grizzly bear sightings to the coordinator for the Forest Service and Washington Department of Wildlife for investigation as soon as possible.

2. Projects within the evaluation area that may affect habitat will have consultation done with the USDI Fish and Wildlife Service.

3. If resident grizzly bears are discovered, cooperate with the USDI Fish and Wildlife Service and Washington Department of Wildlife to appropriately manage the animals.

4. Implement recovery objectives should a recovery plan be completed.

Gray Wolf, Canadian Lynx, and California Wolverine

1. Investigate, evaluate, and monitor sighting reports in coordination with the Washington Department of Wildlife and the USDI Fish and Wildlife Service.

2. If resident animals are discovered, inform and cooperate with the USDI Fish and Wildlife Service and Washington Department of Wildlife to insure the protection of the animals.

3. Implement recovery objectives when a plan is completed.

Northern Spotted Owl

1. Spotted owl habitat shall be managed in accordance with direction specified in the Final Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide.

2. Areas proposed for harvest which contain habitat suitable for spotted owls will be surveyed according to standard inventory procedure. Maintain survey results in the Ranger District resource inventory and forward to the Forest Coordinator annually.

3. For Spotted Owls occupying non-network sites, protect nest tree and an area around it. Seek technical assistance of U.S. Fish and Wildlife Service and Washington Department of Wildlife in developing management strategies for these sites.

WILDLIFE AND FISHERIES

Wildlife and Fish Surveys and Plans

1. Wildlife and fish resources on the Wenatchee, in particular the habitat of indicator species, shall be managed in cooperation with fish and wildlife agencies. Project assessments and habitat improvement projects should be reviewed with appropriate agencies.

2. Coordinate, cooperate, and share costs when possible with the Washington State Department of Wildlife (for animals) and Washington Natural Heritage Program (for plants) in collection of habitat information, population statistics and inventories, and research on animal and plant species.

3. Fish and wildlife habitat shall be managed to maintain viable populations of all existing native and desired non-native vertebrate species in approximately their present distribution.

A. Maintain or enhance limited habitats to provide the habitat characteristics for dependent species. These habitats include, but are not limited to, cliffs, caves, talus, ponds, marshes,

wetlands, and areas of colony nesting species. Activities that need to be sensitive to limited habitat needs are logging, roads, trails, campgrounds, facilities, etc.

B. To maintain viable populations of raptors, protect all active nest and roost sites.

C. To provide viable populations of deciduous dependent species, maintain or enhance the deciduous and mixed conifer/deciduous tree habitat. Maintain activity levels that allow high use of deciduous habitat by wildlife.

4. Coordinate and cooperate with the Washington Department of Wildlife in relocation of animals. Add additional animals where habitat is under utilized and remove animals where habitat is over utilized.

5. All projects will be surveyed to locate habitats which are limited; e.g., for raptor nest and roost sites, deciduous tree habitat, meadows, and watering sites.

6. Strive to provide a high level of wildlife habitat diversity in each sub-basin (1,000 to 10,000 acre area).

7. Develop opportunities for public viewing of wildlife where low impact to animals can be assured, and when compatible with prescription objectives.

8. Expand the education/interpretive materials available so the public has the opportunity to be more appreciative of wildlife, fish, and plants and to enjoy the non-consumptive use opportunities provided.

9. Maintain and update habitat information and maps of sightings for species that have assessments done.

10. Coordinate to the extent possible with State and Federal fish agencies, Indian Tribes and the Northwest Power Planning Council's Fish and Wildlife Program to develop fish and fish habitat management objectives, by subdrainage.

11. Monitor to the extent practical, management indicator species to determine population trends

in relation to habitat conditions. Coordinate and cooperate in the monitoring with the Washington Departments of Fish and Wildlife and Treaty Indian Tribes.

12. Maintain and improve current and long-term fish habitat capability and distribution to accomplish natural production goals as established by State and Federal Fish Management agencies, Indian Tribes and the Northwest Power Planning Council's Sub-basin Planning Process.

13. Implement habitat and watershed surveys to quantify current habitat quantity, quality and production. Utilize approved methods to assess habitat quality and quantity and watershed conditions. The Forest will define baseline inventory parameters based upon Regional direction and monitoring of standards and prescription. Districts may add survey parameters as needed to meet specific objectives. Coordinate, cooperate and share costs where possible with State and Federal Fish Management agencies, Indian Tribes, and private groups in collection of habitat information and population statistics.

14. Update Geographic Information System, Total Resource Inventory or appropriate data base annually.

15. Provide support to other resource projects to evaluate the potential direct, indirect and cumulative effects of proposed activities on fish resources and fish habitat. Utilize professional judgement and technical evaluation on a subdrainage and site specific basis to predict and evaluate effects and prescribe appropriate mitigation.

16. Develop and annually update fish habitat management five year program by Ranger District to provide more specific direction in response to the framework outlined in Forest Plan. Utilize the five-year program as a planning and budgeting tool designed to identify personnel needs, support services, inventory strategy and improvement projects. The five-year program will provide a documented link between Forest Plan objectives and the program development and budgeting process which allows for detailed tracking of fish habitat goals, objectives and accomplishment for current and out-year(s). Coordinate the develop-

ment and revision of the program with the watershed section, other resource elements, State and Federal Fish Agencies, Indian tribes and private groups.

17. Develop fish habitat management objectives for drainages to help prioritize work activities including surveys and improvement projects. Update/revise as needed. Coordinate with other resources, State and Federal Fish Management Agencies, Indian tribes, public groups and Northwest Power Planning Council Sub-basin Planning process.

18. Develop opportunities for public viewing and education so that the public has the opportunity to be more appreciative of fish resources and non-consumptive uses.

Primary Cavity Excavator

Primary cavity excavators, as an indicator species, represent habitat for live defective trees, all decay stages of standing dead trees, and all decay stages of dead and down trees.

1. Provide all decay classes of dead and down trees. Provide an average of not less than two dead and down tree segments per acre in decay classes 1 and 2, well distributed over the area. Tree segments should be greater than 12 inches in diameter and a minimum of 20 feet long.
2. Live and hard dead trees with cavities will be preferred over those without cavities.
3. Establish assessment areas (sub-basins of 1,000 to 10,000 acres) and distribute primary cavity excavator habitat over a majority of the acres within the subbasin. At a minimum, habitat will be provided to maintain cavity excavators at 20 percent of their potential population size. Snag densities necessary to meet this level must be provided within land areas that are generally no larger than 40 acres in size.
4. Each prescription will achieve its assigned population goal for each sub-basin.
5. Maintain the same level of soft dead trees and large down trees as would be naturally created by the population goal for dead trees.

Big Game Management

1. Develop a species management guide for implementation of direction for each deer and elk winter range and mountain goat range. Guides should be completed as soon as possible to achieve meeting the direction in prescriptions. An estimated 15 mountain goat guides, 9 deer/elk guides, 7 deer guides, and 1 deer/bighorn sheep guide will be needed. Species management guides will establish more specific management information for each species.
2. Coordinate, cooperate, and share costs when possible with State and Federal fish and wildlife agencies, Indian Tribes, and private groups in the collection of habitat information, population statistics and inventories, research, and habitat improvement projects.
3. Cooperate and coordinate with the Washington Department of Wildlife to inventory, map and define elk and deer spring and fall range.
4. Coordinate with the Washington Department of Wildlife to map key habitat, winter and summer range for mountain goats and bighorn sheep.
5. Bighorn sheep and mountain goat requirements will take precedence over deer and elk requirements when conflicts in management occurs.
6. Prevent introduction of disease(s) from livestock into resident herds of bighorn sheep by identifying potential problem areas, and developing a plan to mitigate the identified problems.
7. Cooperate and coordinate with the Washington Department of Wildlife in closing some roads during hunting season to provide a variety of motorized and non-motorized hunting opportunities.
8. Generally, strive to provide well distributed cover over at least 40 percent of a subbasin in deer and elk summer range. It would be desirable to have 50 to 100 percent of this cover as thermal cover.

9. Strive to maintain forage areas for deer and elk of less than 40 acres in size. These should be surrounded by thermal and hiding cover. Thermal cover should be at least 20 percent of periphery of each unit.

10. Provide thermal cover for mountain goats to travel between summer and winter range.

11. Limit the roads in mountain goat summer range. Close as many of the roads in summer range as is reasonable while providing recreation access to trails, trail heads, and other areas of recreation activity and interest. Roads will not be built in mountain goat winter range when other reasonable alternatives exist.

12. Provide for an even flow of mountain goat habitat.

13. Discourage activities in key mountain goat winter and kidding range from Dec. 1 until July 1.

14. Manage migration routes of big game to provide enough hiding cover to facilitate travel.

Nonstructural Habitat Improvement

1. Implement cost effective habitat improvement projects that are needed to meet the Forest-wide and prescription directions.

2. Provide an economic analysis of each project.

3. Design the habitat improvements to help meet objectives of other resources, when practical.

4. Look for opportunities to share costs of habitat improvements with the Washington Department of Wildlife, other agencies, and private groups.

5. Improve forage quality and quantity in summer range in allocations other than prescriptions for big game (EW-1 and EW-3), when it is a limiting factor, and consistent with other resource objectives.

6. Strive to provide an abundance of herbaceous vegetation with a high nutrient content in the spring and fall range of big game.

7. For mountain goats create or maintain small openings of 0.5 to 5 acres of high quality forage in both summer and winter range.

8. Update the 10 year schedule for wildlife and plant improvement projects annually.

Structural Habitat Improvement

1. Implement cost effective habitat improvement projects where needed to meet the prescription direction.

2. Provide an economic analysis of each project.

3. Design habitat improvements to help meet the objectives of other resources, when practical.

4. Look for opportunities to share costs of habitat improvements with the Washington Department of Wildlife, other agencies, and private groups.

5. Develop watering facilities, for use by a variety of wildlife, where increases in wildlife are expected.

6. Increase primary cavity excavator habitat in allocations that are below the potential population objective as soon as possible.

7. Update the plan for wildlife and plant improvement projects annually.

Fish Habitat Improvements

1. Utilize sub-basin habitat objectives and five-year plans to prioritize and schedule habitat improvement projects.

2. Develop project plans based upon inventories, sub-basin objectives and Five-year Plans.

3. Schedule projects on a priority basis, upon sub-basin objectives Five-year plans and Forest-wide Activity Schedule (Appendix A). Rehabilitation of degraded habitat will have priority over enhancement projects.

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4. Implement structural and non-structural fish habitat and watershed improvement projects as funded. Coordinate, cooperate and share costs when possible with other resources, State and Federal Fish Agencies, Indian tribes, private groups and the Northwest Power Planning Council Fish and Wildlife Program.

5. Provide maintenance of projects to assure fish habitat improvement projects are functional to meet objectives and protect investment. Annually monitor projects to prioritize maintenance needs. Develop an accounting system to record planned, completed projects and maintenance needs.

6. Annually complete Forest accomplishment report for distribution to Ranger Districts, Regional Office and outside groups.

7. Monitor habitat improvement projects as provided in Chapter V of the Forest Plan to determine effectiveness of projects at meeting stated objectives.

8. Increase fish habitat capability and watershed condition through implementation of rehabilitation and enhancement projects utilizing a variety of funding sources, including but not limited to, FRP, P&M, KV, and BPA funds. Coordinate with State and Federal Fish agencies, Treaty Indian Tribes, private groups, and the Northwest Power Planning Council's Fish and Wildlife Program.

RIPARIAN AREAS

Planning

Specify riparian management objectives for all projects to be implemented within the land and vegetation associated with Class I, II, III and IV streams, lakes, wetlands, seeps and springs.

1. Within Riparian Management Areas, management decisions will be made in favor of riparian dependent resources (e.g., water quality, fish and wildlife habitat) where conflicts exist.

2. Riparian area management will meet or exceed State and Federal Water Quality standards and

Washington State Forest Practices Rules and Regulations.

3. Riparian management objectives for projects will be established based upon an analysis of the existing and desired future conditions within both the project area and the subdrainage (generally 1,000-10,000 acres).

The Riparian Management Area (RMA) within which these objectives apply shall correspond to at least the recognizable area dominated by riparian vegetation (true riparian zone) and sufficient adjacent area (influence area) to assure adequate protection to achieve riparian management objectives and standards in the subdrainage. Utilize the following direction in identifying the width of the RMA:

1. RMA will include the true riparian zone, that zone of transition between the aquatic ecosystem and the terrestrial ecosystem that can be identified by soil characteristics and distinctive vegetative communities that require free or unbound water (FSM 2526.05).

2. The width of the "influence area" required adjacent to the true riparian zone will be determined on a site-specific basis considering factors such as surface erosion/delivery potential, mass erosion potential, large woody debris recruitment, shading needs, fine particulate organic matter input, etc.

A. The following table establishes RMA width based on the potential for sediment delivery from surface erosion into stream channels.

Table IV-16

Potential Erosion Hazard <u>1/</u>	Percent Slope Adjacent to Stream	Slope Distance from High Water Mark <u>2/</u>
High	0 %	100 feet <u>3/</u>
Mod/Low	0 %	100 feet
High	10 %	120 feet
Mod/Low	10 %	110 feet
High	30 %	160 feet
Mod/Low	30 %	130 feet
High	50 %	200 feet
Mod/Low	50 %	150 feet
High	70 %	240 feet
Mod/Low	70 %	170 feet

1/ Potential soil erosion hazard/risk based on Wenatchee National Forest Soil Resource Inventory.

2/ High: Distance increases at a rate of two feet for each one percent increase average slope
Mod/Low: Distance increases at a rate of one foot for each one percent increase in average slope.

3/ Example: A stream 20 feet wide at high water with average slope of 30% on one bank and 70% on the other bank on Mod/Low erosion potential would have an RMA width of 130 feet (30%) plus 170 feet (70%) plus 20 feet (high flow stream width) for a total of 320 feet.

B. Utilize existing or develop new guidelines to facilitate the determination of RMA width based on stream temperature (shade) and natural large wood recruitment.

C. The width of consideration for the Riparian-Aquatic Protection Zone (EW-2 Prescription) is defined by the table above.

Complete a floodplains and wetlands analysis for any project that has the potential to impact these sensitive areas. This analysis and all management activities within these areas will comply with the objectives of Executive Orders #11988 (Floodplains) and #11990 (Wetlands).

Administration

Utilize management prescriptions (such as EW-2) and apply site-specific management practices to achieve riparian management objectives.

The following standards and guidelines describe the desired end results for the various riparian classifications on the forest.

CLASS I, II AND III STREAMS, LAKES AND WETLANDS

The desired future condition for riparian areas on the Forest has been described in terms of four major components of riparian habitat: (1) Sediment, (2) Temperature, (3) Channel Morphology, and (4) Floodplain/ Riparian Vegetation. These four components of riparian habitat are most indicative of the health of the system. Standards that are measurable are identified for each component in order to define the parameters for evaluating riparian habitat conditions.

The focus of these standards is to provide riparian habitat conditions on a subdrainage basis to meet soil productivity standards, water quality standards, and fish and wildlife habitat objectives.

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These standards are intended to be applied as a family of parameters to evaluate conditions and establish management objectives for riparian areas in each subdrainage. The standards provide a means to measure actual "on-the-ground" attainment of the desired future condition for riparian areas on the Forest.

The standards are end-result oriented. That is, they define what riparian habitat conditions need to be in order to meet goals and objectives. How the standards are to be met or maintained will be determined on a project basis depending on both the site conditions and the current and desired future condition of the subdrainage.

It is known that present conditions in some subdrainages on the Forest do not meet one or more of the measureable standards. When this is the case, an analysis needs to be made as to why the subdrainage does not meet a particular standard. A number of different situations might result from this analysis. If a subdrainage does not meet a standard due to man's activity, then a strategy and timeframe needs to be developed to achieve the standard. If man's activities have altered a subdrainage so that it is unlikely that a standard can ever be achieved, then a new standard needs to be developed for that area. If a standard cannot be achieved due to natural conditions, a new standard would need to be developed for that subdrainage.

Class I, II and Fish Bearing Class III Streams 1/

1. Sediment

a) Fines - Maintain <20% fines ($\leq 1.0\text{mm}$) as the area weighted average in spawning habitat (pool tail-outs and glides).

b) Macroinvertebrates - Maintain stream substrate so that ≥ 3 sediment sensitive macroinvertebrate species, typical of streams in the area, maintain densities of ≥ 200 individuals/m².

c) Turbidity - Meet State water quality standards for turbidity.

2. Temperature

a) The maximum temperature will be $\leq 61^\circ\text{F}$ on any day and/or the average 7-day maximum temperature will be $\leq 58^\circ\text{F}$

b) Where streams naturally exceed the above standards, management activities will not cause further measureable temperature increase.

3. Channel Morphology

a) Pools - (1) Alluvial, gravel or low gradient (<2%) streams will maintain one or more primary pools 2/ every 3 channel widths 3/.

(2) Boulder - Rubble or moderately steep gradient (>3%) streams will maintain one or more primary pools every 6 channel widths.

b) In-Channel Large Wood - Provide an average of ≥ 20 pieces (i.e., Key Pieces) 4/ of large wood/1,000 lineal feet ($\geq 100/\text{mile}$) on Class I, II and fish bearing Class III streams.

The minimum size standards to meet in-channel large wood requirements are as follows:

Minimum length 50 feet

Minimum diameter ≥ 12 inches (80%)

≥ 20 inches (20%) 5/

1/ Includes both perennial and intermittent streams as defined in FSM 2526 05 (See Glossary).

2/ Primary pools occupy $\geq 50\%$ of the low flow channel width and have a maximum depth of ≥ 36 inches

3/ Channel widths are bank-full widths

4/ Key wood pieces "in the channel" include those downed pieces meeting size requirements and having at least 20% of their length within the vertical plane established as perpendicular to the bankfull channel margin.

5/ Diameter refers to the mean diameter obtained as an average of the diameters of each end of the log

These dimensions are based on average minimum conditions, Forestwide. Different standards may be developed for some subdrainages when warranted by site-specific conditions (e.g., site potential).

4. Floodplain/Riparian Vegetation

a) Vegetative Ground Cover - Maintain $\geq 90\%$ vegetative ground cover provided by trees, shrubs, grasses, sedges and duff within the floodplain and true riparian zone.

Refer to the Forestwide Standards and Guidelines for Range Planning and Inventory for additional direction on vegetation management in riparian areas.

b) Potential Large Wood - Maintain ≥ 20 live conifer trees per acre ≥ 20 " d.b.h. in order to meet in-channel wood standard.

As with the in-channel wood standard, this standard describes minimum average conditions, Forestwide. Different standards may be developed for some subdrainages when warranted by site-specific conditions (e.g., site potential). The intent of this potential large wood standard is to meet the in-channel large wood standard over time.

The actual number of trees maintained on most sites will be the net result of project prescriptions designed to meet all the riparian standards, including stream temperature, sediment and dead/defective tree habitat. Refer to the "Administration" section for further information on application of these guidelines.

c) Vegetative Composition - At a minimum, meet Washington State Forest Practice Rules and Regulations for leave tree requirements in riparian areas. Maintain riparian habitat diversity associated with deciduous trees as would be expected on the site.

d) Dead/Defective Tree Habitat - Manage RMA dead/defective tree habitat at 80% of the theoretical biological potential within the subdrainage.

e) To provide viable populations of wildlife, manage the edges of lakes to provide wildlife undisturbed access to at least 20% of the RMA.

5. Fish Passage

a) All new road construction shall maintain or enhance fish passage.

b) Identify man-made fish passage barriers. Develop and implement plans for correction of passage problems on a priority basis.

Lakes and Wetlands

1. Floodplain/Riparian Vegetation - Standards for lakes and wetlands for this riparian habitat component are the same as those listed above for Class I, II and Fish Bearing Class III Streams.

Non-Fish Bearing, Class III Streams 1/

1. RMAs associated with non-fish bearing, perennial streams are managed to meet standards and subdrainage objectives for fish habitat, water quality and riparian associated wildlife habitat. Because of the wide diversity of these types of channels across the Forest, a variety of prescriptions will need to be applied based upon the site and subdrainage objectives for riparian dependent resources.

a) Sediment - Limit sediment loading and maintain channel conditions necessary to meet standards in fish-bearing streams. Refer to the variable width table above for initial guidance on determining RMA width considering erosion potential.

b) Temperature - Management along these streams will not increase temperatures in fish bearing streams above standards.

1/ Includes non-fish bearing, perennial streams not meeting higher class criteria as defined in FSM 2526.05 (See Glossary).

c)Channel Morphology

(1)Pools - Same as Class I, II and fish bearing Class III streams except no Forestwide depth requirement. Recognize the role of pools in providing habitat diversity and in regulating the flow of materials through these stream systems. (e.g., diversity for aquatic organisms and terrestrial wildlife; streamflow energy dissipation, etc.)

(2)In-Channel Large Wood - Same as Class I, II and fish bearing Class III streams except minimum piece length is two bankfull channel widths and numbers apply as an average condition for non-fish bearing, perennial streams in a subdrainage.

d)Floodplain/Riparian Vegetation

(1)Vegetative Ground Cover - Maintain $\geq 90\%$ ground cover provided by trees, shrubs, grasses, sedges and duff within the floodplain/true riparian zone.

Refer to the Forestwide Standards and Guidelines for Range Planning and Inventory for additional direction on vegetation management in riparian areas.

(2) Potential Large Wood - Maintain trees necessary for sideslope stability, channel stability, long-term large wood input and wildlife habitat diversity.

(3) Dead/Defective Tree Habitat - Manage so that as an average subdrainage condition, RMA's associated with these streams provide dead/defective tree habitat at 80% of the theoretical biological potential.

CLASS IV STREAMS, SEEPS AND SPRINGS
1/

1. Manage Class IV streams so as to not adversely impact water quality, fish habitat and viable wildlife populations and water quality in the subdrainage. Give special consideration to land and vegetation adjacent to Class IV stream

1/ Includes non-fish bearing, intermittent streams not meeting higher class criteria as defined in FSM 2526.05 (See Glossary).

channels to meet riparian management objectives for the subdrainage. Emphasis is on maintenance of bank and channel stability. Maintain wood necessary for channel maintenance and control. Recognize the importance of Class IV streams, seeps and springs in providing wildlife habitat diversity and maintain diversity necessary to accomplish subdrainage objectives.

a) Protection of channel stability and wildlife habitat diversity associated with Class IV streams, seeps and springs is usually accomplished by cutting area design, logging method selection, maintenance of duff or low ground vegetation and brush. As needed, leave conifer or hardwood trees necessary for bank stability, long-term wood input and wildlife habitat diversity. Forest standards for dead/defective tree habitat are expected to provide wood needed for bank stability, wildlife habitat diversity and long term wood input to the channels.

b) In Class IV stream channels leave all naturally downed large woody material within or across the vertical plane established as perpendicular to the bankfull channel margin, unless on-site evaluation indicates that this material poses an unacceptable risk of damage.

c) Maintain sufficient habitat along Class IV stream channels, seeps and springs to provide viable populations of amphibians. Habitat needs to be well distributed throughout subdrainages on the Forest.

RANGE

Range Planning and Inventory

1. Allotment management plans will be written or revised to meet the goals and objectives for the management area in which the allotment is located.

2. Areas of suitable range outside of existing allotments will be incorporated into existing or new allotments for use by livestock to help:

- A. Solve overuse on problem allotments;
- B. Meet other resource objectives;
- C. Meet demand for forage.

3. As part of the analysis of new allotments or re-analysis of existing allotments.

A Identify lands in unsatisfactory condition, see glossary. Develop allotment management plans with specific objectives for these lands on a priority basis under a schedule established by the Forest Supervisor. These objectives will define a desired future condition based on existing and potential values for all resources. The allotment plan will include: 1) a time schedule for improvement, 2) activities needed to meet forage objectives; and 3) an economic efficiency analysis

B. Identify allotments with riparian areas in unsatisfactory condition, i.e. 1) on suitable range, forage condition is not at least fair, with a stable trend, or 2) classification is PC-basic resource damage or PD-other resource damage, see glossary.

C. Range allotment management plans will include a strategy for managing riparian areas. A measurable desired future riparian condition will be established based on existing and potential vegetative conditions.

When the current riparian condition is less than that desired, objectives will include a schedule for improvement. The allotment management plans will identify management actions needed to meet riparian objectives within the specific time frame. Measurable objectives will be set for key parameters, such as stream surface shaded, streambank stability, and shrub cover. This process is described in "Managing Riparian Ecosystems (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington" (1979). The plan will address the monitoring needed to determine if the desired rate of improvement is occurring. Allotment management plans currently not consistent with this direction will be developed or revised on a priority basis under a schedule established by the Forest Supervisor

Range Non-Structural Improvements

1. Refer to Non-Structural Range Improvement Handbook.

Range Structural Improvement Maintenance

1. Maintain all structural improvements at, or as near as practical to, the standard to which they were constructed.

Range Administration and Management

1. When allotment boundaries do not follow management area boundaries, grazing management systems will be designed to meet the highest prescribed levels of management contained in the appropriate management prescriptions

2. Utilize livestock as a tool to manipulate vegetation in achieving other resource objectives

3 Forage utilization by livestock will generally follow established allowable use guides (Tables IV-17 and IV-18), however, percent use will be adjusted up or down to meet total resource needs

Noxious Farm Weeds

1. Cooperate with the Washington State Noxious Weed Control Board and other state, county and local agencies and organization in the identification, location, prevention and spread of noxious farm weeds.

2. Develop an Action Plan for inventory and monitor populations of noxious weed populations on the Wenatchee National Forest

3. Conduct a noxious weed assessment for all significant ground disturbing project activities to determine the risk of introducing noxious weeds and develop a plan to prevent introduction on moderate and high risk sites.

4. Contain, control or eradicate existing populations as budget allows. Give priority as follows:

TABLE IV-17
RIPARIAN AREAS - FORAGE UTILIZATION
ALLOWABLE USE OF AVAILABLE FORAGE 1/

RANGE RESOURCE MANAGEMENT LEVELS (FSH 2209.21 R-6)	MAXIMUM ANNUAL UTILIZATION (percent)			
	Grass & Grasslike ^{2/}		Shrubs ^{3/}	
	Sat.Cond.4/	Unsat.Cond.5/	Sat.Cond.4/	Unsat.Cond.5/ ⁶
B - Livestock use managed within current grazing capacity by riding, herding and salting. Cost-effective improvements used only to maintain stewardship of range.	40	0-30	30	0-25
C - Livestock managed to achieve full utilization of allocated forage. Management systems designed to obtain distribution and maintain plant vigor include fencing and water development.	45	0-35	40	0-30
D - Livestock managed to optimize forage production and utilization. Cost effective culture practices improving forage supply, forage use & livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50	0-40	50	0-35

1/ This will be incorporated in Allotment Management Plans. Allotment Management Plans may include utilization standards which are either lower or rarely higher when associated with intensive grazing systems and specific vegetation management objectives which will meet objectives for the riparian dependent resources. Includes cumulative annual use by big game and livestock.

2/ Utilization based on percent removed by weight

3/ Utilization based on incidence of use, weight, and/or twig length.
 Example: If 50 leaders out of 100 are browsed, utilization is 50 percent

4/ Satisfactory Condition - see glossary (satisfactory condition is determined by allotment classification and/or forage condition)

5/ Unsatisfactory Condition - see glossary (anything not "satisfactory").

TABLE IV-18
SUITABLE RANGE (EXCEPT RIPARIAN)
ALLOWABLE USE OF AVAILABLE FORAGE ^{1/}

RANGE RESOURCE MANAGEMENT LEVELS (FSH 2209.21 R-6)	MAXIMUM ANNUAL UTILIZATION (percent) ^{2/}					
	Forest		Grassland		Grass and Grasslike	
	Sat. Cond.3/	Unsat. Cond.4/	Sat. Cond 3/	Unsat Cond.4/	Sat. Cond.3/	Unsat. Cond 4/
B - Livestock use managed within current grazing capacity by riding, herding and salting. Cost-effective improvements used only to maintain stewardship of range.	40	0-30	50	0-30	40	0-25
C - Livestock managed to achieve full utilization of allocated forage. Management systems designed to obtain distribution and maintain plant vigor include fencing and water development.	45	0-35	55	0-35	45	0-30
D - Livestock managed to optimize forage production and utilization. Cost effective culture practices improving forage supply, forage use & livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50	0-40	60	0-40	50	0-35

^{1/} This will be incorporated in Allotment Management Plans. Allotment Management Plans may include utilization standards which are either lower or rarely higher when associated with intensive grazing systems and specific vegetation management objectives which will meet resource objectives. Includes cumulative annual use by big game and livestock.

^{2/} Utilization based on percent removed by weight for grass, grasslike, and forbs.

^{3/} Satisfactory Condition - see glossary (satisfactory condition is determined by allotment classification and/or forage condition).

^{4/} Unsatisfactory Condition - see glossary (anything not "satisfactory").

Priority by Noxious Weed Class

1. Class "A" - those noxious weeds not native to the State that are of limited distribution or are unrecorded in the State and pose a serious threat to the State.
2. Class "B Designate" - those noxious weeds (designated by the state) not native to the State that are of limited distribution or are unrecorded in a region of the State and are common in other regions of the State.
3. Class "C" - any other noxious weeds as identified by the Forest Supervisor.
4. Class "B Non-designated" noxious weeds.

Priority by Location

1. Projects that are next to agricultural lands or areas threatening Federally listed threatened, endangered and sensitive plant or animal species.
2. Projects that are along the Forest boundary or within or threatening Congressionally designated Wilderness area(s).
3. Areas in or adjacent to commodity producing areas.
4. Areas adjacent to disturbed areas.
5. Projects within or adjacent to visually sensitive areas.
6. All other locations.

TIMBER

Regeneration Harvest

1. Immature understories of existing stands which are candidates for an overstory removal may be retained for further management if the residual stand contains a minimum of 50 well distributed trees per acre. These trees should be a desirable species, well formed, free to grow after overstory removal, and capable of a radial growth rate of 15 annual rings per inch or better within five years after release. Multi-level stands which do not meet the above understory minimums should be scheduled for regeneration harvest at the appropriate time rather than overstory removal.

Intermediate Harvest

1. Intermediate harvests should be designed to improve quality, vigor, and value of the residual stand and not necessarily to maximize return from the intermediate harvest.

Silvicultural Examination and Prescription

1. The selected silvicultural system must be capable of providing special conditions, such as a continuous canopy or continuous high density live root mats when required by critical soil conditions, or conditions needed to achieve management objectives such as streamside protection, wildlife needs, and visual resources.
2. The selected silvicultural system must permit control of existing or potential vegetation to a degree that establishment of numbers of trees, other desirable vegetation, and rates of growth as identified in site specific silvicultural prescriptions for harvest areas, can be achieved.
3. The silvicultural system selected must promote stand structure and species composition which avoids serious risk of damage from mammals, insects, disease, or wildfire and will allow treatment of existing insect, disease, or fuel conditions.
4. Silvicultural prescriptions will be prepared on a site specific basis for all activities proposing the management of trees or timber stands to meet resource objectives. All prescriptions will be prepared or approved by a certified silviculturist.
5. The silvicultural prescription shall consider integrated pest management. Pests include insects, diseases, animals, and vegetation. Pesticide application shall conform to Regional direction.

Reforestation

1. The selection of any particular treatment method will be made at the project level based on a site-specific analysis of the relative effectiveness, environmental effects (including human health), and costs of the feasible alternatives. Herbicides will be selected consistent with the

basis established in the Final Environmental Impact Statement For Managing Competing and Unwanted Vegetation. Monitoring and enforcement plans to implement specific measures will be developed for site-specific projects and evaluated in the environmental analyses for these projects.

2. Natural regeneration opportunities will be utilized as appropriate to supplement planting of tree improvement stock.

3. In regeneration units, site preparation should be completed concurrently with logging, or one year after harvest. Units should be suitable for certification within five years after the regeneration harvest. Exceptions may occur, but only for resource objectives that have been documented through environmental analysis.

4. Regional and local stocking guides should be utilized to assess adequate stocking on all regeneration units prior to certifying them as being satisfactorily reforested. Minimum stocking is 150 well distributed trees per acre of a species suitable to the site.

Timber Stand Improvement

1. The actual number of trees for satisfactory reforestation may range from 150 to 500 trees per acre. Variations depend on species and tree sizes found on the site. Stands with more than 500 trees per acre normally need thinning to optimize growth.

2. Release projects shall be governed by the Final Environmental Impact Statement for Managing Competing and Unwanted Vegetation. Prevention of problems shall be the overriding principal.

3. Fertilization can be done where positive net public benefits are expected, based on past research and local experience.

Timber Sale Preparation and Timber Harvest Administration

1. Forest openings created by the application of even-aged silviculture shall be limited to a maximum size of 40 acres. Exceptions are permitted in the following cases: When natural catastrophic

situations such as fires, windstorms, or insect and disease outbreaks occur; on an individual case basis after 60 day public notice and review by the Regional Forester; or, when any one of the criteria described below is met and will produce a more desirable combination of benefits, the limits may be exceeded by not more than 50 percent without review by the Regional Forester and 60 day public notice.

Criteria for 50 Percent Exception

A. When larger created openings will reduce the disturbance to soil, water, fish, riparian resources, or residual vegetation by: allowing economically feasible logging systems that reduce landing and road construction; or locating roads away from unstable soils; or by reducing soil and vegetation disturbance from dragging logs.

B. Where groups of dwarf mistletoe or root rot disease infected trees need to be incorporated into the created opening to avoid infection of susceptible conifer reproduction, and their inclusion cannot be achieved by centering the created opening over the area of infection.

C. Where visual quality objectives require shaping and blending of openings to fit landform. This includes the visual rehabilitation of existing openings.

D. Where larger units are needed to achieve silviculture objectives in existing areas of regeneration cutting by the shelterwood method, and where destruction of the newly created stand of reproduction would occur as a result of delayed removal of shelter trees. This exception applies only to existing shelterwood units and shelterwood units under contract prior to approval of the Forest Plan.

2. Created openings will be separated by areas generally not classed as created openings. The areas between created openings shall contain one or more logical harvest units. These areas shall be large enough and contain a stand structure to meet resource requirements of the Forest Plan. Resource requirements may include wildlife habitat, watershed, landscape management, and others.

The total area of created openings contiguous to 30 acre or larger natural openings should normally be limited to an area not exceeding one-third the size of the natural opening, and not occupying more than one-third of the natural opening perimeter. Openings should not be created adjacent to any natural openings unless adequate vegetation along the edge can be developed or retained in sufficient density to protect wildlife values and scenic management objectives. The determination of adequate vegetation will be made by an appropriate interdisciplinary team.

3. A harvested area of commercial forest will no longer be considered a created opening for silvicultural purposes when stocking surveys carried out in accordance with Regional instructions indicate prescribed crop tree stocking at or above four and one-half feet in height and free to grow. Where other resource management considerations are limiting, such as wildlife habitat and visual requirements, a created opening will no longer be considered an opening when the vegetation in it meets the management prescription objective.

Utilization

Table IV-19

Utilization Standards for Saw Logs

Species(groups)	Min DBH 1/	Min Top DIB 2/
<u>First decade</u>		
Existing mature except lodgepole pine	9 inches	6 inches
Existing commercial thinning size and lodgepole pine	7 inches	4 inches
<u>Future decades</u>		
All species	7 inches	4 inches

DBH 1/ - Diameter at Breast Height
DIB 2/ - Diameter Inside Bark

1. Utilization will be emphasized as the primary means of disposal of waste wood residue.

Nursery Management

1. No special practice.

WATER

Planning

1. Program Implementation - Develop and annually update a Water Resource Five-Year Program that identifies support services, inventory needs, improvement targets, and monitoring direction by Unit and subdrainage. Coordinate the development and implementation of the program with other resource elements, Forests, and State and Federal agencies, Indian Tribes and public groups.

Improvement

1. Refer to the "Improvement" section under the soil resource for direction regarding the Watershed Improvement Program.

Administration and Management

1. Protection of Water Quality - Comply with State requirements for protection of waters of the State of Washington (Washington Administrative Code, Chapters 173-201 and 202) through planning, application, and monitoring of Best Management Practices (BMPs) in conformance with the Clean Water Act, regulations, and federal guidance issued thereto.

In cooperation with the State of Washington, the Forest will use the following process to insure protection of water quality:

A. Select and design BMPs based on site-specific conditions, technical, economic, and institutional feasibility, and the water quality standards for those waters potentially impacted.

B. Implement and enforce BMPs.

C. Monitor to determine if practices are correctly applied as designed.

D. Monitor to determine the effectiveness of practices in meeting design expectations and in attaining water quality standards.

E. Evaluate monitoring results and mitigate where necessary to minimize impacts from activities where BMPs do not perform as expected.

F. Adjust BMP design standards and application when it is found that beneficial uses are not being protected and water quality standards are not being achieved to the desired level. Evaluate the appropriateness of water quality criteria for reasonably assuring protection of beneficial uses. Consider recommending adjustment of water quality standards.

Use the existing agreed to process to implement the State Water Quality Management Plan on lands administered by the USFS, as described in Memorandum of Understanding (MOU) between the Washington Department of Ecology and U.S. Department of Agriculture Forest Service (7/79), and "Attachment A" referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest lands in the Pacific Northwest 12/78).

Individual, general Best Management Practices are described in the General Water Quality Best Management Practices, Pacific Northwest Region, 11/88. This document provides guidance but not direction. Also included in this document is a description of the process, and limitations and use of these BMPs. Each general BMP listed includes the Title, Objectives, Explanation, Implementation and Responsibility, and Monitoring. Evaluations of the ability to implement and estimated effectiveness are made at the project level.

Normally, not all of the general BMPs listed will apply to any given project. There may be specific BMPs which are not represented by a general BMP in this document.

The sensitivity of the project determines whether the site-specific BMP prescriptions are included in the EA/EIS or in the sale/project plan, or in the analysis files.

For a more complete explanation of the above, refer to Appendix J in the FEIS, "Best Management Practices".

2. Management of Public Supply Watersheds - Municipal supply watersheds (See Glossary) will be managed to provide water at a level of quality and quantity which, with appropriate treatment by the purveyor, will result in a satisfactory and safe water supply, recognizing that watershed protection can supplement but not be a substitute for adequate treatment.

Conduct management activities in municipal supply watersheds so as to meet State Water Quality Standards for surface water. Achieve this goal through application of Best Management Practices, which will allow compatible multiple-use activities to be conducted on National Forest System Lands in these watersheds.

During project planning, identify any individual drinking water systems in the area that have a significant potential to be affected by proposed management activities. Identify requirements for protection of individual drinking water systems on a project level basis.

3. Water Resource Investigations - Evaluate the potential direct, indirect and cumulative effects of proposed activities on water resources. Refer to the Forestwide Standards and Guidelines for the soil resource for direction regarding cumulative effects analysis.

Design and conduct water resource inventories to support project analyses at a level commensurate with the planning issues. Develop a water resource inventory program, in cooperation with other resources to: (a) provide more specific information for area and project level analysis and planning, (b) improve the Forest data base for use in Plan revisions and (c) revise current inventories to a higher standard.

4. Monitoring - Monitoring and evaluation is contained in Chapter V and in Appendix F.

Rights and Use Management

1. National Forest Water Uses - Secure necessary water rights to accomplish the multiple-use objectives of the USDA-Forest Service as described by Federal law. For consumptive water uses: (a) Secure Federal reserved water rights pursuant to the

Reservation Doctrine and other enabling legislation or Executive Orders. (b) Acquisition of non-reserved water rights will be made pursuant to applicable State law.

For non-consumptive uses: (a) Assert Federal Reserved water rights for timber and watershed management, including instream flows sufficient to maintain stability of the stream channel for the purposes of securing favorable conditions of water flow and protecting against adverse impacts to productive timber lands adjacent to the channel, pursuant to authority contained in the Organic Administration Act of 1897. (b) Assert water rights for other resource programs by securing instream flows pursuant to authorities contained in other applicable Federal law.

2. Protection of Water Uses - Review water right claims and applications that involve development on or near National Forest System lands in order to determine compatibility with multiple-use objectives. Environmental analysis will be conducted by either the Forest or applicant to evaluate proposed water uses, diversions, transmission applications and renewal of permits on Forest.

Protection of water uses will be achieved through the following means: (a) filing protests with the State in cases where applications are made that adversely effect National Forest resources, (b) asserting claims under applicable Federal or State laws, (c) inserting protection measures into special use permits, (d) developing formal agreements over water use, or (e) purchasing needed water rights where sufficient water cannot be obtained under the Reservation or Appropriative Doctrines.

Permits will not be issued for occupancy of National Forest System lands if that occupancy would conflict with Reserved rights or interfere with meeting other multiple-use objectives of the USDA-Forest Service as described by Federal law.

SOIL

Planning and Inventory

1. Inventory- Maintain an accurate soil survey data base that is of sufficient detail and quality to meet Forest Planning needs. All new soil surveys will meet National Cooperative Soil Survey Standards.

2. Program Implementation - Develop and annually update a Soil Resource Five-Year Program that identifies support services, inventory needs, improvement targets, and monitoring direction by Unit and Subdrainage. Coordinate the development and revision of the Program with other resource elements, Forests, and State and Federal agencies.

Improvement

1. Inventory - Utilize the Forest Watershed Improvement Needs (WIN) Inventory for the identification and prioritization of treatment acres. Annually update the WIN inventory and project prioritization compatible with Regional guidelines.

2. Scheduling - Eliminate backlog of watershed improvement needs on a priority basis as directed by the Soil and Water Five-Year Programs. Acres involving potential threats to life and property will receive the highest priority for treatment, followed by projects in municipal watersheds and drainages that are used by anadromous fish. Calculate target accomplishment on a treated acre basis.

3. Maintenance - Provide maintenance to assure that watershed improvement projects are functional until objectives of the projects are met and to protect capital investments.

4. Monitoring - Watershed improvement projects and project maintenance will be monitored in order to evaluate project and program effectiveness.

Administration and Management

1. Cumulative Effects Analysis - In sub-drainages where project scoping identifies cumulative effects to be an issue or concern, a detailed watershed analysis will be made by an appropriate group of specialists. Their job will be to determine current watershed conditions and evaluate probable impacts for additional management activities. These studies will include all lands regardless of ownership.

Furthermore, a detailed watershed analysis will always be conducted when more than forty percent (40%) of the forested area in a 1,000 acre or larger subdrainage is projected to be in openings at one time (opening being defined as: the condition when the regeneration crop is less than fifteen feet tall).

2. Compaction, Displacement, Puddling, Severely Burned - Leave a minimum of 80 percent of an activity area in a condition of acceptable productivity potential for trees and other managed vegetation following land management activities. Surface soil conditions known to result in reduced productivity or loss of productive land surface are: detrimental compaction; detrimental displacement; detrimental puddling, and severely burned. The total acreage of all detrimental soil conditions should not exceed 20 percent of the total acreage within the activity area, including landings and system roads.

3. Soil Erosion - refers to both surface erosion and soil mass wasting.

a. Surface Erosion - to meet acceptable levels of soil loss and soil management objectives, the minimum percent effective ground cover following cessation of any soil-disturbing activity should be:

Table IV-20
Erosion Hazard Class

EROSION HAZARD CLASS	MINIMUM PERCENT EFFEC. GROUND COVER	
	1st Year	2nd Year
Low (very slight-slight)	20-30	30-40
Medium (moderate)	30-45	40-60
High (severe)	45-60	60-75
Very High (very severe)	60-75	75-90

(NOTE: see glossary for definition of effective ground cover).

b. Soil Mass Wasting - Evaluations of each occurrence will be made to determine the amount of sediment produced. Individual sub-drainages affected will be added to the monitoring plan.

4. There will be no scheduled timber harvest on stability Class V soils. These lands are unsuitable for timber management.

5. Soil and foliar testing (both pre and post application) should be done for all fertilization projects. This information will be used to determine the site specific application rates needed, and also to determine how long the fertilizer will last in different soils.

6. Closed roads, temporary roads, and landings should be placed in conditions to minimize soil erosion.

7. Surface water will be controlled on all roads, landings, rock pits, parking areas, and other road related facilities.

8. Where the above standards for soil erosion cannot be met because of specific site conditions, appropriate mitigation measures shall be devel-

STANDARDS AND GUIDELINES

oped in the project environmental analysis, documented in the project record, and implemented prior to fall rains.

9. Sites degraded by management activities shall be rehabilitated.

AIR

1. Maintain air quality at a level that is adequate for the protection and use of Forest resources produced on the Wenatchee National Forest, and meets or exceeds applicable Federal and State standards and regulations.

2. Protect Air Quality Related Values within all Class 1 areas.

3. Prescribed burning will be managed to comply with the State Smoke Management Plan administered by the Department of Natural Resources, the State Implementation Plan (SIP) developed and administered by the Department of Ecology, and the Final Environmental Impact Statement for the Pacific Northwest Regional Guide dated May 1984.

4. To meet Regional Standards and Guidelines, the Wenatchee National Forest will demonstrate reasonable progress in reducing total suspended particulates (TSP) from prescribed burning during Forest Plan implementation. The starting point for the Forest is 5,000 tons.

5. Prescribed fires that exceed applicable air quality regulatory standards will receive appropriate suppression action to minimize the impact to air quality.

MINERALS

Locatable, Leasable, Common Variety, and Recreational

1. The public's right to explore for, develop and produce mineral resources is recognized, and orderly mineral exploration, development and production activities shall be encouraged and facilitated in all areas which are available to such

activities or where valid existing rights to conduct such activities exist.

2. Process all notices of intent, plans of operation, lease applications and permit applications in a timely manner.

3. Approve reasonable means of access when needed for mineral prospecting, exploration and development activities.

4. Per a Coop-Agreement with the State of Washington, when appropriate coordinate mining plan evaluations with the Washington State Department of Natural Resources, Division of Geology and Earth Resources.

5. If mineral activity is proposed, ensure that the land status allows the proposed activity to be conducted (e.g., open to mineral entry under the 1872 mining law, open to and/or subject to mineral leasing and open to the disposal of mineral materials, etc). If the area is withdrawn, determine if valid prior existing rights exist before approving proposed activities (consult with the District, Forest or Area Mineral Specialists).

6. Administration of all locatable, leasable and salable mineral resource activities shall ensure that those activities are conducted in accordance with the 36 CFR 228 Regulations; are conducted in compliance with applicable Federal and State standards for air quality, water quality, solid waste disposal and treatment, threatened and endangered species, cultural resources, and fire; are appropriately integrated with the use, conservation and protection of all other resources; and so as, where feasible, to minimize adverse environmental impacts.

7. Ensure that an appropriate environmental analysis and documentation is used as a basis for making mineral leasing recommendations, approving proposed mineral-related activities; establishing reclamation objectives and requirements, for designing reasonable but necessary stipulations needed to protect other resources; and for establishing reasonable but appropriate bonding requirements.

Ensure that mineral leasing recommendations are made in compliance with the Federal Onshore Oil and Gas Leasing Reform Act of 1987, the Geo-

thermal Steam Act, the Acquired Lands Leasing Act, and other applicable laws and regulations. Once leases are issued, on-the-ground activities will be managed in-keeping with the Interagency Agreements between the Forest Service and the Bureau of Land Management.

8. To the extent practical limit recommended stipulations for leases and permits to only those that have appropriate and approved wording (i.e., Uniform Format For Oil and Gas Lease Stipulations--draft April, 1988 or other approved stipulations). These may include, but are not limited to the following:

1. No surface occupancy stipulation
2. Timing or seasonal stipulation
3. Controlled surface use stipulation

9. Ensure that approved mineral activities are reasonably necessary for and incidental to mineral exploration, development or production.

10. Periodically conduct compliance checks on approved mineral activities to ensure that they are being conducted in compliance with a lease, permit or approved operating plan.

11. If existing laws and regulations will not provide adequate protection of other resources and a withdrawal is determined to be necessary, ensure that the mineral resources are appropriately evaluated and the proposal for withdrawal is made in accordance with the requirements of the Federal Land Policy and Management Act of 1976 (FLPMA).

12. If other resource activities may interfere with the right to conduct mineral resource activities (e.g., exploration, development, mining, mining claim maintenance, etc.), determine what rights do exist. If conflicts exist, resolve the conflicts before proceeding with the proposed activity.

13. Avoid or minimize capital investments in or adjacent to areas with known reserves and alienated mineral rights. If a mining claim validity examination is determined to be necessary in order to resolve land use conflicts, consult with the Area Mining Specialist. Mining claim validity should be used as a last resort for resolving such conflicts.

14. Recreation panning, sluicing, dredging and rockhounding shall be allowed throughout the Forest where such activity does not conflict with established management objectives, withdrawal objectives or the rights of mining claimants. If warranted, management plans providing specific direction on how and where these activities can occur shall be implemented.

RURAL COMMUNITY AND HUMAN RESOURCES

Human Resource Programs

1. Utilize available human and community development programs and/or volunteers in the National Forests whenever they can efficiently accomplish Forest work.

Civil Rights Program

1. Maintain an Affirmative Action Plan.

2. Conduct compliance reviews as required by Title VI of the Civil Rights Act of 1964, within standards established by the Forest Service.

3. Make special efforts to inform the general public, including minorities and the underprivileged, of benefits they are eligible to receive from Forest programs. Techniques and the media best suited to increase awareness and participation will be used.

American Indian Coordination

1. National Forest lands will be managed to minimize social and administrative barriers to legitimate users of the Forest. Where common boundaries exist with the Yakima Indian Reservation, resource activities will be closely coordinated.

2. Honor trust responsibilities to the Yakima Indian Nation under the 1855 Treaty with the Yakimas (12 Stat. 951, June 9, 1855).

3. Where appropriate, information about planned project activities will be presented to Native American Indian groups for coordination concerning effects on traditional religious sites.

STANDARDS AND GUIDELINES

4. Protect for Native Americans their access to sites, use, and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites. Appropriate protection of these areas will be coordinated with the religious leaders of the Yakima Indian Nation and the Confederated Tribes of the Colville Reservation.

LANDS

Special Use Management

1. Land use requests will be reviewed for compatibility with Forest plan prescriptions and allocations.
2. Terminate or conform noncompatible uses on an opportunity basis.
3. Where a use can be accommodated on private or other land, National Forest land will not be used.
4. Private uses will generally be on a charge basis, whereas use by other public agencies will usually be without charge.
5. Management practices/prescriptions will not be applied which restrict or interfere with the current use of transportation/utility corridors.
6. New transportation/utility proposals should be accommodated within existing corridors to the maximum extent feasible.

Right-of-Way Grants for Roads and Trails

1. Aggressively acquire all needed access, in advance of project activity such as the sale of timber.
2. With few exceptions, unlimited easements granted in perpetuity will be acquired.
3. Limited easements (i.e., those authorizing administrative use, but not public use) will be acquired only when, for resource management or other reasons, public use is not desirable or necessary.

4. Temporary easements will be used under the conditions defined in the Forest Service Manual.

Property Line Location, Property Boundary, and Corner Maintenance

1. Property line survey, marking, and posting will be accomplished in the following order:
 - A. Lines needed to facilitate resource projects will be done first.
 - B. Lines involved in litigation, potential litigation or trespass or potential trespass will have priority for non-project oriented work.
2. As much property line as possible should be surveyed, marked, and posted on a cooperative basis with neighboring landowners. This work may be done by our Forest surveyor, or by a "third party" Washington State licensed surveyor acceptable to both the cooperator and the Forest.

Encroachment

1. Prevent the occurrence of occupancy trespass through accurate, clear survey marking and posting of property lines. Where possible, this will be done in cooperation with the neighboring property owners.
2. Where appropriate, the "Small Tracts Act" will be applied in the reduction of "backlog" cases and in resolving new trespasses which occur in "good faith" situations.
3. Promptly detect and act on "new" cases.

Landownership Planning, Land Adjustment Planning, and All Adjustment Activities

1. Landownership Classification on the Wenatchee National Forest places lands in one of five categories. The direction for each is:

Category I lands are those within congressionally designated areas; for example, a Wilderness. The direction for this category is to retain existing National Forest lands and acquire private inholdings.

Category II lands are those within administratively designated areas; for example, scenic areas, Mather Memorial Parkway, botanical areas, and other lands which have been determined to be necessary for wildlife, visual, or recreation needs. Generally, in this category existing National Forest lands will be retained and private inholdings will be acquired. Acquisition of private lands in this category will be pursued as opportunities arise.

Category III lands are primarily within land allocations where management direction emphasizes commodity production. The direction for this category is to avoid placing priorities on either retention or disposal of lands. Ownership changes in either direction may be appropriate. They will be considered on a case-by-case basis.

Category IV lands are National Forest lands which will serve the public interest best in private ownership and existing private lands which should remain in private ownership. The direction for this category is to transfer the National Forest lands into private ownership. The preferred method for accomplishing this is land exchange, thus advancing other land management goals at the same time. Examples of lands which fit this classification are:

- A. Isolated small parcels of land which are impractical to manage.
- B. Parcels where a greater general public value can be derived in private ownership.
- C. Areas necessary for community expansion.

Category V lands are those which require an intensive study before priorities for ownership can be recommended. The direction for this category is to initiate the necessary studies at the earliest opportunity.

In addition to the above, communications will be maintained with neighboring Federal land management agencies. This will be done with the view of affecting land transfers to improve both agencies' resource management.

Rights-of-Way, Cost Share Agreements

1. Use cost share agreements to avoid economic and resource impacts associated with duplicating existing or planned road systems.

FACILITIES

Transportation System Planning and Inventory

1. State and Federal Highways

The Regional Forester's Memorandum of Understanding with Washington State will be consulted for standards and guidelines for coordinating the location, construction, maintenance, signing, access and control, third-party occupancy, landscape management, rest areas, right-of-way grants for existing highways, and Forest highway coordination. This Memorandum is included in this Management Plan by reference.

2. County Roads

- a. When the majority of the use on Forest development roads is comprised of public service or other non-Forest Service generated traffic from commercial or residential development, or the road is used for mail, school, or other local government purposes, the Forest Service will actively negotiate and encourage the transfer of its jurisdiction to the appropriate public road agencies. This is usually a county.
- b. Continue to cooperate with counties and share in the cost of construction, reconstruction, improvement, and maintenance of certain Forest development and county roads. Existing agreements that provide standards and guidelines for consultation, maintenance, rights-of-way, etc., are included in this plan by reference.

3. Share Cost Roads

Whenever possible or feasible, the Forest Service will avoid duplicating existing or planned road systems by negotiating agreements with interested parties to share in the costs of a single system to serve all tributary ownerships. All existing agreements with Burlington Northern, Plum Creek,

STANDARDS AND GUIDELINES

Boise Cascade, Idaho Pine, Longview Fibre, and the Washington State Department of Natural Resources will be reviewed. Future agreements and supplements will insure that the tributary areas and volumes are in conformance with the prescriptions in this Management Plan. When they are adjusted and verified, they shall be included in the Plan by reference.

4. Forest Development Roads

Forest development roads are not public roads in the same sense as roads that are under the jurisdiction of public road agencies, such as States or counties. Forest development roads are not intended to meet the transportation needs of the public at large. Instead, they are authorized only for the administration and utilization of National Forest System lands. Although generally open and available for public use, that use is at the discretion of the Secretary of Agriculture. Through authorities delegated by the Secretary, the Forest Service may restrict or control use to meet specific management direction. Commercial users, permittees, or contractors also may be required to share in the cost of developing, improving, and maintaining forest development roads.

These are roads under the jurisdiction of the Forest Service which are necessary for the protection, administration, and utilization of the National Forest system, and the use and development of its resources (Title 23, USC 101, as amended by the Surface transportation Act of 1978).

Road Construction

1. Roads will be designed and constructed as stable and durable structures suitable for their intended use. Design elements and standards shall be selected to meet the criteria developed from land and resource plans. Standards for timber sale roads included in the contract as specified must comply with the Forest Service Manual. Deviations from standards must be justified and attested to in writing by the Forest Engineer as being technically adequate to meet management's objectives.

2. Plan and design temporary roads to re-establish vegetative cover on the disturbed area within a reasonable period of time, not to exceed 10 years after the termination of a contract, lease or permit, unless the road is determined necessary as a permanent addition to the National Forest Transportation System.

Road Reconstruction

1. Reconstruction of roads will be limited to the requirements necessary to provide for the intended uses and to protect adjacent resources.
2. Roads that do not meet standards may be operated without reconstruction providing the safety of users and the stability of the road can be otherwise provided. Minor reconstruction is authorized for spot repairs. Restrictions on public use for the duration of the project will be considered before more extensive reconstruction is authorized.

Road Operation

1. Road Closures- The decision to close any Forest road will be made on a case by case basis. Unless there is a resource need documented in the project analysis, currently open roads will remain open and newly constructed roads will be closed to public access by vehicle.

Fire, Administration, and Other (FA&O) Construction/Reconstruction

1. Facility project needs will be developed through site plan analysis, evaluated through the NEPA process and selected by using Regional FA&O criteria. Condition surveys will be performed annually with health and safety factors having high priority.
2. Consider the special needs of handicapped persons for employment opportunities, and in the design of public facilities.
3. Facilities should be planned, developed, and maintained and operated for safe use, support of the Forest resource programs, and cost effectiveness.

4. Buildings and utility systems construction and reconstruction, additions and changes, shall comply with approved site development plans.

5. The Administrative facilities management priorities are:

- A. Public and employee safety and health
- B. Prevention of site and interior and exterior building deterioration
- C. Energy conservation
- D. Minor improvements

6. Provide and manage administrative facilities sufficient to accomplish land and resource management and protection objectives of the Forest. Prepare administrative site development plans for all Forest administrative sites. Long-term development and maintenance costs will be a consideration in facilities planning.

PROTECTION

Fire Management Planning and Analysis

1. All wildfires will receive a prompt suppression response. Appropriate suppression strategies will include Control, Contain, and Confinement actions.
2. Priorities for protection will first be human life, followed by public safety and improvements.
3. If a fire escapes Initial Attack, an Escaped Fire Situation Analysis will be completed and approved by the responsible line officer. Efficiency will be emphasized.
4. The prevention of human caused wildfires will continue to be a management priority. The investment in this program will be commensurate with the values at risk.
5. Prescribed fire will be used to modify vegetation in an effort to minimize the risk of wildfires. Unplanned ignitions may be utilized if a prescribed fire plan has been developed and it is appropriate to the management area affected.

6. Prescribed fire will also be used as a resource management tool when appropriate planning indicates it is an efficient and effective option to implement. A prescribed fire that escapes is a wildfire and will receive an appropriate suppression response.

7. Develop and maintain preattack facilities in coordination with the management objectives of each specific management prescription.

Law Enforcement

1. Maintain cooperative law enforcement agreements with Chelan, Kittitas, and Yakima Counties.

Forest Pest Management

1. Survey stands for early detection of pest problems.
2. Coordinate with the Regional Forest Pest Management Unit for technical assistance.
3. Pesticide application will conform with EPA regulations and label restrictions, and will be made only after site specific evaluations have been made.
4. Utilize integrated pest management strategy to prevent unacceptable resource damage and to meet resource objectives in an economically efficient manner.
5. Manage timber to create conditions favorable for the prevention of pest damage.

RESEARCH NATURAL AREAS

1. Normal management and protection activities within RNA's are the responsibility of the Forest Supervisor. Scientific and educational uses of RNA's are the responsibility of the Pacific Northwest Forest and Range Experiment Station. Extensive research use requires a cooperative agreement between the user and the Forest Service. The Forest Supervisor and District Ranger administering the affected Research Natural Area will be informed of mutually agreed

upon activities by the Experiment Station Director. However, a scientist should visit the administering Ranger Station when beginning the studies and explain the nature, purpose, and duration of the activities. Permission for brief visits to Research Natural Areas for observational purposes can be obtained from the District Ranger. Management practices should not call attention to these areas.

BIODIVERSITY

1. Maintain or enhance biological diversity by providing or developing an ecologically sound distribution and abundance of plant and animal communities and species at the forest stand, subdrainage and Forest level. This distribution must contribute to the goal of maintaining or enhancing all native and desirable introduced species and communities.

2. Evaluate opportunities to maintain or enhance stand, subdrainage and Forest level components of biological diversity on a project by project basis as commensurate with management area direction. This evaluation will include project effects on the diversity (both visual and biological) and on wildlife and plant habitat in the subdrainage. If the project will reduce any of these components below the acceptable level as indicated by the management objectives for the sub-drainage the project may be altered to maintain diversity, or wildlife and plant habitat.

3. During project planning, areas of exceptional aesthetic value, unique wildlife or plant habitat or that contribute needed components for biological diversity may be found. These areas can be proposed through the District Ranger to the Forest Supervisor for inclusion into a prescription, special interest area or Research Natural Area (in consultation with the regional RNA committee) to preserve the appropriate area or forest ecologist and appropriate specialists will decide whether to amend the forest plan to allow a change in prescription (or classification) of the area in question. The Supervisor could also decide to protect the area until the next plan revision.

4. The most critical components of diversity (because they are relatively uncommon) include old growth and wildlife and plant habitat for rare species. Visual diversity is also an important consideration in project planning. Old growth stand in particular will often be important in the maintenance of biological diversity and aesthetic value.

Retain contiguous forest stands of later seral stages within 3rd and 4th order watersheds. Link patches of later seral stages with corridors of mid to late seral stages, such as riparian or visual corridors.

Identify subdrainages specific management objectives for fish and wildlife habitat and plants. These objectives should maintain or develop the habitat sizes, patterns and spacing essential for allowing genetic interchange and movement of species.

Where mature and old growth forest stands are managed for wildlife habitat, select and manage for stand characteristics and spatial location and size that will ensure viability of all plant and animal species closely associated with those habitats.

5. During project planning, develop site specific management prescriptions that meet objectives for biological diversity and ecosystem function. In addition to other management direction, consider the following guidelines:

Commercial forest management should provide for species diversity.

Tree species used in planting harvested units should be selected by considering site potential as indicated in plant association guides. Whenever appropriate a mixture of trees species should be planted.

Commercial and non-commercial thinning guidelines will incorporate the species diversity concept.

Vegetation management should allow for all natural species to function. None should be eliminated from the site.

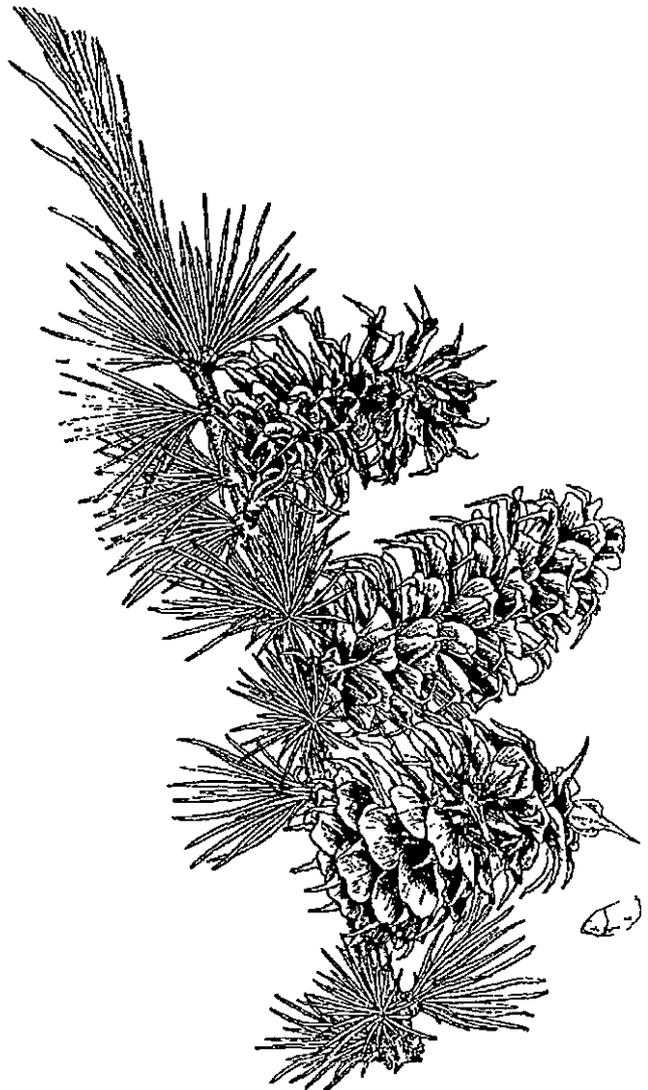
F. MANAGEMENT PRESCRIPTIONS

The National Forest land within the Wenatchee National Forest has been divided into 24 management areas, each with different management goals, resource potential, and limitations. The management areas are shown on the accompanying map, which can be used for reference. The management area maps of record consist of a set of larger scale maps on file in the Forest Supervisor's Office.

Boundaries of the management areas are not meant to require a ground survey for their placement. The actual placement on the ground for management purposes may vary a few hundred feet from the location on the map depending on the circumstances of the project. Disputes that arise will be handled on a case-by-case basis.

Objectives shown represent minimum levels, higher objectives may be achieved.

Table IV-21 displays the acreage of the various management areas.



**TABLE IV-21
MANAGEMENT AREA ACREAGES**

MANAGEMENT	AREA	ACRES
EF-1	Experimental Forest	4,770
EW-1	Key Deer and Elk Habitat	118,742
EW-2	Riparian-Aquatic Habitat Protection Zone	47,361
EW-3	Key Big Game Habitat	19,059
GF	General Forest	389,087
MP-1	Mather Memorial Parkway	13,717
OG-1	Old-Growth Management (dedicated)	79,840
OG-2	Mature Habitat (managed)	49,015
RE-1	Developed Recreation	6,021
RE-2a	Dispersed Recreation, Unroaded Motorized (w/o 4x4 routes)	79,607
RE-2b	Dispersed Recreation, Unroaded Motorized (w/ 4x4 routes)	16,748
RE-3	Dispersed Recreation, Unroaded Non-motorized	116,092
RE-4	Dispersed Recreation, Unroaded, Timber Harvest	6,614
RM-1	Range Management	17,702
RN-1	Research Natural Areas	2,247
SI-1	Classified Special Areas - Scenic and/or Recreation	70,512
SI-2	Classified Special Areas - Other	2,798
ST-1	Scenic Travel - Retention	83,635
ST-2	Scenic Travel - Partial Retention	174,880
UC-1	Utility Corridors	1/
WI-1	Wilderness	841,034
WS-1	Scenic River (Proposed)	5,554
WS-2	Recreational River (Proposed)	11,363
WS-3	Wild River (Proposed)	23,426 2/
Water		7,780

1/ Acres are distributed among other management areas adjacent to utility corridors

2/ All but 170 acres are within Wilderness

Individual Prescriptions

The following are the individual management area prescriptions which apply to the acreage shown in Table IV-21. They must be used along with the "Forest-wide" standards and guidelines.

MANAGEMENT PRESCRIPTION EF-1

TITLE: Experimental Forest

GOAL STATEMENT: Provide opportunities to study the effects of Forest management and fire on vegetative, soil, and water resources occurring on the east side of the Cascade Mountains. Maintain the area in a form that will not compromise the opportunities for research.

DESCRIPTION: The Entiat Experimental Forest was designated under the authority of the Chief of the Forest Service in 1970. Burned by wildfire in 1970, and rehabilitated and reforested in subsequent years, the area has been the subject of numerous scientific investigations. Currently the Experimental Forest is being managed for a wide range of multiple uses in coordination with the Forestry Sciences Laboratory in Wenatchee. Periodic monitoring will occur until vegetation reaches such a size as to have a significant effect on water production. New studies will be initiated at that time.

Objectives following the Entiat Burn in August 1970 were to study the effects of fire on complete hydrologic units.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
RECREATION	Recreation Planning and Inventory	1 Visual Quality Objective MODIFICATION 2. Practices will be consistent with research objectives 3 Plan recreation activities to conform to the appropriate ROS class Semi-primitive to urban	
	Cultural Resource Evaluation, Assessment and Protection	1 Forest-wide Standards and Guidelines apply See p IV-66	
	Facility and Site Reconstruction and Construction	1 Forest-wide Standards and Guidelines apply See p IV-67 and IV-68	
	Facility and Site Management	1 Forest-wide Standards and Guidelines apply. See p IV-68	
	Use Administration	1 Forest-wide Standards and Guidelines apply See p IV-68	
	Trail Reconstruction	1 Practices will be consistent with research objectives	
	Trail Construction	1 Practices will be consistent with research objectives	
	Trail System Maintenance and Operation	1 Forest-wide Standards and Guidelines apply See p IV-69	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>TIMBER</u> (CONTINUED)</p>	<p>Reforestation</p> <p>Timber Stand Improvement</p> <p>Timber Sale Preparation and Timber Harvest Administration</p> <p>Nursery Management and Genetic Tree Improvement</p> <p>Timber Management Research</p>	<p>1. Activities shall be conducted under the guidance of and in harmony with research objectives</p> <p>1. Activities shall be conducted under the guidance of and in harmony with research objectives</p> <p>1. Activities shall be conducted under the guidance of and in harmony with research objectives</p> <p>1 No special practice</p> <p>1 All activities are prescribed to meet research goals and objectives</p>	
<p><u>WATER</u></p>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1 Coordinate all activities with the Experimental Station Project Leader during planning and implementation of project</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-94 and IV-96</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-94 and IV-95</p> <p>1. Forest-wide Standards and Guidelines apply. See p IV-95 and IV-96</p>	
<p><u>SOIL</u></p>	<p>Planning and Inventory</p> <p>Improvement</p> <p>Administration and Management</p>	<p>1 Coordinate all activities with the Experimental Station Project Leader during planning and implementation of project</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-96</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-97</p>	
<p><u>AIR</u></p>	<p>Planning</p> <p>Administration and Management</p>	<p>1 Coordinate all activities with the Experimental Station Project Leader during planning and implementation of project</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-98</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Mineral Activities</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-98 and IV-99</p> <p>1 Recommend a stipulation be attached to leases which ensures the Experimental Forest is appropriately protected</p> <p>1 Allow disposal where removal will not significantly affect the Experimental Forest objectives</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-99</p>	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		<p>1 Forest-wide Standards and Guidelines apply See p IV-99 and IV-100</p>	
<u>LANDS</u>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1 Avoid locating transportation and utility corridors in the Experimental Forest</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-100</p> <p>1 Recommend only compatible uses</p> <p>1. Forest-wide Standards and Guidelines apply. See p IV-100</p> <p>1 National Forest ownership is preferred</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-101</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>FACILITIES</u>	<p>Road Construction</p> <p>Road Operation</p> <p>FA&O Construction and Reconstruction</p>	<p>1 Provide and manage roads as needed to accomplish research goals</p> <p>1 Prohibit or eliminate road use inconsistent with research objectives</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-102 and 103</p>	
<u>PROTECTION</u>	<p>Fire Prevention</p> <p>Fire Suppression</p> <p>Fire Hazard Abatement</p> <p>Preattack Facilities Development</p> <p>Law Enforcement</p> <p>Forest Pest Management</p>	<p>1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan</p> <p>1. Implement fire suppression strategies that attempt to protect the unique research values specific to each research natural area</p> <p>2 Fire suppression tactics should be implemented that attempt to protect the experimental nature of these areas</p> <p>1 Treatment of both activity generated and natural fuels is appropriate when coordinated with the specific experimental activities of the area Coordination with the Experiment Station project leader is essential</p> <p>1 Develop only those preattack facilities which support the objectives of the experimental forest</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-103</p> <p>1 Insect and disease outbreaks should be suppressed when studies are threatened and /or unacceptable damage to resources would occur if no controls are applied</p> <p>2 Research should develop and/ or follow sound Integrated Pest Management (IPM) principles</p> <p>3 Utilize IPM strategies to prevent unacceptable pest damage and meet resource objectives</p> <p>4 Coordinate all activities with the Experimental Station Project Leader during planning and implementation of project.</p>	

MANAGEMENT PRESCRIPTION: EW-1

TITLE: Key Deer and Elk Habitat

GOAL STATEMENT: *Manage deer and elk winter range to meet habitat requirements for sustaining optimum carrying capacity.*

DESCRIPTION: Deer and elk winter ranges are generally on the edge of the Forest, adjacent to or intermingled with, other land ownerships, at low elevations, south and/or east facing slopes with reduced snow depth and early melt-off of snow. Because of these conditions these areas are highly desired for winter and/or early spring recreation activities and dry out early to become high fire danger areas. These habitats have openings covering 10 to 60 percent of the area (used by big game for foraging), containing shrubs, grasses, and forbs with scattered conifer trees, and 20 to 80 percent covered by conifer stands (used by big game for cover). The quality of the forage and the amount of thermal cover combined with the amount of human disturbance are the factors that determine the carrying capacity of these areas for big game in winter.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
RECREATION	Recreation Planning and Inventory	1 Visual Quality Objective MODIFICATION	1. Coordinate with the Washington Department of Wildlife to identify biological objectives
		2 Manage in a Semi-Primitive Non-Motorized to Roaded Modified Recreation Opportunity Spectrum	
	Cultural Resource Evaluation, Assessment and Protection	1 Forest-wide Standards and Guidelines apply. See p IV- 66	
	Facility and Site Reconstruction and Construction	1 Construction and reconstruction of facilities will be designed to minimize impacts on big game.	
	Facility and Site Management	1. Forest-wide Standards and Guidelines apply See p. IV- 68	
	Use Administration	1. Motorized access will be managed when and where needed to meet biological objectives	
	Trail Reconstruction and Construction	1 Construction and reconstruction of trails will be designed to minimize impacts on big game.	
Trail System Maintenance and Operation	2. As opportunities become available, build trails to view big game where appropriate.		

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p>	<p>1 Develop optimum cover/forage relationships for each Species Management Guide</p> <p>2 Big horn sheep requirements will take precedence over deer or elk management, where sheep are present or where sheep habitat exists</p> <p>3 Activities in deer and elk winter range will be limited to corridors for access to other areas from December 1 to April 15 Activities are defined as any human movement that causes the animals distress (i.e., snowmobiling, x-country skiing, rock or ice climbing, hunting, hiking, logging, road building, motorcycle riding, 4-wheel driving etc.) Habitat improvement activities are excluded</p> <p>4 Activity closures earlier than December 1 or later than April 15, may be established by District Rangers for each big game management area in cooperation with the Washington Department of Wildlife</p> <p>5 Restrict activities to allow big game to fully utilize habitat</p> <p>6 Winter range, north of the Wenatchee River, will be managed for deer</p> <p>7 Winter ranges will be managed in cooperation with Washington Department of Wildlife to reduce damage to neighboring private lands</p> <p>8 Manage primary cavity excavators at 60 percent of the potential population level</p>	<p>1 In wildlife habitats in managed forests, optimum cover is 40% and optimum forage is 60%</p>
	<p>Non-Structural Habitat Improvement</p>	<p>1 Use all available techniques for habitat improvements</p> <p>2 Habitat improvements will be done to increase big game carrying capacity and provide more flexibility for timber management</p>	<p>1 The optimum objective for habitat effectiveness index for deer and elk will be 80 Areas that cannot be managed at that level will be managed for the highest level possible</p>
	<p>Structural Habitat Improvement</p>	<p>1 Habitat improvements will be done to increase big game carrying capacity and provide more flexibility for timber management.</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>TIMBER</u></p>	<p>Regeneration Harvest</p>	<p>1. Use harvest methods compatible with the goal to maintain or improve habitat</p>	<p>1 Plant all non-stocked areas following regeneration harvest to achieve habitat effectiveness objectives Use genetically superior stock as available</p> <p>2 Protect plantations against animal damage to achieve habitat effectiveness objectives.</p> <p>1. Precommercially thin to achieve habitat effectiveness objectives</p> <p>1 The optimum objective for habitat effectiveness index for deer and elk will be 80 Areas that cannot be managed at that level will be managed for the highest level possible</p> <p>1 Cone collection</p> <p>2 Seed certification.</p>
	<p>Intermediate Harvest</p>	<p>1 Allow commercial thinning that will maintain at least 40 percent thermal cover and 10 percent hiding cover</p>	
	<p>Silvicultural Examination and Prescription</p>	<p>1. Make stand examinations prior to any activity.</p> <p>2 Design silvicultural prescriptions to meet big game needs</p>	
	<p>Reforestation</p>	<p>1 Reforestation will be aimed at achieving sustained optimum cover/forage relationships</p>	
	<p>Timber Stand Improvement</p>	<p>1 Thin to provide optimum cover/forage relationships</p>	
	<p>Timber Sale Preparation and Timber Harvest Administration</p>	<p>1 The environmental analysis will address big game issues</p> <p>2 Created openings will be considered closed when tree heights are 6 feet tall in deer areas and 8 feet tall in elk areas</p> <p>3 A habitat effectiveness analysis will be done immediately before, immediately after, and ten years after project.</p> <p>4. Activities will avoid conflicts with winter, spring, and fall use by big game</p> <p>5 Timber harvesting or road building activities will be scheduled to avoid conflicts with big game fawning and calving</p>	
	<p>Nursery Management</p>	<p>1. Perform as required to meet reforestation program needs including allowance for natural disasters.</p>	
	<p>Genetic Tree Improvement</p>	<p>1. No special practice.</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>WATER</u></p>	<p>Planning</p>	<p>1. Forest-wide Standards and Guidelines apply See p. IV- 94</p>	
	<p>Improvement</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-94 and 96</p>	
	<p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply. See p. IV-94 and 95</p>	
	<p>Rights and Use Management</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV- 95 and 96</p>	
<p><u>SOIL</u></p>	<p>Planning and Inventory</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV- 96</p>	
	<p>Improvement</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV- 96</p>	
	<p>Administration and Management</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV- 97</p>	
<p><u>AIR</u></p>	<p>Planning</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 98</p>	
	<p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 98</p>	
<p><u>MINERALS AND GEOLOGY</u></p>	<p>Locatable Minerals</p>	<p>1 If reasonable, during pre-production stages recommend mineral prospecting, exploration and development activities be conducted during other than the critical use seasons (i e., critical winter, spring and fall use periods).</p>	
	<p>Leasable Energy Minerals</p>	<p>1 Recommend stipulations be attached to leases and permits which reasonably restricts pre-production activities during the critical use season</p>	
	<p>Common Variety Minerals</p>	<p>1 Same as for Locatable Minerals above.</p>	
	<p>Recreational Mineral Activities</p>	<p>1 If the activity would significantly affect big game use of the area during the critical use season do not approve it</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RURAL COMMUNITY AND HUMAN RESOURCES</u></p>		<p>1 Forest-wide Standards and Guidelines apply See p IV-99 and 100</p>	
<p><u>LANDS</u></p>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way, Cost-Share-Agreements</p>	<p>1 Utility corridors are permitted subject to determination of need and requirements necessary to protect key big game habitat</p> <p>2 Manage special uses to maintain the goals of the Species Management Guide</p> <p>1 Grant necessary road/trail access to landlocked inholders, but keep public access to a minimum during winter, spring, and fall</p> <p>1 Recommend only compatible uses</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-100</p> <p>1 National Forest or Washington Department of Wildlife ownership of winter range areas is preferred</p> <p>1 Big game needs will be resolved during negotiation of cost share agreements</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>FACILITIES</u></p>	<p>Road Construction</p>	<p>1 Construct the least amount of the lowest standard road necessary to accomplish the project objectives</p>	<p>1 Screen meadows, clearcuts, and other openings with vegetation or topography</p>
	<p>Road Operation</p>	<p>1 Emphasize road closures to reduce impact on wildlife</p> <p>2 Prohibit or eliminate road use inconsistent with wildlife goals</p> <p>3 Restrict operating season when necessary to reduce impact on wildlife</p>	<p>2 Do not block elk and deer migration routes with road cuts and fills</p> <p>3 Where roads cross elk and deer migration routes, use minimum clearing and sight distance</p> <p>4 Locate roads so that they may be closed</p> <p>5 Avoid straight sections of road of more than 1/4 mile.</p> <p>6 Fall only those snags that present a safety hazard</p> <p>7 To the extent practical, avoid the disturbance of cliffs, caves, talus, and other limited habitats</p> <p>8 To the extent practical, avoid locating roads in migration routes, saddles, gaps, bands around ridges, streams, seeps, and springs, and cover areas that are in locations generally deficient in cover</p> <p>9 To the extent practical, wind-row or pile slash to provide cover</p> <p>10 Provide openings in wind-rowed, piled, scattered slash at all known wildlife crossings and at a minimum of every 100 feet</p>
	<p>FA&O Construction and Reconstruction</p>	<p>1 To the extent practical, avoid construction in these areas</p> <p>2 Consider removing any facility not compatible with wildlife goals</p> <p>3 Structures intended to benefit wildlife or facilitate management of wildlife permitted</p>	<p>1. (See the Forest-wide standards and guidelines for wildlife and Fish)</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>PROTECTION</u></p>	<p>Fire Prevention</p>	<p>1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan</p>	
	<p>Fire Suppression</p>	<p>1 Implement fire suppression strategies commensurate with the habitat management objectives</p> <p>2 All fire suppression tactics and resources may be appropriate</p>	
	<p>Fire Hazard Abatement</p>	<p>1 Treatment of both natural and activity generated fuels is appropriate when consistent with the habitat management objectives of the specific area</p>	
	<p>Preattack Facilities Development</p>	<p>1 Develop preattack facilities in coordination with the habitat management objectives of each specific area</p>	
	<p>Law Enforcement</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-103</p>	
	<p>Forest Pest Management</p>	<p>1. Suppress insects and diseases when necessary to protect resource values</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives.</p>	

MANAGEMENT PRESCRIPTION: EW-2

TITLE: Riparian-Aquatic Habitat Protection Zone

GOAL STATEMENT: Maintain and enhance riparian management areas to perpetuate their distinctive resource values to (a) achieve and maintain habitat conditions necessary to maximize long-term natural production opportunities for desired fish species, (b) maintain water quality that meets or exceeds State Standards and (c) provide diverse wildlife habitat.

DESCRIPTION: This prescription applies to the land and vegetation adjacent to Class I, II and fish bearing Class III streams, lakes and wetlands. The Riparian Management Area (RMA) shall correspond to at least the recognizable area dominated by riparian vegetation (true Riparian Zone) and sufficient adjacent area (influence area) to assure adequate protection to achieve riparian management objectives and standards in the subdrainage. The area of consideration, from both banks of fish bearing streams and the perimeter of lakes and wetlands, is as defined in the variable width table found in the Forest-wide Riparian Standards and Guidelines

Riparian Management Area boundaries and specific riparian management objectives will be established for all projects within an RMA. Riparian management objectives will be established based upon analysis of RMA habitat conditions, objectives and standards both within the subdrainage (generally 1,000-10,000 acres) and at the project site.

Within Riparian Management Areas, management decisions will be made in favor of riparian dependent resources (water quality, fish and wildlife habitat) when conflicts exist with man's use.

Refer to the Forestwide Standards and Guidelines for Riparian Areas for overall direction on the planning and administration of management activities in RMAs. Refer to the "Administration" section in the Forest-wide Standards and Guidelines for Riparian Areas for a discussion of the use and refinement of applicable quantitative standards.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
RECREATION	Recreation Planning and Inventory	1 Forest-wide Standards and Guidelines apply. See p. IV-65 and 66 2. New developed recreation sites or expansions to existing sites will not reduce flood storage or routing ability and will minimize conflicts with Riparian dependent resources. All new projects will consider Riparian management objectives.	1 Range of Visual Quality Objectives (VQO) from Retention to Modification. The VQO applied will be dictated by the adjacent visual resource prescription and will be managed compatible with the goal of this Riparian Aquatic Protection Zone 2. Allow dispersed sites when compatible with the goal and Riparian Standards
	Cultural Resource Evaluation and Assessment	1 Forest-wide Standards and Guidelines apply See p. IV-66	1. Extraordinary measures may be needed in this zone due to hydraulic actions. Measures may include bank stabilization or cultural resource salvage
	Cultural Resource Protection	1. Forest-wide Standards and Guidelines apply See p. IV-66	Authorized excavation of cultural resources shall be conducted in a manner which best maintains riparian habitat and include necessary rehabilitation measures

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u> (continued)</p>	Facility and Site Reconstruction	1 Forest-wide Standards and Guidelines apply See p IV-67 and 68	1 When feasible relocate camp units outside the zone
	Facility and Site Construction	1 Forest-wide Standards and Guidelines apply See p IV-68	1 New sites will not be built in the floodplain
	Facility and Site Management	1 Forest-wide Standards and Guidelines apply See p IV-68	
	Use Administration	1 The Recreation Opportunity Spectrum applied will be dictated by the adjacent prescription	
	Trail Reconstruction	1 Forest-wide Standards and Guidelines apply See p IV-68	
	Trail Construction	1 Forest-wide Standards and Guidelines apply See p IV-68 and 69	1 To the extent practical locate and relocate trails outside of the Riparian/Aquatic protection zone 2 New trails, except for interpretative trails or those designed specifically to access Riparian resources should not be built within the RMA's
	Trail System Maintenance and Operation	1 Forest-wide Standards and Guidelines apply See p IV-69	
<p><u>WILDLIFE AND FISH</u></p>	Wildlife Surveys and Plans	1 Forest-wide Standards and Guidelines apply See p IV-80 through 83	
	Habitat Improvement	1 Forest-wide Standards and Guidelines apply. See p IV-83 and 84	
	Administration and Management	1 Forest-wide Standards and Guidelines apply See p IV-85 through 88	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RANGE</u>	Range Planning and Inventory	1 Forest-wide Standards and Guidelines apply See p IV- 88 and 89	1 Grazing will be permitted in the RMA when compatible with the RMA objectives 2 Management of the range resource will feature an intensive scheme 3 Allotment management plans will be designed to maintain or enhance riparian habitat Allotment plans will establish riparian habitat objectives and if conditions are not meeting objectives establish a schedule for recovery. 4 Use forage species which will enhance the riparian management area
	Range Non-Structural Improvements	1. Forest-wide Standards and Guidelines apply. See p IV-89 and 92	1 Improvements will be allowed when compatible with riparian management objectives and include provisions to maintain / improve habitat
	Range Structural Improvements	1 Forest-wide Standards and Guidelines apply See p IV-89	
	Range Structural Improvement Maintenance	1 Forest-wide Standards and Guidelines apply See p. IV-89	
<u>TIMBER</u>	Regeneration Harvest	1 Forest-wide Standards and Guidelines apply See p IV-92	1 Adjust harvest for specific goals in individual Riparian Zones to meet forest-wide riparian standards. 2. Maintain trees providing bank stability
	Intermediate Harvest	1 Forest-wide Standards and Guidelines apply See p IV-92	1 Salvage will generally be discouraged Review any such harvest to insure consistency with RMA objectives.
	Silvicultural Examination and Prescription	1. Forest-wide Standards and Guidelines apply See p IV-92	
	Reforestation	1 Forest-wide Standards and Guidelines apply See p IV-92 and 93	
	Timber Stand Improvement	1 Forest-wide Standards and Guidelines apply See p. IV-93	1. Allow precommercial thinning when consistent with management objectives in the subdrainage

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p>TIMBER (continued)</p>	<p>Timber Sale Preparation and Timber Harvest Administration</p> <p>Nursery Management and Genetic Tree Improvement</p> <p>Reforestation Animal Control</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-93 and 94</p> <p>1. No special practice.</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV-92 and 93</p>	<p>1 Give special emphasis to administration within the zone</p> <p>2 Directionally fall timber away from water courses unless such work is prescribed as a habitat improvement measure</p> <p>3 Protect snags from all incompatible uses.</p> <p>4 Remove convertible products (e.g firewood) only from designated areas</p>
<p><u>WATER</u></p>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV-94</p> <p>1. Forest-wide Standards and Guidelines apply. See p. IV-94 and 96</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-94 and 95</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-95 and 96</p>	
<p><u>SOIL</u></p>	<p>Planning and Inventory</p> <p>Improvement</p> <p>Administration and Management.</p>	<p>1. Forest-wide Standards and Guidelines apply. See p IV-96</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-96</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-97</p>	<p>1. Maintain slope stability in and adjacent to the riparian management area.</p> <p>The minimum distance for RMA consideration is 100 foot horizontal distance from the ordinary high water line associated with both banks of streams and the perimeter of lakes and wetlands.</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-98</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV- 98</p>	
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p>	<p>1 If a mineable deposit does not underlie this zone and if it is reasonable, limit significant surface disturbing activities to areas outside the Riparian-Aquatic zone</p> <p>2 Establish reasonable reclamation requirements in approved operating plans that ensure the riparian habitat is reasonably restored or complemented</p> <p>3 If the area is identified as water and associated wetlands as defined in 33 CFR 328, unless categorically exempted by 33 CFR 323.4, ensure dredging activities are conducted in compliance with section 404 of the Clean Water Act and a Corps of Engineers permit is obtained</p> <p>1 If reasonable, attach stipulations to a lease that require significant surface disturbing activities to be conducted outside of the Riparian-Aquatic zone.</p> <p>1 If removal would significantly impact the Riparian-Aquatic zone and reasonable reclamation is not achievable, do not permit the removal of these mineral resources</p> <p>2 Establish reasonable reclamation objectives which either restore the habitat or complement it.</p>	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		<p>1 Forest-wide Standards and Guidelines apply See p IV-99 and 100</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>LANDS</u></p>	<p>Special Use Management</p>	<p>1 Utility corridors are permitted subject to determination of need and requirements necessary to protect the riparian resource Include measures to minimize or mitigate resource damage, where permitted</p>	<p>1 Retain National Forest lands and acquire private inholdings on an opportunity basis</p>
	<p>Right-of-Way Grants for Roads and Trails</p>	<p>1 Grant access only where no other feasible options exist. 2 Relocate and Rehabilitate roads whenever possible</p>	
	<p>Federal Energy Regulatory Commission License and Permits</p>	<p>1 Allow where compatible and mitigate when zone is adversely affected Coordinate with Northwest Power Planning Councils protected area designation</p>	
	<p>Property Line Location Property Boundary and Corner Maintenance</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 100</p>	
	<p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-100 and 101</p>	
<p><u>FACILITIES</u></p>	<p>Road Construction</p>	<p>1. Road use will be designed by project planning, design criteria, and Forest Management Objectives 1 Locate FA&O structures outside the zone to the extent practical 2 Solid waste landfills will not be permitted in the zone 3 Transfer systems will be allowed if they are compatible with Forest standards</p>	<p>1 Locate roads outside the zone to the extent practical.</p>
	<p>Road Operation</p>		<p>2 When a prudent and feasible alternative exists, abandon or relocate existing roads</p>
	<p>FA&O Construction and Reconstruction</p>		<p>3 To the extent practical, create new or replacement habitat in the location, design and operation of road related rock pits, borrow areas and other disturbed sites 4 Restrict activities to time periods most suited to minimize unavoidable impacts 5 Maintain or enhance hydraulic flow consistent with habitat requirements 6 To the extent practical, cross habitat with structures rather than fill Use a 90 degree crossing where possible See FSH 7709 56b Drainage Structures Handbook, or revision</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p>FACILITIES (continued)</p>			<p>7 Provide for erosion control during and after construction (sediment traps, revegetation, etc) All roads within this zone shall have an erosion resistant surface. Vegetation is the preferred surface on closed roads</p> <p>8 No channelization, stream relocation or associated activity will be approved if a feasible alternative exists</p> <p>9 In projects where channelization is undertaken, the design will provide that the aquatic habitat is restored to original or better condition</p> <p>10 All new road construction will maintain or enhance fish passage Follow the guidelines in Engineering Technical report ETR 7700-5 "Fish Versus Culverts" or revision</p> <p>11 To the extent practical, correct existing barriers to fish passage; inventory road related passage obstructions and prioritize for corrective measures</p>
<p>PROTECTION</p>	<p>Fire Prevention</p> <p>Fire Suppression</p> <p>Fire Hazard Abatement</p> <p>Preattack Facilities Development</p> <p>Law Enforcement</p> <p>Forest Pest Management</p>	<p>1. Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan.</p> <p>1. Implement fire suppression strategies commensurate with the habitat management objectives</p> <p>2. All fire suppression tactics and resources may be appropriate Emphasize maintenance and enhancement of sub-drainage objectives</p> <p>1. Forest-wide Standards and Guidelines apply See p IV- 103</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV- 103</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-103</p> <p>1 Suppress Forest pests when they adversely affect the vegetation component essential for maintaining the zone and/or when unacceptable damage to resources would occur if no controls are applied</p>	<p>1 Generally tractors will not be compatible</p> <p>1 Treatment of activity generated and natural fuels is appropriate when compatible with the subdrainage objectives.</p> <p>1 Develop preattack facilities when compatible with the habitat objectives</p> <p>1 Use suppression techniques which avoid or minimize degradation of water quality as determined by state Forest practices</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable damage and meet resource objectives</p> <p>3 Rodenticides should not be used in this allocation</p>

MANAGEMENT PRESCRIPTION: EW-3

TITLE: Key Big Game Habitat/Unroaded

GOAL STATEMENT: Manage deer, elk, and mountain goat winter range and key summer range to meet habitat requirements for sustaining optimum carrying capacity in an unroaded setting.

DESCRIPTION: Deer and elk winter ranges are generally at low elevations, on south and/or east facing slopes with reduced snow depth and early melt-off of snow. Because of these conditions, these areas are highly desirable for winter and early spring recreation activities, and dry out early to become high fire danger areas. These habitats have 10-60 percent of the area in openings (used by big game for foraging) containing shrubs, grasses, and forbs with scattered conifer trees, and 20-80 percent of the area in conifer stands (used by big game for cover). The quality of the forage and the amount of thermal cover combined with the amount of human disturbance are the factors that determine the carrying capacity of these areas for big game in winter. Mountain goat summer and winter ranges are generally adjacent to each other at high elevations, well within the Forest, and just above and below the line separating suitable and unsuitable timber harvesting stands. Summer range consists of dense stands of old conifer trees intermingled with small meadows that provide food and shelter. Winter range consists of open, steep, rocky ridges with grasses, forbs, and shrubs dominating a landscape containing scattered conifer trees. Human activity, reductions in winter habitat, and lack of quality forage in summer range limit the populations of mountain goats.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>Recreation</u></p>	<p>Recreation Planning and Inventory</p> <p>Cultural Resource Evaluation, Assessment and Protection</p> <p>Facility and Site Reconstruction and Construction</p> <p>Facility and Site Management</p> <p>Use Administration</p>	<p>1. Visual Quality Objective Retention</p> <p>2 Plan recreation activities to conform to ROS class setting criteria: Semi-primitive non-motorized or semi-primitive motorized</p> <p>3 Motorized recreation activities may be planned only when compatible with big game habitat objectives</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-66</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-67 and 68</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-68</p> <p>1 Recreation visitor activities will be encouraged that are compatible with prescription goals</p>	<p>1 Coordinate with the Washington Department of Wildlife to identify areas where there is a need to meet biological objectives</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u> (continued)</p>	<p>Trail Reconstruction and Construction</p> <p>Trail System Maintenance and Operation</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-68 and 69</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-69</p>	
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p> <p>Non-Structural Habitat Improvement</p> <p>Structural Habitat Improvement</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV-80 through 82</p> <p>2 Manage primary cavity excavators at 95 percent of the potential population level</p> <p>1 Develop optimum cover/forage relationships</p> <p>2 Prescribed fire will be considered where appropriate to simulate natural fire vegetative succession and maintain key big game habitat</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 83 and 84</p>	<p>1 The optimum objective for habitat effectiveness index for deer and elk will be 80 Areas that cannot be managed at that level will be managed for the highest level possible Mountain goat areas will be managed for a 50/50 cover/forage ratio</p>
<p><u>RANGE</u></p>	<p>Range Planning and Inventory</p> <p>Range Non-Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1 Grazing of suitable range by livestock shall emphasize range management practices that maximize the production of key forage species for big game</p> <p>1. Emphasize big game forage species in range forage improvement projects</p> <p>1 Emphasize big game needs in the design and application of range improvements Reconstruct, relocate, or eliminate existing range improvements that are detrimental to big game</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-89</p> <p>1 Forest-wide Standards and Guidelines apply</p>	<p>1 Management seeks to optimize production of forage allocated to Wildlife consistent with maintaining the environment and providing for livestock use of the range Practices may be selected and used to develop cost-effective methods for achieving improved forage supplies and uniform livestock distribution and forage</p> <p>1. Cultural practices such as brush control, fertilization, site preparation, and seeding of improved forage species may be used to improve quality and quantity of wildlife forage</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u>	<p>Regeneration Harvest</p> <p>Intermediate Harvest</p> <p>Silvicultural Examination and Prescription</p> <p>Reforestation</p> <p>Timber Stand Improvement</p> <p>Timber Sale Preparation and Timber Harvest Administration</p> <p>Nursery Management</p> <p>Genetic Tree Improvement</p>	<p>1 No scheduled harvest Use harvest methods compatible with the goal to maintain or improve habitat</p> <p>1 Intermediate harvest will depend upon big game needs</p> <p>1 Make examinations prior to any activity and as required for certification of reforestation and thinning</p> <p>2 Design silvicultural prescriptions to meet big game needs</p> <p>1 Reforestation will be aimed at achieving optimum cover/forage relationships</p> <p>1 Thin to provide optimum cover/forage relationships where necessary</p> <p>1 All inventories and plans will include a habitat effectiveness analysis</p> <p>1 Perform as required to meet reforestation program needs including allowance for natural disasters</p> <p>1. No special practice</p>	<p>1 Stand examination</p> <p>1 Plant all non-stocked areas following regeneration harvest to achieve habitat effectiveness objectives Use genetically superior stock as available.</p> <p>2 Protect plantations against animal damage to achieve habitat effectiveness objectives</p> <p>1 Precommercially thin to achieve habitat effectiveness objectives.</p> <p>1 The optimum objective for habitat effectiveness index for deer and elk will be 80 Areas that cannot be managed at that level will be managed for the highest level possible Mountain goat areas will be managed for a 50/50 cover/forage ratio</p> <p>2 Created openings will be considered closed when tree heights are 6 feet tall in deer areas and 8 feet tall in elk areas</p> <p>1. Cone collection</p> <p>2 Seed certification</p>
<u>WATER</u>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-94</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 94 and 96</p> <p>1 Forest-wide Standards and Guidelines apply. See p. IV- 94 and 95</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 95 and 96</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>SOIL</u>	Planning and Inventory Improvement Administration and Management	1 Forest-wide Standards and Guidelines apply See p IV-96 1 Forest-wide Standards and Guidelines apply See p IV-96 1 Forest-wide Standards and Guidelines apply See p IV-97	
<u>AIR</u>	Planning Administration and Management	1 Forest-wide Standards and Guidelines apply. See p. IV-98 1 Forest-wide Standards and Guidelines apply See p IV-98	
<u>MINERALS AND GEOLOGY</u>	Locatable Minerals Leasable Energy Minerals Common Variety Minerals Recreational Mineral Activities	1. If reasonable, during pre-production stages, recommend mineral prospecting, exploration, and development activities be conducted during other than the critical use season (critical winter, spring, and fall use periods) 2. If reasonable, limit access for pre-production prospecting and exploration activities to existing 4x4 routes and trails 3 If roading is necessary and incidental to proposed mineral prospecting, exploration and development activities, approve the activity and prescribe appropriate mitigation 1. Recommend stipulations be attached to leases and permits which reasonably restricts pre-production activities during the critical use season, and restricts access as indicated above 1. Same as for Locatable Minerals above 1 Access for conducting these activities shall be in keeping with the management goals for the area. If the activity would significantly affect big game use of the area during the critical use period do not approve it.	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		1. Forest-wide Standards and Guidelines apply See p IV-99 and 100	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>LANDS</u>	<p><i>Special Use Management</i></p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights of Way Cost-Share Agreements</p>	<p>1. Avoid locating transportation and utility corridors in key big game habitat</p> <p>2. Grant permits only for compatible uses</p> <p>1. Grant necessary road/trail access to landlocked inholders</p> <p>1. Recommend only compatible uses</p> <p>1. Forest-wide Standards and Guidelines apply See p IV- 100</p> <p>1. National Forest or Washington Department of Wildlife ownership of winter range areas is preferred</p> <p>1. Big game needs will be resolved during negotiation of cost share supplements</p>	
<u>FACILITIES</u>	<p>Road Construction</p> <p>Road Operation</p> <p>FA&O Construction and Reconstruction</p>	<p>1. No roads will be constructed or maintained except that</p> <p>a. Reasonable access will be granted to landlocked inholders under then prevailing guidelines</p> <p>b. Short term roads may be constructed to protect adjacent resources</p> <p>1. Prohibit or eliminate road use inconsistent with big game objectives</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-102 and 103</p>	
<u>PROTECTION</u>	<p>Fire Prevention</p> <p>Fire Suppression</p> <p>Fire Hazard Abatement</p>	<p>1. Implement a high intensity fire prevention program as outlined in the Forest's Fire Management objectives</p> <p>1. Implement fire suppression strategies commensurate with the habitat management objectives</p> <p>2. All fire suppression tactics and resources may be appropriate</p> <p>1. Treatment of both activity generated and natural fuels is appropriate when coordinated with the habitat management objectives of each specific area</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>PROTECTION</u> (continued)</p>	<p>Preattack Facilities Development</p> <p>Law Enforcement</p> <p>Forest Pest Management</p>	<p>1 Develop preattack facilities in coordination with the habitat management objectives of the specific area</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-103</p> <p>1 Suppress insects and diseases when adversely affecting vegetation essential for maintaining wildlife and/or unacceptable damage to resources would occur if no controls are applied</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives</p>	

MANAGEMENT PRESCRIPTION: GF

TITLE: General Forest

GOAL STATEMENT: Provide for long-term growth and production of commercially valuable wood products at a high level of investment in silvicultural practices.

DESCRIPTION: Future stands will vary from intensive timber management typified by regular spacing, relatively even age and height, to those that are similar to natural stands. Regenerated stands will have a high ratio of genetically superior stock and may receive cultural treatments throughout the rotation. The cultural practices will be determined on a site specific basis depending on the biological and economic conditions of the stand. Regeneration harvest will generally occur at culmination of mean annual increment. Logging will be by the most economical methods compatible with silvicultural requirements, soil and water standards and landform. Road densities and standards would also be dependent upon these conditions. In the General Forest area, the relative intensity of management is set by the Forest Plan. However, site specific details and locations of treatments will be determined in the prescription written or field reviewed by a certified silviculturist.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RECREATION</u>	Recreation Planning and Inventory	1 Visual Quality Objective MAXIMUM MODIFICATION 2 Plan timber harvest and other vegetative treatments to meet ROS setting objectives for applicable class, roaded natural to urban	1 Cutting units may dominate natural patterns but must repeat natural form, line, color and texture. 2 Provide a variety of age classes 3 Cutting units should generally avoid obliteration of high use dispersed recreation sites and other specific locations of special interest to recreation visitors 4 A higher VQO may be considered along roads, trails and dispersed sites within this prescription
	Cultural Resource Inventory Evaluation, Assessment and Protection	1 Forest-wide Standards and Guidelines apply. See p IV- 66	
	Facility and Site Reconstruction and Construction	1 Forest-wide Standards and Guidelines apply See p IV-67 and 68	
	Facility and Site Management	1 Forest-wide Standards and Guidelines apply See p IV-68	
	Use Administration	1 Forest-wide Standards and Guidelines apply See p IV-68	
	Trail Reconstruction and Construction	1. Construct new trails or relocate existing trails outside of this prescription if recreation management and trail objectives can be met	
	Trail System Maintenance and Operation	1 Forest-wide Standards and Guidelines apply See p. IV- 69	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p> <p>Non-Structural Habitat Improvement</p> <p>Structural Habitat Improvement</p>	<p>1 Manage primary cavity excavators at 20 percent or higher of the potential population level</p> <p>1 To the extent practical schedule timber harvest to meet the needs for big game diversity, especially adjacent to winter range</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-83 and 84</p>	
<p><u>RANGE</u></p>	<p>Range Planning and Inventory</p> <p>Range Non-Structural Improvements</p> <p>Range Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1. Grazing of suitable range by livestock shall emphasize range management practices that favor timber production</p> <p>2 Management of the range resource under this prescription will feature a full range of management schemes</p> <p>3 Recognize potential of timber sales to create new forage producing areas</p> <p>4 Provide for logical development of sale areas that can be packaged with existing grazing allotments or for new transitory grazing areas.</p> <p>1 Use only compatible species in range forage improvement projects</p> <p>1 Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements</p> <p>1. Forest-wide Standards and Guidelines apply. See p IV-89</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-89</p>	<p>1 The management scheme applied will be one which best meets the timber management goal for the specific area. Management seeks utilization of forage allocated to livestock</p> <p>1 Grass seeding will not be done when it interferes with tree regeneration or growth</p> <p>1. Cost effective management systems and techniques including fences and water developments are designed and applied to obtain relatively uniform livestock distribution and use of forage, and to maintain plant vigor.</p>
<p><u>TIMBER</u></p>	<p>Regeneration Harvest</p> <p>Intermediate Harvest</p>	<p>1. Harvest generally at culmination of mean annual increment Regeneration practices subject to standards in Regional Guide and NFMA Regulations</p> <p>1. Up to two commercial thinnings may be considered</p> <p>2 Remove dead and dying trees, as economical, from areas not scheduled for regeneration harvest</p>	<p>1 Clearcut</p> <p>2 Shelterwood cut</p> <p>3 Seed tree cut</p> <p>1 Thin to maintain a minimum basal area that will utilize site potential and produce an economical harvest</p> <p>1 Salvage Sales should be considered, where dead or dying trees exceed minimum wildlife needs</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u> (continued)	Silvicultural Examination and Prescription	1. Make examination prior to any activity and as required for certification of reforestation and thinning.	1 Stand examination
	Reforestation	1. Use compatible reforestation methods	1 Plant all nonstocked areas following regeneration harvest unless adequate natural regeneration of desired species is expected within three years. 2 Perform site preparation as required by site specifications 3 Protect seedlings from animal damage where stocking level is threatened.
	Timber Stand Improvement	1 Use methods compatible with the goal	1 Release regeneration overtopped by competing vegetation 2 Fertilization will be used where it is cost effective, and on soils where increased growth of conifers can be expected based on past experience or research
	Timber Sale Preparation and Timber Harvest Administration	1 Forest-wide Standards and Guidelines apply See p. IV- 93 and 94	
	Nursery Management	1 Collect seed in sufficient quantities to meet program reforestation needs plus a sufficient reserve for natural disasters.	1 Cone collection 2 Seed certification.
	Genetic Tree Improvement	1. Implement the Forest Tree Improvement Program Include seed orchards and plantations to evaluate the genetic quality of selected trees	1 Select and maintain superior trees 2 Collect seed from superior trees
<u>WATER</u>	Planning	1. Forest-wide Standards and Guidelines apply See p IV-94	
	Improvement	1. Forest-wide Standards and Guidelines apply See p. IV-94 and 96	
	Administration and Management	1 Forest-wide Standards and Guidelines apply See p. IV- 94 and 95	
	Rights and Use Management	1 Forest-wide Standards and Guidelines apply. See p. IV-95 and 96	
<u>SOIL</u>	Planning and Inventory	1 Forest-wide Standards and Guidelines apply. See p IV-96	
	Improvement	1 Forest-wide Standards and Guidelines apply See p IV- 96	
	Administration and Management	1. Forest-wide Standards and Guidelines apply. See p IV-97	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-98</p> <p>1. Forest-wide Standards and Guidelines apply. See p IV-98</p>	
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Mineral Activities</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-98 and 99</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-98 and 99</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 98 and 99</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-99</p>	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		<p>1 Forest-wide Standards and Guidelines apply See p IV- 99 and 100</p>	
<u>LANDS</u>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1. Transportation and utility corridors are permitted where suitable</p> <p>1 Grants will be made under then prevailing guidelines</p> <p>1. Recommend only compatible uses</p> <p>1 Property lines adjacent to timber production areas will be surveyed, marked and posted</p> <p>2 These property lines will have high priority in the use of available Land Line Location funds</p> <p>1 Use land exchange to facilitate resource management</p> <p>1 Maximize use of cost share process to reduce miles of road (acres out of production), costs, and assure that location and standard of roads within the National Forest portion of agreement areas are compatible with management goals.</p>	

MANAGEMENT PRESCRIPTION: MP-1

TITLE: Mather Memorial Parkway

GOAL STATEMENT: Manage area to maintain and enhance its outstanding scenic and recreation qualities.

DESCRIPTION: This is an area classified by executive order, encompassing a zone extending 1/2 mile either side of U.S. Highway 410, to be managed primarily for scenic and recreational purposes. Developments and management activities within the allocation generally are not visually evident. The natural existing or established landscape will generally have vegetation on forested lands that is composed of large old growth trees in the overstory or in groves intermixed with a variety of age classes in the understory. The general perception of the landscape is a natural appearing environment. Motorized use is permitted within these areas to the extent it is compatible with the management intent.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Recreation Planning and Inventory</p>	<p>1 Visual Quality Objective. RETENTION</p> <p>2. Plan recreation activities in conformance with appropriate ROS class: Semi-primitive to Rural.</p>	<p>1. Dispersed sites may be modified to accommodate recreational facilities and uses</p> <p>2 Visual analysis is required to blend activities with the naturally established landscape.</p> <p>3 Structures within the area will be architecturally compatible with the naturally established landscape</p> <p>4 Rehabilitation measures are to be applied to the landscape where needed to improve visual setting</p> <p>5. Prescribed fire may be used to enhance visual quality and to maintain natural fire succession</p>
	<p>Cultural Resource Evaluation, Assessment and Protection</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV- 66</p>	
	<p>Facility and Site Reconstruction and Construction</p>	<p>1. Provide high quality recreation sites and facilities with development of activities and opportunities desired by the recreating public.</p>	
	<p>Facility and Site Management</p>	<p>1. Forest-wide Standards and Guidelines apply. See p. IV- 68</p>	
	<p>Use Administration</p>	<p>1. Forest-wide Standards and Guidelines apply. See p. IV- 68</p>	
	<p>Trail Reconstruction and Construction</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV- 68 and 69</p>	
	<p>Trail System Maintenance and Operation</p>	<p>1 Forest-wide Standards and Guidelines apply. See p. IV-69</p>	

MP-1

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>WILDLIFE AND FISH</u>	Wildlife Surveys and Plans Non-Structural and Structural Habitat Improvement	1 Manage primary cavity excavators at close to 100 percent of the potential population level 1. Forest-wide Standards and Guidelines apply See p IV-83 and 84	
<u>RANGE</u>	Range Planning and Inventory Range Non-Structural Improvements Range Structural Improvements Range Structural Improvement Maintenance Range Administration and Management	1 Grazing of suitable range by livestock shall emphasize range management practices that are consistent with the scenic quality of the area 2 Management of the range resource under this prescription will feature an extensive (Level C) scheme of management 3 Intensive cultural practices will not be used 1 Use only compatible species in range forage improvement projects 1. Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements 1. Forest-wide Standards and Guidelines apply See p IV- 89 1 Forest-wide Standards and Guidelines apply See p IV-89	1 Level C Management - Management seeks utilization of forage allocated to livestock consistent with the management goal 1 Cost effective management systems and techniques, including fences and water developments, are designed and applied to obtain relatively uniform livestock distribution and use of forage, and to maintain plant vigor
<u>TIMBER</u>	Regeneration Harvest Intermediate Harvest	1 No scheduled harvest within seen area (the foreground area visible from Highway 410, trails and developed sites) of the zone Regeneration harvest may take place within the zone outside of the seen area if compatible with the adjacent management prescription Improvement cutting for recreational purposes is permitted Unscheduled harvest may also take place to recover losses due to fire, windthrow, insect or other catastrophies 1 No scheduled harvest within the seen area of the zone Intermediate harvest may take place within the zone outside of the seen area if compatible with the adjacent management prescription. Unscheduled harvest may also take place to recover losses due to fire, windthrow, insects or other catastrophies	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u> (continued)	<p>Silvicultural Examination and Prescription</p> <p>Reforestation</p> <p>Timber Stand Improvement</p> <p>Timber Sale Preparation and Timber Harvest Administration</p> <p>Nursery Management and Genetic Tree Improvement</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 92</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-92 and 93</p> <p>1. Precommercial thinning may take place if compatible with the adjacent management prescription</p> <p>1. Forest-wide Standards and Guidelines apply See p IV- 93 and 94</p> <p>1 No special practice</p>	
<u>WATER</u>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-94</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-94 and 96</p> <p>1. Forest-wide Standards and Guidelines apply See p IV- 94 and 95</p> <p>1. Forest-wide Standards and Guidelines apply See p IV- 95 and 96</p>	
<u>SOIL</u>	<p>Planning and Inventory</p> <p>Improvement</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV- 96</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV- 96</p> <p>1. Forest-wide Standards and Guidelines apply. See p IV- 97</p>	
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 98</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV- 98</p>	

MP-1

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Mineral Activities</p>	<p>1 Continue the existing withdrawal along the highway (330 feet each side of the centerline), unless other existing laws and regulations will provide adequate protection</p> <p>2 Ensure that prior valid existing rights exist before approving any mining related activities within the withdrawn area.</p> <p>1. If leasable mineral related activities are incompatible with the management objectives for the withdrawn area, attach a no surface occupancy stipulation to the lease</p> <p>1. Allow mineral material sites when compatible with the goal</p> <p>1 Consider designating panning areas</p>	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		<p>1 Forest-wide Standards and Guidelines apply See p IV- 99 and 100</p>	
<u>LANDS</u>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1 Permit transportation and utility corridors when compatible with the goal</p> <p>1 Provide appropriate access to inholders under then existing guidelines</p> <p>1 Recommend only compatible uses</p> <p>1. Survey, mark and post lines of all other ownerships within the area not planned for acquisition</p> <p>1 Use land exchange to facilitate resource management</p> <p>1. Forest-wide Standards and Guidelines apply See p IV- 101</p>	
<u>FACILITIES</u>	<p>Road Construction</p> <p>Road Operation</p> <p>FA&O Construction and Reconstruction</p>	<p>1 Provide and manage roads as needed to accomplish resource objectives</p> <p>1 Appropriate road use will be determined by project planning and design</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV- 102 and 103</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>PROTECTION</u></p>	<p>Fire Prevention</p>	<p>1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan</p>	
	<p>Fire Suppression</p>	<p>1. Implement fire suppression strategies that emphasize the protection of recreation facilities and values or other special values of the area.</p> <p>2 Fire suppression tactics should emphasize the protection of life and property while minimizing the physical disturbance of the resources. The use of all fire suppression resources is appropriate</p>	
	<p>Fire Hazard Abatement</p>	<p>1 Treatment of both activity generated and natural fuels is appropriate when coordinated with the scenic, recreational, or other special management objectives of the area</p> <p>2 The protection of recreation values will be emphasized during the planning and implementation of these projects</p>	
	<p>Preattack Facilities Development</p>	<p>1 Develop only those preattack facilities that are compatible with the special scenic and recreational values of the areas</p>	
	<p>Law Enforcement</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV- 103</p>	
	<p>Forest Pest Management</p>	<p>1. Suppress insects and diseases when outbreaks threaten managed resources and/or users</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives</p>	

MANAGEMENT PRESCRIPTION: OG-1

TITLE: Old-Growth Management

GOAL: Manage for old growth habitat to achieve "ecosystem diversity, preservation of aesthetic qualities", and/or "wildlife and plant habitat".

DESCRIPTION: The Regional Guide for the Pacific Northwest Region directs all Forests to use a standard definition of old growth. Following are the descriptions of the characteristics needed to meet the requirements of this prescription.

1. **ECOSYSTEM DIVERSITY:** Ecosystem diversity is a representation of the variety that exists in biotic communities and is characterized by the number of species on a site and by the number of communities at all sites. The variety of management prescriptions will provide many and varied stand conditions and species, helping to maintain ecosystem diversity in managed, younger stands. However, enough of all types of old growth are required to maintain species dependent on old growth and preserve the various kinds of old growth communities found on the Forest.

2. **PRESERVATION OF AESTHETIC QUALITIES** People using the forest for recreation purposes enjoy old growth trees for their aesthetic and awe-inspiring qualities. Old trees represent a living link with the past and provide an important visual reference to the natural successional process of the forest environment.

Old growth stands are typically thought of as having an atmosphere that is peaceful, cathedral-like, and park-like or an atmosphere of being small, closed in, dominated and encompassed. The stand feels cool and refreshing, and smells musty from the decadent vegetation (rotting logs, snags, fruiting bodies of fungus and underbrush). The trees have deep furrowed bark, large diameters at the base of the tree (generally 21" in diameter or larger), tall and straight boles, (over 100 feet tall) rotten cracks, broken limbs, mosses, lichens, and rounded tops that create the illusion of being old.

3. **WILDLIFE AND PLANT HABITAT:** The indicator species for old growth and mature habitat is the spotted owl. Habitat for spotted owls includes mature and overmature trees dominant in the overstory, a multi-layered canopy, trees of several age classes, large amounts of standing dead trees and down material present, canopy crown closure of 45 percent or greater, and elevations between 1500 and 5000 feet.

The 2200 acres (more or less depending upon local circumstances) of suitable habitat may be contiguous, or scattered over a area of about 9000 acres. There is usually unsuitable habitat (either naturally occurring or from harvest) intermingled with the suitable habitat. It is common to find logging activities next to suitable spotted owl habitat. Road use and recreation activities will often be taking place within the habitat site.

Maintenance and reproduction of spotted owls is of high concern, therefore, limit activities that may affect reproduction.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RECREATION</u>	Recreation Planning and Inventory Cultural Resource Evaluation, Assessment and Protection	1 Visual Quality Objective Retention 2 Plan recreation activities and facilities that meet applicable ROS class criteria Semi-primitive non-motorized to Roaded natural 1 Forest-wide Standards and Guidelines apply See p IV- 66	1 Rehabilitation measures are to be applied to the landscape where needed to improve the visual setting

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u> (continued)</p>	<p>Facility and Site Reconstruction and Construction</p> <p>Facility and Site Management</p> <p>Use Administration</p> <p>Trail Reconstruction and Construction</p> <p>Trail System Maintenance and Operation</p>	<p>1 New facilities should be designed and managed such that they are consistent with the goals of the prescription</p> <p>1 Manage existing facilities so that they're consistent with the goals of the prescription</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 68</p> <p>1. Construct or reconstruct trails to conform with goals of old growth management and to enhance the recreation experience opportunities presented by old growth habitats</p> <p>2 As opportunities become available, build trails where appropriate, to provide viewing of old growth and old growth dependent species</p> <p>1 Manage recreation use to be compatible with the old growth setting Prohibit non-conforming activities and relocate uses outside this prescription</p>	
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p>	<p>1 For each spotted owl network site, maintain within 2 1 miles of the owl's center of activity (whichever is less) .</p> <ul style="list-style-type: none"> a. 2200 acres of high quality old growth and/or mature habitat, or b all suitable habitat <p>As suitable habitat becomes available, it will be added to these sites until there is 2200 acres at each site.</p> <p>2 Maintain the distribution of spotted owl habitat in a network that provides for all species dependent upon mature or old growth habitat (mature and old growth network) Distribution of sites in the network will meet the standards and guidelines established in the Supplemental Environmental Impact Statement on spotted owls</p> <p>3 Follow the Regional Monitoring Plan for spotted owls</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>WILDLIFE AND FISH</u> (continued)</p>	<p>Non-Structural Habitat Improvement</p> <p>Structural Habitat Improvement</p>	<p>4 Exact boundaries will be undetermined until site specific project analysis is completed Factors to consider in determining exact location will be</p> <p>a <i>Overlap with resource allocations that do not harvest timber.</i></p> <p>b <i>Provide high quality spotted owl habitat</i></p> <p>c. <i>Maintain habitat for the "mature and old growth network "</i></p> <p>d <i>Provide areas where Ecosystem Diversity, Aesthetic Qualities, and Animal and Plant habitat overlap</i></p> <p>e <i>Provide better management boundaries</i></p> <p>f <i>Maintain suitable habitat after catastrophic events</i></p> <p>5 <i>Maintain ecosystem diversity by having sites large enough to provide for adequate representation of sites.</i></p> <p>6 <i>Manage primary cavity excavators at close to 100 percent of the potential population level</i></p> <p>1 Habitat improvements will be done to</p> <p>a <i>Meet the management requirements for indicator species</i></p> <p>b <i>Improve factors that may be limiting indicator species and dependant species from occupying network sites</i></p> <p>1. Habitat improvements will be done to</p> <p>a <i>Meet the management requirements for indicator species.</i></p> <p>b <i>Improve factors that may be limiting indicator species and dependant species from occupying network sites</i></p>	
<p><u>RANGE</u></p>	<p>Range Planning and Inventory</p> <p>Range Non-Structural and Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1. <i>Grazing of suitable range by livestock is allowed, but must be compatible with the goal of the prescription</i></p> <p>1 <i>Forest-wide Standards and Guidelines apply</i> See p IV- 89 and 92</p> <p>1 <i>Reconstruct, relocate, or eliminate existing range improvements that visually detract from the old growth definitions</i></p> <p>1 <i>Forest-wide Standards and Guidelines apply</i> See p IV- 89</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u>	Regeneration Harvest Intermediate Harvest Silvicultural Examination and Prescription Reforestation Timber Stand Improvement Timber Sale Preparation, and Timber Harvest Administration Nursery Management and Genetic Tree Improvement	1 No scheduled timber harvest 1 No scheduled timber harvest 1 Silvicultural prescriptions will be written to enhance old growth conditions 1 Natural regeneration will be the preferred method 1 None planned, any timber stand improvement projects should enhance old growth condition 1 Forest-wide Standards and Guidelines apply See p IV- 93 and 94 1 No special practice.	1 Stand examination
<u>WATER</u>	Planning Improvement Administration and Management Rights and Use Management	1 Forest-wide Standards and Guidelines apply See p IV- 94 1 Forest-wide Standards and Guidelines apply See p IV- 94 and 96 1 The riparian zones will be managed the same as the old growth prescription 1 Design water and hydro developments to be compatible with the goals	
<u>SOIL</u>	Planning and Inventory Improvement Administration and Management	1 Forest-wide Standards and Guidelines apply See p IV- 96 1 Forest-wide Standards and Guidelines apply. See p IV- 96 1 Forest-wide Standards and Guidelines apply See p IV- 97	
<u>AIR</u>	Planning Administration and Management	1 Forest-wide Standards and Guidelines apply See p IV-98 1 Forest-wide Standards and Guidelines apply See p IV-98	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>MINERALS AND GEOLOGY</u></p>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Mineral Activities</p>	<p>1. If the proposed activity will adversely impact nesting birds or other dependent species and it is reasonable, recommend during pre-production stages that mineral activities not be conducted during the <i>critical use period</i> (e.g. nesting/fledging period of spotted owls -- February 15 to August 15)</p> <p>1 Recommend that a stipulation be attached to leases which provides for the same reasonable restrictions as required for <i>Locatable Minerals above</i></p> <p>1 Do not allow disposal of common variety minerals if removal will significantly and irreversibly impact old growth dependent species habitat, and alternative sources of these minerals are available</p> <p>2 Attach a stipulation to the permit which provides the same protection as is required under <i>Locatable Minerals</i></p> <p>1 Forest-wide Standards and Guidelines apply See p IV-99</p>	
<p><u>RURAL COMMUNITY AND HUMAN RESOURCES</u></p>	<p>Not applicable to this prescription</p>		
<p><u>LANDS</u></p>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1. Avoid locating transportation and utility corridors in these areas</p> <p>1 Grant access only where no other options exist</p> <p>1 Recommend only compatible uses</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-100</p> <p>1 National Forest ownership is most desirable</p> <p>1 Maximize use of the cost share program in control of road locations, numbers, standards, etc where these areas coincide with cost share areas</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>FACILITIES</u></p>	Road Construction	<p>1. No roads will be built if a reasonable alternative exists</p>	
	Road Operation	<p>1 Appropriate road use will be determined by project planning and design</p>	
	FA&O Construction and Reconstruction	<p>1 To the extent practical, locate structures outside this prescription</p>	
<p><u>PROTECTION</u></p>	Fire Prevention	<p>1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan</p>	
	Fire Suppression	<p>1 Implement fire suppression strategies commensurate with the habitat management objectives</p> <p>2 All fire suppression tactics and resources may be appropriate</p>	
	Fire Hazard Abatement	<p>1 Treatment of both activity generated and natural fuels is appropriate when coordinated with the habitat management objectives of the specific area</p>	
	Preattack Facilities Development	<p>1 Develop preattack facilities in coordination with the habitat management objectives of each specific area</p>	
	Law Enforcement	<p>1 Forest-wide Standards and Guidelines apply See p IV- 103</p>	
	Forest Pest Management	<p>1. Suppress insect and disease outbreaks to ensure protection of old-growth trees and other resources. Insects and disease are important components of old growth</p>	
		<p>2 Survey insects and diseases common to old growth that may threaten immediate and adjacent areas</p>	

MANAGEMENT PRESCRIPTION: OG-2

TITLE: Mature Habitat

GOAL STATEMENT: Manage for mature to old growth habitat for wildlife and plant species dependent upon this habitat.

DESCRIPTION: The indicator species for this prescription are the marten/northern three-toed woodpecker and pileated woodpecker. These indicators plus the spotted owl are designed to provide a mature and old growth network. The network is to provide habitat for all species dependent upon mature or old growth habitat. The habitat for the marten/northern three-toed woodpecker and pileated woodpecker is described as mature or overmature trees in the overstory, a three-layered canopy of trees in several age classes, large amounts of dead standing and down trees present, and a canopy closure of 95 percent or greater. Habitat for marten/northern three-toed woodpeckers is at elevations of about 2000 to 7000 feet, and for the pileated woodpecker, about 1500 to 5000 feet in elevation.

The marten/northern three-toed woodpecker habitat is a 160 acre contiguous habitat. One site will be found every 4000 to 5000 acres and it will be overlapped with spotted owl and pileated woodpecker sites when possible. An additional 160 acres of habitat is needed for developing future marten/northern three-toed woodpecker habitat. This additional acreage may be in any successional stages. The location of the 160 acres of mature habitat will change through time in the 320 acre site.

The pileated woodpecker habitat is 300 acres, made of stands of no less than 50 acres within a 1000 acre area. One site will be found every 12,000 acres and these sites should be overlapped with spotted owls when possible. An additional 300 acres of habitat is needed for pileated woodpecker sites that may be in any successional stage but must have a high number of snags to provide food. The location of the 300 acres of mature habitat will change through time in the 600 acre site.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RECREATION</u>	Recreation Planning and Inventory	1. Visual Quality Objective Partial Retention 2 Recreation Opportunity Spectrum Class Criteria Semi-primitive non-motorized to roaded natural.	
	Cultural Resource Evaluation, Assessment and Protection	1 Forest-wide Standards and Guidelines apply See p IV- 66	
	Facility and Site Reconstruction and Construction	1. New and reconstructed facilities should be consistent with the goals of the prescription	
	Facility and Site Management	1. Forest-wide Standards and Guidelines apply See p IV- 68	
	Use Administration	1 Forest-wide Standards and Guidelines apply See p IV- 68	
	Trail Reconstruction and Construction	1 As opportunities become available, build trails to provide viewing of indicator species and mature habitat	
	Trail System Maintenance and Operation	1 Forest-wide Standards and Guidelines apply See p IV- 69	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p>	<p>1 Maintain 160 acres of contiguous suitable mature or old growth habitat for marten and 300 acres of mature or old growth habitat for pileated woodpeckers at all times</p> <p>2 Maintain the distribution of habitat in a network that provides for all species dependent upon mature or old growth habitat (mature and old growth network) Follow Region 6 Management Requirement Guidelines for wildlife</p> <p>3 Pileated woodpecker areas will have a minimum of 60 percent potential population of primary cavity excavator habitat on the entire area The mature habitat component (160 acres for pine marten and 300 acres for pileated woodpecker) will strive to maintain 100 percent potential population of primary cavity excavators.</p> <p>4 Exact boundaries will be undetermined until site specific project analysis is completed Factors to consider in determining exact locations will be.</p> <p>a. Overlap with resource allocations that do not harvest timber b Provide mature or old growth habitat c Maintain habitat for the "mature and old growth network " d. Provide better management boundaries e Maintain suitable habitat after catastrophic events</p> <p>5 Part of the habitat in these stands will have decay, insects, and disease apparent</p>	
	<p>Non-Structural Habitat Improvement</p>	<p>1 Habitat improvements will be done to</p> <p>a Meet the management requirements for indicator species b Improve factors that may be limiting indicator species and dependent species from occupying network sites</p>	
	<p>Structural Habitat Improvement</p>	<p>1 Habitat improvements will be done to</p> <p>a Meet the management requirements for indicator species b Improve factors that may be limiting indicator species and dependent species from occupying network sites</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RANGE</u>	<p>Range Planning and Inventory</p> <p>Range Non-Structural and Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1 When areas occur within allotments, management will be at the same intensity as adjacent lands and compatible with the goal</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 89 and 92</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 89</p> <p>1 Forest-wide Standards and Guidelines apply. See p. IV- 89</p>	
<u>TIMBER</u>	<p>Regeneration Harvest</p> <p>Silvicultural Examination and Prescriptions</p> <p>Reforestation</p>	<p>1 Harvest will be to perpetuate the mature habitat characteristics and reduce the risk of loss of sites from natural events Habitat conditions will be achieved at about 120 years and be maintained until the stand is about 180 years old Final harvest is planned at about 180 years of age</p> <p>1. Leave primarily thrifty dominant trees when possible to maintain <i>timber production</i>, but <i>some</i> mistletoe infected and/or defective trees should be maintained to provide wildlife habitat</p> <p>2. Thin to maintain growth so that site productivity is utilized and to produce an economical harvest</p> <p>1. Use an appropriate mix of naturally occurring trees Regeneration will be by planting and natural seeding following harvest</p> <p>2 Perform site preparation as required by site specifications</p> <p>3 Protect plantations against animal damage</p> <p>4 Use reforestation methods, nursery stock, and stocking levels that help achieve the goals of the prescription</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u> (continued)	Timber Stand Improvement Timber Sale Preparation, and Timber Harvest Administration Nursery Management and Genetic Tree Improvement	1 Manage stands to achieve large trees quickly. 1 Schedule activities to minimize harassment of wildlife 2 Make examination prior to any activity and as required for certification of reforestation and thinning 1 Use genetically superior tree stock when needed to achieve the goals of the prescription.	
<u>WATER</u>	Planning Improvement Administration and Management Rights and Use Management	1. Forest-wide Standards and Guidelines apply See p IV- 94 1. Forest-wide Standards and Guidelines apply See p IV-94 and 96 1 The riparian zones in this management prescription will be managed to provide mature habitat as well as meet the goals for the Riparian-Aquatic Habitat Protection Zone 1. Forest-wide Standards and Guidelines apply See p IV- 95 and 96	
<u>SOIL</u>	Planning and Inventory Improvement Administration and Management	1 Forest-wide Standards and Guidelines apply. See p IV-96 1. Forest-wide Standards and Guidelines apply See p IV- 96 1. Forest-wide Standards and Guidelines apply. See p IV- 97	
<u>AIR</u>	Planning Administration and Management	1 Forest-wide Standards and Guidelines apply See p IV-98 1. Forest-wide Standards and Guidelines apply See p IV- 98	
<u>MINERALS AND GEOLOGY</u>	Locatable Minerals	1 If the proposed activity will adversely impact nesting birds or other dependent species and it is reasonable, recommend mineral activities during pre-production stages not be conducted during the critical use period. Ensure all habitat-disturbing activities are essential for conducting the proposed mineral related activity	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>MINERALS AND GEOLOGY</u> (continued)</p>	<p>Leasable Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Mineral Activities</p>	<p>1 Recommend that a stipulation be attached to leases which provides for the same reasonable restrictions as required for Locatable Minerals above</p> <p>1 Do not allow disposal of common variety minerals if removal will significantly and irreversibly impact old growth dependent species habitat, and alternative sources of these minerals are available</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 99</p>	
<p><u>RURAL COMMUNITY AND HUMAN RESOURCES</u></p>	<p>Not applicable to this prescription</p>		
<p><u>LANDS</u></p>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1 Avoid locating buildings and utility corridors in mature habitat areas</p> <p>1 Grant access only where no other options exist</p> <p>1. Recommend only compatible uses</p> <p>1. Forest-wide Standards and Guidelines apply See p IV- 100</p> <p>1 National Forest ownership is most desirable</p> <p>1 Maximize use of the cost share program in control of road locations, numbers, standards, etc. where these areas coincide with cost share areas.</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>FACILITIES</u></p>	Road Construction	<p>1 Provide and manage roads as needed to accomplish resource objectives</p>	
	Road Operation	<p>1 Appropriate road use will be determined by project planning and design</p>	
	FA&O Construction and Reconstruction	<p>1 Forest-wide Standards and Guidelines apply See p IV-102 and 103</p>	
<p><u>PROTECTION</u></p>	Fire Prevention	<p>1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan</p>	
	Fire Suppression	<p>1 Implement fire suppression strategies commensurate with the habitat management objectives</p> <p>2 All fire suppression tactics and resources may be appropriate</p>	
	Fire Hazard Abatement	<p>1 Treatment of both activity generated and natural fuels is appropriate when coordinated with the habitat management objectives of the specific area</p>	
	Preattack Facilities Development	<p>1 Develop preattack facilities in coordination with the habitat management objectives of each specific area</p>	
	Law Enforcement	<p>1 Forest-wide Standards and Guidelines apply See p IV-103</p>	
	Forest Pest Management	<p>1 Suppress insect and disease outbreaks to insure protection of old-growth timber and other resources</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damages and meet resource objectives</p> <p>3 Survey insects and diseases common to old-growth that may threaten immediate and adjacent areas</p>	

MANAGEMENT PRESCRIPTION: RE-1

TITLE: Developed Recreation

GOAL STATEMENT: Provide developed recreation in an Urban to Semi-Primitive Recreation Opportunity Spectrum (ROS) setting.

DESCRIPTION: This prescription is applicable to existing and potential developed recreation sites within the full spectrum of ROS settings. The areas allocated to this use include only the specific site on which development takes place. This prescription is also applicable to existing and potential Alpine (downhill) ski areas including runs, tows or lift facilities, shelters, lodges, services and parking lots. Associated developments such as skating rinks, toboggan runs, etc., may also be present. Potential sites allocated to this prescription will be managed to protect or enhance the future values and conditions desired.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p>RECREATION</p>	<p>Recreation Planning and Inventory</p>	<p>1 Visual Quality Objective Retention</p> <p>2 Plan recreation activities and facilities to provide a diverse range of recreation opportunities in ROS classes, semi-primitive to urban</p> <p>3 Develop partnerships and encourage recreation development through permits, joint ventures, and cooperative agreements</p> <p>4 Encourage development of recreation opportunities by the private providers</p> <p>5 Employ marketing strategies to determine wants and needs of recreation visitors Incorporate these wishes in recreation planning and development</p>	<p>1 A visual analysis is required to blend activities with the naturally established landscape</p> <p>2 Vegetative management plans are required prior to manipulation of vegetation</p> <p>3 Consistent with safety, retain the vegetative character of the area</p> <p>4 Manmade structures are to be architecturally compatible with the established landscape</p> <p>5 Sites may be modified to accommodate recreational facilities and uses</p> <p>6 Buildings should present naturally harmonious colors</p> <p>7 Trails will be located to take advantage of viewing opportunities</p> <p>8 Rehabilitation measures are to be applied to landscape where needed to improve the visual setting</p>
	<p>Cultural Resource Evaluation, Assessment and Protection</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-66</p>	
	<p>Facility and Site Reconstruction and Construction</p>	<p>1 Provide high quality recreation sites and facilities with development of activities and opportunities desired by the recreating public</p> <p>2 Reconstruct all moderate to heavily used sites with high quality facilities</p> <p>3 Construct new recreation sites where demand is high and overuse problems are occurring at existing sites</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u> (continued)</p>	<p>Facility and Site Management</p> <p>Use Administration</p> <p>Trail Reconstruction and Construction</p> <p>Trail System Maintenance and Operation</p>	<p>1 Manage all recreation sites to provide high quality facilities and recreation opportunities</p> <p>2 Charge user fees in all facilities that can meet fee site requirements</p> <p>3 Provide interpretive facilities and programs in high use developed sites and where opportunities for public education are optimal</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-68</p> <p>1. Forest-wide Standards and Guidelines apply See p IV- 68 and 69</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 69</p>	
<p><u>WILDERNESS</u></p>	<p>Not Applicable to this Prescription</p>		
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p> <p>Non-Structural and Structural Habitat Improvement</p>	<p>1 Due to the hazard that wildlife trees present to recreation users, manage for maintenance of wildlife trees only if safety of recreation users can be maintained</p> <p>1. Forest-wide Standards and Guidelines apply See p. IV-83 and 84</p>	
<p><u>RANGE</u></p>	<p>Not Applicable to this Prescription</p>		
<p><u>TIMBER</u></p>	<p>Regeneration Harvest</p> <p>Intermediate Harvest</p>	<p>1 No scheduled harvest Regeneration harvest may be needed to convert areas from thin bark or shallow rooted species to those more tolerant to disturbance, recreation use, and disease, or to perpetuate a desired forest type</p> <p>1 No scheduled harvest Improvement cutting and salvage harvesting compatible with the prescription goal may be used Improvement cutting will be in accordance with the vegetative management plan for the site</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u> (continued)	<p>Silvicultural Examination and Prescription</p> <p>Reforestation</p> <p>Timber Stand Improvement</p> <p>Timber Sale Preparation, and Timber Harvest Administration</p> <p>Nursery Management and Genetic Tree Improvement</p>	<p>1 Silvicultural examination and prescription will be the biological basis for the vegetation management plan.</p> <p>1. All activities will be in accordance with the vegetative management plan</p> <p>1 All activities will be in accordance with the vegetative management plan</p> <p>1 All activities will be compatible with area objectives.</p> <p>1 No special practice.</p>	
<u>WATER</u>	<p>Inventory</p> <p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV- 94</p> <p>1 Existing and/or proposed trail construction, maintenance, and use shall be designed to protect water resources</p> <p>1. Forest-wide Standards and Guidelines apply. See p IV- 94 and 96</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 94 and 95</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV- 95 and 96</p>	
<u>SOIL</u>	<p>Inventory</p> <p>Planning</p> <p>Improvement</p> <p>Administration and Management</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV- 96</p> <p>1 Conduct an on-site soil investigation on all recreation sites being considered for development</p> <p>2 Existing and/or proposed trail construction, maintenance, and use shall be designed to protect soil resources</p> <p>3 Use soil information when locating and designing trails</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-96</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 97</p>	

RE-1

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and guidelines apply See p IV-98</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-98</p>	
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Mineral Activities</p>	<p>1 If existing laws and regulations do not provide adequate protection for the facilities and activities from mineral entry and the effects of mining, and recreation development is the highest and best use for the area, the area should be proposed for withdrawal</p> <p>1 If off-site mineral development is technically reasonable and is compatible with the recreation development objectives, recommend that a no-surface occupancy stipulation be attached to leases. If off-site development is not technically reasonable and on-site activity would be totally incompatible with the recreation development, recommend that a mineral lease not be issued</p> <p>1 If removal of these minerals can be done in a manner which is compatible with the developed recreation facility, allow disposal</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-99</p>	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>	<p>Not Applicable to this Prescription</p>		
<u>LANDS</u>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Withdrawals, Modifications, and Revocations</p>	<p>1 Avoid locating transportation and utility corridors in these areas</p> <p>1 Provide appropriate access to inholders under then existing guidelines</p> <p>1 Recommend only compatible uses</p> <p>1 Use withdrawals only where necessary to protect on-site values</p>	

RE-1

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>PROTECTION</u> (continued)</p>	<p>Fire Hazard Abatement</p>	<p>1 Treatment of both activity generated and natural fuels is appropriate when coordinated with the recreation management objectives of the area</p> <p>2 The protection of recreation values will be emphasized</p>	
	<p>Preattack Facilities Development</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-103</p>	
	<p>Law Enforcement</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV- 103</p>	
	<p>Forest Pest Management</p>	<p>1 Suppress insect and disease outbreaks with a minimum of resource disturbance to protect developments and/or users Favor biological and silvicultural treatments over pesticides when possible.</p> <p>2 Utilize high intensity preventive efforts featuring Integrated Pest Management</p>	

MANAGEMENT PRESCRIPTION: RE-2

TITLE: Dispersed Recreation, Unroaded, Motorized

GOAL STATEMENT: Provide dispersed, unroaded recreation in a semi-primitive motorized recreation opportunity setting.

DESCRIPTION: This prescription is for application to unroaded areas in which trails are evident and maintained for the following types of uses.

RE-2a - Areas having existing or potential trails for motorbikes, hikers and horseback riders.

RE-2b - Areas having existing or potential 4x4 routes in addition to trails for motorbikes, hikers and horseback riders.

They are generally located in a natural appearing landscape setting. Winter motorized use is permitted where appropriate.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Recreation Planning and Inventory</p>	<p>1 Visual Quality Objective RETENTION</p> <p>2 Plan recreation activities to conform to the ROS class criteria Semi-primitive motorized</p>	<p>1 A visual analysis is required to blend activities with the naturally established landscape</p> <p>2 Trails and routes will be located to take advantage of viewing opportunities and provide a variety of vegetative compositions, landscape character and viewing sequences</p> <p>3 Rehabilitation measures are to be applied to the landscape where needed to improve the visual setting</p>
	<p>Cultural Resource Evaluation, Assessment and Protection</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 66</p>	
	<p>Facility and Site Reconstruction and Construction</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 67 and 68</p>	
	<p>Facility and Site Management</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV- 68</p>	
	<p>Use Administration</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 68</p>	
	<p>Trail Reconstruction and Construction</p>	<p>1 Trails will be located or relocated to minimize substantial impacts to resource values also dependent upon semi-primitive conditions or settings</p>	
	<p>Trail System Maintenance and Operation</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 69</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p> <p>Non-Structural and Structural Habitat Improvement</p>	<p>1 Minimize or prevent wildlife harassment in calving, fawning and selected nesting areas</p> <p>2 Manage primary cavity excavators at 100 percent of the potential population level</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV- 83 and 84</p>	
<p><u>RANGE</u></p>	<p>Range Planning and Inventory</p> <p>Range Non-Structural Improvements</p> <p>Range Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1 Grazing of suitable range by livestock shall emphasize range management practices that favor unroaded, motorized, dispersed recreation</p> <p>2 Management of the range resource under this prescription will feature a Level C scheme of management There will be no increased range use</p> <p>1 Use only compatible species in range forage improvement projects</p> <p>2 Control noxious weeds as practical</p> <p>1. Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-89</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 89</p>	<p>1 Level C Management - Management seeks full utilization of forage allocated to livestock.</p> <p>1 Cost effective management systems and techniques including fences and water developments are designed and applied to obtain relatively uniform livestock distribution and use of forage, and to maintain plant vigor.</p>
<p><u>TIMBER</u></p>	<p>Regeneration Harvest</p> <p>Intermediate Harvest</p> <p>Silvicultural Examination and Prescription</p> <p>Reforestation</p> <p>Timber Stand Improvement</p>	<p>1 No scheduled harvest Salvage harvesting related to catastrophic occurrences is permitted</p> <p>1 No scheduled harvest Salvage harvesting related to catastrophic occurrences is permitted</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-92</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-92 and 93</p> <p>1 No precommercial thinning</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u> (continued)	Timber Sale Preparation, and Timber Harvest Administration Nursery Management and Genetic Tree Improvement	1 Forest-wide Standards and Guidelines apply See p IV- 93 and 94 1 No special practice	
<u>WATER</u>	Planning Improvement Administration and Management Rights and Use Management	1 Existing and/or proposed trail construction, maintenance and use shall be designed to protect water resources 2. Forest-wide Standards and Guidelines apply. See p IV- 94 1 Forest-wide Standards and Guidelines apply. See p IV- 94 and 96 1 Forest-wide Standards and Guidelines apply See p IV- 94 and 95 1 Forest-wide Standards and Guidelines apply See p IV-95 and 96	
<u>SOIL</u>	Planning and Inventory Improvement Administration and Management	1 Existing and/or proposed trail construction, maintenance and use shall be designed to protect soil resources. 2 Use soil information when locating and designing trails 1 Forest-wide Standards and Guidelines apply. See p IV- 96 1 Forest-wide Standards and Guidelines apply See p IV- 97	
<u>AIR</u>	Planning Administration and Management	1. Forest-wide Standards and Guidelines apply See p IV-98 1 Forest-wide Standards and Guidelines apply See p IV- 98	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>MINERALS AND GEOLOGY</u></p>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Mineral Activities</p>	<p>1 If reasonable, limit access for pre-production prospecting and exploration activities to existing 4X4 routes or trails</p> <p>2 If roading is reasonably necessary and incidental to proposed mineral prospecting, exploration and development activities, approve the activity using Forest-wide Standards and Guidelines</p> <p>1 Attach a stipulation to the lease which provides for the same restrictions as required for Locatable Minerals above</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 98 and 99</p> <p>1 Access for conducting these activities shall be in keeping with the management goals for the area</p>	
<p><u>RURAL COMMUNITY AND HUMAN RESOURCES</u></p>		<p>1 Forest-wide Standards and Guidelines apply See p IV- 99 and 100</p>	
<p><u>LANDS</u></p>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Withdrawals, Modifications, and Revocations</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1 Avoid locating transportation and utility corridors in these areas</p> <p>1 Provide appropriate access to inholders under then existing guidelines</p> <p>1. Permits and licenses will be issued under prevailing guidelines</p> <p>1 Withdrawals from mineral entry are not appropriate in these areas</p> <p>1 Survey, mark and post all National Forest property lines within these areas where private lands are not scheduled for acquisition</p> <p>1. National Forest status is most desirable</p> <p>1 Limit participation to cooperating in determining the most appropriate means, location and standard for cooperator access to their lands Do not share in the cost of development</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>FACILITIES</u>	<p>Road Construction</p> <p>Road Operation</p> <p>FA&O Construction and Reconstruction</p>	<p>1 No roads will be constructed or maintained except that</p> <p>a 4x4 routes are permitted for dispersed recreation in RE-2B</p> <p>b. Reasonable access will be granted to landlocked inholders under then prevailing guidelines</p> <p>c Short-term roads may be constructed if compatible with the recreation objective</p> <p>1 Prohibit or eliminate road use except encourage 4x4 use on specified routes.</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 102 and 103</p>	
<u>PROTECTION</u>	<p>Fire Prevention</p> <p>Fire Suppression</p> <p>Fire Hazard Abatement</p> <p>Preattack Facilities Development</p> <p>Law Enforcement</p> <p>Forest Pest Management</p>	<p>1 Implement a moderate intensity fire prevention program as outlined in the Forest's Fire Management Action Plan</p> <p>1 Implement fire suppression strategies that emphasize the protection of recreation facilities and values</p> <p>2 Fire suppression tactics should emphasize the protection of life and property The use of all fire suppression resources is appropriate</p> <p>1 Treatment of both activity generated and natural fuels is appropriate when coordinated with the recreation management objectives of the area</p> <p>2 The protection of recreation values will be emphasized</p> <p>1. Develop only those preattack facilities that are compatible with the unroaded nature and management objectives of the area</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 103</p> <p>1 Suppress insects and diseases when outbreaks threaten managed resources and/or users</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives</p>	

MANAGEMENT PRESCRIPTION: RE-3

TITLE: Dispersed Recreation, Unroaded, Non-Motorized

GOAL STATEMENT. Provide dispersed recreation in an unroaded, semi-primitive, non-motorized or primitive setting.

DESCRIPTION: This prescription is for application to unroaded areas in which trails are evident and maintained for non-motorized users. Landscape changes are generally not evident to those walking through the area. The area is essentially a natural or natural appearing environment. There is little evidence on-site of other users.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Recreation Planning and Inventory</p>	<p>1 Visual Quality Objective RETENTION</p> <p>2 Plan recreation opportunities and activities to conform to ROS classes, primitive and semi-primitive non-motorized</p>	<p>1 A visual analysis is required to blend activities with the naturally established landscape</p> <p>2 Trails will be located to take advantage of opportunities to view scenery or special features present in the landscape</p>
	<p>Cultural Resource Evaluation, Assessment and Protection</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 66</p>	
	<p>Facility and Site Reconstruction and Construction</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 67 and 68</p>	
	<p>Facility and Site Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 68</p>	
	<p>Use Administration</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV- 68</p>	
	<p>Trail Reconstruction and Construction</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-68 and 69</p>	
	<p>Trail System Maintenance and Operation</p>	<p>1. Forest-wide Standards and Guidelines apply. See p IV- 69</p>	
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p>	<p>1. Forest-wide Standards and Guidelines apply See p. IV- 80 through 83</p> <p>2 Manage primary cavity excavators near 100 percent of the potential population level.</p>	
	<p>Non-Structural Habitat Improvement</p>	<p>1. Habitat improvements will be done for management of wildlife species when not conflicting with the goals of the prescription</p>	
	<p>Structural Habitat Improvement</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 83 and 84</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RANGE</u></p>	<p>Range Planning and Inventory</p>	<p>1 Grazing of suitable range by livestock shall emphasize range management practices that favor dispersed recreation in an unroaded, semi-primitive, non-motorized or primitive setting</p> <p>2. Management of the range resource under this prescription will feature Level C scheme of management. There will be no increased range use</p>	<p>1 Level C Management - Management seeks full utilization of forage allocated to livestock</p> <p>1 Cost effective management systems and techniques including fences and water developments are designed and applied to obtain relatively uniform livestock distribution and use of forage, and to maintain plant vigor</p>
	<p>Range Non-Structural Improvements</p>	<p>1 Use only compatible species in range forage improvement projects</p> <p>2 Type conversion projects are not compatible</p>	
	<p>Range Structural Improvements</p>	<p>1 Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements.</p>	
	<p>Range Structural Improvement Maintenance</p>	<p>1 Reconstruct, relocate, or eliminate range improvements that are not visually compatible</p>	
	<p>Range Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 89</p>	
<p><u>TIMBER</u></p>	<p>Sale Preparation</p>	<p>1 No harvest anticipated</p>	
	<p>Timber Stand Improvement</p>	<p>1 No precommercial thinning</p>	
<p><u>WATER</u></p>	<p>Planning</p>	<p>1 Existing and/or proposed trail construction, maintenance and use shall be designed to protect water resources.</p>	
	<p>Improvement</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 94 and 96</p>	
	<p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 94 and 95</p>	
	<p>Rights and Use Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 95 and 96</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>SOIL</u>	Planning and Inventory Improvement Administration and Management	1. Existing and/or proposed trail construction, maintenance and use shall be designed to protect soil resources. 2 Use soil information when locating and designing trails 1 Forest-wide Standards and Guidelines apply See p IV- 96 1 Forest-wide Standards and Guidelines apply See p IV- 97	
<u>AIR</u>	Planning Administration and Management	1 Forest-wide Standards and Guidelines apply. See p. IV- 98 1 Forest-wide Standards and Guidelines apply See p IV- 98	
<u>MINERALS AND GEOLOGY</u>	Locatable Minerals Leasable Energy Minerals Common Variety Minerals Recreational Mineral Activities	1 If roading and the use of motorized equipment is reasonably necessary for and incidental to mineral prospecting, exploration and development activities, approve the activity using Forest-wide Standards and Guidelines 2 If reasonable, limit access for pre-production prospecting and exploration activities to those methods that are most compatible with the objectives established for these areas (i.e., if helicopter access or packing are economically and technically reasonable, recommend they be used). 1 Recommend that a stipulation be attached to the lease which provides for the same restrictions as required for Locatable Minerals above 1 Forest-wide Standards and Guidelines apply See p IV- 98 and 99 1 Access, the use of motorized equipment, and the effects associated with conducting these activities will be limited to those that are in keeping the goals established for the area	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		1. Forest-wide Standards and Guidelines apply. See p IV- 99 and 100	
<u>LANDS</u>	Special Use Management Right-of-Way Grants for Roads and Trails Federal Energy Regulatory Commission License and Permits Withdrawals, Modifications, and Revocations Property Line Location Property Boundary and Corner Maintenance Landownership Planning, Land Adjustment Planning, and All Adjustment Activities Rights-of-Way Cost-Share Agreements	1. Avoid locating transportation and utility corridors in these areas 1 Provide appropriate access to inholders under then existing guidelines 1. Recommend only compatible use 1 Withdrawals from mineral entry are not appropriate in these areas 1. Survey, mark and post all National Forest property lines within these areas where private lands are not scheduled for acquisition 1 Retain National Forest lands Consolidate on a high priority basis 1 Limit participation to cooperating in determining the most appropriate means, location and standard for cooperator access to their lands Do not share cost	
<u>FACILITIES</u>	Road Construction Road Operation FA&O Construction and Reconstruction	1 No roads will be constructed or maintained except that a Reasonable access will be granted to inholders under then prevailing guidelines 1 Prohibit or eliminate road use 1 Forest-wide Standards and Guidelines apply See p IV- 102 and 103	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>PROTECTION</u>	Fire Prevention	1 Implement a moderate intensity fire prevention program as outlined in the Forest's Fire Management Action Plan	
	Fire Suppression	<p>1. Implement fire suppression strategies that emphasize the protection of recreation facilities and values or other special values of each management area</p> <p>2. Fire suppression tactics should emphasize the protection of life and property while minimizing the physical disturbance of the resources. The use of all fire suppression resources is appropriate</p>	
	Fire Hazard Abatement	<p>1. Treatment of both activity generated and natural fuels is appropriate when coordinated with the scenic, recreation, or other special management objectives of the area.</p> <p>2 The protection of recreation values will be emphasized during the planning and implementation of these projects</p>	
	Preattack Facilities Development	1. Develop only those preattack facilities that are compatible with the special visual and recreational values of the areas	
	Law Enforcement	1 Forest-wide Standards and Guidelines apply See p IV- 103	
	Forest Pest Management	<p>1 Suppress insects and diseases when outbreaks threaten managed resources and/or users where possible</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives.</p>	

MANAGEMENT PRESCRIPTION: RE-4

TITLE: Dispersed Recreation/Unroaded/Timber Harvest

GOAL STATEMENT: Provide for dispersed recreation, as well as long-term growth and production of commercially valuable wood products at a very low level of investment in timber cultural practices while maintaining the unroaded characteristics.

DESCRIPTION: Approximately 90 percent of future stands would come from natural regeneration. The remaining 10 percent would be regenerated by planting, after failure of natural regeneration to establish the stand. No stand improvements are planned between regeneration and harvest, future stands will closely resemble unmanaged conditions and will be typified by a tendency towards small irregularly spaced groups. Stands will generally have poor crown ratios and a wide range of age and height. Mortality due to tree competition, disease, and insects can be expected. Logging will generally be by aerial system to protect the unroaded characteristics of the area. Roads will not be constructed, except to protect adjacent resources.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
RECREATION	<i>Recreation Planning and Inventory</i>	<p>1. <i>Visual Quality Objective, Modification</i></p> <p>2 Plan recreation and timber harvest activities to meet appropriate ROS class Semi-primitive motorized</p>	<p>1. <i>A visual analysis is required to blend activities with the naturally established landscape</i></p> <p>2 Trails and routes will be located to take advantage of viewing opportunities and provide a variety of vegetative compositions, landscape character and viewing sequences</p> <p>3 Rehabilitation measures are to be applied to the landscape where needed to improve the visual setting</p> <p>4 Meet retention or partial retention from trails and viewpoints within the allocation, as appropriate</p>
	<i>Cultural Resource Evaluation, Assessment and Protection</i>	1 Forest-wide Standards and Guidelines apply See p IV-66	
	<i>Facility and Site Reconstruction and Construction</i>	1. Forest-wide Standards and Guidelines apply See p. IV-67 and 68	
	<i>Facility and Site Management</i>	1 Forest-wide Standards and Guidelines apply See p IV- 68	
	<i>Use Administration</i>	1 Forest-wide Standards and Guidelines apply See p IV-68	
	<i>Trail Reconstruction and Construction</i>	1 Forest-wide Standards and Guidelines apply. See p IV-68 and 69	
	<i>Trail System Maintenance and Operation</i>	1 Forest-wide Standards and Guidelines apply See p IV-69	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p> <p>Non-Structural and Structural Habitat Improvement</p>	<p>1 Manage primary cavity excavators at 60 percent of the potential population level</p> <p>1. Forest-wide Standards and Guidelines apply See p IV- 83 and 84</p>	
<p><u>RANGE</u></p>	<p>Range Planning and Inventory</p> <p>Range Non-Structural Improvements</p> <p>Range Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1 Grazing of suitable range by livestock shall emphasize range management practices that favor unroaded, motorized, dispersed recreation</p> <p>2 Management of the range resource under this prescription will feature a Level C scheme of management</p> <p>1 Use only compatible species in range forage improvement projects</p> <p>2 Control noxious weeds as practical</p> <p>1 Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 89</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 89</p>	<p>1 Level C Management - Management seeks utilization of forage allocated to livestock</p> <p>1 Cost effective management systems techniques including fences and water developments are designed and applied Obtain relatively uniform livestock distribution and use of forage, and to maintain plant vigor</p>
<p><u>TIMBER</u></p>	<p>Regeneration Harvest</p> <p>Intermediate Harvest</p> <p>Silvicultural Examination and Prescription</p>	<p>1 Regeneration practice subject to standards in Regional Guide and NFMA Regulations Natural regeneration will be the preferred method</p> <p>1 No commercial thinnings</p> <p>2 Remove dead and dying trees if economical, from areas not scheduled for commercial harvest</p> <p>1 Make examination prior to any activity and as required for certification of reforestation and thinning</p>	<p>The following are the regeneration harvest priorities</p> <ol style="list-style-type: none"> 1 Extended Shelterwood 2 Shelterwood cut 3 Seed tree cut 4 Clearcut <p>1 Salvage Sales</p> <p>1 Stand examination</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u> (continued)	<p>Reforestation</p> <p>Timber Stand Improvement</p> <p>Timber Sale Preparation and Timber Harvest Administration</p> <p>Nursery Management</p> <p>Genetic Tree Improvement</p>	<p>1. Planting will be delayed until the site has had three years for natural regeneration</p> <p>1 No precommercial thinning anticipated</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV- 93 and 99</p> <p>1 Collect seed in sufficient quantities to meet program reforestation needs plus a sufficient reserve for natural disasters</p> <p>1. Implement the Forest Tree Improvement Program</p>	<p>1 Plant nonstocked areas following regeneration harvest as necessary to meet Regional minimum stocking level standards within ten years Regeneration remainder of area naturally Use genetically superior stock as available. Interplant where needed</p> <p>2 Site preparation to encourage natural seeding will replace planting on most sites</p> <p>1 Cone collection.</p> <p>2 Seed certification.</p> <p>1 Select and maintain superior trees</p> <p>2 Collect seed from superior trees</p>
<u>WATER</u>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1 Existing and/or proposed management activities maintenance and use shall be designed to protect soil and water resources</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-94 and 96</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 94 and 95</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-95 and 96</p>	
<u>SOIL</u>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p>	<p>1. Existing and/or proposed management activities maintenance and use shall be designed to protect soil and water resources.</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV-96</p> <p>1 Forest-wide Standards and Guidelines apply See p IV- 97</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICES
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-98</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-98</p>	
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Mineral Activities</p>	<p>1 If reasonable, limit access for pre-production prospecting and exploration activities to existing 4X4 routes or trails.</p> <p>2. If roading is reasonably necessary and incidental to proposed mineral prospecting, exploration and development activities, approve the activity using Forest-wide Standards and Guidelines</p> <p>1 Attach a stipulation to the lease which provides for the same restrictions as required for Locatable Minerals above</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-98 and 99</p> <p>1 Access for conducting these activities shall be in keeping with the management goals for the area</p>	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		<p>1. Forest-wide Standards and Guidelines apply See p. IV- 99 and 100</p>	
<u>LANDS</u>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Withdrawals, Modifications, and Revocations</p> <p>Property Line Location Property Boundary and Corner Maintenance</p>	<p>1. Avoid locating transportation and utility corridors in these areas</p> <p>1 Provide appropriate access to inholders under then existing guidelines</p> <p>1 Permits and licenses may be issued when consistent with the goals of this prescription</p> <p>1 Withdrawals from mineral entry are not appropriate in these areas</p> <p>1 Property lines adjacent to timber production areas will be surveyed, marked and posted</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>LANDS</u> (continued)	Landownership Planning, Land Adjustment Planning, and All Adjustment Activities Rights-of-Way Cost-Share Agreements	1 National Forest status is desirable, but not mandatory 1 Limit participation to cooperating in determining the most appropriate means, location and standard for cooperator access to their lands	
<u>FACILITIES</u>	Road Construction Road Operation	1. No roads will be constructed or maintained except that. a. Reasonable access will be granted to land-locked inholders under then prevailing guidelines b. Short-term roads may be constructed to protect adjacent resources 1 Prohibit or eliminate road use.	
<u>PROTECTION</u>	Fire Prevention Fire Suppression Fire Hazard Abatement Preattack Facilities Development Law Enforcement Forest Pest Management	1 Implement a moderate intensity fire prevention program as outlined in the Forest's Fire Management Action Plan 1 Implement fire suppression strategies that emphasize the protection of recreation facilities and values 2. Fire suppression tactics should emphasize the protection of life and property. The use of all fire suppression resources is appropriate 1. Treatment of both activity generated and natural fuels is appropriate when coordinated with the recreation management objectives of the area 2. The protection of recreation values will be emphasized 1 Develop only those preattack facilities that are compatible with the unroaded nature and management objectives of the area 1 Forest-wide Standards and Guidelines apply See p IV-103 1 Suppress insects and diseases when outbreaks threaten managed resources and/or users 2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives	

MANAGEMENT PRESCRIPTION: RM-1

TITLE: Intensive Range Management

GOAL STATEMENT: Provide for maximum forage production and utilization by commercial livestock with a high level of investment in range cultural practices

DESCRIPTION: Management seeks to optimize production and utilization of forage allocated for livestock use consistent with maintaining the environment and providing for multiple use of the range. Cultural practices such as brush control or seeding may be combined with fencing and water developments to implement complex grazing systems.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Recreation Planning and Inventory</p>	<p>1 Visual Quality Objective Modification</p> <p>2 Plan recreation activities to conform to the appropriate ROS class criteria Roaded natural to Rural</p> <p>3 Plan and design recreation facilities in coordination with the development of range facilities and livestock management</p>	<p>1 A visual analysis is required to blend activities with the naturally established landscape</p> <p>2 Revegetate all disturbed areas to the extent compatible with the applicable visual quality objective</p> <p>3 Rehabilitation measures are to be applied to landscape where needed to meet the Visual Quality Objective where compatible with the range goal</p>
	<p>Cultural Resource Evaluation, Assessment and Protection</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-66</p>	
	<p>Facility and Site Reconstruction and Construction</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-67 and 68</p>	
	<p>Facility and Site Management</p>	<p>1 Forest-wide and Standards and Guidelines apply See p IV-68</p>	
	<p>Use Administration</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV-68</p>	
	<p>Trail Reconstruction and Construction</p>	<p>1 Construct or reconstruct trails to a standard which allows for trailing of livestock when desirable and identified in the Allotment Management Plan</p>	
	<p>Trail System Maintenance and Operation</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-69</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p>	<p>1 Manage primary cavity excavators at 20 percent of potential population level</p>	
	<p>Non-Structural Habitat Improvement</p>	<p>1 Maintain minimum forage and cover needs for big game diversity, especially adjacent to winter range</p> <p>2. Maintain existing hardwood components at a level compatible with the goal of this prescription</p>	
	<p>Structural Habitat Improvement</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-83 and 84</p>	
<p><u>RANGE</u></p>	<p>Range Planning and Inventory</p>	<p>1 Grazing of suitable range by livestock shall emphasize range management practices that favor livestock forage production</p> <p>2 Management of the range resource under this prescription will feature an intensive (Level D) management scheme</p> <p>3. Design range management system that will provide for reforestation needs</p>	<p>1. Level D Management - Management seeks to optimize production and utilization of forage allocated for livestock use consistent with maintaining the environment and providing for multiple use of the range</p> <p>2 Recognize potential of timber sales to create new forage producing areas</p> <p>3. Design silvicultural prescriptions to meet range objectives</p> <p>4 Utilize prescribed fire where appropriate to enhance forage production, palatability, and access</p>
	<p>Range Non-Structural Improvements</p>	<p>1 Use forage species and practices which will maximize or favor forage production for livestock</p>	<p>1. Where necessary, seed clearcuts to desirable forage to produce an average of 1000 pounds of forage (air dry) at the end of the first decade Forage levels will be noncompetitive with tree stocking</p> <p>2 Cultural practices such as brush control or seeding may be combined with fencing and water developments to implement complex grazing systems. Type conversions will not be practiced</p>
	<p>Range Structural Improvements</p>	<p>1 Utilize the National Forest Landscape Management Handbook (USDA No. 484) "Range" in the design and application of improvements</p>	<p>1 Cost effective management systems and techniques including fences and water developments are designed and applied to obtain relatively uniform livestock distribution and use of forage and to maintain plant vigor.</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RANGE</u> (continued)</p>	<p>Range Structural Improvement Maintenance</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-89</p>	
	<p>Range Administration and Management</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-89</p>	
<p><u>TIMBER</u></p>	<p>Regeneration Harvest</p>	<p>1. Harvest generally at culmination of mean annual increment Regeneration practice subject to standards in Regional Guide and NFMA Regulations.</p>	<p>1 Thin to maintain a minimum basal area that will utilize site potential to produce wood and forage</p> <p>1. Salvage Sales</p> <p>1 Stand examination.</p> <p>1 Regenerate by planting and natural means, a sufficient number of trees to achieve regional stocking levels. Use genetically superior stock as available</p> <p>2 Perform site preparation as required by site specifications.</p> <p>3 Coordinate the planting schedule with the rotation schedule to provide maximum protection</p> <p>1 Release regeneration overtopped by competing vegetation</p> <p>2 Fertilization will be used where it is cost effective Benefits will consider both increased wood and forage production</p> <p>1 Cone collection</p> <p>2 Seed certification</p> <p>1 Select and maintain superior trees 2 Collect seed from superior trees</p>
	<p>Intermediate Harvest</p>	<p>1 Will generally use commercial thinnings</p> <p>2. Remove dead and dying trees as economical from areas not scheduled for commercial harvest</p>	
	<p>Silvicultural Examination and Prescription</p>	<p>1 Make examination prior to any activity and as required for certification of reforestation and thinning</p>	
	<p>Reforestation</p>	<p>1. Use compatible reforestation methods</p>	
	<p>Timber Stand Improvement</p>	<p>1 Use methods compatible with the goal</p>	
	<p>Timber Sale Preparation and Timber Harvest Administration</p>	<p>1. Coordinate harvest activities with range rotation schedules</p> <p>2 Avoid natural openings when decking logs and piling activity fuels.</p>	
	<p>Nursery Management</p>	<p>1 Collect seed in sufficient quantities to meet program reforestation needs plus a sufficient reserve for natural disasters</p>	
	<p>Genetic Tree Improvement</p>	<p>1 Implement the Forest Tree Improvement Program</p>	

RM-1

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>WATER</u>	Planning Improvement Administration and Management Rights and Use Management	1 Forest-wide Standards and Guidelines apply See p IV-94 1 Forest-wide Standards and Guidelines apply See p IV-94 and 96 1. Forest-wide Standards and Guidelines apply See p IV-94 and 95 1 Forest-wide Standards and Guidelines apply. See p IV- 95 and 96	
<u>SOIL</u>	Planning and Inventory Improvement Administration and Management	1 Forest-wide Standards and Guidelines apply See p. IV-96 1 Forest-wide Standards and Guidelines apply See p. IV-96 1 Forest-wide Standards and Guidelines apply See p IV-97	
<u>AIR</u>	Planning Administration and Management	1 Forest-wide Standards and Guidelines apply. See p IV-98 1 Forest-wide Standards and Guidelines apply See p IV-98	
<u>MINERALS AND GEOLOGY</u>	Locatable Minerals Leasable Energy Minerals Common Variety Minerals Recreational Mineral Activities	1 Forest-wide Standards and Guidelines apply See p IV-98 and 99 1 Forest-wide Standards and Guidelines apply See p IV-98 and 99 1 Forest-wide Standards and Guidelines apply See p IV-98 and 99 1 Forest-wide Standards and Guidelines apply See p IV-99	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		1 Forest-wide Standards and Guidelines apply See p IV-99 and 100	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>LANDS</u>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1 Transportation and utility corridors are permitted where suitable</p> <p>1 Provide appropriate access to inholders under then existing guidelines</p> <p>1 Recommend only compatible uses</p> <p>1 Property lines will be surveyed, marked and posted consistent with improvement construction</p> <p>2 These property lines will have high priority in the use of available Land Line Location funds.</p> <p>1 National Forest status is desirable to facilitate range development and administration</p> <p>1 Maximize use of the cost share process to reduce miles of road (acres out of production), costs, and assure that location and standard of roads within the National Forest portion of agreement areas are compatible with management goals</p>	
<u>FACILITIES</u>	<p>Road Construction</p> <p>Road Operation</p> <p>FA&O Construction and Reconstruction</p>	<p>1 Provide and manage roads as needed to accomplish resource objectives.</p> <p>1 Appropriate road use will be determined by project planning and design.</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-102 and 103</p>	<p>1 Provide gates, fences, and cattleguards as appropriate</p>
<u>PROTECTION</u>	<p>Fire Prevention</p> <p>Fire Suppression</p>	<p>1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan</p> <p>1. Implement fire suppression strategies that support the Range Management objectives and practices being applied under this prescription</p> <p>2 All fire suppression tactics and fire suppression resources may be appropriate Protection of all range improvements should be a priority</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>PROTECTION</u> (continued)</p>	<p>Fire Hazard Abatement</p>	<p>1 Treatment of both activity generated and natural fuels is appropriate when coordinated with the Range Management practices being implemented</p>	
	<p>Preattack Facilities Development</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-103</p>	
	<p>Law Enforcement</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-103</p>	
	<p>Forest Pest Management</p>	<p>1. Suppress insect and diseases when adversely affecting vegetation essential for maintaining livestock and/or when unacceptable damage to resources would occur if no controls are applied</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives</p>	

MANAGEMENT | DESCRIPTION: RN-1

TITLE: Research Natural Areas

GOAL STATEMENT: Provide for; (1) Preservation of examples of all significant natural Ecosystems for comparison with those influenced by man, (2) educational research areas for ecological and environmental studies, and (3) preservation of gene pools for typical and rare and endangered plants and animals.

DESCRIPTION. Research Natural Areas (RNA) contain either examples of typical natural ecosystems or unique kinds of vegetation, animals, and land which are reserved for scientific and educational use. This use is restricted to non-manipulative and non-destructive research. On the Wenatchee National Forest there are two established RNAs: **Meeks Table** and **Thompson Clover**. Two additional areas have been studied and are candidates for addition to the system. They are: **Fish Lake**, a marsh-bog community, and **Eldorado Creek**, a montane serpentine community. Several new areas on the Forest are candidates as Research Natural areas to meet regional cell (ecosystem) needs. A Research Natural Area establishment report will be prepared for each recommended area when the Forest Plan is implemented. These reports will describe the boundaries of the areas. Until the reports are signed by the Chief of the Forest Service, the areas designated in this Plan are recommendations. They will be managed to maintain their suitability as RNAs.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Recreation Planning and Inventory</p>	<p>1. Visual Quality Objective PRESERVATION</p> <p>2 Do not plan or develop new recreation site or facilities in this prescription</p>	
	<p>Cultural Resource Evaluation, Assessment and Protection</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-66</p>	
	<p>Facility and Site Reconstruction and Construction</p>	<p>1 Forest-wide Standards and Guidelines apply. See p. IV-67 and 68</p>	
	<p>Facility and Site Management</p>	<p>1 Forest-wide Standards and Guidelines apply. See p. IV-68</p>	
	<p>Use Administration</p>	<p>1 Do not encourage recreation use and prohibit use if it is damaging to the intent of the area</p>	
	<p>Trail Reconstruction and Construction</p>	<p>1 Construct or reconstruct trails only if needed for research purposes</p>	
	<p>Trail System Maintenance and Operation</p>	<p>1 Trail standards will be the minimum needed for essential research access</p>	
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-80 through 83</p>	
	<p>Non-Structural and Structural Habitat Improvement</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-83 and 84</p>	

RN-1

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RANGE</u>	<p>Range Structural Improvements</p> <p>Range Structural Improvement Maintenance</p>	<p>1 Fence as needed to exclude livestock</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-89</p>	
<u>TIMBER</u>	<p>Not Applicable to this Prescription</p>		
<u>WATER</u>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-94</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-94 and 96</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-94 and 95</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-95 and 96</p>	
<u>SOIL</u>	<p>Planning and Inventory</p> <p>Improvement</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-96</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-96</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-97</p>	
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-98</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-98</p>	
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p>	<p>1 Propose that the area be withdrawn from entry under the 1872 Mining Law using the Forest-wide Standards and Guidelines for withdrawals</p> <p>2 After the area is withdrawn, determine if valid prior-existing rights to explore for or mine locatable minerals exist before approving such activities under Forest-wide Standards and Guidelines</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>FACILITIES</u></p>	<p>Road Construction</p>	<p>1. No roads will be constructed or maintained except that a reasonable access will be granted to landlocked inholders under the then prevailing guidelines</p>	
	<p>Road Operations</p>	<p>1 Prohibit or eliminate road use</p>	
<p><u>PROTECTION</u></p>	<p>Fire Prevention</p>	<p>1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan</p>	
	<p>Fire Suppression</p>	<p>1. Management of natural fires will be addressed in the Establishment Report for each specific Research Natural Area. All wildfires will be suppressed utilizing an appropriate suppression strategy. Suppression tactics which minimize physical disturbance will be used</p> <p>2 All human caused fires will be considered wildfires</p>	
	<p>Fire Hazard Abatement</p>	<p>1 Naturally occurring fires burning within prescription will be managed in an attempt to replicate the natural fire cycle if it is appropriate to the management objectives of the Research Natural Area</p> <p>2 Prescribed burning may be used to maintain ecologic conditions (Ref FSM 4063.41-4)</p>	
	<p>Preattack Facilities Development</p>	<p>1. The development of preattack facilities is not appropriate except on the exterior boundaries of the area where such facilities would supplement the protection of the adjacent lands</p>	
	<p>Law Enforcement</p>	<p>1 Use special closures when necessary to protect the RNA from actual or potential damage from public use when appropriate</p>	
	<p>Forest Pest Management</p>	<p>1 Suppress insect and disease outbreaks to meet RNA objectives</p> <p>2 Use these areas to observe insects and diseases in undisturbed areas</p> <p>3 Survey pest populations as a management strategy for adjacent resource areas</p>	

MANAGEMENT PRESCRIPTION: SI-1

TITLE: Classified Special Areas - Scenic and/or Recreation

GOAL STATEMENT: Manage Special Areas for recreation use, substantially in their natural conditions.

DESCRIPTION: These areas are classified under 36 CFR 294.1 and managed for recreation use substantially in their natural condition. The purpose of classifying these areas is to protect the natural beauty and, where appropriate, foster public use and enjoyment of the feature or environment (scenic areas possess outstanding or unique natural beauty). They occupy large areas of land where some multiple use activities may be compatible. Motorized use is permitted within these areas to the extent it is compatible with the management intent. Developments such as resorts, parking areas, campgrounds, etc., are located outside of the Special Area whenever possible

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Recreation Planning and Inventory</p>	<p>1 Visual Quality Objective RETENTION</p> <p>2. Plan recreation activities in conformance with appropriate ROS class Primitive to Roaded natural</p>	<p>1 Dispersed sites may be modified to accommodate recreational facilities and uses.</p> <p>2 Visual analysis is required to blend activities with the naturally established landscape.</p> <p>3 Structures within the area will be architecturally compatible with the naturally established landscape.</p> <p>4. Rehabilitation measures are to be applied to the landscape where needed to improve visual setting</p> <p>5 Prescribed fire may be used to enhance visual quality and to maintain natural fire succession</p>
	<p>Cultural Resource Evaluation, Assessment and Protection</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV-66</p>	
	<p>Facility and Site Reconstruction and Construction</p>	<p>1. Construct new facilities outside this prescription when viable alternatives exist</p>	
	<p>Facility and Site Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-68</p>	
	<p>Use Administration</p>	<p>1 Forest-wide Standards and Guidelines apply. See p. IV-68</p>	
	<p>Trail Reconstruction and Construction</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-68 and 69</p>	
	<p>Trail System Maintenance and Operation</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-69</p>	

SI-1

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>WILDLIFE AND FISH</u>	<p>Wildlife Surveys and Plans</p> <p>Non-Structural and Structural Habitat Improvement</p>	<p>1 Manage primary cavity excavators at 100 percent of the potential population level</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-83 and 84</p>	
<u>RANGE</u>	<p>Range Planning and Inventory</p> <p>Range Non-Structural Improvements</p> <p>Range Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1. Grazing of suitable range by livestock shall emphasize range management practices that favor classified special interest areas</p> <p>2 Management of the range resource under this prescription will feature an extensive (Level C) scheme of management</p> <p>3 intensive cultural practices will not be used</p> <p>1 Use only compatible species in range forage improvement projects</p> <p>1. Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-89</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-89</p>	<p>1. Level C Management - Management seeks utilization of forage allocated to livestock</p> <p>1 Cost effective management systems and techniques, including fences and water developments, are designed and applied to obtain relatively uniform livestock distribution and use of forage, and to maintain plant vigor.</p>
<u>TIMBER</u>	<p>Regeneration Harvest</p> <p>Intermediate Harvest</p> <p>Silvicultural Examination and Prescription</p> <p>Reforestation</p> <p>Timber Stand Improvement</p>	<p>1 No scheduled harvest Improvement cutting for recreational purposes is allowed. Unscheduled harvest may also take place to recover losses due to fire, windthrow, insects or other catastrophies.</p> <p>1 Unscheduled harvest may take place to recover losses due to fire, windthrow, insects, or other catastrophies</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-92</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV-92 and 93</p> <p>1. No precommercial thinnings</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u> (continued)	Timber Sale Preparation and Timber Harvest Administration Nursery Management and Genetic Tree Improvement	1 Forest-wide Standards and Guidelines apply. See p IV-93 and 94 1 No special practice	
<u>WATER</u>	Planning Improvement Administration and Management Rights and Use Management	1 Forest-wide Standards and Guidelines apply. See p IV-94 1 Forest-wide Standards and Guidelines apply See p. IV-94 and 96 1. Forest-wide Standards and Guidelines apply See p. IV-94 and 95 1 Forest-wide Standards and Guidelines apply See p IV-95 and 96	
<u>SOIL</u>	Planning and Inventory Improvement Administration and Management	1 Forest-wide Standards and Guidelines apply See p IV-96 1. Forest-wide Standards and Guidelines apply See p IV-96 1 Forest-wide Standards and Guidelines apply See p IV-97	
<u>AIR</u>	Planning Administration and Management	1. Forest-wide Standards and Guidelines apply See p IV-98 1. Forest-wide Standards and Guidelines apply See p IV-98	
<u>MINERALS AND GEOLOGY</u>	Locatable Minerals	1 Determine where existing laws and regulations will not adequately protect areas classified Scenic Special Interest Areas, and propose that those areas be withdrawn from entry under the 1872 mining law 2 After an area has been withdrawn, ensure that prior valid existing rights exist before approving any mining related activities within the area	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>MINERALS AND GEOLOGY</u> (continued)	Leasable Energy Minerals Common Variety Minerals Recreational Mineral Activities	1 If leasable mineral related activities are incompatible with the management objectives for the area, and it is reasonable to do so, attach a no surface occupancy stipulation to the lease 2 If no surface occupancy is unreasonable, then propose the area be withdrawn 1 Where feasible, locate all mineral material sites out of these areas 1 Forest-wide Standards and Guidelines apply See p. IV-99	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		1 Forest-wide Standards and Guidelines apply See p. IV-99 and 100	
<u>LANDS</u>	Special Use Management Right-of-Way Grants for Roads and Trails Federal Energy Regulatory Commission License and Permits Property Line Location Property Boundary and Corner Maintenance Landownership Planning, Land Adjustment Planning, and All Adjustment Activities Rights-of-Way Cost-Share Agreements	1. Avoid locating transportation and utility corridors in these areas 1 Provide appropriate access to inholders under then existing guidelines 1 Recommend against these uses 1 Survey, mark and post lines of all other ownerships within the area not planned for acquisition 1 Retain existing National Forest land, and acquire lands in other ownerships within these areas to protect and promote public resource values 1 Forest-wide Standards and Guidelines apply See p IV-101	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>FACILITIES</u>	Road Construction	1. Provide and manage roads as needed to accomplish resource objectives.	
	Road Operation	1 Appropriate road use will be determined by project planning and design	
	FA&O Construction and Reconstruction	1 Forest-wide Standards and Guidelines apply See p IV-102 and 103	
<u>PROTECTION</u>	Fire Prevention	1. Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan	
	Fire Suppression	1 Implement fire suppression strategies that emphasize the protection of recreation facilities and values or other special values of each management area 2 Fire suppression tactics should emphasize the protection of life and property while minimizing the physical disturbance of the resources The use of all fire suppression resources is appropriate	
	Fire Hazard Abatement	1. Treatment of both activity generated and natural fuels is appropriate when coordinated with the scenic, recreational, or other special management objectives of the area 2 The protection of recreation and scenic values will be emphasized during the planning and implementation of these projects	
	Preattack Facilities Development	1 Develop only those preattack facilities that are compatible with the special visual and recreational values of the areas	
	Law Enforcement	1 Forest-wide Standards and Guidelines apply See p IV-103	
	Forest Pest Management	1 Suppress insects and diseases when outbreaks threaten managed resources and/or users	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p>RECREATION (continued)</p>	<p>Facility and Site Construction</p>	<p>1 Construction of new facilities should be limited to those which directly benefit and provide for appropriate public use of the feature or environment to which this prescription is directed</p>	<p>1 Design should be unobtrusive as possible and assure preservation of character-defining features of the site For historic sites, maintain the historic relationship between buildings, landscape features and open space</p>
	<p>Facility and Site Management</p>	<p>1. Provide maintenance to protect and preserve the values defined by this prescription</p>	<p>Minimize disturbance of the terrain. Design criteria should be developed that meet the sensitive values of this goal</p>
	<p>Use Administration</p>	<p>1 Manage recreation visitor use to prevent loss, damage, or displacement of resource values Prohibit uses in direct conflict with the goal of this prescription</p>	<p>1. Maintenance work should be in keeping with the Secretary of Interior's standards for rehabilitation of historic structures</p>
		<p>2. New permits for Recreational Special Use sites should be issued for compatible uses only Terminate or conform noncompatible uses on an opportunity basis</p>	<p>1 Pertinent protection clauses should be included in all special use permits to ensure preservation of the values to which this goal is directed</p>
	<p>Trail Reconstruction</p>	<p>1 Design and reconstruction should avoid specific features and characteristics of the environment to which the prescription is directed, and should correct existing conflicts between public use and the special features to be protected</p>	
	<p>Trail Construction</p>	<p>1 Provide access to those areas designated appropriate for public enhancement under this prescription Avoid construction where conflicts with the values of this prescription are unavoidable</p>	
	<p>Trail System Maintenance and Operation</p>	<p>1 Emphasize maintenance of those trails which provide appropriate public access to and use of the features defined by this prescription Consider closures where conflicts cannot be resolved.</p>	
<p>WILDERNESS</p>	<p>Wilderness Use Administration</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-70 through 78</p>	
<p>WILDLIFE AND FISH</p>	<p>Wildlife Surveys and Plans</p>	<p>1. Manage primary cavity excavators at 100 percent of the potential population level where snags do not pose threats to historical structures, features, facilities, or visitors</p>	
	<p>Non-Structural Habitat Improvement</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-83 and 84</p>	
	<p>Structural Habitat Improvement</p>	<p>1 Develop structural improvements only where compatible with the values of this prescription (i.e. to protect special botanical or zoological areas)</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RANGE</u>	Not Applicable to this Prescription		
<u>TIMBER</u>	<p><i>Regeneration Harvest</i></p> <p><i>Intermediate Harvest</i></p> <p>Silvicultural Examination and Prescription</p> <p>Reforestation</p> <p><i>Timber Stand Improvement</i></p> <p>Timber Sale Preparation and Timber Harvest Administration</p> <p>Nursery Management and Genetic Tree Improvement</p>	<p>1 No scheduled harvest. With the exception of the Tumwater Botanical Area, improvement cutting and salvage are allowed when compatible with, or to enhance the goal of this prescription. Unscheduled harvest may also take place to recover losses due to fire windthrow, insects or other catastrophes, where compatible with the prescription.</p> <p>1 Unscheduled harvest may take place to recover losses due to fire, windthrow, insects, or other catastrophes where compatible with the prescription.</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV-92</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-92 and 93</p> <p>1 No precommercial thinning</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-93 and 94</p> <p>1 No special practice.</p>	
<u>WATER</u>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-94</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-94 and 96</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-94 and 95</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-95 and 96</p>	
<u>SOIL</u>	<p>Planning and Inventory</p> <p>Improvement</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-96</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-96</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV-97</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply. See p. IV-98</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-98</p>	
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Mineral Activities</p>	<p>1 If cultural resources are encountered and it is determined that they are not presently owned or being used for mining or other purposes, assert public ownership by appropriately signing as Government Property</p> <p>2 Where legally permissible and logistically reasonable, remove unattached cultural resources to a visitor center for appropriate protection and interpretation</p> <p>1 Where existing laws and regulations do not adequately protect the area from entry and mining under the 1872 Mining Law, propose the area be withdrawn</p> <p>2 After the area has been withdrawn, confirm valid existing rights exist before approving any locatable mineral related activities</p> <p>1 If necessary to protect the resource and technically reasonable, recommend a no surface occupancy stipulation be attached to leases If the no-surface occupancy stipulation is unreasonable and significant unmitigatable impacts would occur from leasable mineral activity, recommend the area not be leased</p> <p>1 Do not permit the development of mineral material sites within these areas</p> <p>1 Allow only those uses that are compatible with the management objectives established for each individual site</p>	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		<p>1 Forest-wide Standards and Guidelines apply See p IV-99 and 100</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>LANDS</u>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Withdrawals, Modifications, and Revocations</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1. Avoid locating transportation and utility corridors in these areas</p> <p>1. Provide appropriate access to inholders under then existing guidelines</p> <p>1 Recommend against these uses</p> <p>1 Consider withdrawal where mining activities may be detrimental to the resource and harmful effects cannot be avoided.</p> <p>1 Survey, mark, and post lines of all other ownerships within area not planned for acquisition</p> <p>1 Retain existing National Forest ownership, and acquire private inholdings within these areas to protect and promote public resource values</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-101</p>	<p>1 Consider impact to special values of the site and develop appropriate mitigation alternatives for that portion of the rights-of-way that is subject to Federal grant or cost sharing</p> <p>1 Make mineral classification investigation to support withdrawal.</p>
<u>FACILITIES</u>	<p>Road Construction</p> <p>Road Operation</p> <p>FA&O Construction and Reconstruction</p>	<p>1 Provide and manage roads as needed to accomplish resource objectives</p> <p>1 Encourage, accept, discourage, eliminate or prohibit road use as determined by project planning</p> <p>1. Maintenance and construction should be in keeping with the Secretary of Interior's standards for the rehabilitation of historic structures</p>	
<u>PROTECTION</u>	<p>Fire Prevention</p> <p>Fire Suppression</p>	<p>1. Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan.</p> <p>1. Implement fire suppression strategies that emphasize the protection of recreation facilities or other special values of each management area</p> <p>2 Fire suppression tactics should emphasize the protection of life and property while minimizing the physical disturbance of the resources The use of all fire suppression resources is appropriate</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>PROTECTION</u> (continued)</p>	<p>Fire Hazard Abatement</p>	<p>1 Treatment of both activity generated and natural fuels is appropriate when coordinated with the scenic, recreational, or other special values being emphasized in these management areas</p> <p>2. The protection of recreation values will be emphasized during the planning and implementation of these projects</p>	<p>1. Determine the occurrence and frequency of vandalism and theft at these areas, with corresponding investigations of any violations observed</p>
	<p>Preattack Facilities Development</p>	<p>1 Develop only those preattack facilities that are compatible with the special visual and recreational values of the areas</p>	
	<p>Law Enforcement</p>	<p>1 Provide law enforcement action as a means of protecting the special characteristics of the area</p>	
	<p>Forest Pest Management</p>	<p>1 Suppress insects and diseases when outbreaks threaten managed resources and/or users.</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives.</p>	

MANAGEMENT PRESCRIPTION: ST-1

TITLE: Scenic Travel - Retention

GOAL STATEMENT: To retain or enhance the viewing and recreation experiences along scenic travel routes.

DESCRIPTION: Development and permitted uses will meet the "Retention" Visual Quality Objective in foreground and middleground areas viewed from developed recreation sites and designated roads and trails. Developments and management activities within the allocation generally are not visually evident. The natural existing or established landscape will generally have vegetation on forested lands that is composed of large old growth trees in the overstory or in groves intermixed with a variety of age classes in the understory. The general perception of the landscape is a natural appearing environment.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Recreation Planning and Inventory</p>	<p>1 Visual Quality Objective RETENTION</p>	<p>1 Landscape architectural input is recommended when planning an activity or constructing improvements</p> <p>2 Provide a diversity of vegetative species and age classes</p> <p>3 Where consistent with existing or predicted insect and disease conditions, strive to grow or maintain large (24-36" diameter) mature ponderosa pine, larch, and mixed conifer trees to an age of about 260 years. The number of trees left should retain form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, arrangement, and pattern should not be evident</p> <p>4 Regeneration cutting is generally by the extended shelterwood treatment. The design and viewing angle of created openings is more important than size. However, the seen area of openings will normally be three acres or less in foreground, and five acres or less in middleground</p> <p>5 Changes in form, line, color and texture resulting from management activities such as skid trails, landings, and prescribed burning should not be evident for more than one season</p> <p>6 New cutting units are designed to give the viewer the perception that not more than three percent of the foreground area in the viewshed (travel corridor) has been disturbed within any one decade</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u> (continued)</p>	<p>Recreation Planning and Inventory (continued)</p>	<p>1 Visual Quality Objective RETENTION (continued)</p> <p>2 Attempt to preserve indefinitely a few small patches of old growth timber for viewing by travelers Strive to retain a few scattered old growth or "character" trees throughout the corridor to add to visual variety</p> <p>3 Plan and develop recreation facilities and activities in conformity with applicable ROS class Semi-primitive motorized to Urban</p>	<p>7 New cutting units are designed to give the viewer the perception that not more than five percent of the middleground area in the viewshed has been disturbed</p> <p>8 Landings are to be located outside of seen areas or rehabilitated after the timber sale</p> <p>9 Utility right-of-way clearing are to blend with the natural vegetative pattern where possible</p> <p>10 Overhead utility lines are to be screened where possible, visible transmission towers will exhibit naturally harmonious colors</p> <p>11 Buildings shall exhibit natural harmonious colors</p> <p>12 Gravel, borrow, and stockpile areas are to be excluded from seen area, or rehabilitated after use</p> <p>13 Roads should not dominate natural patterns of form, line, color, and texture within clearcut areas one year after cutting</p> <p>14 Consider revegetating cut and fill slopes to the extent compatible with the surrounding area</p> <p>15 Landscape design should accompany all intersections of arterial and collector roads</p> <p>16 Fire protection measures should not dominate natural patterns of form, line, color, and texture</p> <p>17 Consider a level of prescribed fire, where appropriate, to maintain a natural appearance and enhance visual quality</p> <p>18 Rehabilitation measures are to be applied to landscapes where needed to improve the visual setting</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RECREATION</u> (continued)	<p>Cultural Resource Evaluation, Assessment and Protection</p> <p><i>Facility and Site Reconstruction and Construction</i></p> <p>Facility and Site Management</p> <p>Use Administration</p> <p>Trail Reconstruction and Construction</p> <p><i>Trail System Maintenance and Operation</i></p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-66</p> <p>1. <i>Forest-wide Standards and Guidelines</i> apply See p IV-67 and 68</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-68</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-68</p> <p>1 Plan and design trail construction and reconstruction projects to meet retention criteria when trails are viewed from roads and viewpoints</p> <p>2 Locate trails to take advantage of scenic viewpoints</p> <p>3 Issue permits and authorizations for activities or facilities compatible with the prescription goal</p> <p>1 <i>Maintain trail corridors</i> to provide a semiprimitive recreation experience</p>	
<u>WILDLIFE AND FISH</u>	<p>Wildlife Surveys and Plans</p> <p><i>Non-Structural and Structural Habitat Improvement</i></p>	<p>1 Develop openings or vistas where wildlife can be viewed in their natural habitat by the public.</p> <p>2 Manage primary cavity excavators at 60 percent of the potential population level.</p> <p>1. <i>Forest-wide Standards and Guidelines</i> apply See p IV-83 and 84</p>	
<u>RANGE</u>	<p>Range Planning and Inventory</p> <p><i>Range Non-Structural Improvements</i></p>	<p>1 Grazing of suitable range by livestock shall emphasize range management practices that favor scenic travel corridors</p> <p>2 Management of the range resource under this prescription will feature an intensive scheme of management</p> <p>1 Use only compatible species in range forage improvement projects</p>	<p>1 Management seeks to optimize production and utilization of forage allocated to livestock use consistent with maintaining the environment and providing for multiple use of the range</p> <p>1 Cultural practices may be selected and used to develop cost-effective methods for achieving improved forage supplies and uniform livestock distribution and forage use.</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RANGE</u> (continued)</p>	<p>Range Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1 Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-89</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-89</p>	<p>1. Fences and water developments are designed and applied to obtain relatively uniform livestock distribution and use of forage, and to maintain plant vigor</p>
<p><u>TIMBER</u></p>	<p>Regeneration Harvest</p> <p>Intermediate Harvest</p> <p>Silvicultural Examination and Prescription</p> <p>Reforestation</p> <p>Timber Stand Improvement</p> <p>Timber Sale Preparation and Timber Harvest Administration</p> <p>Nursery Management</p>	<p>1 Use shelterwood and small clearcuts subject to standards in Regional Plan, NFMA Regulations, and visual quality objectives</p> <p>1 Will generally use two commercial thinnings</p> <p>2. Remove dead and dying trees, as economical, from areas not scheduled for commercial harvest.</p> <p>1 Make examination prior to any activity and as required for certification of reforestation and thinning.</p> <p>1 Use compatible reforestation methods</p> <p>1 Use methods compatible with the goal</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-93 and 94</p> <p>1 Collect seed in sufficient quantities to meet program reforestation needs plus a sufficient reserve for natural disasters.</p>	<p>1 Extended shelterwood will be the predominant method</p> <p>2 Seed tree cut</p> <p>3 Small clearcuts</p> <p>1 Thin to maintain a minimum basal area that will utilize site potential and produce an economical harvest</p> <p>2 Salvage Sales.</p> <p>1 Stand examination</p> <p>1 Plant all nonstocked areas following regeneration harvest that are not expected to regenerate naturally within three years with desired species Use genetically superior stock as available. Interplant where needed Where feasible, use species suitable for long rotations (pine, larch, Douglas-fir)</p> <p>2 Perform site preparation compatible with the goal.</p> <p>3. Protect seedlings from animal damage where stocking level is threatened,</p> <p>1. Release regeneration overtopped by competing vegetation</p> <p>2. Fertilization will be used where needed to meet the objectives of this management</p> <p>1. Cone collection</p> <p>2 Seed certification.</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>TIMBER</u> (continued)	<i>Genetic Tree Improvement</i>	1 Implement the Forest Tree Improvement Program	1 Select and maintain superior trees 2 Collect seed from superior trees
<u>WATER</u>	Planning Improvement <i>Administration and Management</i> Rights and Use Management	1. Forest-wide Standards and Guidelines apply See p. IV-94 1 Forest-wide Standards and Guidelines apply. See p IV-94 and 96 1. Forest-wide Standards and Guidelines apply See p. IV-94 and 95 1 Forest-wide Standards and Guidelines apply See p IV-95 and 96	
<u>SOIL</u>	Planning and inventory Improvement <i>Administration and Management</i>	1 Forest-wide Standards and Guidelines apply See p IV-96 1 Forest-wide Standards and Guidelines apply. See p IV-96 1. Forest-wide Standards and Guidelines apply See p IV-97	
<u>AIR</u>	Planning <i>Administration and Management</i>	1 Forest-wide Standards and Guidelines apply See p IV-98 1. Forest-wide Standards and Guidelines apply See p IV-98	
<u>MINERALS AND GEOLOGY</u>	Locatable Minerals	1 Withdrawals will be recommended in only a very few situations where it is determined that existing laws and regulations will not provide adequate protection for this prescription area 1 If existing laws and regulations do not provide adequate protection from mineral entry and mining under the 1872 mining law, propose the area be withdrawn 2 If the area is withdrawn, ensure valid existing rights exist before approving any locatable mineral related activities	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>MINERALS AND GEOLOGY</u> (continued)	Leasable Energy Minerals Common Variety Minerals Recreational Mineral Activities	1. If reasonable and necessary to maintain the integrity of the area, attach a no surface occupancy stipulation to leases 1 Allow mineral material disposal where removal of this resource is compatible with the objectives established for the area. 1. Forest-wide Standards and Guidelines apply See p IV-99	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		1. Forest-wide Standards and Guidelines apply See p IV-99 and 100	
<u>LANDS</u>	Special Use Management Right-of-Way Grants for Roads and Trails Federal Energy Regulatory Commission License and Permits Withdrawals, Modifications, and Revocations Property Line Location Property Boundary and Corner Maintenance Landownership Planning, Land Adjustment Planning, and All Adjustment Activities Rights-of-Way Cost-Share Agreements	1 Utility corridors are permitted subject to determination of need and requirements necessary to achieve visual objectives 1 Grant requests when necessary 1 Recommend only compatible uses 1. Withdrawals will be recommended only when necessary to meet the goal of the prescription 1 Survey, mark, and post all National Forest property lines 1. Make those land adjustments which will assist in achieving the goal of this prescription 1. Where applicable, use cost-share process to identify road location and standards compatible with the goal	
<u>FACILITIES</u>	Road Construction	1 Reduce the visual impact of roads 2 Fit the landscape with a minimum of landform and vegetation modification 3 Provide for flowing, rather than abrupt changes of grade and alignment Consolidate intersections	1 See National Forest Landscape Management Volume 2, Chapter 4, Roads, or revision.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>FACILITIES</u> (continued)</p>	<p>Road Construction (continued)</p>	<p>4 Provide viewing opportunities for a variety of landforms, waterforms, rockforms, and vegetation</p> <p>5 Provide viewing opportunities for the dominant landform feature</p> <p>6 Rehabilitate existing roads and material sources to meet the specified visual quality objective.</p> <p>7 To the extent practical, screen road from other viewing locations</p> <p>8. To the extent practical, locate roads on stable, fertile, and dark colored soils</p> <p>9 Reduce the visual contrasts of construction</p> <p>10 Utilize waste in positive ways.</p> <p>11 To the extent practical, shape borrow areas and abandoned roads</p> <p>12 Retain as many large rocks as practical within construction slopes.</p> <p>13 Conserve topsoil for revegetation areas</p> <p>14 Mulch with low contrast materials</p> <p>15. Strive for broken-faced rock cuts</p> <p>16 Retain the maximum amount of existing vegetation</p>	<p>1 Consider slope rounding</p> <p>2 Consider slope warping</p> <p>3. Use natural forms for ditches, swales, and channels</p> <p>1 Create screen and variety with mounds</p> <p>2 Fill depressions on uphill side of fills</p> <p>3 Fill cut sections of abandoned roads</p> <p>1 Minimal clearing beyond cut and fills</p> <p>2 Utilize treewells, retaining walls, and binwalls to reduce clearing width</p> <p>3 Allow for some fill over tree roots.</p> <p>4 Protect edges from equipment and blasting damage.</p> <p>5 Maintain the hydrologic regiment</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>PROTECTION</u>	Fire Prevention	1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan.	
	Fire Suppression	1. Implement fire suppression strategies that protect the scenic and recreational values being emphasized in the areas where these prescriptions are being used 2 Fire suppression tactics should minimize physical disturbance when feasible The use of water is preferred to physical disturbance of the site.	
	Fire Hazard Abatement	1. Treatment of both activity generated and natural fuels is appropriate when coordinated with the scenic and recreational values being emphasized in these management areas.	
	Preattack Facilities Development	1. Development of preattack facilities should occur only in areas of high fire frequency and when they do not detract from the scenic or recreational character of the landscape	
	Law Enforcement	1. Forest-wide Standards and Guidelines apply See p IV-103	
	Forest Pest Management	1 Suppress insects and diseases when outbreaks threaten managed resources and/or users. 2. Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives	

MANAGEMENT PRESCRIPTION: ST-2

TITLE: Scenic Travel - Partial Retention

GOAL STATEMENT: Provide a near natural appearing foreground and middleground along scenic travel corridors.

DESCRIPTION: Development and permitted uses will meet the "Partial Retention" Visual Quality Objective in the foreground and middleground viewed from developed recreation sites and designated roads and trails. The foreground of the main use routes will generally have vegetation that is composed of some large trees in the overstory or in groves intermixed with a variety of age classes in the understory. The middleground viewed areas from the main travel routes will generally have the perception of a slightly altered environment. The proposed uses and vegetation management within the allocation will be integrated with the natural landscape so that activities are visually subordinate to the characteristic landscape

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
RECREATION	Recreation Planning and Inventory	1 Visual Quality Objective. PARTIAL RETENTION	<p>1 Landscape architectural input is recommended on all planned activities or developments.</p> <p>2. Provide a diversity of vegetative species and age classes</p> <p>3 Where consistent with existing or predicted insect and disease conditions, strive to grow or maintain large mature ponderosa pine and larch to an age of about 260 years on dry ecosites. For mixed conifer trees to an age of about 180 years on wet ecosites. The number of trees left should retain form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, arrangement, and pattern must remain subordinate to the characteristic landscape.</p> <p>4 Regeneration cutting is generally by the extended shelterwood treatment. The design and viewing angle of created openings is more important than size. However, the seen area of openings will normally be 5 acres or less in foreground, and 15 acres or less in middleground.</p> <p>5 Changes in form, line color, and texture resulting from management activities such as skid trails, landings, and prescribed burning should not be evident for more than two seasons</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p>RECREATION (continued)</p>	<p>Recreation Planning and Inventory (continued)</p>	<p>1 Visual Quality Objective PARTIAL RETENTION (continued)</p>	<p>6 New cutting units are designed to give the viewer the perception that not more than five percent of the foreground area in the viewshed (travel corridor) has been disturbed within any one decade</p> <p>7 New cutting units are designed to give the viewer the perception that not more than seven and one-half percent of the seen middleground area in the viewshed has been disturbed within any one decade.</p> <p>8 Landings are to be located outside of seen areas or rehabilitated after timber sale.</p> <p>9. Utility right-of-way clearings are to blend with the natural vegetative pattern where possible.</p> <p>10.Overhead utility lines are to be screened where possible Visible transmission towers will exhibit naturally harmonious colors</p> <p>11 Buildings shall exhibit natural harmonious colors.</p> <p>12.Gravel, borrow, and stockpile areas are to be excluded from seen area or rehabilitated after use</p> <p>13 Roads should not dominate natural patterns of form, line, color, and texture within clearcut areas one year after cutting</p> <p>14 Consider revegetating cut and fill slopes to an extent compatible with the surrounding area</p> <p>15 Landscape design should accompany all intersections of arterial and collector roads.</p> <p>16 Fire protection measures should not dominate natural patterns of form, line, color, and texture</p> <p>17. Consider a level of prescribed fire where appropriate to maintain a natural appearance and enhance visual quality</p> <p>18 Rehabilitation measures are to be applied to landscapes where needed to improve the visual setting</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
RECREATION (continued)	Recreation Planning and Inventory (continued)	<p>2 Attempt to preserve indefinitely a few small patches of old-growth timber for viewing by travelers Strive to retain a few scattered old-growth or "character" trees throughout the corridor to add to visual variety.</p> <p>3 Plan recreation facilities and activities to conform to the Roaded natural ROS class criteria and harmonize with prescription goal</p>	
	Cultural Resource Evaluation, Assessment and Protection	1 Forest-wide Standards and Guidelines apply See p IV-66	
	Facility and Site Reconstruction and Construction	1 Forest-wide Standards and Guidelines apply See p IV-67 and 68	
	Facility and Site Management	1 Forest-wide Standards and Guidelines apply See p. IV-68	
	Use Administration	<p>1. Manage and maintain trail corridors to meet visual quality and recreation setting objectives of the prescription</p> <p>2 Issue permits when compatible with the goal.</p>	
	Trail Reconstruction and Construction	1. Plan and design trail construction and reconstruction projects to meet partial retention criteria as trail is viewed from roads or viewpoints	
	Trail System Maintenance and Operation	1 Forest-wide Standards and Guidelines apply See p IV-69	
<u>WILDLIFE AND FISH</u>	Wildlife Surveys and Plans	<p>1 Regulate human activities where necessary to prevent habitat degradation and wildlife harassment</p> <p>2 Develop openings or vistas where wildlife can be viewed in their natural habitat by the public</p> <p>3. Manage primary cavity excavators at 60 percent of the potential population level</p>	
Non-Structural and Structural Habitat Improvement	1 Forest-wide Standards and Guidelines apply See p IV- 83 and 84		

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RANGE</u></p>	<p>Range Planning and Inventory</p>	<p>1 Grazing of suitable range by livestock shall emphasize range management practices that are compatible with scenic travel corridors</p> <p>2 Management of the range resource under this prescription will feature an intensive scheme of management</p>	<p>1 Management seeks utilization of forage allocated to livestock. Cost effective management systems and techniques are designed and applied to obtain relatively uniform livestock distribution and use of forage, and to maintain plant vigor</p>
	<p>Range Non-Structural Improvements</p>	<p>1. Use only compatible species in range forage improvement projects</p>	<p>1. Cultural practices such as brush control, type conversion, fertilization, site preparation, and seeding of improved forage species may be used to improve quality and quantity of forage</p>
	<p>Range Structural Improvements</p>	<p>1. Utilize the National Forest Landscape Management Handbook (USDA No. 484) "Range" in the design and application of improvements</p>	<p>1. Cultural practices may be combined with fencing and water developments to implement complex grazing systems</p>
	<p>Range Structural Improvement Maintenance</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-89</p>	
	<p>Range Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-89</p>	
<p><u>TIMBER</u></p>	<p>Regeneration Harvest</p>	<p>1 Use shelterwood and small clearcuts subject to standards in Regional Plan, NFMA Regulations, and visual quality objectives</p>	<p>1. Extended shelterwood will be the predominant method in the foreground</p>
	<p>Intermediate Harvest</p>	<p>1 Will generally use two commercial thinnings</p> <p>2. Remove dead and dying trees, as economical, from areas not scheduled for commercial harvest</p>	<p>1 Thin to maintain a minimum basal area that will utilize site potential and produce an economical harvest.</p> <p>1 Salvage Sales</p>
	<p>Silvicultural Examination and Prescription</p>	<p>1. Make examination prior to any activity and as required for certification of reforestation and thinning</p>	<p>1 Stand examination</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p>TIMBER (continued)</p>	<p>Reforestation</p>	<p>1. Use compatible reforestation methods.</p>	<p>1 Plant all nonstocked areas following regeneration harvest that are not expected to regenerate naturally within three years with desired species Use genetically superior stock as available. Interplant where needed. Where available, use species suitable for long rotations (pine, larch, Douglas-fir)</p> <p>2 Perform site preparation as required by site specifications.</p> <p>3. Protect seedlings from animal damage where stocking level is threatened</p>
	<p>Timber Stand Improvement</p>	<p>1 Use methods compatible with the goal.</p>	<p>1. Release regeneration overtopped by competing vegetation</p> <p>2 Fertilization will be used where needed to meet objectives of the management prescription</p>
	<p>Timber Sale Preparation and Timber Harvest Administration</p>	<p>1. Forest-wide Standards and Guidelines apply See p. IV- 93 and 94</p>	
	<p>Nursery Management</p>	<p>1. Collect seed in sufficient quantities to meet program reforestation needs plus a sufficient reserve for natural disasters</p>	<p>1 Cone collection</p> <p>2 Seed certification</p>
	<p>Genetic Tree Improvement</p>	<p>1 Implement the Forest Tree Improvement Program.</p>	<p>1 Select and maintain superior trees</p> <p>2 Collect seed from superior trees.</p>
<p>WATER</p>	<p>Planning</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 94</p>	
	<p>Improvement</p>	<p>1 Forest-wide Standards and Guidelines apply. See p. IV- 94 and 96</p>	
	<p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-94 and 95</p>	
	<p>Rights and Use Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV- 95 and 96</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>SOIL</u>	Planning and Inventory Improvement Administration and Management	1 Forest-wide Standards and Guidelines apply See p IV-96 1 Forest-wide Standards and Guidelines apply See p. IV-96 1 Forest-wide Standards and Guidelines apply See p IV-97	
<u>AIR</u>	Planning Administration and Management	1. Forest-wide Standards and Guidelines apply. See p IV-98 1 Forest-wide Standards and Guidelines apply See p IV-98	
<u>MINERALS AND GEOLOGY</u>	Locatable Minerals Leasable Energy Minerals Common Variety Minerals Recreational Mineral Activities	1 Withdrawals will be recommended only in a very few situations where it is determined that existing laws and regulations will not provide adequate protection for this prescription area 1 if existing laws and regulations do not provide adequate protection from the impacts of entry and mining under the 1872 Mining Law, recommend the area be withdrawn 2 If the area is withdrawn, ensure that valid existing rights exist before approving mining related activities. 1. Forest-wide Standards and Guidelines apply See p. IV-98 and 99 1 Allow mineral material disposal where removal can be made compatible with the objectives established for these areas 1 Forest-wide Standards and Guidelines apply. See p IV-99	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		1. Forest-wide Standards and Guidelines apply See p IV-99 and 100	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>LANDS</u>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Withdrawals, Modifications, and Revocations</p> <p>Property Line Location <i>Property Boundary and Corner Maintenance</i></p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1 <i>Utility corridors are permitted subject to determination of need and requirements necessary to achieve visual objectives</i></p> <p>1 Grant requests when necessary</p> <p>1 Recommend only compatible uses</p> <p>1. <i>Withdrawals will be recommended only when necessary to meet the goal of the prescription</i></p> <p>1 Survey, mark, and post all <i>National Forest property lines</i></p> <p>1 Make those land adjustments which will assist in achieving the goal of this prescription</p> <p>1 Where applicable, use cost-share process to identify road location and standards compatible with the goal</p>	
<u>FACILITIES</u>	<p>Road Construction</p> <p>Road Operation</p> <p>FA&O Construction and Reconstruction</p>	<p>1 Reduce the visual impact of roads</p> <p>2 Consistent with the amount and type of use, utilize the standards and guidelines for ST-1.</p> <p>1. <i>Appropriate road use will be determined during project planning and design</i></p> <p>1 Forest-wide Standards and Guidelines apply See p IV-102 and 103</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>PROTECTION</u></p>	<p>Fire Prevention</p>	<p>1. Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan.</p>	
	<p>Fire Suppression</p>	<p>1 Implement fire suppression strategies that protect the scenic and recreational values being emphasized in the areas where these prescriptions are being used</p> <p>2 Fire suppression tactics should minimize physical disturbance when feasible The use of water is preferred to physical disturbance of the site.</p>	
	<p>Fire Hazard Abatement</p>	<p>1. Treatment of both activity generated and natural fuels is appropriate when coordinated with the scenic and recreational values being emphasized in these management areas.</p>	
	<p>Preattack Facilities Development</p>	<p>1 Development of preattack facilities should occur only in areas of high fire frequency and when they do not detract from the scenic or recreational character of the landscape</p>	
	<p>Law Enforcement</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-103</p>	
	<p>Forest Pest Management</p>	<p>1. Suppress insects and diseases when outbreaks threaten managed resources and/or users Use suppression methods that minimize site disturbance</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives</p>	

MANAGEMENT PRESCRIPTION: UC-1

TITLE: Utility Corridors

GOAL STATEMENT: Provide and manage utility corridors to accommodate energy transmission needs

DESCRIPTION: This prescription is applicable to existing and potential utility and transmission corridors. It includes the land directly under and adjacent to the pipeline or powerline facility (clearing limits). Compatible facilities are combined in the same corridor whenever possible. Resource uses, such as grazing, and dispersed recreation activities, such as camping, mushroom and berry picking, Christmas tree cutting, etc., may be compatible in some areas.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Recreation Planning and Inventory</p>	<p>1. Visual Quality Objective MAXIMUM MODIFICATION</p> <p>2 Plan recreation activities to conform to the appropriate ROS class criteria within the range of Roaded modified to Urban</p>	<p>1 A visual analysis is required to blend activities with the naturally established landscape.</p> <p>2 Rehabilitation measures may be applied to the landscape where needed to improve the visual setting.</p>
	<p>Cultural Resource Evaluation, Assessment and Protection</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-66</p>	
	<p>Facility and Site Reconstruction and Construction</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV-67 and 68</p>	
	<p>Facility and Site Management</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV-68</p>	
	<p>Use Administration</p>	<p>1 Manage dispersed recreation activities to emphasize uses that are compatible with utility corridor objectives</p>	
	<p>Trail Reconstruction and Construction</p>	<p>1 Forest-wide Standards and Guidelines apply. See p. IV-68 and 69</p>	
	<p>Trail System Maintenance and Operation</p>	<p>1 Forest-wide Standards and Guidelines apply See p. IV-69</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>WILDLIFE AND FISH</u>	Wildlife Surveys and Plans Non-Structural and Structural Habitat Improvements	1 Management for primary cavity excavators is incompatible with this prescription 1 Forest-wide Standards and Guidelines apply See p. IV-83 and 84	
<u>RANGE</u>	Range Planning and Inventory Range Non-Structural and Structural Improvements Range Structural Improvement Maintenance Range Administration and Management	1 Suitable range will be available for allocation to livestock and managed at the same intensity level as adjoining prescription 1 Forest-wide Standards and Guidelines apply See p IV-89 and 92 1 Forest-wide Standards and Guidelines apply. See p IV-89 1 Forest-wide Standards and Guidelines apply. See p IV-89	
<u>TIMBER</u>	Regeneration Harvest Intermediate Harvest Silvicultural Examination and Prescription Reforestation Timber Stand Improvement Timber Sale Preparation and Timber Harvest Administration Nursery Management and Genetic Tree Improvement	1 No scheduled harvest. Use improvement and salvage cutting when compatible with the prescription goal 1 Forest-wide Standards and Guidelines apply See p IV-92 1. Forest-wide Standards and Guidelines apply See p IV-92 1 May be reforested to grow products compatible with the goal 1 Forest-wide Standards and Guidelines apply See p IV-93 1 Forest-wide Standards and Guidelines apply See p IV-93 and 94 1 No special practice	
<u>WATER</u>	Planning Improvement Administration and Management Rights and Use Management	1 Forest-wide Standards and Guidelines apply See p IV-94 1 Forest-wide Standards and Guidelines apply. See p IV-94 and 96 1 Forest-wide Standards and Guidelines apply. See p IV-94 and 95 1 Forest-wide Standards and Guidelines apply See p IV-95 and 96	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>SOIL</u>	Planning and Inventory Improvement Administration and Management	1. Forest-wide Standards and Guidelines apply See p IV-96 1 Forest-wide Standards and Guidelines apply See p IV-96 1. Forest-wide Standards and Guidelines apply See p IV-97	
<u>AIR</u>	Planning Administration and Management	1. Forest-wide Standards and Guidelines apply. See p IV-98 1. Forest-wide Standards and Guidelines apply See p IV-98	
<u>MINERALS AND GEOLOGY</u>	Locatable Minerals Leaseable Energy Minerals Common Variety Minerals Recreational Mineral Activities	1. Ensure permittee's improvements are appropriately protected or impacts are mitigated 1. Same as for Locatable Minerals 1. Same as for Locatable Minerals 1 Forest-wide Standards and Guidelines apply See p IV-99	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		1. Forest-wide Standards and Guidelines apply. See p. IV-99 and 100	
<u>LANDS</u>	Special Use Management Right-of-Way Grants for Roads and Trails Federal Energy Regulatory Commission License and Permits Property Line Location Property Boundary and Corner Maintenance	1 Forest-wide Standards and Guidelines apply See p IV-100 1. Provide appropriate access to inholders under then existing guidelines 2 Utility right-of-way clearing is to blend with the natural vegetative pattern where possible 1 These areas will have priority for new applications 2 Overhead utility lines are to be screened where possible, visible transmission towers require naturally harmonious colors 1 Forest-wide Standards and Guidelines apply See p. IV-100	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>LANDS</u> (continued)</p>	<p>Landownership Planning, Land Adjustment Planning, and All Adjustments Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1. Forest-wide Standards and Guidelines apply See p. IV-100 and 101</p> <p>1. Proposed cost share access road locations and standards will be coordinated with corridor managers</p>	
<p><u>FACILITIES</u></p>	<p>Road Construction</p> <p>Road Operation</p> <p>FA&O Construction and Reconstruction</p>	<p>1 Provide and manage roads as needed to accomplish resource objectives</p> <p>1. Encourage, accept, discourage, eliminate or prohibit road use as determined by project planning and design</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-102 and 103</p>	
<p><u>PROTECTION</u></p>	<p>Fire Prevention</p> <p>Fire Suppression</p> <p>Fire Hazard Abatement</p> <p>Preattack Facilities Development</p> <p>Law Enforcement</p> <p>Forest Pest Management</p>	<p>1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan.</p> <p>1 Implement fire suppression strategies that emphasize the protection of the facilities associated with the utility transmission corridors</p> <p>2. Fire suppression tactics should emphasize the protection of life and property The use of all fire suppression resources is appropriate.</p> <p>1 Treatment of both activity generated and natural fuels is appropriate when the activities enhance the management objectives of the utility corridor</p> <p>1. Forest-wide Standards and Guidelines apply. See p IV-103</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-103</p> <p>1 Suppress insects and diseases when outbreaks threaten managed resources and integrity of structures</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource objectives</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Facility and Site Management</p>	<p>1 Facilities and campsites, where appropriate, will be managed to minimize social and biological resource impacts</p>	<p>1 Campsites with fire rings may be retained and managed to provide campsite opportunities and help direct users to specific sites capable of withstanding use impacts</p> <p>2 Sites in excess of user need or sites showing unacceptable change in social or biological condition may be obliterated and rehabilitated. Appropriate management actions to correct the situation are described in Appendix E</p>
	<p>Use Administration</p>	<p>1 Management actions will be implemented to control or restrict visitor use when user impacts result in a change in biological or social resource conditions that approach limits of acceptable change. Appropriate management actions are explained in Appendix E</p> <p>2 Wilderness Ranger contacts with recreation visitors for educational, instructive and informative purposes will generally be made outside wilderness or in high visitor use areas. Contacts inside wilderness will be in accord with the managerial setting for each WROS class</p> <p>3 Permits or authorizations to providers of commercial recreation opportunities will be issued when appropriate to the goals of wilderness management and where compatible with the WROS class and existing visitor use of an area</p>	<p>1. Monitoring will measure the specific parameters of key indicators of biological or social conditions</p> <p>2 Monitoring measurements will be conducted in areas receiving significant visitor use, at least every five years to record trends of change</p>
	<p>Trail Reconstruction and Construction</p>	<p>1 Trail construction and reconstruction will occur to protect biological resource values and to meet wilderness management objectives</p> <p>2 Trail reconstruction or construction specifications will meet trail objectives and conform with specifications of the appropriate WROS class in which the trail is located</p>	<p>1 Trail location and design standards will be compatible with WROS class criteria.</p> <p>2 No trails will be constructed in pristine WROS Class areas</p> <p>3 Trails may be relocated into Primitive WROS class areas if necessary to solve resource management problems. However, the solitude and remoteness of a primitive area will not be sacrificed to distribute or accommodate more use</p> <p>1 Specific trail objectives identifying the role, purpose, destination, level, and type of use and expectations of the users will be established for each trail.</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RECREATION</u> (continued)	Trail System Maintenance and Operation	1 The trail system will be maintained and operated as appropriate to trail objectives and the appropriate WROS class for the area accessed by the trail	
<u>WILDLIFE AND FISH</u>	Wildlife Surveys and Plans Non-Structural and Structural Habitat Improvement	1 Manage primary cavity excavators at 100 percent of the potential population level 1 Forest-wide Standards and Guidelines apply See p. IV-83 and 84	
<u>RANGE</u>	Range Planning and Inventory Range Non-Structural Improvements Range Structural Improvements Range Structural Improvement Maintenance Range Administration and Management	1. Allotment Management Plans will define the specific allocation of forage resources, the grazing management system, and the monitoring necessary to achieve wilderness management objectives and maintain range conditions within acceptable limits of change 2 Management of the range resource under this prescription will feature a stewardship (Level B) management scheme There will be no increased range use. 3 Where conflicts are identified on suitable range, these will be minimized through range management practices that emphasize management needs 1. Manage existing plants only 1 Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements. 1 Reconstruct, relocate, or eliminate range improvements that are not compatible 1. Forest-wide Standards and Guidelines apply See p IV-89	1 Monitoring will be conducted in allotment management at frequencies that will record and document vegetative conditions and trends 1 Level B Management - Management controls livestock numbers so that livestock use is within present grazing capacity Distribution is achieved through riding, herding and/or salting. 1. Improvements are minimal and constructed only to the extent needed to cost effectively maintain stewardship of the range resource in the presence of grazing.
<u>TIMBER</u>	Not applicable to this prescription		

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>WATER</u>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1. Educate visitors to maintain water quality</p> <p>2. Water resource improvements shall be consistent with the Wilderness Act.</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-94 and 96</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-94 and 95</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-95 and 96</p>	
<u>SOIL</u>	<p>Planning and Inventory</p> <p>Improvement</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV-96</p> <p>1 Rehabilitate degraded sites caused by management activities or visitor use.</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-97</p>	<p>1 Rehabilitation will utilize only materials and techniques that are compatible with the wilderness</p>
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-98</p> <p>1 Protect air quality related values (AQRV's) within all Class I areas</p>	<p>1. Management activities which are ongoing within the area will be conducted in a manner which protects Air Resource quality to a standard that meets or exceeds the guidance provided by the Clean Air Act.</p>
<u>MINERALS AND GEOLOGY</u>		<p>1 Even though these areas are withdrawn, allow prospecting in accordance with Section 4(d)(2) of the Wilderness Act. This may include private parties, State Agencies, the US Geological Survey or the US Bureau of Mines</p> <p>2 If recently located mining claims are encountered, inform the claimant that the area is no longer subject to location</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>FACILITIES</u>	Road Construction	1 No roads will be constructed or maintained except that reasonable access will be granted to landlocked Inholders under the then prevailing guidelines	
<u>PROTECTION</u>	<p>Fire Prevention</p> <p>Fire Suppression</p> <p>Fire Hazard Abatement</p> <p>Preattack Facilities Development</p> <p>Law Enforcement</p> <p>Forest Pest Management</p>	<p>1. Implement a low intensity fire prevention program as outlined in the Forest's Fire Management Action Plan.</p> <p>1. All naturally occurring fires will initially be considered prescribed fires. A timely analysis will be conducted and if the situation does not comply with all elements of the prescription it will be declared a wildfire.</p> <p>2. All wildfires will be suppressed utilizing an appropriate suppression strategy. Suppression tactics that minimize physical disturbance will be used.</p> <p>3. All human caused fires will be considered wildfires.</p> <p>1. Naturally occurring fires burning within prescription will be managed in an attempt to replicate the natural fire cycle.</p> <p>2. Management ignited fire may be used to replicate the natural fire cycle where ignitions are infrequent or to protect adjacent values.</p> <p>1. The development of Preattack facilities is not appropriate.</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-103</p> <p>1. Suppress insects and diseases when outbreaks threaten resources in adjacent areas. Favor biological controls when available.</p> <p>2. Survey pest populations as a management strategy for adjacent resource areas.</p>	

WS-1 AND WS-2

MANAGEMENT PRESCRIPTION: WS-1

TITLE: Scenic River (Proposed)

GOAL STATEMENT: Preserve the Scenic River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

DESCRIPTION: This prescription is for application to those river segments on the Forest that are free of impoundments, and have largely primitive watersheds or shorelines but are accessible by road in places.

MANAGEMENT PRESCRIPTION: WS-2

TITLE: Recreational River (Proposed)

GOAL STATEMENT: Preserve the Recreational River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System

DESCRIPTION: This prescription is for application to those river segments on the Forest that are readily accessible by road or railroad, may have some development along their shorelines, and may have undergone some impoundment or diversion in the past.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RECREATION</u>	Recreation Planning and Inventory	1 Visual Quality Objective RETENTION	<p>1 Landscape architectural input is required when planning an activity or constructing improvements</p> <p>2 Provide a diversity of vegetative species and age classes.</p> <p>3 Where consistent with existing or predicted insect and disease conditions, strive to grow or maintain large (24-36" diameter) mature ponderosa pine, larch, and mixed conifers to an age of about 260 years. The amount of trees left should retain form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, and pattern should not be evident</p> <p>4 Regeneration cutting is generally by the extended shelterwood treatment. The design and viewing angle of created openings is more important than size. However, the seen area of openings generally should not exceed three acres in the foreground, and five acres in the middleground</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u> (continued)</p>	<p>Recreation Planning and Inventory (continued)</p>	<p>1. Visual Quality Objective. RETENTION (continued)</p>	<p>5 Activities creating form, line, color, and texture changes such as slid trails, red needles, and black ground from burning, should not be evident for more than one season</p> <p>6. New cutting units are designed to give the viewer the perception that not more than three percent of the foreground area in the viewshed has been disturbed within any one decade.</p> <p>7 New cutting units are designed to give the viewer the perception that not more than five percent of the middleground area in the viewshed has been disturbed</p> <p>8 Landings are to be located outside of seen areas or rehabilitated after timber sales</p> <p>9 Utility right-of-way clearings are to blend with the natural vegetative pattern</p> <p>10 Overhead utility lines are to be screened where possible, visible transmission towers will exhibit naturally harmonious colors</p> <p>11 Buildings shall exhibit natural harmonious colors</p> <p>12 Gravel, borrow and stockpile areas are to be excluded from the seen area or be rehabilitated after use</p> <p>13. Roads must not dominate natural patterns of form, line, color, texture within clearcut areas one year after cutting</p> <p>14 Revegetate cut and fill slopes to the extent compatible with the surrounding area</p> <p>15 Landscape design is to accompany all intersections of arterial and collector roads</p> <p>16 Fire protection measures shall not dominate natural patterns of form, line, color, and texture.</p> <p>17 Consider a level of prescribed fire where appropriate to maintain natural appearance and enhance visual quality</p> <p>18 Rehabilitation measures are to be applied to the landscape where needed to improve the visual setting</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u> (continued)</p>	<p>Recreation Planning and Inventory (continued)</p> <p>Cultural Resource Protection</p> <p>Facility and Site Reconstruction</p> <p>Facility and Site Construction</p> <p>Facility and Site Management</p> <p>Use Administration</p> <p>Trail Reconstruction</p> <p>Trail Construction</p> <p>Trail System Maintenance and Operation</p>	<p>2. Plan recreation activities and facility development to conform to the appropriate ROS class criteria within the range of Roded natural to urban.</p> <p>3 Motorized use is appropriate when compatible with the management goal.</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-66</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-67 and 68</p> <p>1 New facilities should be screened from scenic rivers</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-68</p> <p>1 Encourage recreation use and activities to the setting of the Recreational or Scenic River designation</p> <p>2. Issue permits for land uses and activities that are compatible with the prescription goal</p> <p>1. Forest-wide Standards and Guidelines apply See p. IV-68</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-68 and 69</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-69</p>	
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p> <p>Non-Structural Habitat Improvement</p> <p>Structural Habitat Improvement</p>	<p>1. Manage primary cavity excavators at 60 percent of the potential population level.</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-83 and 84</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV-83 and 84</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>RANGE</u>	<p>Range Planning and Inventory</p> <p>Range Non-Structural Improvements</p> <p>Range Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1. Grazing of suitable range by livestock shall emphasize range management practices that favor potential Recreational and Scenic Rivers</p> <p>2 Management of the range resource under this prescription will feature a Level C scheme of management</p> <p>3. Intensive cultural practices will not be used</p> <p>1. Use only compatible species in range forage improvement projects</p> <p>1 Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-89</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-89</p>	<p>1 Level C Management - Management seeks utilization of forage allocated to livestock</p> <p>1 Cost effective management systems and techniques including fences and water developments are designed and applied to obtain relatively uniform livestock distribution and use of forage and to maintain plant vigor</p>
<u>TIMBER</u>	<p>Planning and Inventory</p> <p>Regeneration Harvest</p> <p>Intermediate Harvest</p> <p>Silvicultural Examination and Prescription</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-92</p> <p>1 Use shelterwood and small patchcuts subject to standards in Regional Plan, NFMA Regulations and visual quality objectives</p> <p>2 Entiat River from Cottonwood trailhead to Wilderness boundary will have no scheduled harvest</p> <p>1 Remove dead and dying trees, as economical, from areas not scheduled for commercial harvest</p> <p>2 Will generally use two commercial thinnings</p> <p>3 Entiat River from Cottonwood trailhead to Wilderness boundary will have no scheduled harvest</p> <p>1 Make examination prior to any activity and as required for certification of reforestation and thinning</p>	<p>1 Extended shelter wood will be the predominant method.</p> <p>2 Seed tree cut</p> <p>3 Small clearcuts</p> <p>1 Salvage Sales</p> <p>2 Thin to maintain a minimum basal area that utilize site potential and produce an economical harvest</p> <p>1 Stand examination</p>

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>TIMBER</u> (continued)</p>	Reforestation	1 Use compatible reforestation methods	<p>1. Plant all nonstocked areas following regeneration harvest, unless natural regeneration is expected within 3 years. Use genetically superior stock as available. Interplant where needed. Use species suitable for long rotations (pine, larch, Douglas-fir)</p> <p>2 Perform site preparation as required by site specifications.</p> <p>3 Protect seedlings from animal damage.</p>
	Timber Stand Improvement	1. Use methods compatible with the goal	
	Timber Sale Preparation and Timber Harvest Administration	1 Forest-wide Standards and Guidelines apply See p IV-93 and 94	
	Nursery Management	1 Collect seed in sufficient quantities to meet program reforestation needs plus a sufficient reserve for natural disasters.	<p>1 Cone collection</p> <p>2 Seed certification</p>
	Genetic Tree Improvement	1 Implement the Forest Tree Improvement Program	<p>1. Select and maintain superior trees</p> <p>2. Collect seed from superior trees</p>
	Reforestation Animal Control	1. Forest-wide Standards and Guidelines apply. See p IV-92 and 93	
<p><u>WATER</u></p>	Planning	1 Forest-wide Standards and Guidelines apply. See p IV-94	
	Improvement	1 Forest-wide Standards and Guidelines apply See p IV-94 and 96	
	Administration and Management	1 Forest-wide Standards and Guidelines apply See p IV-94 and 95	
	Rights and Use Management	1 Forest-wide Standards and Guidelines apply. See p IV-95 and 96	
<p><u>SOIL</u></p>	Planning and Inventory	1 Forest-wide Standards and Guidelines apply. See p IV-96	
	Improvement	1 Forest-wide Standards and Guidelines apply See p IV-96	
	Administration and Management	1 Forest-wide Standards and Guidelines apply See p. IV-97	

WS-1,2

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-98</p> <p>1 Forest-wide Standards and Guidelines apply See p. IV-98</p>	
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p> <p>Leaseable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreation Minerals Activities</p>	<p>1. Forest-wide Standards and Guidelines apply until the river component is designated part of the Wild and Scenic River system Mining activities shall then be subject to such regulations as the Secretary of Agriculture may prescribe</p> <p>1 Same as Locatable Minerals</p> <p>1. Same as Locatable Minerals</p> <p>1 Same as Locatable Minerals</p>	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		<p>1. Forest-wide Standards and Guidelines apply. See p IV-99 and 100</p>	
<u>LANDS</u>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Withdrawals, Modifications, and Revocations</p> <p>Property Line Location Property Boundary and Corner Maintenance</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p>	<p>1 Avoid locating transportation and utility corridors in these areas</p> <p>1 Provide appropriate access to inholder under then existing guidelines</p> <p>1. Recommend only compatible uses</p> <p>1 Mineral withdrawal will not be recommended upon classification.</p> <p>1 Property lines of those inholdings not to be acquired will be surveyed, marked and posted to full standard</p> <p>1 Identify those lands needed in National Forest ownership to meet management goals</p> <p>2 Identify those lands which can be left in other ownerships, or would contribute to the proposed management goals in other ownership</p> <p>3 Use partial takings to maximum extent consistent with management goals</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>LANDS</u> (continued)	Rights-of-Way Cost-Share Agreements	1 Forest-wide Standards and Guidelines apply See p IV-101	
<u>FACILITIES</u>	Road Construction	1 Provide and manage roads to accomplish resource objectives	1. Scenic Rivers Roads may occasionally bridge the rivers Short stretches of conspicuous roads or longer stretches of inconspicuous or well screened roads are allowed 2 Recreational Rivers' Roads may parallel on one or both river banks There can be several bridge crossings and numerous river access points
	Road Operation	1 Appropriate road use will be determined by project planning and design	
	FA&O Construction and Reconstruction	1. Forest-wide Standards and Guidelines apply See p IV-102 and 103	
<u>PROTECTION</u>	Fire Prevention	1 Implement a high intensity fire prevention program as outlined in the Forest's Fire Management Action Plan	
	Fire Suppression	1 Implement fire suppression strategies that attempt to protect the scenic and recreationa values being emphasized in the areas where these prescriptions are being used 2. Fire suppression tactics should minimize physical disturbance when feasible The use of water is preferred to physical disturbance of the site	
	Fire Hazard Abatement	1 Treatment of both activity generated and natural fuels is appropriate when coordinated with the scenic and recreational values being emphasized in these management areas	
	Preattack Facilities Development	1. Development of preattack facilities should occur only in areas of high fire frequency and when they do not detract from the scenic or recreational character of the landscape	
	Law Enforcement	1 Forest-wide Standards and Guidelines apply. See p IV-103	
	Forest Pest Management	1 Suppress insect and disease outbreaks to preserve recreational character and adjacent resources. Avoid degradation of water quality 2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource goals. 3. Inspect defective trees for unacceptable hazard to users and facilities.	

MANAGEMENT PRESCRIPTION: WS-3

TITLE: Wild River (proposed)

GOAL STATEMENT: Preserve the Wild River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

DESCRIPTION. This prescription is applicable to those river segments that are free of impoundments and generally inaccessible except by trail, with watersheds or shoreline essentially primitive and waters unpolluted. These represent vestiges of primitive America.

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>RECREATION</u></p>	<p>Recreation Planning and Inventory</p>	<p>1. Visual Quality Objective. PRESERVATION</p> <p>2 Plan recreation activities that conform to the primitive and Semi-primitive non-motorized ROS classes</p> <p>3 Motorized use may be appropriate depending upon current uses and adjacent allocations</p>	<p>1 Fire protection measures should not dominate natural patterns of form, line, color, and texture</p> <p>2 Consider a level of prescribed fire where appropriate to maintain natural appearance and enhance visual quality</p> <p>3 Rehabilitation measures are to be applied to the landscape where needed to improve the visual setting</p>
	<p>Cultural Resource Evaluation, Assessment and Protection</p>	<p>1 Forest-wide Standards and Guidelines apply. See p IV-66</p>	
	<p>Facility and Site Reconstruction and Construction</p>	<p>1 Where practical locate new structures outside of the zone</p>	
	<p>Facility and Site Management</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-68</p>	
	<p>Use Administration</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-68</p>	
	<p>Trail Reconstruction and Construction</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-68 and 69</p>	
<p><u>WILDERNESS</u></p>	<p>Wilderness and Wild River Mgmt</p>	<p>1 In case of conflict between wilderness management and Wild River management, the more restrictive prescription shall apply</p>	

WS-3

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>WILDLIFE AND FISH</u></p>	<p>Wildlife Surveys and Plans</p> <p>Non-Structural and Structural Habitat Improvement</p>	<p>1. Manage primary cavity excavators at 100 percent of the potential population level</p> <p>1. Forest-wide Standards and Guidelines apply. See p. IV-83 and 84</p>	
<p><u>RANGE</u></p>	<p>Range Planning and Inventory</p> <p>Range Non-Structural Improvements</p> <p>Range Structural Improvements</p> <p>Range Structural Improvement Maintenance</p> <p>Range Administration and Management</p>	<p>1. Grazing of suitable range by livestock shall emphasize range management practices that protect Wild Rivers.</p> <p>2. Management of the range resource under prescription will feature a Level C scheme of management.</p> <p>3 Intensive cultural practices will not be used.</p> <p>1 Use only compatible species in range forage improvement projects</p> <p>1. Utilize the National Forest Landscape Management Handbook (USDA No 484) "Range" in the design and application of improvements</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-89</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-89</p>	<p>1 Level C Management - Management seeks utilization of forage allocated to livestock.</p> <p>1 Cost effective management systems and techniques including fences and water developments are designed and applied to obtain relatively uniform livestock distribution and use of forage, and to maintain plant vigor</p>
<p><u>TIMBER</u></p>	<p>Not Applicable to this Prescription</p>		
<p><u>WATER</u></p>	<p>Planning</p> <p>Improvement</p> <p>Administration and Management</p> <p>Rights and Use Management</p>	<p>1 Forest-wide Standards and Guidelines apply See p IV-94</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-94 and 96</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-94 and 95</p> <p>1 Forest-wide Standards and Guidelines apply See p IV-95 and 96</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<u>SOIL</u>	<p>Planning and Inventory</p> <p>Improvement</p> <p>Administration and Management</p>	<p>1. Forest-wide Standards and Guidelines apply See p IV-96</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-96</p> <p>1 Forest-wide Standards and Guidelines apply. See p IV-97</p>	
<u>AIR</u>	<p>Planning</p> <p>Administration and Management</p>	<p>1. Forest-wide Standards and Guidelines apply. See p. IV-98</p> <p>1. Forest-wide Standards and Guidelines apply. See p. IV-98</p>	
<u>MINERALS AND GEOLOGY</u>	<p>Locatable Minerals</p> <p>Leasable Energy Minerals</p> <p>Common Variety Minerals</p> <p>Recreational Minerals</p>	<p>1. Forest-wide Standards and Guidelines apply until the component is designated part of the system Upon designation the river segment and one-quarter mile of the bank of the river are withdrawn from all forms of appropriation under the mining laws and mineral leasing laws</p> <p>2 After inclusion in the system as a Wild segment, ensure prior valid existing rights exist before approving mining claim activities</p> <p>1 Same as Locatable Minerals</p> <p>2. After inclusion in the system as a Wild segment, do not issue any mineral leases Ensure prior valid existing rights exist before approving any leasable mineral activities.</p> <p>1 Same as Locatable Minerals</p> <p>2. After inclusion as part of the system, do not allow disposal of common variety minerals.</p> <p>1 Meet Forest-wide Standards and Guidelines until the area is designated a Wild River, then allow only those activities that are in keeping with the management objectives of the river.</p>	
<u>RURAL COMMUNITY AND HUMAN RESOURCES</u>		<p>1 Forest-wide Standards and Guidelines apply See p IV-99 and 100</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>LANDS</u></p>	<p>Special Use Management</p> <p>Right-of-Way Grants for Roads and Trails</p> <p>Federal Energy Regulatory Commission License and Permits</p> <p>Withdrawals, Modifications, and Revocations</p> <p>Landownership Planning, Land Adjustment Planning, and All Adjustment Activities</p> <p>Rights-of-Way Cost-Share Agreements</p>	<p>1 Avoid locating transportation and utility corridors in these areas</p> <p>2 Issue permits when compatible with the goal</p> <p>1 Provide appropriate access to inholders under then existing guidelines</p> <p>1. Section 7 of the Wild and Scenic Rivers Act of Oct 2, 1968 (P L 90-542, 82 Statue 906, as amended), prohibits the licensing of the construction of any project works within a Wild, Scenic, or Recreational River area</p> <p>1 Lands classified as "Wild" segments will be withdrawn from mineral entry under the Wild and Scenic Rivers Act</p> <p>1. Identify those lands needed in National Forest ownership to meet management goals</p> <p>2 Identify those lands which can be left in other ownerships, or would contribute to the proposed management goals in other ownership.</p> <p>3 Use partial takings to maximum extent consistent with management goals</p> <p>1. Forest-wide Standards and Guidelines apply See p IV-101</p>	
<p><u>FACILITIES</u></p>	<p>Road Construction</p> <p>Road Operation</p> <p>FA&O Construction and Reconstruction</p>	<p>1 No roads will be constructed or maintained except that reasonable access will be granted to landlocked inholders under the then prevailing guidelines</p> <p>1. Appropriate road use will be determined by project planning and design</p> <p>1 Not applicable to this prescription</p>	

RESOURCE ELEMENT	MANAGEMENT ACTIVITY	STANDARDS AND GUIDELINES	MANAGEMENT PRACTICE
<p><u>PROTECTION</u></p>	<p>Fire Prevention</p>	<p>1. Implement a low intensity fire prevention program as outlined in the Forest's Fire Management Action Plan</p>	
	<p>Fire Suppression</p>	<p>1 All naturally occurring fires will initially be considered prescribed fires. A timely analysis will be conducted and if the situation does not comply with all elements of the prescription it will be declared a wildfire.</p>	
		<p>2 All wildfires will be suppressed utilizing an appropriate suppression strategy. Suppression tactics which minimize physical disturbance will be used.</p>	
	<p>Fire Hazard Abatement</p>	<p>3 All human caused fires will be considered wildfires</p> <p>1. Naturally occurring fires burning within prescription will be managed in an attempt to replicate the natural fire cycle</p> <p>2 Management ignited fire may be used to replicate the natural fire cycle where ignitions are infrequent or to protect adjacent values</p>	
	<p>Preattack Facilities Development</p>	<p>1 The development of Preattack facilities is not appropriate.</p>	
	<p>Law Enforcement</p>	<p>1. Forest-wide Standards and Guidelines apply See p. IV-103</p>	
	<p>Forest Pest Management</p>	<p>1. Suppress insect and disease outbreaks when necessary to protect river character or adjacent resources.</p> <p>2 Utilize Integrated Pest Management strategies to prevent unacceptable pest damage and meet resource goals</p>	

CHAPTER V

IMPLEMENTATION OF THE FOREST PLAN

A. INTRODUCTION

Implementation of the Wenatchee National Forest Plan requires moving from an existing management program, with a budget and “targets” for accomplishment, to a new management program with a budget, goals, and objectives that provide a different way of addressing the issues and concerns people have voiced about management of the Wenatchee National Forest. This Forest Plan establishes the direction for the Forest for the next ten to fifteen years, when used *in conjunction with Forest Service Manuals and the Pacific Northwest Regional Guide*

This chapter explains how management of the Wenatchee National Forest moves from the Current Direction and Existing Situation to the Proposed Action, all described in the Final Environmental Impact Statement. The following sections describe aspects of implementation that are influenced by previous management activities and objectives, the relationship between project planning and this Forest Plan, the goals of and requirements for monitoring and evaluation, and the circumstances which could require the Plan to be amended or revised.

B. IMPLEMENTATION DIRECTION

Implementation of the Forest Plan occurs through identification, selection, scheduling and execution of management practices to meet management direction provided in the Plan. Implementation also involves responding to proposals by others for use and/or occupancy of National Forest System lands.

Project Planning

Implementation and action plans designed to give implementation guidance for management, protection, and development activities may be developed under the “umbrella” of this Forest Plan. These may become part of the implementation package for the Forest.

Examples of these plans include:

- Forest Trail Plan**
- Wilderness Action Plans**
- Range Allotment Management Plans**
- Fire Management Action Plans**
- Municipal Watershed Plans**
- Land Adjustment Action Plans**
- Corridor Viewshed Plans**
- Tree Improvement Plan**
- Best Management Practices**
- Forest Development Transportation Plan**
- Pacific Crest National Scenic Trail
Comprehensive Plan**
- Off Road Vehicle Plan**
- Law Enforcement Plan**
- Noxious Weed Action Plan**
- Species Management Guides**

Project Scheduling

The schedule of proposed projects is contained in Appendix A of this document. This appendix contains activity schedules. These activity schedules represent a pool of possible projects from which implementation schedules (specific, funded projects) are developed in conjunction with funding approvals. Listings of possible projects to meet or accelerate the ten-year management activities schedules are maintained by the unit managers. These listings will routinely change as projects are implemented, or are removed from the listings for other reasons and as new projects take their place. Projects are scheduled in response to the planned outputs of goods and services and the annual budgeting process.

Consistency with Other Instruments

This Forest Management Plan serves as the single land management plan for the Wenatchee National Forest with the exception of the Alpine Lakes Management Plan, which is incorporated into this Forest Plan by reference. All other land management plans are replaced by the direction in this plan; a list of plans superseded by this plan are:

Land Management Plans

- The Chelan Unit Plan 1976
- The Kittitas Unit Plan 1979

Ranger District Multiple Use Plans

- Naches Ranger District Multiple Use Plan 11/10/61
- Tieton Ranger District Multiple Use Plan

Timber Management Plans

- Wenatchee National Forest 12/16/63 as amended
- Snoqualmie National Forest 3/3/69 as amended (Naches-Tieton Working Circle)

If direction in this Plan is found not to agree with the direction contained in the Alpine Lakes Management Plan, the Alpine Lakes Management Plan will take precedence for the Alpine Lakes Management Unit.

All outstanding and future permits, contracts, cooperative agreements and other instruments for occupancy and use of lands included in the Forest Plan will be brought into compliance with this Plan, subject to the valid existing rights of the parties involved; this will be done within three years of the date of this plan.

Budget Proposals

The Plan's scheduled projects are translated into multi-year program budget proposals that identify needed expenditures. The schedule is used for requesting and allocating the funds needed to carry out the planned management direction. Upon approval of a final budget for the Forest, the annual program of work is finalized and carried out. Accomplishment of the annual program is the incremental implementation of the management direction of the Forest Plan. Outputs and activities in individual years may be significantly different from those shown in Chapter IV depending on final budgets.

Environmental Analysis

Projects and activities permitted through this Forest Plan are subject to analysis to assure compliance with the National Environmental Policy Act (NEPA), as they are planned for implementation. If the environmental analysis for a project shows that: (1) the management area prescriptions, standards and guidelines can be complied with and (2) little or no environmental effect is expected beyond that identified and documented in the Forest Plan Final EIS, the analysis will probably result in a finding of no significant impact. An analysis file and/or a project file will be available for public review. The analysis will not necessarily be documented in the form of an environmental assessment or environmental impact statement. If the analysis shows neither the activity nor the resulting impacts to be significant, and the activity conforms to the list of categories in the Forest Service Manual, then it can result in a Categorical Exclusion.

The environmental analysis process provides a tie between implementation and monitoring of this Forest Plan. Reviews of Environmental Assessments and Environmental Impact Statements assure that the Standards and Guidelines contained in the Plan are identified in the formulation of alternatives for permitted activities (Implementation Monitoring).

C. MONITORING AND EVALUATION PROGRAM

The Monitoring Plan, Table V-1, identifies the key activities and outputs to be tracked during implementation of this plan to ensure that activities reasonably conform to the Management Area direction, and that outputs satisfy the objectives of the Plan.

It is not intended to spell out all monitoring that is occurring or may occur on the Forest in the future. Currently, many activities are being monitored to comply with administrative and legal responsibilities. However, this monitoring is not essential for the purposes mentioned above. Only those items that are essential and sensitive enough for the purposes of this plan will be addressed in the monitoring plan.

The specific objectives of the Monitoring and Evaluation Program are to determine whether:

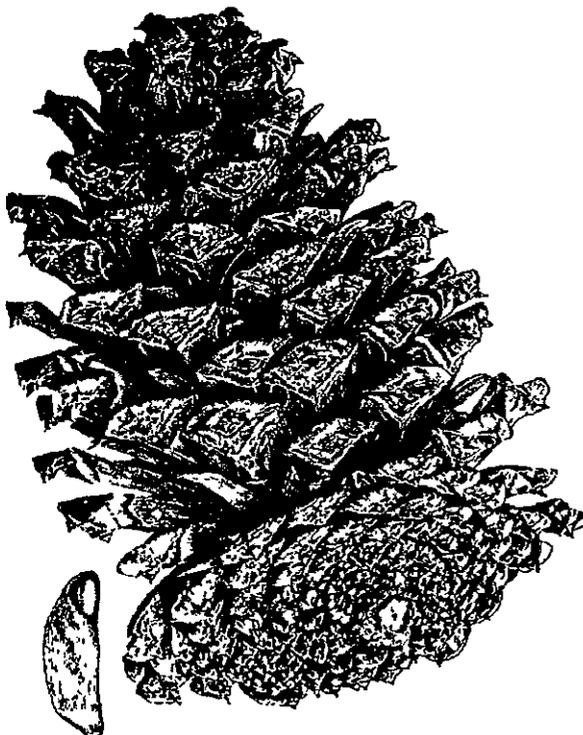
1. Planned goals and objectives are achieved.
2. Programs and activities address existing and emerging public issues and management concerns.
3. Management Standards and Guidelines are being followed.
4. Management Standards and Guidelines effectively maintain environmental quality.
5. Workforce, resource and cost assumptions used in projecting output and impacts are correct.
6. Activities on intermingled and adjacent lands managed by other agencies or land owners are affecting management of the Forest.
7. Research and information needs beyond that identified in Chapter II of this Plan is needed.
8. The Forest Plan needs to be amended or revised.
9. Intensity of monitoring is commensurate with the risks, costs and values involved in meeting Plan objectives.

Monitoring and evaluation each have a distinctly different purpose and scope. In general, monitoring is designed to gather the data necessary for evaluation. During evaluation, data provided through monitoring are analyzed and interpreted. This process will provide periodic summary data necessary to determine if implementation is within the bounds of the Forest Plan.

At intervals established in this Plan, implementation will be evaluated to determine how well objectives have been met, how accurate effects and cost projections are, and how closely management standards and guidelines have been applied. Based upon this evaluation of the monitoring results, the Interdisciplinary Team shall recommend to the Forest Supervisor such changes in management direction, revisions, or amendments to the Forest Plan as deemed necessary. The action prescribed by the Forest Supervisor will depend upon the significance of the monitoring results. The magnitude of the change from predicted conditions is an important factor, as is the risk associated with the change. Procedures prescribed by the National Environmental Policy Act will be followed by the Forest Supervisor in determining the appropriate action.

The data collected during monitoring will be evaluated using the Decision Flow Diagram shown in Figure V-1. As indicated in the diagram the results of the evaluation lead to recommendations of the following types:

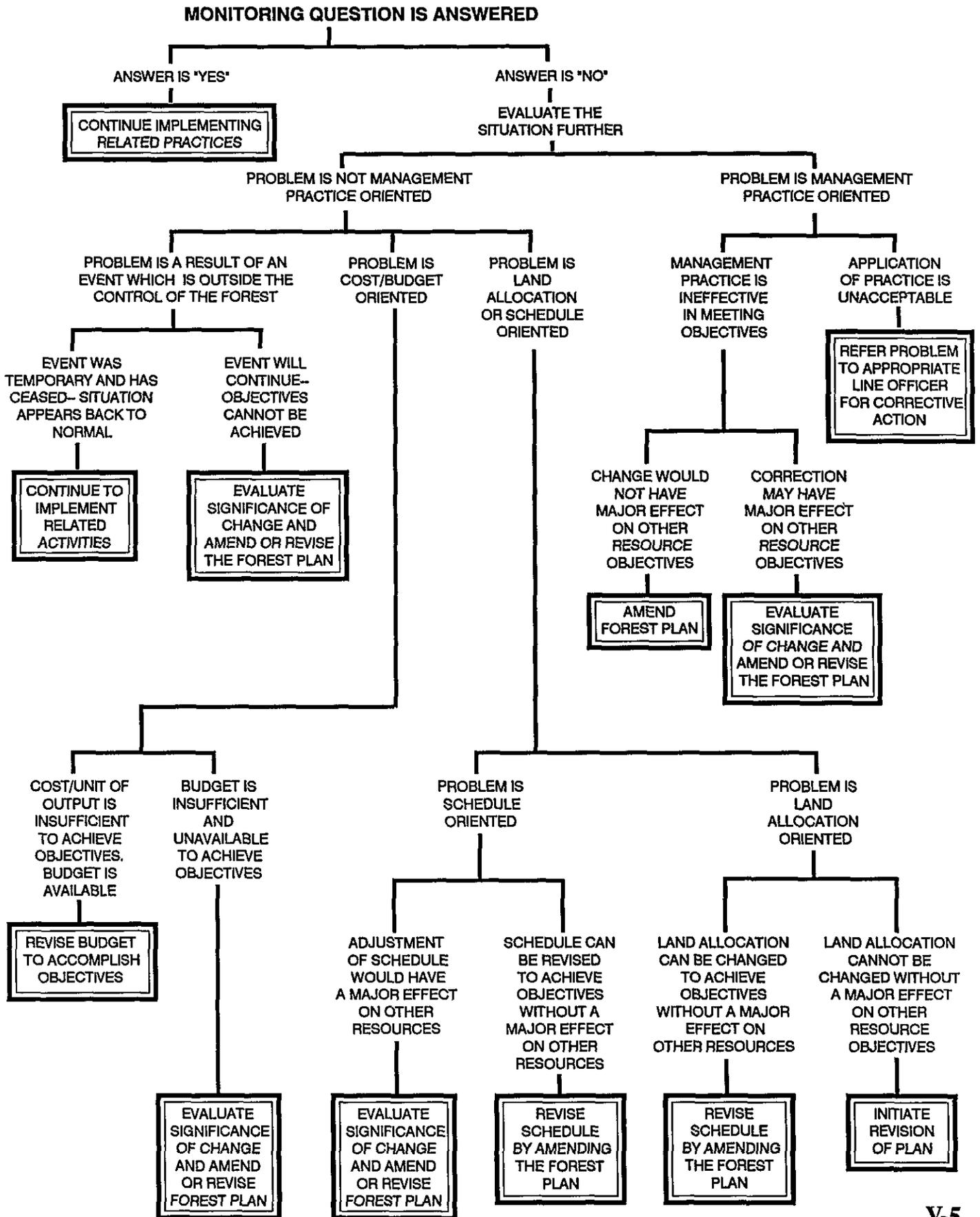
1. Referring problems to the appropriate line officer for action.
2. Modifying the management practice or direction as a plan amendment.
3. Modifying the land allocation as a plan amendment.
4. Revising the schedule of outputs.
5. Revising the cost/unit output.
6. Initiating revision of the Plan.



The document resulting from the use of the Decision Flow diagram constitutes the evaluation report. As applicable, the following will be included in each evaluation report:

1. A quantitative estimate of performance comparing outputs and services with those projected in the Forest Plan.
2. Documentation of measured effects, including any changes in productivity of the land.
3. Unit costs associated with carrying out the planned activities as compared with unit costs estimated during Forest Plan development.
4. Recommendations for changes.
5. A list of needs for evaluation of management systems and for alternative methods of management.
6. A list of additional research needed to support the management of the Forest.
7. Identification of additional monitoring needs to facilitate achievement of the monitoring goals.

**FIGURE V-1
DECISION FLOW DIAGRAM**



The Monitoring Plan consists of the following components:

1. **Monitoring Item** - Identification of the item or resource component being monitored.
2. **Actions/Effects** - A specific statement of what will be examined.
3. **Units** - Units to be measured or produced.
4. **Variability Permitted** - The variation from the expected outputs, or activities that is permitted before corrective action or further evaluation is taken.
5. **Suggested Methods** - The specific method on how the monitoring will be accomplished.
6. **Who will Monitor** - The person or persons responsible for evaluating or coordinating the monitoring activity.
7. **Frequency** - The time period showing how often the item will be monitored.
8. **Location of Data** - The file or data storage system in which the monitoring results will be kept.
9. **Annual Cost** - The cost included is the minimum anticipated cost of conducting the monitoring for that item. Amount in () indicates the amount currently being spent on the monitoring item.

Appendix F displays detailed Monitoring Worksheets which are summarized in the following Table V-1.

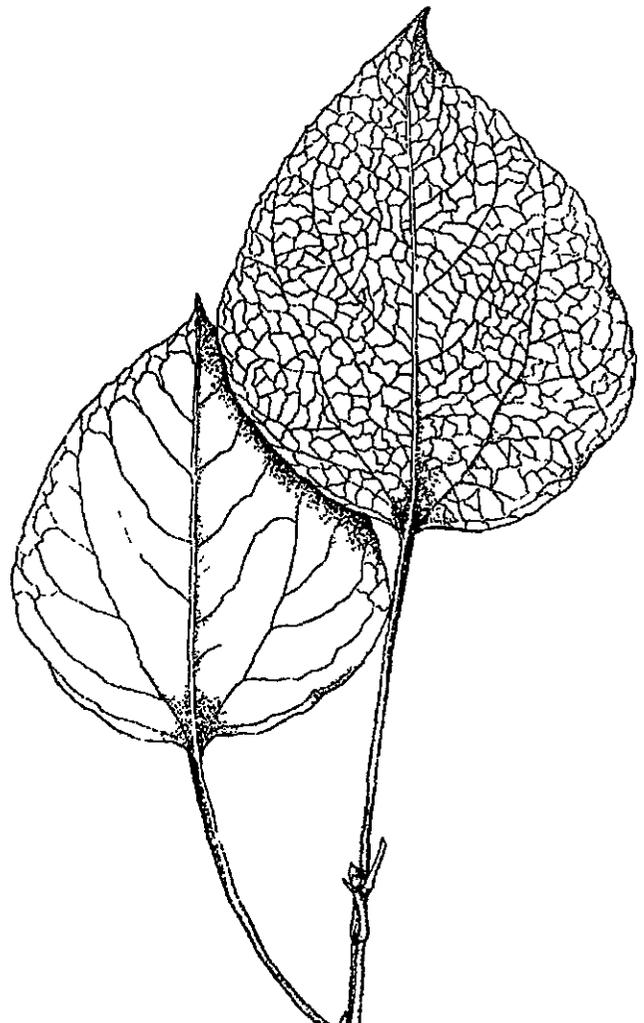


TABLE V-1
MONITORING PLAN

MONITORING ITEM	ACTIONS/EFFECTS TO BE MONITORED	UNITS	VARIABILITY PERMITTED	SUGGESTED METHODS	WHO WILL MONITOR	FREQUENCY AND REPORT	LOCATION OF DATA	ANNUAL COST
Standards & Guidelines, General	Are S&G being implemented? Do S&G achieve expectations?	All Forest Acres	No deviation See other worksheets	2 stage Mgt. Team review Comparisons w/ stage 2	Planning Staff	Annual w/ 5-yr rpt.	S O. Files	\$10,000 (5,000)
ROS Classes & Semi-prim Setting	Compliance with Prescribed ROS Direction	All Forest Acres	Change to a more dev set than Plan	Review random proj. in field	Rec. Staff, DRs.	Annual w/ 5-yr rpt	District & S O. Files	\$ 3,500 (1,000)
Forest trails, inc. ORV	Trails give variety of experiences. Use w/o impair. Trails w/ mixed use meet user expectations	Miles of Trail	Miles const. w/in 25% ann & 10% decade Features on stable to improv. trend Inc. trend of letters w/ conflict.	Project accomp rpts Review of Use Records & Public Comments	Rec. Staff, DRs Rec. Staff	Annual w/ 5-yr rpt	Project Files & RIM District & SO files	\$15,000 (7,500)
Developed Recreation Facilities	Available Facilities meet demand Site mgt serves public & protect resource	Acres in RE-1 trend	Exceeds 60% of PAOT Declining sites	Estimate use at sites Inspect rec	Rec Staff, DRs	Annual w/ 5-yr rpt	RIM Reports	\$18,000 (12,000)
Dispersed Areas	Dispersed sites meet visitor expectations Sites across ROS	All Forest Acres	Declining trend ROS not met	Field Review	Rec Staff, DRs	Annual w/ 5-yr rpt	District & S.O. Files	\$12,000 (6,000)
Wild, Scenic and Rec Rivers	Maintain suitability of recom. rivers	All WS-1 WS-2, & WS-3 River Acres	No Loss of eligibility	Project Reviews	Rec. Staff DRs	Annual w/ 5-yr rpt	Project Files	\$ 7,000 (0)
Visual Resource Objectives	Cumulative activities meet desired obj.	Total Forest Acres	Met in all	NEPS & field review Viewshed analysis	Timber, Visual Res. Staff	Annual 5-yr	EAs & files	\$14,000 (5,000)
Wilderness	Maintain LAC Standard	All Wilderness	Various depending on LAC	Field Monitoring & Photopoint	Rec. Staff	Annually w/ 5-yr rpt	District and S.O. Files	\$33,000 (10,000)
Protection of Cultural Resources	Protect characteristics Find reasonably locatable sites	Number of Sites	10% damaged Significant find during project	Field inspect Proj. Surv.	Rec.Staff	Annual Ongoing	Project Files	\$10,000 (3,000)
Rehab of Cultural sites	Rehab & stable sites	Number of Sites	Significant site damaged	Field review	Rec Staff	Annual	SO files	\$ 3,750 (0)

TABLE V-1 (continued)

MONITORING PLAN

MONITORING ITEM	ACTIONS/EFFECTS TO BE MONITORED	UNITS	VARIABILITY PERMITTED	SUGGESTED METHODS	WHO WILL MONITOR	FREQUENCY AND REPORT	LOCATION OF DATA	ANNUAL COST
Coord with Indian Tribes	Rights of Tribes protected Projects in area of concern coordinated	Total Forest Acres	No violation See other wksheet, i.e. fish, wildf	NEPA review Evaluate outputs of resource w/ Tribe	Forest Sup, DRs, Plan Staff	Annual w/ 5-yr rpt	S O Files	\$15,000 (5,000)
Sensitive Plants	Populations maintained or increasing	All Forest Acres	Downward trend	Monitor Plots	R,W,F & W Staff, DRs	As activity occurs or at 5-yr	District & S.O. Files	\$ 5,500 yr 1-5, \$ 4,800 (4,000)
Biodiversity	Diversity moving as expected Model is used	All Forest Acres	Varies by Plant/Animal Community	Diversity index NEPA review	R,W,F & W Staff DRs	Annual w/ 5-yr rpt Annual	TRI or GIS Files	\$ 3,000 (0)
Old Growth Ecosystems	Old growth retained as expected	All where OG to be retained	10%	Maintain acre by Mgt Area	D R , TM R ,W,F & W Staff	5-yr intervals	GIS	\$10,000 (3,000)
Old Growth & Mature Habitat Indicators. Spotted Owl, Pileated Woodpecker, Marten & 3-toed Woodpecker	Enough habitat to meet 1st dec (owls only) Netwrk sites occupied Areas in Plan protected	Where suit habitat found Where SOHAs & MRs are established	Forest total w/in 15% Trend stable to inc. 0% for MRs	GIS R-6 protocol for owl, field review for others	R,W,F & W Staff & DRs	Annual w/ 5-yr rpt	GIS SO & RD files GIS	\$ 4,000 (3,000) \$85,000 owls, (85,000) pileated (0) \$10,600 \$ 4,500 marten (0)
Goat	Each subpop maintained	Where habitat found	No Downward trend	State estimates	R,W,F & W Staff & DRs	Annual w/ 5-yr rpt	SO & RD files	\$ 2,000 (1,000)
Big Game Indicators (deer & elk)	Populations maintained Habitat capability maintained	Total Forest Acres	20% w/in 5-yr period 20% below optimum	State census Habitat model, GIS	R,W,F & W Staff & DRs	5-yr interval As projects occur	S O Files RD files	\$ 6,000 (0)
Primary Cavity Excavators	Is habitat retained Is habitat used Down trees provided	Total Forest Acres	Nearing amt in Plan 50% of expected Downward trend	Field review Sample transects	R,W,F & W Staff & DRs	Annual w/ 5-yr rpt	SO&RD files	\$10,000 (3,000)
Hawk & Owl Nest Sites	Protect Nests	All Forest Acres	Previously unknown nest destroyed	Field Review	R,W,F & W Staff & DRs	Ongoing w/ 5-yr rpt	District & S O Files	\$ 2,000 (1,000)
Beaver & Ruffed Grouse	Populations Maintained	EW-2 Acres	20%	Field Review & Sample Transects	R,W,F & W Staff & DRs	Annual w/ 5-yr rpt	District & S O Files	\$3,500 (0)

TABLE V-1 (continued)

MONITORING PLAN

MONITORING ITEM	ACTIONS/EFFECTS TO BE MONITORED	UNITS	VARIABILITY PERMITTED	SUGGESTED METHODS	WHO WILL MONITOR	FREQUENCY AND REPORT	LOCATION OF DATA	ANNUAL COST
Bald Eagle	Nests w/ young Nest, roost, perch sites	Where occur	2 yrs w/ no young No loss of managed sites	Interagency survey Field review	R,W,F & W Staff & DRs	Annual w/ 5-yr rpt	SO & RD files	\$ 5,000 (3,000)
Grizzly Bear	Guides followed for NCGBRA	Forest-wide	Project in noncompliance	NEPA/field review	R,W,F & W Staff	Annual	SO files	\$ 1,000 (1,000)
Peregrine Falcon	Recovery sites maintained Sites used	Where find habitat	No loss Occupancy for Wen = E Cascad	Field review Site visit	R,W,F & W Staff & DRs	Annual w/ 5-yr rpt	SO & RD files	\$ 3,000 (500)
Gray Wolf	Habitat capability increase	Forest-wide	No downward trend	GIS mapping	R,W,F & W Staff	Annual w/ 5-yr rpt	SO files	\$ 1,000 (0)
Habitat for Candidate Species (various)	Habitat trend increasing	Forest-wide	No downward trend	GIS mapping	R,W,F & W Staff	Annual w/ 5-yr rpt	SO files	\$ 6,000 (0)
Timber Offered	Acres by Harvest Method Achieve ASQ & Achieve TSPQ	All Suitable Acres & Harvest Volume (cf)	25% annual 5% decade	STARS and Cut and Sold Report	Timber Staff, DRs	Annual w/ rpt yr 5&8 each decade	District and S.O. Files	\$ 3,500 (3,500)
Timber Harvest Units	Manage Size of Openings Creat by TM Harvest	Total Sched & Non Sched Acres	0% 10%	Field Review	Timber Staff, DRs	Annual w/ 5-yr rpt	District and S.O. Files	\$ 5,000 (4,000)
Timber Harvest	Harvest at time for best growth Vol removed = vol sold	Total Harvest Acres	±5% of CMAI Removed ± 10% sold	Review Rx Cut and sold reports	Timber Staff, DRs	Annual w/ 5-yr rpt	S.O Files	\$12,000 (6,000)
Silvicult Practices	Acres of silv treatment Rx meet obj PROGNOSIS accurate	Total Sched & Non Sched Acres	10% Planned 10% acres not meet obj 10% diff growth/predict	Review Data vs Accom Reports Modified stand exam	Timber Staff & DRs Timber Staff & DRs	Annual w/ Staff When trees are saps & yr 8 each decade	S O Files 5-yr rpt	\$20,000 (6,000)
Reforestation	Stock w/in time # & species as Rx	All acres harvested	10% over 3 yr w/in 10% of Rx	Rpt for cut & reforest Field surveys	Timber Staff, DRs	Annual Yrs 1 & 3 after plant	District Files	\$100,000 (100,000)
Non Suit. TM Lands	Unsuit lands in Plan now suit Suit notsuit accurate	All areas where harv OK	± 10% Error	Field Review Projects & Stand Exams, NEPA	Timber Staff, DRs	Annual w/ rpt yr 10	District and S.O. File, GIS	\$12,000 (0)

TABLE V-1 (continued)

MONITORING PLAN

MONITORING ITEM	ACTIONS/EFFECTS TO BE MONITORED	UNITS	VARIABILITY PERMITTED	SUGGESTED METHODS	WHO WILL MONITOR	FREQUENCY AND REPORT	LOCATION OF DATA	ANNUAL COST
Soil Productivity	Assure maint. of soil productivity	All Forest Acres	20% of area disturbed	Field Review and Surveys	R,W,F & W Staff	Variable for each method	S O. Files	\$19,500 (0)
Fish Population Trends	Trends stable to improving	Fish Numbers	No downward trends	# from WDW & WDG, trends from index	R,W,F & W Staff	Annual w/ 5-yr rpt	District & S.O Files	\$ 6,000 (1,000)
Riparian Water & Fish	Achieve expected conditions	EW-2 Acres	Nonattainment of S&G	Field Review of Projects and EA'S	R,W,F & W Staff	Annual w/ 5-yr rpt	District & S O Files	\$26,000 (5,000)
Cumulative Effects on Watershed & Fish	Activities (FS, & other) scheduled to min cum. effects	National Forest & Other Acres	Effects outside of predicted	Evaluation of Projects & Monitoring	R,W,F & W Staff	Annual w/ 5-yr rpt	District and S.O. Files	\$ 6,000 (1,000)
Watershed Condition	What are long-term trends	All Forest Acres	Various	Various	R,W,F & W Staff	Annual w/ 5-yr rpt start yr 10	S O Files	\$28,500-\$53,500 (0)
Range Outputs	AUMs being achieved	Where graze allowed	10% change From permit	Review rpt actual use	R,W,F & W Staff	Annual w/ 5-yr rpt	Annual use report	\$ 3,000 (2,000)
Forage Utilization	Achieve forage utilization	Where graze allowed	10% increase over Rx	Field review 30% allots	R,W,F & W Staff	Annual w/ 5-yr rpt	Allotment Files	\$ 5,000 (5,000)
Range Forage Condition	Trend stable to improving Unsatisfactory areas improve	Where graze allowed	10% increase in down trend No move to up trend	Transects, photo points, field obs	R,W,F & W Staff	Annual w/ 5-yr rpt	Allotment Files	\$20,000 (10,000)
Range Improvements	Maint. of imp. for intended use	Where graze allowed	10% not functioning	Allotment inspection records	R,W,F & W Staff	Annual w/ 5-yr rpt	Allotment Files	\$ 6,000 (3,000)
Road Miles & Maint.	Trans system serves use Miles const. as planned	All areas where rds OK	No variation +25% annual, +10% decade	ID field review STARS, TSPIRS, etc	Eng. Staff, DRs	Annual w/ 5-yr rpt	District & S.O. Files	\$ 8,000 (6,000)
Insect and Disease Control	I&D below damaging level	Forest-wide	Increase since last survey	Review maps & field survey	Timber Staff	5 Years 10 Years	District and S.O. Files	\$ 5,000 (1,000)
Fire Management	Implemented strategies protect OK Costs in line w/ values	Forest-wide	15% decr outputs due to fire 20% over in 2 years	Compare plan w/ outputs Review costs w/ loss	Fire Staff, DRs	Annual w/ 5-yr rpt	District & S.O. Files	\$ 7,000 (3,500)
Prescribed Fire Use	Acres treated meet expectation Fuel loads not over natural	Forest-wide	+25% annual, 10% decade +25% natural	Review plans Field inventory	Fire Staff DRs	Annual w/ 5-yr rpt	District and S.O Files	\$30,000 (10,000)

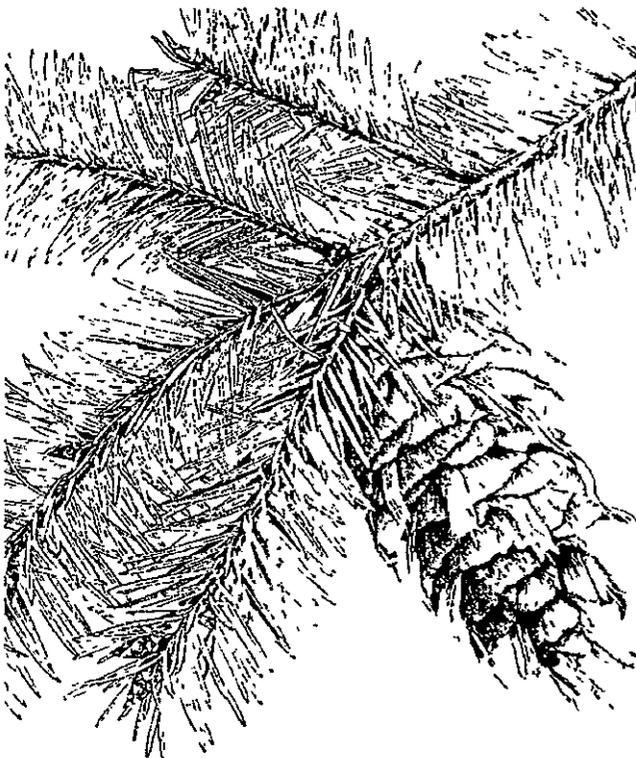
TABLE V-1 (continued)

MONITORING PLAN

MONITORING ITEM	ACTIONS/EFFECTS TO BE MONITORED	UNITS	VARIABILITY PERMITTED	SUGGESTED METHODS	WHO WILL MONITOR	FREQUENCY AND REPORT	LOCATION OF DATA	ANNUAL COST
Air Resource Management	Air impacts considered Comply w/ Clean Air Act	Forest-wide	Project does not allow Violation	Review EA'S Review smoke mgt document	Fire Staff, DRs	Annual w/ 5-yr rpt	District and S O Files	\$10,000 (3,000)
Community Effects	Changes in local income	Dollars	± 25% Annual	U.S. Census State Publications, County & Local Agency Reports	Planning Staff	Annual w/ 5 yr Report	S O. Files	\$5,000 (2,500)
	Changes in local population	Persons	Subjective	(Same as above)	Planning Staff	Annual w/ 5 yr Report	S O/ Files	\$5,000 (2,500)
	Changes in local employment patterns	Persons by industry or occupation	Subjective	(Same as above)	Planning Staff	Annual w/ 5 yr Report	S.O.Files	\$5,000 (2,500)
	Changes in Payments to Counties	Dollars	± 25% Annual	Review Payments to Counties Reports	Planning Staff	Annual w/ 5 yr Report	S.O.Files	\$5,000 (2,500)
	Changes in lifestyles, attitudes, beliefs in values	Various	Subjective	Interviews	Planning Staff	Annual w/ 5 yr Report	S O Files	\$5,000 (2,500)
	Changes in Forest contribution to area forest products industries	MMCF /yr percent industry distribution	Subjective	Tracking of raw material flow to mills; industry mix	Planning Staff	Annual w/ 5 yr Report	S.O. Files	\$5,000 (2,500)
Resource Budgets	Budgets OK for achieve outputs	Forest-wide	± 20% of outputs	Compare plan w/ actual	Planning Staff	Annual w/ rpt 3,5,7	S.O Files	\$ 3,500 (0)
Costs and Values	Costs as in Plan	Forest-wide	±25% Var. from planned	Review of PAMARS	Planning Staff	Annual w/ 5-yr rpt	S.O. Files	\$ 3,500 (0)
	Current values as in Plan			Various				

D. AMENDMENT AND REVISION

The Forest Plan incorporates legal mandates, professional judgement and the public's stated concerns into a future vision of the Forest. It charts a path for getting there by developing management goals and objectives and translating them into management direction in the form of standards and guidelines for management areas on the Forest. National Forest planning is a dynamic process, and the products -- Forest Plans -- are similarly dynamic. Forest Plans can and should be modified if conditions warrant. As management goals are applied on the ground or as new information is learned about resources, the Plan's goals and objectives, or activities the goals generate, may no longer be appropriate. In such instances, activities may be tailored to fit the resource, or planning objectives as stated in the Plan may be amended. Plans do not apply direction in site-specific management activities. It would be unrealistic to try to identify, analyze and schedule the numerous diverse projects or activities that occur on a National Forest. Instead, this type of site-specific planning occurs at the project-level planning stage, such as allotment management planning.



The Forest Supervisor may amend the Forest Plan. Based on an analysis of the objectives, standards, and other contents of the Forest Plan, the Forest Supervisor shall determine whether a proposed amendment would result in a significant change in the Plan. If the change resulting from the proposed amendment is determined to be significant, the Forest Supervisor shall follow the same procedure as that required for development and approval of a Forest Plan. If the change resulting from the amendment is determined not to be significant for the purposes of the planning process, the Forest Supervisor may implement the amendment following appropriate public notification and satisfactory completion of NEPA procedures.

The Forest Plan shall ordinarily be revised on a ten-year cycle or at least every 15 years. It also may be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the Plan have changed significantly or when changes in Resource Planning Act policies, goals, or objectives would have a significant effect on Forest level programs. In the monitoring and evaluation process, the interdisciplinary team may recommend a revision of the Forest Plan at any time. Revisions are not effective until considered and approved in accordance with the requirements for the development and approval of the Forest Plan. The Forest Supervisor shall review the conditions on the land covered by the Plan at least every five years to determine whether conditions or demands of the public have changed significantly.

GLOSSARY



ACRE EQUIVALENT - When applied to habitat improvement or improvement structures this term reflects overall habitat benefits derived. It reflects the zone of influence of the habitat improvement for the target species. For example, a single water development for upland game birds occupies very little space but has an acre equivalent of 160 because it serves 160 acres of bird habitat. A single water structure for big game has a value of 640 because it has a larger zone of influence for the more mobile big game animals.

ACRE-FOOT (AF) - A water measurement term equal to the amount of water that would cover an area of one acre to a depth of one foot (43,560 cubic feet).

ACTIVITY - Actions, measures, or treatments undertaken which directly or indirectly produce, enhance, or maintain forest outputs and rangeland outputs, or achieve administrative and environmental quality objectives. Forest Service activity definitions, codes, and units of measure are contained in the Management Information Handbook (FSM 1309.11).

AIRSHED - A geographical area that, because of topography, meteorology, and climate, shares the same air

ALLOCATED FUNDS - Funds from sources other than Congressionally appropriated funds. Allocated funds include the Senior Community Service Program, brush disposal (BD), Knutson-Vandenberg cooperative deposits (K-V), and State of Washington funds for trails from the Interagency Committee for Outdoor Recreation

ALLOWABLE SALE QUANTITY (ASQ) - The quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity." (36 CFR 219.3)

ALTERNATIVE - One of several policies, plans, or projects proposed for decision making

AMENITY - An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses. Amenity value is typically used in land use planning to describe those resource properties for which market values (or proxy values) are not or cannot be established.

AMS - An abbreviation of Analysis of the Management Situation.

ANADROMOUS FISH - Those species of fish that mature in the ocean and migrate into streams to spawn. Salmon, steelhead, and shad are examples.

ANALYSIS AREA - A delineated area of land subject to analysis of (1) responses to proposed management practices in the production, enhancement, or maintenance of forest and rangeland outputs and environmental quality objectives and (2) economic and social impacts.

ANALYSIS OF THE MANAGEMENT SITUATION (AMS) - A determination of the ability of the planning area to supply goods and services in response to society's demand for those goods and services.

ANIMAL UNIT MONTH (AUM) - The quantity of forage required by one mature cow (1,000 pounds), or the equivalent for one month, based upon average daily forage consumption of 26 pounds of dry matter per day (800 pounds/month).

APPROPRIATE SUPPRESSION RESPONSE - The planned strategy for suppression action (in terms of kind, amount, and timing) on a wildfire which most efficiently meets fire management direction under current and expected burning conditions. It may range in objective from prompt control to one of containment or confinement.

APPROPRIATED FUNDS - Funds from the U. S. Treasury, which Congress has authorized the Forest Service to obligate. This is the sum of operational, capital investment, and backlog costs.

AQUATIC ECOSYSTEMS - Streams, channels, lakes, marshes or ponds, and the plant and animal communities they support.

ASQ - An abbreviation of Allowable Sale Quantity.

AREA OF SPECIES MANAGEMENT GUIDES - A contiguous area where management direction is the same.

ARTERIAL ROADS - See Roads.

AUM'S - An abbreviation of Animal Unit Months.



BACKGROUND - In visual management terminology, refers to the visible terrain beyond the foreground and middleground where individual trees are not visible but are blended into the total fabric of the forest stand (also see Foreground and Middleground).

BASAL AREA - The cross-sectional area of a stand of trees measured at breast height. The area is expressed in square feet.

BASE TIMBER SALE SCHEDULE - A Timber Sale Schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade, and this planned sale and harvest for any decade is not greater than long-term sustained yield capacity. (36 CFR 219.3).

BASIN - The largest regional hydrologic unit for the Wenatchee National Forest (Columbia River Basin)

BENCHMARK LEVELS - The outputs and costs for managing the Forest at certain levels of management so that a comparison could be made on costs, values, and effects.

BENEFIT - (Value) Inclusive terms used to quantify the results of a proposed activity, program or project expressed in monetary or nonmonetary terms.

BENEFIT-COST RATIO - Measure of economic efficiency computed by dividing total discounted primary benefits by total discounted economic costs.

BEST MANAGEMENT PRACTICES (BMP's) - A practice or combination of practices determined by the state that are the most effective and practical (including technological, economic and institutional considerations) means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

BF - An abbreviation of board feet.

BIG GAME - Those species of large mammals normally managed for sport hunting.

BIOLOGICAL CONTROL - A method to control wildlife or insect populations and noxious weeds or tree diseases through the use of applied biology.

BIOLOGICAL GROWTH POTENTIAL - The average net growth attainable in a fully stocked natural forest stand. (36 CFR 2193)

BIOLOGICAL POTENTIAL - The maximum production of a selected organism that can be attained under optimum management.

BIOMASS - The total quantity (at a given time) of living organisms of one or more species per unit of space (species biomass), or the total quantity of all the species in a biotic community (community biomass).

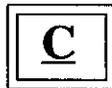
BOARD FOOT - The amount of wood equivalent to a piece of wood one foot by one foot by one inch thick.

BRITISH THERMAL UNIT (BTU) - The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.

BROADCAST BURN - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for a reduction of fuel hazard or as a silvicultural treatment, or both.

BRUSH - A growth of shrubs or small trees usually of a type undesirable to livestock or timber management.

BUREAU OF LAND MANAGEMENT (BLM) - An agency within the Department of the Interior with land management responsibility for the Public Domain lands.



CAPABILITY - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease. (36 CFR 219.3)

CEQ - An abbreviation of Council on Environmental Quality.

CF - An abbreviation of cubic feet.

CHARGEABLE TIMBER VOLUME - The timber removed from regulated forest land that contributes to meeting the allowable sale quantity.

CLASS I (II & III) STREAMS - See Stream Class.

CLEARCUTTING - The harvesting in one cut of all trees in an area for the purpose of creating a new, even-aged stand. The area harvested may be a patch, stand, or strip large enough to be mapped or recorded as a separate age class in planning for sustained yield.

CLIMAX - The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition.

CLIMAX SPECIES - Those species that dominate the forest stand in either numbers per unit area or biomass at climax.

CODE OF FEDERAL REGULATIONS (CFR) - The listing of various regulations pertaining to management and administration of the National Forest

COLLECTOR ROAD SYSTEM - See Roads.

COMMERCIAL FOREST LAND (CFL) - Forest land that is producing or is capable of producing crops of industrial wood and (a) has not been withdrawn from timber management by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils, productivity, or watershed conditions; and (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking of young trees can be attained within 5 years after final harvest.

COMMERCIAL THINNING - Cutting by mean of sales of products (poles, posts, pulpwood, etc.) in immature forest stands to improve the quality and growth of the remaining stand.

COMMODITY - A transportable resource product with commercial value; all resource products which are articles of commerce.

COMPACTION - The packing together of soil particles by forces at the soil surface, resulting in increased soil density.

CONCERN - A point, matter, or question raised by management that must be addressed in the planning process.

CONFINE - To restrict the fire spread within a predetermined area principally by use of natural or preconstructed barriers or environmental conditions. Suppression action may be minimal and limited to surveillance under appropriate conditions.

CONGRESSIONALLY CLASSIFIED AND DESIGNATED AREAS - Areas that require Congressional enactment for their establishment, such as National Wilderness Areas, National Wild, Scenic, and Recreational Rivers, and National Recreation Areas.

CONIFER - A group of cone-bearing trees, mostly evergreen, such as pine, spruce, fir, etc.

CONSUMPTIVE USE - Those uses of a resource that reduce its supply.

CONTAIN - To surround a fire, and any spot fires therefrom, with control line as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions. The normal suppression tactic is indirect attack, allowing the fire to burn to human-made or natural barriers with little or no mop-up.

CONTROL - To complete the control line around a fire and around any spot fires therefrom and any interior islands of vegetation to be saved. Firefighters will also burn out any unburned area adjacent to the fire side of the control line, and cool down all hot spots that are immediate threats to the control line until the line can reasonably be expected to hold under foreseeable conditions. The normal tactic is direct attack on the fire, if possible, and mop-up to extinguish all fire.

CORE AREA - (As related to spotted owl.) An area encompassing at least 300 contiguous acres of old growth forest suitable for nesting and reproduction. The area consists of a portion of the territory required by a pair of owls, the nest site, and principal roost areas.

CORRIDOR - A linear strip of land identified for the present or future location of transportation or utility rights-of-way. (36 CFR 219.3)

COST EFFICIENCY - The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values but are achieved at specified levels in the least cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates of return may be appropriate. (36 CFR 219.3)

COST, CAPITAL INVESTMENT - The cost of man made structures, facilities, or improvements in natural resources used as inputs in production processes to produce outputs over one or more planning periods.

COST-EFFECTIVE - Achieving specified outputs or objectives under given conditions for the least cost.

COST, FIXED - A cost that is committed for the time horizon of planning or the decision being considered. Fixed costs include fixed ownership requirements, fixed protection, short-term maintenance and long-term planning and inventory costs.

COST, OPERATIONAL - Costs associated with administering and maintaining National Forest facilities and resource programs. This includes appropriated funds only.

COST, VARIABLE - A cost that varies with the level of controlled outputs in the time horizon covered by the planning period or decisions being considered.

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) - An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters

COVER/FORAGE RATIO - The mixture of cover and forage areas on a unit of land expressed as a ratio (e.g. deer summer range goal may be a 60/40 ratio).

CREATED OPENING - Created openings are openings in the Forest created by the silvicultural practices of shelterwood regeneration cutting at the final harvest, clearcutting, seed tree cutting, or group selection cutting.

CRITICAL HABITAT - For threatened or endangered species, the specific areas within the geographical area occupied by the species (at the time it is listed, in accordance with provisions of Section 4 of the Endangered Species Act) on which are found those physical or biological features essential to the conservation of the species. This habitat may require special management considerations or protecting. Protection may also be required for additional habitat areas outside the geographical area occupied by the species at the time it is listed based upon a determination of the Secretary of the Interior that such areas are essential for the conservation of the species.

CRITICAL MINERALS - Minerals essential to the national defense, but whose procurement, while difficult in case of war, is less serious than those of Strategic Minerals.

CUBIC FOOT (CF) - A unit of measure with the dimensions of one foot by one foot by one foot thick

CULMINATION OF MEAN ANNUAL INCREMENT (CMAI) - The point where the mean annual growth of a timber stand ceases to increase prior to decline. Mean annual increment is expressed in cubic feet measure and is based upon expected growth according to the management intensities and utilization standards assumed in accordance with 36 CFR 219.16.

CULTURAL RESOURCES - Any site, structure, or object, or group of sites, structures, or objects that have been made, modified, or used by man in the past.

CUMULATIVE EFFECTS - The combined effects of two or more management activities. The effects may be related to the number of individual activities, or to the number of repeated activities on the same piece of ground. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.



DECISION CRITERIA - Essentially the rules or standards used to evaluate alternatives. They are measurements or indicators that are designed to assist a decision maker in identifying a preferred choice from an array of possible alternatives.

DEFERRED ROTATION - Any grazing system which provides for a systematic rotation of the delay or discontinuance of livestock grazing on an area to provide for plant reproduction establishment or restoration of vigor

DEMAND - The amount of output that users are willing to take at specific price, time period, and conditions of sale.

DEPARTURE - A schedule which deviates from the principle of nondeclining flow of timber harvest by exhibiting an increase in cutting levels above sustainable levels followed by a planned decrease below sustainable levels in the timber sale and harvest schedule at some time in the future.

DESIGNATED AREA (AIR QUALITY) - Those areas delineated in the Oregon and Washington Smoke Management Plans as principal population centers of air quality concern.

DESTINATION RESORT - A recreation resort designed for multi-day use in contrast to single day use

DEVELOPED RECREATION SITE - Distinctly defined area where facilities are provided for concentrated public use, e.g. campgrounds, picnic areas, boating sites, and ski areas.

DIAMETER BREAST HIGH (DBH) - The diameter of a standing tree at a point 4 feet, 6 inches from ground level.

DISCOUNT RATE - An interest rate that represents the cost or time value of money in determining the present value of future costs and benefits.

DISCOUNT RATE, REAL - A discount rate adjusted to exclude the effects of inflation

DISCOUNTING - An adjustment, using a discount rate, for the value of money over time so that costs and benefits occurring in the future are reduced to a common time, usually the present, for comparison.

DISPERSED RECREATION - Outdoor recreation that takes place outside developed recreation sites or the Wilderness.

DIVERSITY - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan. (36 CFR 219.3)

DRAINAGE PATTERN - The configuration or arrangement of streams within a drainage basin or other area.



ECONOMIC EFFICIENCY - The usefulness of inputs (costs) to produce outputs (benefits) and effects when all costs and benefits that can be identified and valued are included in the computations. Economic efficiency is usually measured using present net value, though use of benefit/cost ratios and rates of return may sometimes be appropriate

ECONOMIC IMPACT - The positive or negative change in economic conditions, including distribution and stability of employment and income in affected local, regional, and national economies, which directly or indirectly results from an activity, project or program.

ECOSYSTEM - An interacting system of organisms considered together with their environment; for example, marsh, watershed, and lake ecosystems.

EDGE - The boundary between two or more elements of the environment; e.g. field and woodland.

EDGE CONTRAST - A qualitative measure of the difference in structure of two adjacent vegetated areas; for example, low, medium, or high edge contrast.

EFFECTS - Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include population growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

The terms "Effects" and "Impacts" as used in this statement are synonymous. Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems),

aesthetic quality, historic, cultural, economic, social, or health related, whether direct, indirect, or cumulative Effects resulting from actions may have both beneficial and detrimental aspects, even if on balance the agency believes that the overall effects will be beneficial (40 CFR 1508 8).

ENDANGERED SPECIES - Any species of animal or plant which is in danger of extinction throughout all or a significant portion of its range. An endangered species must be designated by the Secretary of Interior as endangered in accordance with the Endangered Species Act of 1973.

ENVIRONMENTAL ANALYSIS - An analysis of alternative actions and their predictable short and long-term environmental effects, incorporating the physical, biological economic, social, and environmental design factors and their interactions.

ENVIRONMENTAL ASSESSMENT - A concise public document required by the regulations implementing the National Environmental Policy Act.

EROSION - The wearing away or detachment of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitation creep.

EROSION (ACCELERATED) - Erosion much more rapid than normal, primarily as a result of the influence or the activities of man.

EROSION (NATURAL) - Wearing away of the earth's surface by water, ice, or other natural agents under natural environmental conditions of climate, vegetation, etc., undisturbed by human activity.

ESCAPED FIRE - A fire which has exceeded, or is anticipated to exceed, preplanned initial action capabilities or the fire management direction

ESCAPE COVER - Usually vegetation dense enough to hide an animal; used by animals to escape from potential enemies.

ESSENTIAL HABITAT - Areas designated by the Forest Service Regional Forester that possess the same characteristics of critical habitat as those designated by the Secretary of the Interior or Commerce

EVEN-AGED MANAGEMENT - The application of a combination of actions that results in the creation of forest stands composed of trees of essentially the same age Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes throughout the forest area). The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained in a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands. (36 CFR 219.3)

EVEN-FLOW - Maintaining a relatively constant supply of timber from decade to decade.

EXCLUSION AREA - An area having a statutory prohibition to rights-of-way for linear facilities or corridor designation.

EXPECTED BURNED ACREAGE - The expected annual number of acres burned by fire size class and intensity level for a given program option or budget level.

EXTENDED SHELTERWOOD - This is a variation of the shelterwood system design to provide for other resources such as wildlife or scenery considerations. The term extended is used to denote the retention of the old stand for a longer period than is necessary or, in many cases, desirable for maximum growth of the new stand.

EXTIRPATION - Extermination.



FINAL REMOVAL - The removal of the last seed bearers or shelter trees after regeneration is established under a shelterwood system.

FIRE MANAGEMENT ANALYSIS ZONE - The geographically delineated areas into which the planning unit is divided for the purpose of fire management analysis. The delineation is based upon common fire-behavior characteristics which is the “corner stone” for fire planning and evaluation of fire effects.

FIRE MANAGEMENT DIRECTION - The direction provided by an interdisciplinary team for each separate management area on the Forest. It includes guides by management area for long-term maximum burn acreages, specifying fire size and intensity, which would not adversely affect attainment of resource targets or outputs. In addition, it provides guidelines on desired residue profiles and the use of fire to meet resource prescriptions.

FIRE PROGRAM OPTION - A given program mix funded at a given program level. Options are developed in response to specific fire management direction established for the Forest Plan. The objective is to identify the most cost-efficient option meeting resource protection and management objectives.

FLOOD PLAINS - Lowland and relatively flat areas adjoining inland and coastal water including, as a minimum, that area subject to one percent or greater chance of flooding in any given year

FORAGE - All browse and non woody plants available to livestock or wildlife for grazing or harvestable for feed.

FORB - Any herb other than grass.

FORDRY - That forested ecotype where the climax conifer species is Douglas-fir or ponderosa pine.

FOREGROUND - A term used in visual (scenery) management to describe the stand of trees immediately adjacent to a high-value scenic area, recreation facility, or forest highway (see “Background”, “Middleground”).

FOREST LAND - Land at least 10 percent occupied by forest trees of any size or formerly having had such cover and not currently developed for non-forest use. Lands developed for non-forest use include areas devoted to crops, improved pasture, residential or administrative areas, improved roads of any width and adjoining road clearing and powerline clearing of any width (36 CFR 219.3)

FOREST AND RANGELAND RENEWABLE RESOURCES PLANNING ACT (RPA) 1974 - An act of Congress requiring the preparation of a program for the management of the National Forest’s renewable resources and preparation of land and resource management plans for units of the National Forest System. It also requires a continuing inventory of all National Forest System lands and renewable resources.

FOREST-WIDE STANDARD - A principle requiring a specific level of attainment; a rule to measure against. The Forest-wide Standards apply to all areas of the Forest regardless of the other prescriptions applied.

FORPLAN - A linear programming system used for developing and analyzing Forest Planning Alternatives.

FORWET - That forested ecotype where conifer trees other than Douglas-fir or ponderosa pine are climax species over time. Characterized by more available moisture than the forested dry (FORDRY) zone.

FREE-TO-GROW - A term used by silviculturists to indicate that trees are free of growth restraints, the most common of which is competing overtopping vegetation.

FUELBREAK - Any natural or constructed barrier utilized to segregate, stop, or control the spread of fire

FUELS - Any material that will carry and sustain a forest fire, primarily natural materials, both live and dead.

FUEL TREATMENT - The rearrangement or disposal of natural or activity fuels to reduce the fire hazard

G

GAME - Wildlife that are hunted for sport and regulated by State Game regulations.

GENERAL DISTRIBUTION - The geographic area presently occupied, often on a seasonal basis, by a species within the planning area. Distribution is not to be confused with present occupancy of specific habitat(s). Resource management activities will create changes in habitat which will force local shifts in occupancy.

GENERAL FOREST (GF) - The portion of the Forest where timber management and other consumptive uses are emphasized.

GENETIC INTEGRITY - Refers to a normal healthy genetic pool (foundation) within a biological population to provide for long-term maintenance and survival of the species. Of specific concern in management direction is the prevention of loss of genetic variance (heterozygosity) and the avoidance of inbreeding depression, an important part of a given population's genetic integrity within the gene pool.

GOAL - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principle basis from which objectives are developed. (36 CFR 219.3)

GOODS AND SERVICES - The various outputs, including on-site uses, produced from forest and rangeland resources. (36 CFR 219.3)

GRADIENT - Change of elevation, velocity, pressure or other characteristics per unit length of slope.

GROUP SELECTION CUTTING - Removal of tree groups ranging in size from a fraction of an acre up to about 2 acres in area that is smaller than the minimum feasible for even-aged management of a single stand.

GUIDELINE - An indication or outline of policy or conduct; i.e. any issuance that assists in determining the course of direction to be taken in any planned action to accomplish a specific objective.

GULLY - A channel or miniature valley cut by concentrated runoff but through which water commonly flows only during and immediately after heavy rains or during the melting of snow.

GULLY EROSION - The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to considerable depths, ranging from one to two feet to as much as 75 to 100 feet.

H

HABITAT - The place where a plant or animal naturally or normally lives and grows.

HABITAT CAPABILITY - The estimated ability of an area, given existing or predicted habitat conditions, to support a wildlife, fish or plant population. It is measured in terms of potential population numbers.

HARVEST CUTTING METHOD - A combination of interrelated actions whereby forests are tended, harvested, and replaced. The combination of management practices used to manipulate the vegetation in forests. Harvest cutting methods are classified as even-aged and uneven-aged.

HEAVING - The partial lifting of plants out of the ground, frequently breaking their roots, as a result of freezing and thawing of the surface soil during the winter.

HIDING COVER - Vegetation capable of hiding 90 percent of a standing deer or elk from the view of a human at a distance of 200 feet.

HIGH QUALITY HABITAT - Habitat which completely satisfies a species existence requirement

HORIZONTAL DIVERSITY - The distribution and abundance of plant and animal communities or successional stages across an area of land; the greater the number of communities, the higher the degree of horizontal diversity. This concept is close to, but not exactly the same as, "even-aged management," although each may influence the other. Application of even-aged management, for example, can be designed to accomplish horizontal diversity objectives.

HUMAN RESOURCE PROGRAMS - Providing human and natural resource benefits through administering and hosting programs in work, training, and education for the unemployed, the underemployed, the elderly, the young and others with special needs.

HYDRAULIC GRADIENT - The slope of the hydraulic grade line. The slope of the free surface of water flowing in an open channel



INDICATOR SPECIES - A wildlife management scheme in which the welfare of a selected species is presumed to indicate the welfare of other species. The condition of the selected species can be used to assess the impacts of management actions on a particular area.

INITIAL ACTION - The prompt, preplanned response to a wildfire.

INTEGRATED PEST MANAGEMENT - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resources values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides. A basic principle in the choice of strategy is that it be ecologically compatible or acceptable (36 CFR 219.3)

INTEGRATED RESOURCE MANAGEMENT - A management strategy which emphasizes no resource element to the exclusion or violation of the minimum legal standards of others.

INTENSIVE FOREST MANAGEMENT - A high investment level of timber management that includes regeneration with genetically improved seedling stock, control of competing vegetation, fill-in planting, precommercial thinning as needed for stocking control, and one or more commercial thinnings.

INTERDISCIPLINARY TEAM (ID TEAM) - A team of people that collectively represent several disciplines and whose duty it is to coordinate and integrate the planning activities

INTERMITTENT STREAM - A stream that runs water in most months, but does not run water during dry seasons of most years.

INVENTORIED ROADLESS AREA - Areas of undeveloped Federal land, greater than 5,000 acres in size, within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use. Exceptions are those areas less than 5,000 acres manageable in their natural condition, contiguous to existing wilderness, or are of issue to the public.

IRRETRIEVABLE - Applies to losses of production, harvest, or use of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

IRREVERSIBLE - Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long time periods. Irreversible also includes loss of future options.

ISSUE - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

K

KNUTSON-VANDENBERG ACT (KV) - Legislation authorizing the collection of money from timber sale receipts for reforestation, stand improvements, and other resource improvement or mitigation projects on timber sale areas.

KV - An abbreviation of Knutson-Vandenberg.

L

LAND ALLOCATION - The assignment of a management emphasis to particular land areas with the purpose of achieving the goals and objectives of that alternative.

LANDINGS - Those designated areas within a timber sale where logs are temporarily stored before transport to a mill.

LANDTYPE - A portion of the landscape resulting from geomorphic and climatic processes with defined characteristics having predictable soil, hydrologic, engineering productivity, and other behavior.

LEASABLE MINERALS - Coal, oil, gas, phosphate, sodium, potassium, oil shale, sulphur, geothermal steam
Also includes other minerals on acquired National Forest lands

LIMITING HABITAT - Habitat which restricts the distribution, numbers, or condition of an organism

LOCATABLE MINERALS - Generally includes those hardrock minerals which are mined and processed for the recovery of metals, but may also include certain non-metallic minerals and uncommon varieties of mineral materials.

LONG-TERM SUSTAINED YIELD TIMBER CAPACITY - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives. (36 CFR 219.3)

M

M - Thousand

MANAGEMENT AREA - An area with similar management objectives and a common management prescription

MANAGEMENT CONCERN - An issue, problem, or a condition which constrains the range of management practices identified by the Forest Service in the planning process. (36 CFR 219.3)

MANAGEMENT DIRECTION - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them (36 CFR 219.3)

MANAGEMENT INTENSITY - The management practice or combination of management practices and associated costs designed to obtain different levels of goods and services. (36 CFR 219.3)

MANAGEMENT PRACTICE - A specific activity, measure, course of action, or treatment. (36 CFR 219.3)

MANAGEMENT PRESCRIPTION - Management practices and intensity of management selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives. (36 CFR 219.3)

MANAGEMENT REQUIREMENT (MR) - Minimum standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, and soil and water resources, to be met in accomplishing National Forest System goals and objectives.

MARGINAL TIMBER COMPONENT - Timber on which the income just equals or could just equal the costs of production under a given form of management.

MARKET RESOURCES - Products derived from renewable and nonrenewable resources that have a well-established market value; for example, forage, timber, water, and minerals.

MARKET VALUE - The unit price of an output normally exchanged in a market after at least one stage of production, expressed in terms of what people are willing to pay

MASS MOVEMENT - A general term for any of the variety of processes by which large masses of earth material are moved down slope by gravitational forces, either slowly or quickly.

MATURE TIMBER - Trees that have attained full development, particularly in height, and are in full seed production.

MAXIMUM MODIFICATION - A visual quality objective meaning man's activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background.

MBF - Thousand board feet. A measure of wood volume

MCF - Thousand cubic feet. A measure of wood volume. The conversion ratio for the Wenatchee National Forest is 5.45 board feet per one cubic foot of wood

MEAN ANNUAL INCREMENT OF GROWTH - The total increase in girth, diameter, basal area, height, or volume of individual trees or a stand up to a given age, divided by that age.

MIDDLEGROUND - A term used in visual management to describe the visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly from the stand

MINERAL SOIL - Weathered rock materials usually containing less than 20 percent organic matter.

MINERAL WITHDRAWAL - The exclusion of locatable mineral deposits from mineral entry on areas required for administrative sites by the Forest Service and other areas highly valued by the public. Public lands withdrawn from entry under the General Mining Laws and/or the Mineral Leasing Laws.

MINIMUM VIABLE POPULATION - The low end of the viable population range

MINING CLAIMS - That portion of the public estate held by law for mining purposes in which the right of exclusive possession of locatable mineral deposits is vested to the locator of a deposit.

MITIGATION - Actions to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice

MM - Million.

MMBF - Million board feet.

MMCF - Million cubic feet.

MONITORING - The periodic evaluation of Forest Plan management practices on a sample basis to determine how well objectives have been met.

MODIFICATION - A visual quality objective meaning man's activity may dominate the characteristic landscape but must, at the same time, utilize natural established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

MULTIPLE USE - The management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people. The concept also includes making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in the use to conform to changing needs and conditions. Some lands will be used for less than all of the resources. There will be harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land. Consideration will be given to the relative values of the various resources, and management will not necessarily favor the combination of uses that will give the greatest dollar return or the greatest unit output.

MUNICIPAL SUPPLY WATERSHED - A watershed that provides water for human consumption where Forest Service management could have a significant effect upon the quality of water at the point of intake. The watershed must provide water utilized by a community or any other public water system regularly serving 25 individuals at least 60 days out of the year or provide at least 15 service connections. This definition can include such facilities as campgrounds, organization camps, resorts, residential areas, etc.



NAAQS - National Ambient Air Quality Standards

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA) - An Act, to declare a National policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the nation; and to establish a Council on Environmental Quality.

NATIONAL FOREST MANAGEMENT ACT OF 1976 (NFMA) - An Act amending the Forest and Rangeland Renewable Resources Planning Act. NFMA requires the preparation of Regional and Forest Plans and the preparation of regulations to guide that development.

NATIONAL FOREST SYSTEMS - All National Forest lands reserved or withdrawn from the public domain of the United States, all National Forest lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012), and other lands, waters or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system (16 U.S.C. 1608)

NATURAL FOREST - The condition of a forest environment at any point in time including its associated plant and animal communities, which has been reached essentially through the process of natural succession. This process would include the effects of natural catastrophic occurrences.

NDF - An abbreviation of Non-Declining Flow.

NEPA - An abbreviation of National Environmental Policy Act.

NET PUBLIC BENEFITS - An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of net public benefits to be derived from management of the units of the National Forest System is consistent with the principles of multiple-use and sustained-yield. (36 CFR 219.3)

NET VALUE CHANGE - The estimation process carried out by an interdisciplinary team to assess positive and negative effects of individual resource allocation or management area designation. An estimation of physical effects and economic consequences of various fire intensity levels.

NFMA - An abbreviation of the National Forest Management Act of 1976.

NON-CHARGEABLE TIMBER HARVEST - Timber harvest that is not chargeable to the allowable sale quantity.

NON-CONSUMPTIVE USE - That use of a resource that does not reduce the supply

NON-DECLINING FLOW (NDF) - A level of timber production assigned so that the planned timber sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade.

NON-GAME - Any species of wildlife or fish which is not managed or otherwise controlled by hunting, fishing, or trapping regulations.

NON-MARKET - Products derived from National Forest resources that do not have a well-established market value, for example, recreation, wilderness, wildlife.

NON-POINT SOURCE POLLUTION - Pollution whose source is general rather than specific in location.

NON-PRICED OUTPUTS - Outputs for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value. Subjective non-dollar values are given to non-priced outputs.

NOXIOUS WEEDS - A plant considered to be extremely destructive or harmful to agriculture and designated by law. An undesirable species that conflicts with, restricts, or otherwise causes problems with the management objectives.

NPB - An abbreviation of net public benefits.



OBJECTIVE - A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals. (36 CFR 219.3)

OCCUPANCY TRESPASS - The illegal occupation or possession of National Forest land or property

OFF-ROAD VEHICLE (ORV) - Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, snow, ice, or other natural terrain.

OLD GROWTH STAND - An old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics: 1) stands contain mature and overmature trees in the overstory and are well into the mature growth stage; 2) stands will usually contain a multilayered canopy and trees of several age classes, 3) standing dead trees and down material are present; and 4) evidence of man's activities may be present but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand

OLIGOTROPHIC - Lakes having low nutrient supplies which are poor producers of organic matter.

OPPORTUNITY COSTS - The values of a resource's foregone net benefits in its most economically efficient alternative use.

OPTIMUM DENSITY - For wildlife, the maximum rate of animal stocking possible without inducing damage to vegetation or related resources, may vary from year to year because of environmental and/or population factors.

ORV - An abbreviation for off-road vehicles.

OUTPUT - A good, service, or on-site use that is produced from forest and rangeland resources. See FSH 1309.11 for forest and rangeland outputs, codes and units of measure. Examples: X06 - Softwood Sawtimber production - MCF; X80 - Increased Water Yield - Acre feet; W01 - Primitive Recreation Use - RVD's

OVERSTORY - That portion of the trees in a forest of more than one story, forming the upper or uppermost canopy layer.



PAOT - Persons At One Time - Public recreational measurement term. The number of people in an area or using a facility at one time

PARENT MATERIAL - The unconsolidated and more or less chemically weathered mineral or organic matter from which the upper horizons of the soil profile are developed

PARTIAL CUT - Covers a variety of silvicultural practices where a portion of the stand is removed and a portion is left.

PARTIAL RETENTION - A visual quality objective where man's activities may be evident but subordinate to the characteristic landscape.

PARTICULATES - Small particles suspended in the air and generally considered pollutants

PATENTED MINING CLAIMS - A patent is a document which conveys a title. Public law provides that when patented, a mining claim becomes private property and is land over which the United States has no property rights, except as may be reserved in the patent. After a mining claim is patented, the owner does not have to comply with requirements of the General Federal Mining law, but is required to meet State regulations

PAYMENT IN LIEU OF TAXES - Payments to local or State governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing. Specifically, they include payments made under the Payments in Lieu of Taxes Act of 1976 by U S Department of the Interior.

PERENNIAL STREAMS - A stream that runs water year around.

PERSONS-AT-ONE-TIME (PAOT) - A recreation capacity measurement term indicating the number of people that can use a facility or area at one time.

PLANNING AREA - The area of the National Forest System covered by a regional guide or Forest Plan (36 CFR 219.3)

PLANNING HORIZON - The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions. (36 CFR 219.3)

PLANNING PERIOD - One decade The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits. (36 CFR 219 3)

PLANT COMMUNITIES - A vegetation complex unique in its combination of plants which occur in particular locations under particular influences. A plant community is a reflection of integrated environmental influences on the site - such as soils, temperature, elevation, solar radiation, slope, aspect, and rainfall.

PNV - An abbreviation of present net value.

POTENTIAL YIELD - (This term is in reference to the Timber Management plans only.) Optimum sustained yield of timber harvest volume attainable with intensive forestry on available commercial forest land (forest lands able to produce 20 cubic feet of timber per acre per year or more) while considering the interrelationship with other forest resources and uses. Programmable net salvage volume and volume from marginally economical lands are also included.

PRACTICES - Those management activities that are proposed or expected to occur.

PRECOMMERCIAL THINNING - The selective felling or removal of trees in a young stand, primarily to accelerate diameter increment on the remaining stems, maintain a specific stocking or stand density range, and improve the vigor and quality of the trees that remain.

PRESCRIBED FIRE - A wildland fire burning under preplanned specified conditions which will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions.

PRESCRIBED NATURAL FIRE - The use of unplanned natural ignitions to meet management prescriptions.

PRESENT NET VALUE (PNV) - The difference between the discounted values (benefits) of all outputs to which monetary values or established market prices are assigned, and the total discounted costs of managing the planning area (36 CFR 219.3)

PRESERVATION - A visual quality objective that allows only ecological changes to take place.

PRESUPPRESSION - Activities required in advance of fire occurrence to ensure an effective suppression action. It includes (1) recruiting and training fire forces, (2) planning and organizing attack methods, (3) procuring and maintaining fire equipment, and (4) maintaining structural improvements necessary for the fire program.

PRICE - The unit value of an output expressed in dollars.

PRIMARY CAVITY EXCAVATOR - Wildlife species that digs or chips out cavities in wood to provide itself or its mate with a site for nesting or roosting.

PRIMITIVE RECREATION - Those recreation activities which occur in areas characterized by an essentially unmodified natural environment of fairly large size (2,500 acres or greater).

PRODUCTION POTENTIAL - The capability of the land or water to produce a given resource

PRODUCTIVE FOREST LANDS - Forest lands that are capable of producing crops of industrial wood and have not been reserved or deferred from timber management.

PROGRAM DEVELOPMENT AND BUDGETING - The process by which forest management activities are proposed and funded

PROGRAM ELEMENT - An individual Forest Service area of responsibility, which in combination with other elements, comprises the statutory or Executive directed mission of the Forest Service. Specific Forest Service program elements are defined in the Management Information Handbook (FSH 1309 11)

PROGRAMMED HARVEST - The amount of timber that is scheduled for harvesting. Includes salvage and cull timber volumes. It is based on current demand, funding, and multiple use considerations.

PUBLIC ACCESS - Usually refers to a road or trail route over which a public agency claims a right-of-way for public use

PUBLIC ISSUE - A subject or question of widespread public interest relating to management of the National Forest System. (36 CFR 219.3)

PURCHASER CREDIT - Credit earned by the purchaser of a National Forest timber sale in return for construction of contract-specified roads. Earned purchaser credit may be used by the purchaser as payment for National Forest timber removed.



RANGE ALLOTMENT - A designated area containing land suitable and available for livestock grazing use upon which a specified number and kind of livestock are grazed under an approved allotment management plan. It is the basic management unit of the range resource on National Forest System lands administered by the Forest Service.

RANGER DISTRICT - An administrative subdivision of the Forest, supervised by a District Ranger who reports to the Forest Supervisor.

RAPTORS - Any predatory bird - such as a falcon, hawk, eagle or owl - that has feet with sharp talons or claws adapted for seizing prey and a hooked beak for tearing flesh.

RARE II - An abbreviation of Roadless Area Review and Evaluation II

REAL DOLLAR VALUE - A monetary value that compensates for the effects of inflation. (36 CFR 219.3)

RECORD OF DECISION (ROD) - A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not. (40 CFR 1505.2)

RECREATION CAPACITY - The number of people that can take advantage of recreation opportunity at any one time without substantially diminishing the quality of the experience or the biophysical resources.

RECREATION INFORMATION MANAGEMENT (RIM) - The Forest Service system for recording recreation facility condition and use.

RECREATION OPPORTUNITY - An opportunity for a user to participate in a preferred activity within a preferred setting, in order to realize those satisfying experiences which are desired

RECREATION OPPORTUNITY SPECTRUM (ROS) - Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs. This is measured based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The seven classes are.

1. **Primitive**--Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low, and evidence of other users is minimal. The area is managed to be essentially free from evidence of management restrictions and controls. Motorized use within the area is not permitted.

2. **Semi-primitive Non-motorized**--Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.

3. Semi-primitive Motorized--Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but subtle Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted.

4. Roaded Natural--Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, and evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.

5. Roaded Modified--Area is generally natural appearing, but has significant vegetation management and resource modification. Modifications generally harmonize with the natural environment. A moderate opportunity exists for isolation and undisturbed activities but some interaction with other visitors can be expected. Conventional motorized use is allowed and incorporated into construction standards and designs of facilities.

6. Rural--Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agricultural development. Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.

7. Urban--Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant on site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

RECREATION VISITOR DAY (RVD) - A unit for measuring recreation use, with 12 visitor hours in a visitor day. This may consist of one person for 12 hours, 12 persons for one hour, or any equivalent combination of continuous or intermittent recreation use by individuals or groups.

REFORESTATION - The natural or artificial restocking of an area with forest trees; most commonly used in reference to artificial restocking.

REGENERATION - The actual seedlings and saplings existing in a stand; or the act of establishing young trees naturally or artificially.

REGENERATION CUT - Any removal of trees to make regeneration possible.

REGION - An area covered by a Regional guide. See FSM 1221.3 for organizational definitions.

REGIONAL FORESTER - The official responsible for administering a single Forest Service region.

REGIONAL GUIDE - The guide developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended. It guides all natural resource management activities, and establishes management standards and guidelines for the National Forest System lands within a given region, it also disaggregates the assigned Regional RPA objectives to the Forests within that Region.

REGULATED VOLUME - Same as Allowable Sale Quantity.

REHABILITATION - A short-term management alternative used to return existing visual impacts in the natural landscape to a desired visual quality.

RELEASE - Freeing a tree or group of trees from competition by cutting or otherwise eliminating vegetation that is overtopping or closely surrounding them.

REMOVAL CUT (Final Cut) - The removal of the last seed bearing or shelter trees after regeneration is established under a shelterwood method.

RESEARCH NATURAL AREA - An area of land in as near a natural condition as possible that exemplifies typical or unique vegetation and associated biotic, soil, geologic, and aquatic features. The area is set aside to preserve a representative sample of an ecological community primarily for non-manipulative scientific and education purposes.

RESERVED FOREST LAND - Public forest land withdrawn from timber utilization through statute or administrative regulations (e.g. Wilderness, Research Natural Areas).

RESIDENT FISH - Generally refers to trout and char which are not anadromous. However, some Forest reservoirs contain warmwater resident fish species such as bass.

RESIDUAL STAND - The trees remaining standing after some form of selection cutting is performed on a stand

RESIDUE - Material which includes both desired and unwanted vegetative residues which result from an activity or natural event.

RESOURCE PLANNING ACT (RPA) - The Forest and Rangeland Renewable Resources Planning Act of 1974 Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of the Act.

RESPONSIBLE LINE OFFICER - For land management planning purposes, the Forest Service employee who has been delegated the authority to carry out a specific planning action. (36 CFR 219.3)

REST-ROTATION - A system of grazing management which defines systematically recurring periods of grazing and deferment for two or more pastures or management units.

RETENTION - A visual quality objective where human activities are not evident to the casual forest visitor.

RILL EROSION - An erosion process in which numerous small channels only several inches deep are formed, occurs mainly on recently cultivated or disturbed soils.

RIPARIAN - Pertaining to acres of land directly influenced by water. Riparian areas usually have visible vegetative or physical characteristics reflecting this water influence. Stream sides, lake borders, or marshes are typical riparian areas.

RIPARIAN-AQUATIC PROTECTION ZONE - A geographically delineated area with distinctive resource values and characteristics that is comprised of aquatic and riparian ecosystems. This includes floodplains, wetlands, and all areas within a variable horizontal distance from the normal line of high water of a stream channel or from the shoreline of a standing body of water

RISK - The degree and probability of loss based on chance.

RUNOFF - That part of the water which travels over the soil surface to the nearest outlet or channel

RNA - An abbreviation of Research Natural Area.

ROAD - A general term denoting a way for purposes of travel by vehicles greater than 40 inches in width

a. **Forest Arterial Road**. Provides services to large land areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service. It is usually developed and operated for long-term land and resource management purposes and constant service (FSM 7710.51).

b. **Forest Collector Road**. Serves smaller land areas than a Forest arterial road and is usually connected to a Forest arterial or public highway. Collects traffic from Forest local roads and/or terminal facilities. The location and standard are influenced by both long-term multiresource service needs as well as travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility (FSM 7710.51).

c. **Forest Local Road**. Connects terminal facilities with Forest collector or Forest arterial roads or public highways. The location and standard are usually controlled by specific resource activity requirements rather than travel efficiency needs (FSM 7710.51).

ROADLESS AREA - See Inventoried Roadless Area.

ROADLESS AREA REVIEW AND EVALUATION II (RARE II) - The national inventory of roadless and undeveloped areas within the National Forest and grasslands. This refers to the second such assessment, which was documented in the Final Environmental Impact Statement of the Roadless Area Review and Evaluation, January 1979.

ROS - An abbreviation of Recreation Opportunity Spectrum.

ROTATION - Planned number of years, between the formation of a generation of trees and its final harvest of a specified stage of maturity.

ROTATION AGE - The age of a stand when harvested.

ROUNDWOOD - Commercially valuable wood that is generally too small to be made into boards.

RPA - The Forest and Rangeland Renewable Resources Planning Act of 1974 Also refers to the National Assessment and Recommended Program developed to fill the requirements of the Act.

RPA RESOURCE TARGETS - Quantified resource goals stated in the Forest Service Region 6 plan.

RVD's An abbreviation of Recreation Visitor Days.



SALE SCHEDULE - The quantity of timber planned for sale by time period from an area of suitable land covered by a forest plan. The first period (usually a decade) of the selected sale schedule provides the allowable sale quantity. Future periods are shown to ensure that long term sustained yield will be achieved and maintained. (36 CFR 219.3)

SALVAGE CUTTING - Intermediate cuttings made to remove trees that are dead or in imminent danger of being killed by injurious agents

SANITATION CUTTING - The removal of dead, damaged or susceptible trees primarily to prevent the spread of insect pests or diseases.

SATURATION DENSITY - (Same as tolerance density.) This term relates to the requirement of many wildlife species for living space. This condition is most marked in territorial species. Space is the limiting factor to the further increases of the population density of these species

SCENIC AREAS - Places of outstanding or matchless beauty which require special management to preserve these qualities. They may be established under 36 CFR 294.1 whenever lands possessing outstanding or unique natural beauty warrant this classification.

SCENIC RIVERS - See Wild and Scenic Rivers

SCHEDULED TIMBER HARVEST - Timber harvest that is chargeable to the annual allowable sale quantity for the Forest.

SCOPING PROCESS - A part of the National Environmental Policy Act (NEPA) process; early and open activities used to determine the scope and significance of the issues; and the range of actions, alternatives, and impacts to be considered in an Environmental Impact Statement (40 CFR 1501.7).

SCORP - Statewide Comprehensive Outdoor Recreation Plan.

SECOND GROWTH - Forest growth that has become established following some interference with the previous forest growth (e.g., cutting, serious fire, or insect attack).

SECONDARY USER SPECIES - Wildlife that occupies a site (cavity in a snag or a den) created by another species.

SEDIMENT - Solid material, both mineral and organic, that is in suspension, and is being transported from its site of origin by air, water, gravity, or ice, or has come to rest on the earth's surface either above or below sea level.

SEDIMENT YIELD - the total sediment outflow from a drainage basin in a specified period of time.

SEED TREE CUTTING - Removing all mature trees from a stand except for selected seed-bearing trees retained on site to provide a seed source for stand regeneration.

SELECTION CUT - Selection cutting is the periodic removal of mature trees individually or in small groups from an uneven-aged forest. By this method, both regeneration cutting and tending of immature stand components are accomplished at each entry.

SEMI-PRIMITIVE MOTORIZED ROS CLASS - See RECREATION OPPORTUNITY SPECTRUM

SEMI-PRIMITIVE NON-MOTORIZED ROS CLASS - See RECREATION OPPORTUNITY SPECTRUM

SENSITIVE SPECIES - Those species of plants or animals that have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent their being placed on Federal or State lists.

SERAL - A biotic community which is a developmental, transitory stage in an ecological succession.

SERAL STAGE--See "successional stage"

SHELTERWOOD CUTTING - Any regeneration cutting in a stand designed to establish a new stand under the protection (overhead or side) of the old stand. Usually the shelterwood involves two separate harvest operations. The first harvest (seed cut) is designed to create space and seed production to establish new trees. The second cut (removal cut) is designed to remove the remainder of the old stand before it begins to compete with the new stand for light and nutrients. This is usually within 10 years. (See also EXTENDED SHELTERWOOD.)

SHEET EROSION - The removal of a fairly uniform layer of soil from the land surface by runoff water.

SILVICULTURAL SYSTEM - A management process whereby forests are tended, harvested, and replaced resulting in a forest of distinctive form. Systems are classified according to the logging method that removes the mature crop and provides for regeneration and according to the type of forest thereby produced (36 CFR 219.3)

SILVICULTURE - The art and science of controlling the establishment, composition and growth of forests

SITE INDEX - A numerical evaluation of the quality of land for plant productivity which uses height growth as a function of age.

SITE PRODUCTIVITY - Production capability of specific areas of land to produce defined outputs such as AUMs, cubic feet/acre/yr., etc.

SIZE CLASS - For purposes of Forest planning, size class refers to the three intervals of tree stem diameter used for classification of timber in the Forest Plan data base:

less than five-inch diameter = seedling/sapling

five to eight-inch diameter = pole timber

greater than eight-inch diameter = sawtimber

SLASH - The wood residue left on the ground after timber cutting and/or accumulating there as a result of storm, fire, or other damage. It includes unused logs, uprooted stumps, broken or uprooted stems, branches, twigs, leaves, bark, and chips.

SMALL GAME - Birds and small mammals typically hunted or trapped.

SMOLT HABITAT CAPABILITY - Smolt habitat capability is a measure of the productive capability of aquatic habitat to produce smolts of a given species.

SNAG - A standing dead tree.

SOCIOECONOMIC - Pertaining to, or signifying the combination or interaction of, social and economic factors.

SOHA - An abbreviation for Spotted Owl Habitat Area

SOIL - The unconsolidated mineral and organic material on the immediate surface of the earth.

SOIL and WATER CONSERVATION PRACTICES (SWCP) -- The set of practices which ensures that soil productivity is maintained, soil loss and water quality impacts are minimized, and water related beneficial are protected during implementation of a project. These practices include the following: (1) State recognized Best Management Practices, (2) Forest-wide standards and guidelines (3) Management Area standards and guidelines, and (4) practices identified at the area and project levels based on on-site specific evaluation.

SOIL DISTURBANCE - Soil disturbance is the mixing of duff material or other woody material into the surface horizon or horizons without significant movement of the soil from one spot to another.

SOIL RESOURCE COMMITMENT - Soil resource commitment is a conversion of a productive site to an essentially nonproductive site for a period of more than 50 years.

SOIL SURVEYS - Systematic examinations of soils in the field and in laboratories which are then interpreted according to their adaptability for various crops, grasses and trees.

SOUND WOOD - Timber that is free from defect, damage, or decay, i.e., in solid, whole, good condition

SPECIAL TIMBER COMPONENT - (obsolete term) That part of the planned timber harvest area and volume where timber production may require special harvest methods, production rates, or other requirements to benefit or mitigate resources other than timber.

SPECIES MANAGEMENT GUIDE - A guide for management of an indicator species in a particular area. The guide includes management direction, schedules for utilization, inventories, research, monitoring, and optimum cover/forage relationships for the long term.

SPECIES RICHNESS MANAGEMENT - A wildlife management strategy to maintain viable populations of all resident species.

SPOTTED OWL HABITAT AREA (SOHA) - A habitat area designated to support one pair of owls. A dedicated SOHA does not allow scheduled timber harvest on otherwise suitable timber lands.

SPRING BREAK-UP - Time of year when roads are damaged or "break up" due to melting frost and ice, generally from first of March to middle of April

STAND - Timber possessing uniformity as regards to type, age class, risk class, vigor, size class, and stocking class

STANDARD - A principle requiring a specific level of attainment, a rule to measure against.

STANDARD TIMBER COMPONENT - That part of the planned timber harvest area and volume of normal or "standard" sawlog production Used in Timber Management Plans.

STOCKING - The degree of occupancy of land by trees as measured by basal area or number of trees as compared to a stocking standard.

STORET - The acronym for a computerized water quality data base operated nationwide by the U.S. Environmental Protection Agency.

STRATEGIC MINERALS - Those minerals of which the U.S. imports 50 percent or more from foreign sources (based on 1978 U.S. Bureau of Mines figures).

STREAM CLASS - Classification of streams based on the present and foreseeable uses made of the water, and the potential effects of on-site changes on downstream uses. Four classes are defined

Class I - Perennial or intermittent streams that provide a source of water for domestic use; are used by large numbers of fish for spawning, rearing or migration; and/or are major tributaries to other Class I streams.

Class II - Perennial or intermittent streams that are used by moderate though significant numbers of fish for spawning, rearing or migration; and/or may be tributaries to Class I streams or other Class II streams.

Class III - All other perennial streams not meeting higher class criteria.

Class IV - All other intermittent streams not meeting higher class criteria.

STREAMSIDE MANAGEMENT UNIT (SMU) - An area of varying width adjacent to a stream where practices that might affect water quality, fish and other aquatic resources are modified to meet water quality goals, for each class of stream.

SUB-BASIN - Further subdivision of the Columbia Basin for the Wenatchee N F (Chelan, Entiat, Wenatchee and Yakima Sub-basins).

SUBWATERSHED - A part of a whole watershed As used in this Forest plan: the part of a WATERSHED that lies within the boundary of the Wenatchee National Forest.

SUBSTANTIVE COMMENT - A comment that provides factual information, professional opinion, or informal judgement germane to the action being proposed

SUCCESSIONAL STAGE - A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax For example, coniferous forests in the Blue Mountains progress through six recognized stages grass-forb; shrub-seedling; pole-sapling, young; mature, old growth.

SUITABILITY - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices. (36 CFR 219.3)

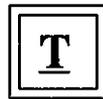
SUPPLY - The amount of an output that producers are willing to provide at a specific price, time period, and condition of sale.

SUPPRESSION - The action of extinguishing or confining a fire.

SURFACE RESOURCES - Renewable resources located on the earth's surface in contrast to ground water and mineral resources located below the earth's surface.

SURFACE RUNOFF - Water that flows over the ground surface and into streams and rivers.

SUSTAINED YIELD OF PRODUCTS AND SERVICES - The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land. (36 CFR 219.3)



TARGETS - Output accomplishments assigned to the Forest by the Forest Service Regional Forester. A statement used to express planned results to be achieved within a stated period of time.

TEMPORARY ROAD --Any short-lived road not intended to be a part of the Forest development transportation system and not necessary for future resource management.

TENTATIVELY SUITABLE FOREST LAND - Forest land that is capable of producing crops of industrial wood and: (a) has not been withdrawn by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soil productivity or watershed conditions, (c) existing technology and knowledge provides reasonable assurance that it is possible to restock adequately within five years after final harvest; and (d) adequate information is available to project responses to timber management activities.

THERMAL COVER - Cover used by animals to lessen the effects of weather; for elk, a stand of coniferous trees 12 meters (40 feet) or more tall with an average crown closure of 70 percent or more, for deer, cover may include saplings, shrubs, or trees at least 1.5 meters (5 feet tall) with 75 percent crown closure.

THREATENED SPECIES - Any species of animal or plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which has been designated in the Federal Register by the Secretary of Interior as a threatened species.

TIERING - The coverage of general matters in broader environmental impact statements with subsequent, narrower statements or environmental analyses incorporating by reference the general discussions and concentrating solely on specific issues.

TIMBER CLASSIFICATION - Forest land is classified under each of the land management alternatives according to how it relates to the management of the timber resource. The following are definitions of timber classifications used for this purpose.

1. **Nonforest**--Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

2. **Forest**--Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

3. Suitable--Commercial forest land identified as appropriate for timber production in the Forest planning process.

4 Unsuitable--Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as not appropriate for timber production in the Forest planning process.

5. Commercial Forest--Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn from timber utilization.

TIMBER MANAGEMENT PLANS (TM PLANS) - Functional resource plans completed in 1963 for the Wenatchee Working Circle and 1969 for the Naches-Tieton Working Circle, which established a timber sale volume to be sold each year. They were not integrated resource plans which considered impacts to all other resources on the Forest.

TIMBER PRODUCTION - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use. For planning purposes, the term "timber production" does not include production of fuelwood (36 CFR 219.3)

TIMBER STAND IMPROVEMENT (TSI) - The elimination or suppression of the less desirable vegetation in favor of the more desirable tree growth. It includes thinning, cleaning, weeding, and release cuttings.

TOLERANT SPECIES - Plants that grow well in shade.

TOTAL SUSPENDED PARTICULATES (TSP) - Any finely divided material (solid or liquid) that is airborne with an aerodynamic diameter smaller than a few hundred micrometers.

TRANSITORY RANGE - Land that is suitable for grazing use of a nonenduring nature over a period of time. For example, on particular disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage.

TURBIDITY - The degree of opaqueness, or cloudiness, produced in water by suspended particulate matter, either organic or inorganic. Measured by light filtration or transmission and expressed in Nephelometric Turbidity Units (NTU).



UNCERTAINTY - Whenever a variety of outcomes are possible and a probability of any specific outcome cannot be assigned with any degree of accuracy.

UNDERSTORY - Vegetation growing under a higher canopy.

UNEVEN-AGED MANAGEMENT - The application of a combination of actions needed to simultaneously maintain continuous high forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. This management must provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection. (36 CFR 219.3)

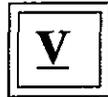
UNIFORM FLOW - A state of steady water flow where the mean velocity and cross sectional area are equal at all sections.

UNREGULATED TIMBER MANAGEMENT - Timber cut from those lands that are not organized to provide sustained yields of timber.

UNROADED ACRES - Those areas of undeveloped Federal land within which there are no improved roads maintained for travel by means of vehicles intended for highway use.

UTILIZATION STANDARDS - Standards guiding the use and removal of timber which is measured in terms of diameter at breast height (d.b.h.), top diameter inside the bark (top d.i.b.), and percent "soundness" of the wood.

UTILITY AND TRANSPORTATION CORRIDORS - A strip of land designated for the transportation of energy, commodities, and communications by railroad, state highway, electrical power transmission (69 KV and above), oil and gas and coal slurry pipelines 10 inches in diameter and larger, and tele-communication cable and electronic sites for interstate use. Transportation of minor amounts of power for short distances, such as short feeder lines from small power projects including geothermal or wind, or to serve customer subservice substations along the line, are not to be treated within the Forest Plan effort.



VARIETY CLASS - A classification system for establishing three visual landscape categories according to the relative importance of the visual features. Those with the most variety of diversity have the greatest potential for high scenic value. The three variety classes are distinctive, common and minimal.

VERTICAL DIVERSITY - The diversity in a stand that results from the complexity of the above ground structure of the vegetation; the more tiers of vegetation or the more diverse the species make up (or both), the higher the degree of vertical diversity. This concept is close to but not exactly the same as "uneven-aged management," although each may influence the other. Application of even-aged management, for example, can be designed to accomplish vertical diversity objectives.

VIABLE POPULATION - A population which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population on the planning area.

VIEWSHED - The total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.

VISITOR INFORMATION SERVICE (VIS) - Activities which interpret for visitors, in layman's language, Forest management, protection, utilization, and research. It also includes interpretation of local botany, geology, ecology, zoology, history, and archaeology.

VISUAL MANAGEMENT SYSTEM - The management system used to protect and enhance the visual resource.

VISUAL QUALITY OBJECTIVES (VQO's) - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape. These categories include Preservation, Retention, Partial Retention, Modification, and Maximum Modification.

VISUAL RESOURCE (FOREST SCENERY) - The composite of basic terrain, geologic features, water features, vegetative patterns, and land-use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

VQO - An abbreviation of visual quality objective.



WATER QUALITY - The biological, physical, and chemical properties of water that make it suitable for given specified uses. Different instream conditions of levels of water quality are needed to support different beneficial uses.

WATER YIELD - The measured output of the Forest's streams.

WATER YIELD INCREASE - Additional water released to Forest streams as a result of Forest management activities.

WATERSHED - The entire land area that contributes water to a drainage system or stream.

WETLANDS - Areas that are inundated by surface or ground water with a frequency sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. (Executive Order 11990.) Under normal circumstances the area does or would support a prevalence of vegetative or aquatic life.

WFUD'S - An abbreviation of Wildlife and Fish User Days.

WILD AND SCENIC RIVERS - Those rivers or sections of rivers designated as such by congressional action under the 1968 Wild and Scenic Rivers Act, as supplemented and amended, or those sections of rivers designated as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

1. **Wild River Areas**--Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
2. **Scenic River Areas**--Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
3. **Recreational River Areas**--Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

WILDERNESS - Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and unconfined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

WILDERNESS RECREATION OPPORTUNITY SPECTRUM (WROS) --The Wilderness Recreation Opportunity Spectrum is an extension of the Recreation Opportunity Spectrum into Wilderness. There are four classes; Pristine, Primitive, Semi-Primitive and Transition. The Primitive and Semi-Primitive WROS classes correspond very closely to the Primitive and Semi-Primitive Non-Motorized classes in ROS. The Pristine WROS class is the most undisturbed, natural portion of a primitive area. The Transition WROS class is essentially a Semi-Primitive WROS class area with greater allowances for social and biological influences of humans.

WILDFIRE - Any wildland fire not designated and managed as a prescribed fire within an approved prescription.

WILDLIFE AND FISH USER DAY (WFUD) - One WFUD consists of 12 hours of recreation use that is the result of fish or wildlife.

WINTER RANGE - The area available to and used by big game through the winter season.

WITHDRAWAL - An order removing specific land areas from availability for certain uses.

WORKING CIRCLE - A geographic division of the Forest created for administrative or marketing purposes. The Wenatchee Working Circle in the Timber Management (TM) plans includes Chelan, Entiat, Lake Wenatchee, Leavenworth, and Cle Elum Ranger Districts. The Naches-Tieton Working Circle includes the Naches Ranger District.

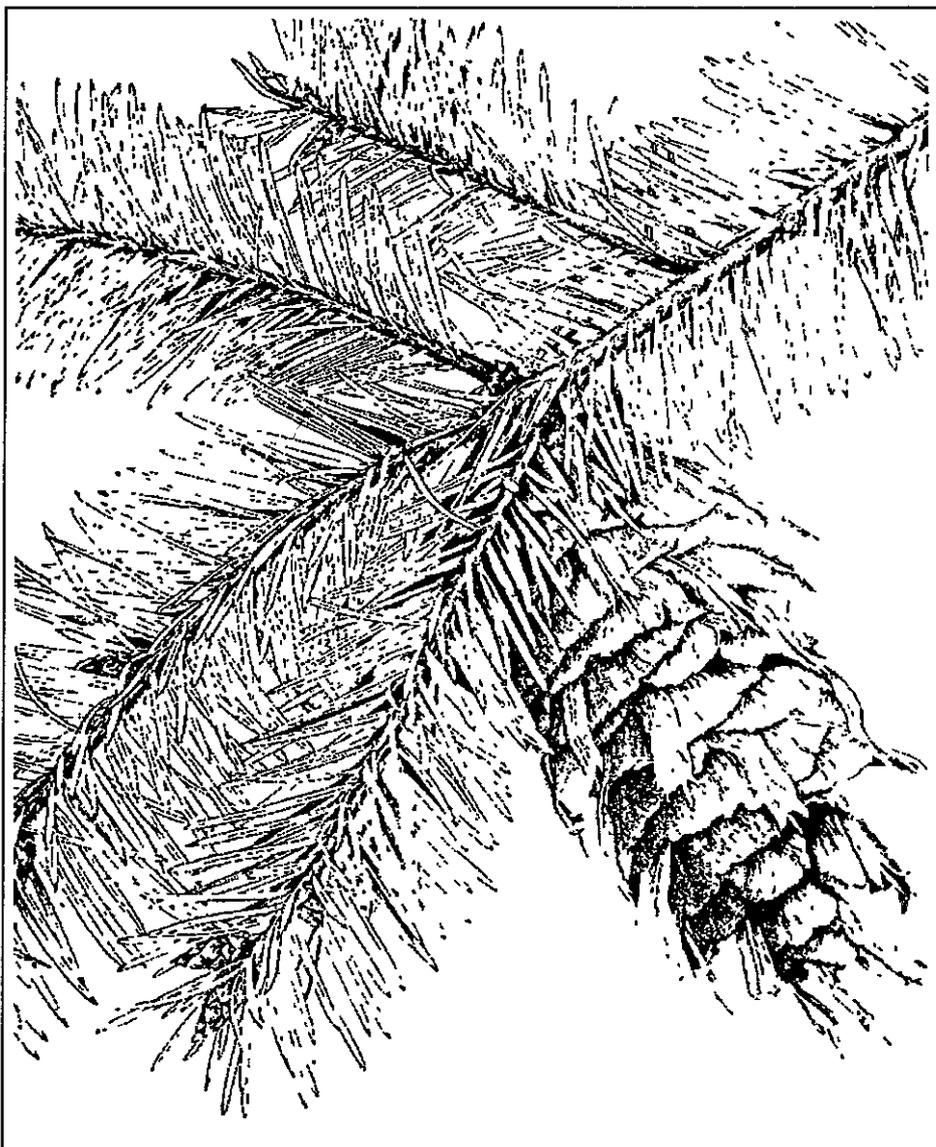
Y

YAKIMA INDIAN TREATY RIGHTS AREA - Those lands on the Wenatchee National Forest where the Yakima Indian Nation retained certain use rights under Article 3 of the Yakima Indian Treaty of 1855.

YIELD TABLES - Tables that estimate the level of outputs that would result from implementing a particular activity, yield tables can be developed for timber volumes, range production, soil and water outputs, and other resources.

Z

ZONE OF INFLUENCE - The geographic area whose social, economic and/or environmental condition is significantly affected by changes in Forest resource production or management.



APPENDIX A

The following activity schedules represent a pool of possible projects necessary to achieve the outputs contained in Table IV-2 of Chapter IV. You may note that the outputs projected are not always exactly identical to those in Table IV-1 of this Plan and Alternative C in the FEIS. The differences result from the approximations of the FORPLAN Model as compared to the reality of implementing the objectives of the preferred alternative on-the-ground. However, the schedules do approximate the outputs over the ten year period.

The cost of implementation of these projects in addition to General Administration and monitoring costs approximate the budget required to implement this Plan. If budgets are significantly different than those contained in this Plan, some projects will not be accomplished, which will result in a reduction in expected outputs, and the corresponding objectives of the Plan will not be met.

The project schedules were derived from existing action plans and inventories, and most are accurate for the first three to five years. In some cases, the project list calls for new inventories or resource plans, which will result in new projects and in new priorities. This will necessitate updating the schedules periodically as new inventories and analysis are completed. It is expected that the detailed schedules will require updating annually as a result of the budget process and new action plans.

RECREATION CONSTRUCTION PROJECTS

Region Capital Investment Program 1/

Project Name	District	Construction Cost (in Thousands)	
		First Five Yrs	Second Five Yrs
Boat Launch Extensions	Chelan	356.0	
Cottonwood Campground	Entiat	253.0	
Fields Point Phase III	Chelan	200.0	
Icicle/Lake Wenatchee	Leaven/Lake	117.0	
Kachess Campground	Cle Elum	1,080.0	
Lake Chelan Rec. Sites	Chelan	1,000.0	
Pleasant Valley/Bumping/ Halfway/Lodgepole	Naches	669.0	
Rimrock/Bumping Boat Ramps	Cle Elum	114.0	
Speelyii Beach	Cle Elum	56.0	
Three Creeks Campground	Entiat	162.0	
Wenatchee River Campground	Lake Wenatchee	750.0	
Kaner Flat ORV (IAC)	Naches	240.2	
Rock Creek Horse Camp	Lake Wenatchee	150.0	
Campground Paving	Leavenworth		92.0
Fish Lake Campground	Lake Wenatchee		249.0
Handicapp Facilities	Cle Elum		107.5
River Bend Campground	Lake Wenatchee		100.0
West End Group Site	Leavenworth		222.5
Clear Lake Rec. Site	Naches		325.0
South Navarre Campground	Chelan		57.0
Pine Flat Campground	Entiat		376.0
North Fork Campground	Entiat		318.0
Salmon La Sac Campground	Cle Elum		1,000.0
Tronson/Bonanza	Leavenworth		200.0
Crow Creek Campground	Naches		108.0
Little Naches Campground	Naches		150.0
Longmire Meadow Campground	Naches		125.0
Lost Meadow Campground	Naches		705.5
Quartz Creek Campground	Naches		75.0
South Shore Campground	Chelan		50.0
Antilon Lake Campground	Chelan		50.0
Owhi Campground	Cle Elum		50.0
Peninsula Campground	Naches		50.0
Dog Lake Campground	Naches		125.0
White Pass Horse Camp	Naches		100.0
Milk Pond Campground	Naches		50.0

1/ Does not include cultural resource projects or wilderness rehabilitation projects.

RECREATION CONSTRUCTION PROJECTS

Region Capital Investment Program 1/

Project Name	District	Construction Cost (in Thousands)	
		First Five Yrs	Second Five Yrs
Nile Creek	Naches		50.0
CCC Shelter	Naches		20.0
Holden Campground	Chelan		350.0
25 Mile Cr. Campground	Chelan		100.0
Boston/Mann	Cle Elum		100.0
Crystal Springs Campground	Cle Elum		50.0
Small Campground Rehab	Cle Elum		109.5
Kachess Boat-in Sites	Cle Elum		54 5
Stafford Campground	Cle Elum		60.0
Wild Rose Campground	Naches		200.0
Willows Campground	Naches		50 0
Windy Point Campground	Naches		80.0
Indian Creek Campground	Naches		400.0
Tieton Infor Center	Naches		100.0
American Ridge Rehab.	Naches		65.0
American Forks Campground	Naches		105.0
So. Fork Falls Campground	Naches		140 0
Silver Salmon Cove	Naches		80 0
Horseshoe Cove	Naches		30 0
Crane Pack Campground	Naches		250 0
Naches Campground	Naches		350 0
Chinook Pass WC	Naches		100 0
Clear Lake Water System	Naches		135 0
American Forks Water System	Naches		65 0
Hells Crossing Reconstruction	Naches		200.0
Little Naches Dispersed	Naches		150.0
Bumping River Dispersed	Naches		150.0
Ponderosa Camp	Naches		160.0

1/ Does not include cultural resource projects or wilderness rehabilitation projects

TRAIL CAPITAL INVESTMENT PROGRAM

Project Name	District	Construction Cost (in Thousands)	
		First Five Yrs	Second Five Yrs
Twenty Five Mile	Chelan	134.0	
10M/Company/Devo	Chelan	80.0	
Summit Rehab 11	Chelan	10 0	
S. Shore Day Hike	Chelan	42.0	
North Shore X-C	Chelan	66.0	
South Shore Tr.	Chelan	1,202.0	
Slide Ridge	Chelan	155.0	
Holden Nature	Chelan	83.0	
Bridge I Holden	Chelan	44 0	
Bridge 11 Holden	Chelan	44 0	
S. Shore X-C Ski	Chelan	73 0	
Sawtooth Trails	Chelan	118.0	
Lightening Ridge	Chelan	184.0	
Surprise Lake	Chelan	23.0	
Indianhead	Chelan	60.0	
Muleshoe/Summit	Chelan	122 0	
PCNST Snoq. 11	Cle Elum	113 0	
Koppen Mtn.	Cle Elum	109 0	
County Line	Cle Elum	86 0	
Little Kaches	Cle Elum	53 0	
Rachel Lake	Cle Elum	66.0	
Granite Creek	Cle Elum	88.0	
Sasse Mtn.	Cle Elum	66.0	
Cathedral Rock	Cle Elum	88 0	
W. Fork Teanaway	Cle Elum	79 0	
July Creek	Cle Elum	28.0	
Dutch Miller Gap	Cle Elum	65.0	
Standup Bean	Cle Elum	96.0	
Johnson-Medra	Cle Elum	63.0	
Tamarack Spring	Cle Elum	134 0	
S Boulder-Jolly	Cle Elum	66 0	
Cle Elum Valley	Cle Elum	166 0	
Three Creek Play Tr.	Entiat	19 0	
Mud Cr X-Country Ski	Entiat	54.0	
Entiat X-Country Ski	Entiat	20 0	
Entiat River Exten	Entiat	114 0	
2 Mad River Tr Bridges	Entiat		
Miners Ridge Ext.	Entiat	63 0	
Billy Ridge	Entiat	50.0	
Middle Tommy Tr Bridge	Entiat		
North Tommy Ext	Entiat	47 0	
Three Creeks	Entiat	95.0	
Larch Lakes	Entiat	15 0	
Pyramid Mtn	Entiat	88.0	
North Fork	Entiat	72.0	
Butte Creek	Entiat	50.0	
Silver Falls NRT	Entiat	36 0	
Wilderness Access	Entiat	73 0	

TRAIL CAPITAL INVESTMENT PROGRAM

Project Name	District	Construction Cost (in Thousands)	
		First Five Yrs	Second Five Yrs
Bygone Byways	Lake Wenatchee	20 0	
Sally Ann Route	Lake Wenatchee	35 0	
Indian Creek Lake	Lake Wenatchee	42 0	
Top Lake	Lake Wenatchee	91.0	
Rock Creek	Lake Wenatchee	53.0	
Trinity Reroute	Lake Wenatchee	26.0	
Little Wenatchee	Lake Wenatchee	71.0	
Nason Ridge East	Lake Wenatchee	67.0	
Nason Ridge West	Lake Wenatchee	67.0	
Ethel Lake	Lake Wenatchee	92 0	
Smithbrook	Lake Wenatchee	63.0	
Tumwater Mtn.	Leavenworth	430.0	
Tumwater Canyon	Leavenworth	88.0	
#2 Canyon	Leavenworth	380 0	
Old Icicle	Leavenworth	65 0	
Ingalls Creek	Leavenworth	240 0	
Ingalls Way	Leavenworth	32 0	
Upper Icicle Cr.	Leavenworth	131.0	
Upper Snow Creek	Leavenworth	68.0	
8-Mile/Trout Creek	Leavenworth	162 0	
Jack Creek	Leavenworth	158 0	
Mid Icicle Ridge	Leavenworth	149 0	
Chiwaukum	Leavenworth	205 0	
Painter Creek	Leavenworth	118.0	
Hatchery Creek	Leavenworth	51 0	
French Creek	Leavenworth	184.0	
Upper Colchuck	Leavenworth	37 0	
Twin Fish Swamp	Naches	29 0	
SF Tieton Falls	Naches	190.0	
Sand Ridge	Naches	42.0	
Indian Creek NAC	Naches	48 0	
Rattlesnake	Naches	33.0	
Goose Egg	Naches	37 0	
S. Kloochman	Naches	29.0	
PCNST WP/Culvert	Naches	27 0	
PCNST CH/Culvert	Naches	27 0	
Edgar Rock	Naches	125 0	
Bumping X-Country Ski	Naches	43.0	
Cougar Valley	Naches	32 0	
Crow Lake Way	Naches	32.0	
Dewey Lake Way	Naches	26.0	
Cougar Lake	Naches	33 0	
Mesatchee Tr. & Bridge	Naches	33.0	

TRAIL CAPITAL INVESTMENT PROGRAM

Project Name	District	Construction Cost (in Thousands)	
		First Five Yrs	Second Five Yrs
Summer Blossom	Chelan		<u>1/</u>
Lake Margaret	Cle Elum		
Ridge	Cle Elum		
Wishpoosh CG	Cle Elum		
Gale-Bos	Cle Elum		
Box Canyon	Cle Elum		
Swauk Area	Cle Elum		
Silver Falls Handicap	Entiat		
Shetipo	Entiat		
Pyramid Creek	Entiat		
Garland Peak	Entiat		
Larch Lakes	Entiat		
Duncan Hill	Entiat		
Anthem Creek	Entiat		
Cow Creek	Entiat		
Pugh Ridge	Entiat		
Pomas Creek	Entiat		
Columbia Breaks	Entiat		
Fish Pond Handicap	Lake Wenatchee		
Lillebye/Jellstrip	Leavenworth		
Tronsen CG Loop X-Country	Leavenworth		
Middle Shaser	Leavenworth		
So. Shaser	Leavenworth		
Lower 8 Mile	Leavenworth		
No. Shaser	Leavenworth		
County Line	Leavenworth		
Negro Creek	Leavenworth		
Scotty Creek	Leavenworth		
Mill-Ingall	Leavenworth		
Lower Icicle	Leavenworth		
Beehive	Leavenworth		
Little Camas	Leavenworth		
King Creek	Leavenworth		
Sand Creek	Leavenworth		
Entiat Ridge ORV Tie	Leavenworth		
Lost Creek	Naches		
Pinegrass Way	Naches		

1/ All of these trail projects are planned for the second five year period and construction costs are not estimated

TRAILHEAD CAPITAL INVESTMENT PROGRAM

Project Name	District	Construction Cost (in Thousands)	
		First Five Yrs	Second Five Yrs
South Shore	Chelan	79 0	
North Shore	Chelan	65.0	
Slide	Chelan	80.0	
Holden	Chelan	32 0	
South Shore	Chelan	32 0	
Lightening	Chelan	21.0	
Esmeralda	Cle Elum	52.0	
Standford	Cle Elum	52.0	
Granite Creek	Cle Elum	43.0	
Kachess Ridge	Cle Elum	57 0	
Mirror/Cot	Cle Elum	57.0	
Johnson/Me	Cle Elum	10 0	
Paris/Davis	Cle Elum	57 0	
Mineral	Cle Elum	38 0	
Rachel/Ram	Cle Elum	269.0	
Swauk Corridor	Cle Elum	899.0	
Crystal SN	Cle Elum	74.0	
Taneum Jct	Cle Elum	127 0	
Sno-Park Entiat	Entiat	36.0	
Lake Creek	Entiat	75 0	
Three Creeks	Entiat	275 0	
Maverick	Entiat	114.0	
North Fork	Entiat	125.0	
Top Lake	Lake Wenatchee	20.0	
Little Wenatchee	Lake Wenatchee	19.0	
Smithbrook	Lake Wenatchee	13 0	
Tumwater	Leavenworth	83 0	
#2 Canyon	Leavenworth	82 0	
Ingall/Hat	Leavenworth	140 0	
Icicle/Mis	Leavenworth	139 0	
S F. Falls	Naches	75 0	
M.J.B.	Naches	16.0	
Sand Ridge	Naches	6.0	
Blankship	Naches	50.0	
Sno-Soup/Air Exp	Naches	42 0	
Andy, Kitte	Naches	22 0	
Rattlesnake	Naches	16 0	
Ravens Roost	Naches	60 0	
Goat Creek	Naches	21 0	
Fish Lake	Naches	60.0	

TRAILHEAD CAPITAL INVESTMENT PROGRAM

Project Name	District	Construction Cost (in Thousands)	
		First Five Yrs	Second Five Yrs
Granite Creek	Cle Elum		1/
Stafford Creek	Cle Elum		
Mad River	Entiat		
County Creek	Naches		
Windy Point	Naches		
Thunder Creek	Naches		
Jumpoff Meadow	Naches		
Pinegrass Horse Camp	Naches		
Bumping Lake	Naches		
Quartz Creek & Hillside	Naches		
Colver Spring	Naches		

1/ All of these trailhead projects are planned for the second five year period and construction costs are not estimated

WILDERNESS REHABILITATION

Project Name	District	Construction Cost (in Thousands)	
		First Five Yrs	Second Five Yrs
Wilderness Rehab I			
Cloudy/Lyman	Chelan	10 0	
Sawtooth Shelter	Chelan	10.0	
Cathedral/Squaw	Cle Elum	21.0	
Rachel/Rampart/Lila	Cle Elum	20 0	
Chain/Doelle	Leavenworth	18.0	
Eightmile Lake	Leavenworth	42 0	
TOTAL		121.0	
Wilderness Rehab II			
Blue/Twin Sprs	Chelan	10.0	
Yang/White Rock	Chelan	20.0	
Deep Lake	Cle Elum	8.0	
Hyas Lake	Cle Elum	10.0	
Peggy's Pond	Cle Elum	3.0	
Frosty Pass	Leavenworth	22 0	
Stuart/Colchuck	Leavenworth	22 0	
Lake/Surprise	Naches	3.0	
Rattlesnake	Naches	2 0	
Hindoo Camps	Naches	2.0	
TOTAL		102 0	
Wilderness Rehab III			
Holden Pass	Chelan	15 0	
Pete Lake	Cle Elum	5.0	
Spectacle Lake	Cle Elum	7.0	
Upper Ingals	Leavenworth	22.0	
Cramer/Dumpbell	Naches	5.0	
MJB Elk Camps	Naches	2 0	
TOTAL		56.0	
Surprise Lake	Chelan		4.0
Waptus Lake	Cle Elum		12.0
Upper Park Lake	Cle Elum		20.0
Ridge Lake	Cle Elum		15 0
Entiat Valley	Entiat		10 0
Buck Creek Pass	Lake Wenatchee		16.0
Lake SallyAnn	Lake Wenatchee		15.0
Cradle Lake	Leavenworth		20.0
Dewey Lake	Naches		20.0

WILDERNESS REHABILITATION

Project Name	District	Construction Cost (in Thousands)	
		First Five Yrs	Second Five Yrs
Crow Creek Lake	Naches		15.0
Little Twin/Grassy	Naches		6.0
Tuck/Robin	Cle Elum		8.0
Ivanhoe	Cle Elum		15.0
Ice Creek	Entiat		6.0
Lake Janus	Lake Wenatchee		10.0
Michael Lake	Cle Elum		15.0
Hour Lake	Cle Elum		20.0
Escondido Lake	Cle Elum		20.0
Diamond Lake	Cle Elum		20.0
Twin/Lillian	Cle Elum		4.0
McCall Basin	Naches		10.0
Apple/Pear Lakes	Naches		20.0
Windy/Burnt	Naches		2.0
Augusta/Cabin Basin	Leavenworth		20.0
Chiwakum/Larch	Leavenworth		40.0
Enchantments/Rat	Leavenworth		50.0
Flora/Brigham	Leavenworth		40.0
Josephine/Upper Icicle	Leavenworth		20.0
Klona Qua	Leavenworth		15.0
Caroline/Windy Pass	Leavenworth		15.0
Mirror Lake	Chelan		15.0
Norse Structures	Naches		10.0
Sand/Swamp	Naches		8.0
Shoe Lake	Naches		4.0
Turquoise/Cuitan	Leavenworth		15.0
Lake Valhalla	Lake Wenatchee		8.0
Cougar/Sheep Herder	Naches		20.0

DETAILED SCHEDULE CULTURAL RESOURCES

Activity	Unit of Measure	Units By Year									
		90	91	92	93	94	95	96	97	98	99
INVENTORY											
SURVEYS:											
Timber ^{1/}	Thousand Acres	40.0	40.0	40.0	40.0	40.0	40.0	35.0	35.0	30.0	30.0
Recreation ^{2/}	Thousand Acres	2.6	2.1	3.3	2.1	2.0	1.9	2.3	2.1	2.1	2.1
Landownership Adjustment ^{3/}	Thousand Acres	5.6	8.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Cultural Resources ^{4/}	Thousand Acres	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Other ^{5/}	Thousand Acres	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
SITE RECORDATIONS ^{6/}											
Chelan	Sites	1 ----- Same each year ----->									
Cle Elum	Sites	20 ----->									
Entiat	Sites	1 ----->									
Lake Wenatchee	Sites	5 ----->									
Leavenworth	Sites	3 ----->									
Naches	Sites	20 ----->									
OVERVIEW UPDATES											
	Reports	1					1				
MANAGEMENT PLANS ^{7/}											
Chelan RD											
CCC Picnic Shelters	Plans						1				
CCC Trail Shelters	Plans					1					
Chelan RS	Plans	1									
Cle Elum RD											
CCC Picnic Shelters	Plans						1				
CCC Trail Shelters	Plans					1					
Salmon La Sac GS	Plans		1								
Site Theft Plan	Plans	1									
Entiat RD											
CCC Guard Stations (3)	Plans								1		
CCC Lookouts (3)	Plans				1						
CCC Trail Shelters	Plans					1					
Lake Wenatchee RD											
CCC Campgrounds	Plans						1				
CCC Guard Stations (5)	Plans								1		
CCC Lookouts (10)	Plans				1						
Lake Wenatchee RS	Plans	1									
Site Theft Plan	Plans			1							
Stevens Pass Hist Dist.	Plans	1									
Leavenworth RD											
Chatter Ck GS	Plans								1		
Leavenworth RS & Barn	Plans	1									
Leavenworth Ski Lodge	Plans				1						
Site Theft Plan	Plans		1								
Naches RD											
American Forks GS	Plans								1		
American Ridge Ski Lodge	Plans									1	

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DETAILED SCHEDULE CULTURAL RESOURCES

Activity	Unit of Measure	Units By Year									
		90	91	92	93	94	95	96	97	98	99
Naches RD (Cont)											
CCC Picnic Shelters	Plans							1	1		
CCC Trail Shelters	Plans					1					
Naches Pass Trail	Plans		1								
Site Theft Plan	Plans	1									
White Pass GS	Plans								1		
Yakima-Tieton Irr Dist	Plans									1	
<hr/>											
<u>EVALUATIONS</u> 8/											
Individual Sites	Sites	10	10	10	10	10	11	11	12	12	12
Thematic Evaluations											
Chelan RD											
Lake Chelan Arch Sites	Themes		1								
Cle Elum RD											
Liberty & Swauk Mining	Themes		1								
Lake Wenatchee RD											
Indian/Army Battle Sites	Themes					1					
Indian Cross-Mtn Trails	Themes		1								
Indian Fishing Camps	Themes						1				
Indian Hunting Camps	Themes								1		
Irrigation/Mining Ditches	Themes							1			
Railroad Owens	Themes									1	
Wenatchee R Arch Sites	Themes				1						
Leavenworth RD											
Alpine Lakes Wild Water											
Diversion Sites	Themes								1		
Wenatchee R Arch Sites	Themes					1					
Naches RD											
Naches Drainage Arch Sites	Themes			1				1			
Naches Pass Trail	Themes	1									
Tieton Drainage Arch. Sites	Themes		1					1			
<hr/>											
<u>DATA RECOVERIES/DOCUMENTATIONS</u> 9/											
Chelan RD											
Moore Point Arch Site	Projects			1							
Refrigerator Harbor Arch	Projects				1						
Cle Elum RD											
Kachess Arch Site	Projects		1								
Speelyl Beach Arch Site	Projects			1							
Lake Wenatchee RD											
Creepo Camp Arch Site	Projects								1		
Fish Creek Arch. Site	Projects				1						
Headwaters Ext Arch. Site	Projects			1							
Island View Arch. Site	Projects							1			
Naches RD											
Crow Creek Arch Site	Projects					1					
Rockshelter Arch Sites	Projects				1						

DETAILED SCHEDULE CULTURAL RESOURCES

Activity	Unit of Measure	Units By Year									
		90	91	92	93	94	95	96	97	98	99
<u>INTERPRETATIONS/REHABILITATIONS</u> 10/											
Chelan RD											
Holden Mine Scale Model	Projects		1								
Lake Chelan 4 Sites Inter.	Projects		1								
Front Office & Display	Projects			1							
Luc./Moore Pt. Inter. Trail	Projects				1						
Lucerne Inter. Center	Projects					1					
Holden Inter. Trail	Projects					1					
CCC Shelters Rehab	Projects						1				
Antilon Lake Inter.	Projects							1			
25 Mile Creek Inter.	Projects								1		
Lookouts (4) Inter.	Projects									1	
First Creek Inter.	Projects										1
Cle Elum RD											
CCC Shelter Rehab.	Projects					1					
Milwaukie RR Inter. Trail	Projects			1							
Salmon La Sac Inter. Center	Projects		1								
Old Blewett Pass Hwy. Inter.	Projects						1				
Liberty GS Inter.	Projects						1				
Entiat RD											
Silver Falls Inter.	Projects			1							
Lake Wenatchee RD											
Bygone Byways Inter. Trail	Projects			1							
Stevens Pass Auto Tour	Projects		1								
Rock Creek GS Reconst	Projects							1			
Face Tree Inter Display	Projects	1									
Wenatchee R. Arch In. Trail	Projects				1						
Front Office Display	Projects			1							
Trapper Inter. Auto Tour	Projects							1			
Trailhead Inter	Projects	1									
Railroad Survey Trails Inter	Projects						1				
CCC Lookouts Inter.	Projects								1		
CCC Rock Ck. GS Inter. Trail	Projects									1	
Leavenworth RD											
Powerhouse Trail Inter.	Projects			1							
Swiftwater Inter.	Projects				1						
Tumwater Inter	Projects				1						
Ski Lodge Inter	Projects				1						
Old Blewett Pass Hwy Inter.	Projects						1				

DETAILED SCHEDULE CULTURAL RESOURCES

Activity	Unit of Measure	Units By Year									
		90	91	92	93	94	95	96	97	98	99
Naches RD											
CCC Inter	Projects			1							
Site Protection & Signs	Projects				1						
Trailheads Inter	Projects							1			
CCC Picnic Shelters Rehab.	Projects								1		
Irrigation District Inter	Projects									1	
Prehistoric Sites Inter.	Projects										1
OPERATIONAL COSTS	Thousand \$	40.0	40 0	40 0	40 0	40 0	40 0	40 0	40 0	40 0	40 0

- 1/ Surveys in support of timber should precede, by at least two years, the anticipated timber sell date to allow time to complete any mitigation needed Use 10 year timber sale action plan to schedule surveys and District targets.
- 2/ Surveys are in support of trail construction/reconstruction and construction or expansion of developed recreation sites. Trail corridors include survey of 250 feet either side of centerline Refer to the 10 year schedule of recreation projects to schedule surveys and District targets
- 3/ Surveys are in support of the land exchange program To the extent possible, these should be scheduled 2 years in advance of any particular exchange to allow time to complete any mitigation needed.
- 4/ Surveys that are not tied to project support should emphasize Wilderness and roadless areas since inventory here has been limited to date
- 5/ Surveys are in support of fish habitat improvements, range improvements minerals and special use permit administration
- 6/ This category includes either the recordation of new sites or the revision of currently inadequate site inventories to Regional standards
- 7/ Where functional administrative buildings are involved plans will be coordinated with the District facility operations and maintenance plans
- 8/ Evaluation priorities will be based on a) sites falling within or adjacent to a proposed project area. b) sites easily accessible to the public and hence subject to vandalism, c) sites experiencing various levels of natural degradation; and d) remaining sites By 1990 evaluations will be based on groups of sites for which a common thematic context has been developed
- 9/ Six of these projects are in support of the recreation capital investment construction program; the remaining projects are in conjunction with an archaeological site where there is a substantial threat of vandalism and an archaeological site undergoing substantial river erosion.
- 10/ These projects include interpretation through a variety of media signs, displays, cassette and video tapes, brochures, maps, visitor centers, rehabilitations and even reconstructions

SCENERY MANAGEMENT

Project Name	District	Unit of Measure	Units By Year										
			90	91	92	93	94	95	96	97	98	99	
Visual Analysis Support of Proposed Timber Sales Based on the 10 Year Timber Sale Action Plan	All	Thousand Acres	25	25	25	25	25	25	25	25	25	25	25
Collect and Update Visual Resource Data for Forest Plan Update	All	Thousand Acres						260	260	260	260	260	260
Visual Resource Management Inventory Update	All	Thousand Acres			5	5	5	5	5	10	10	10	
Recreation Site Planning and Visual Analysis of New or Expanded Developed Recreation Sites	All	Plans	2	1	1	1	1	1	1	1	1	1	1
Developed Campground Vegetative Management Plans for a Safe and Visually Attractive Setting													
Lake Chelan Sites	Chelan	Plans		5	6								
Silver Falls	Entiat	Plans			1								
Cottonwood	Entiat	Plans				1							
Wish Poosh	Cle Elum	Plans					1						
Salmon La Sac	Cle Elum	Plans						1					
Pine Flats	Entiat	Plans							1				
Tumwater	Leavenworth	Plans				1							
Others	All	Plans								1	1	1	
Viewshed Plans to Provide Direction for Visual Resource Management in Vegetation Manipulation Projects Along Travel Routes *													
Bumping Lake	Naches	Plans	1										
Stevens Pass	Lake Wenatchee	Plans						1					
Icicle Valley	Leavenworth	Plans			1								
Chiwawa River	Lake Wenatchee	Plans		1									
Little Wenatchee	Lake Wenatchee	Plans				1							
Snoqualmie Pass	Cle Elum	Plans						1					
Mather Memorial	Naches	Plans							1				
Cle Elum Valley	Cle Elum	Plans								1			
Shady Pass	Chelan/Entiat	Plans									1		
Little Naches	Naches	Plans										1	

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SCENERY MANAGEMENT

Project Name	District	Unit of Measure	Units By Year									
			90	91	92	93	94	95	96	97	98	99
Visual Analysis for Land Exchange (Land Ownership Adjustments)	All	Thousand Acres	9	10.5	5.6	5.6	8	2.4	2.4	2.4	2.4	2.4
Visual Analysis for Resource Projects (Wildlife Range and Minerals)	All	Thousand Acres	5	10	10	10	10	10	10	10	10	10
Visual Analysis for Special-Use Projects. Examples include Hwy-410 Reconstruction and Hwy-2 Widening Project	All	Plans or Cases	6	6	6	6	6	6	6	6	6	6
Visual Management Data Collection and Visual Absorption Capacity Inventory for Wilderness Management		Plans										
Glacier Peak	--			1								
Alpine Lakes	--				1							
Henry M Jackson	Lake Wenatchee				1							
William O Douglas	Naches					1						
Norse Peak	Naches					1						
Goat Rocks	Naches					1						
Chelan-Sawtooth	Chelan						1					
Shady Pass	Chelan/Entiat	Plans										
Little Naches	Naches	Plans										
Trailhead Site Planning		Plans	2	3	3	2	7	5	4	2	1	1

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* Additional viewsheds on inventory can be drawn from the following list should the need arise or the priority change. These viewsheds are Lake Chelan Railroad Creek Cooper Mountain to South Narraive, French Corral, Mad River, Sugarloaf-Maverick Saddle, Eagle Creek, Chumstick-Plain, Beehive to Swauk Pass, Mission Creek Table Mountain to Reecer Creek, Taneum-Manastash/Quartz Mountain, Ravens Roost, Little Bald, Rattlesnake Creek, Cash Prairie Little Rattlesnake Creek, White Pass, North Fork Tieton, South Fork Tieton, Tieton Road, and Teanaway. There may be other areas that may need a specific plan.

PLANTS AND ANIMAL HABITAT IMPROVEMENT SCHEDULE

FISCAL YEAR

District and Project	90	91	92	93	94	95	96	97	98	99
Chelan RD										
Wildlife Structures 1/	25	25	25	20	25	25	25	25	25	25
Non-Structures	6	7	7	7	7	100	100	100	100	100
T, E and S Structures	10					2	2	2	2	2
Non-Structures						20	20	20	20	20
Cle Elum RD										
Wildlife Structures	35	25	23	20	25	25	25	25	25	25
Non-Structures	145	145	280	350	350	180	180	180	180	180
T, E and S Structures		2	2	2		2	2	2	2	2
Non-Structures		25	25	25	25	20	20	20	20	20
Lake Wenatchee RD										
Wildlife Structures	30	25	20	28	25	25	25	25	25	25
Non-Structures	307	310	280	415	454	320	320	320	320	320
T, E and S Structures	20	20	20	35	10	20	20	20	20	20
Non-Structures	17	155	19	19	17	50	50	50	500	50
Leavenworth RD										
Wildlife Structures	20	25	20	20	34	20	20	20	20	20
Non-Structures	350	372	280	453	420	320	320	320	320	320
T, E and S Structures	5	10	15	20	10	15	15	15	15	15
Non-Structures	15	15	157	71	17	50	50	50	50	50

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PLANTS AND ANIMAL HABITAT IMPROVEMENT SCHEDULE

District and Project	FISCAL YEAR									
	90	91	92	93	94	95	96	97	98	99
Naches RD										
Wildlife Structures	35	25	40	20	36	30	30	30	30	30
Non-Structures	100	150	200	200	200	300	300	300	300	300
T, E and S Structures	15	18	30	30	30	30	30	30	30	30
Non-Structures	5	10	10	10	10	20	20	20	20	20
Entiat RD										
Wildlife Structures	5	25	5	5	5	5	5	5	5	5
Non-Structures	955	711	642	350	400	500	500	500	500	500
T, E and S Structures						1	1	1	1	1
Non-Structures						20	20	20	20	20
FOREST TOTALS										
Structures	200	200	200	200	200	200	200	200	200	200
Non-Structures	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900

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1/ Structures include such things as spring developments, gates for blocking roads, nest boxes for various bird species etc. There is a great range in the number of structures required to treat an area and the cost of each structure. Consequently the values for number of structures and costs are highly variable within and between Districts.

FISH HABITAT IMPROVEMENT

Ranger District	Activity Code	Unit	Year									
			90	91	92	93	94	95	96	97	98	99
Entiat (NFWF) (CWKV)	CF221-1	Struct					20	20		20	20	
	CF221-2	Struct		20	20	20			20	20	20	20
	CF221-1	Struct.						40	15	15	15	15
Chelan (NFWF)	CF221-1	Struct.	20	20	20	20	35		20	20	20	20
	CF222-1	Acres										
Leavenworth (NFWF) (CWFV)	CF221-1	Struct		30	20	20	20	20	20	20	20	20
	CF221-2	Struct.	30	30	20	20	20	20	20	20	20	
	CF222-1	Acres						5				
	CF221-1	Struct		15	20		15	15	15	15	15	15
	CF221-2	Struct				15						
	CF222-2	Acres				2						
	CF221-1	Struct.			20	10	10	10	20	20	20	20
Lake Wen. (NFWF) (CWKV)	CF221-2	Struct.	20	30	20	20	20	20	20	20	20	20
	CT221	Struct.		20	10	10	10	10				
	CF221-1	Struct	10	15	20	10	10	20	20	20	20	20
	CF221-1	Struct	15	25	15	20	20	20	20	20	20	20
	CT221-1	Struct		10	10	10	15					
	CF221-1	Struct						20	20	20	20	20
	CF221-2	Struct	23	20	40	40	40	20	20	20	20	20
Naches (NFWF)	CF222-1	Acre	11	6	6		1	1	1	1	1	1
	CF222-2	Acre										

FISH HABITAT IMPROVEMENT

Ranger District	Activity Code	Unit	Year									
			90	91	92	93	94	95	96	97	98	99
(CWKV)	CT221	Struct.		5		3						
	CT222	Struct.			5							
	CF221-1	Struct	10	10	15	20	20	20	20	20	20	20
	CF221-2	Struct.	20	20	20	20	20	20	20	20	20	20
	CF222-1	Acre										
	CF222-2	Acre										
	CT221	Struct.	10	10	10							
Cle Elum (NFWF)	CT222	Struct										
	CF221-1	Struct.	20	20	20	20	20	20	20	20	20	20
	CF221-2	Struct.		20	20	20	20	20	20	20	20	20
	CF222-1	Acre	1					1	1	1	1	1
	CF222-2	Acre										
	CT221	Struct.										
	CT222	Acre										
(CWKV)	CF221-1	Struct	10	10	15	20	20	20	20	20	20	20
	CF221-2	Struct	20	20	20	20	20	20	20	20	20	20
	CF222-1	Acre	10	10	10							

NFWF- Fish habitat improvement projects supported through regular funds.
 CWKV- Fish habitat improvement projects supported through KV funds.
 CF221-1 Structural improvements, resident fish.
 CF221-2 Structural improvements, anadromous fish.
 CF222-1 Non-Structural improvements, resident fish.
 CF222-2 Non-Structural improvements, anadromous fish.
 CT221 Structural improvements, T.E and S. species.
 CT222 Non-Structural improvements, T.E. and S. species

Proposed Ten Year Timber Sale Schedule
1990-1999

This appendix provides information on individual planned and proposed timber sales. These sales are at various stages of preparation. For example, some sales for 1990 have all the field work completed while others, especially miscellaneous and salvage sales, may not have any field work done at this time. In general, the farther into the future a sale is scheduled the less complete is the information.

Alternative C, the preferred alternative in the FEIS, has an annual sale quantity volume of 136 MM board feet or 24.3 MM cubic feet. A phase down to this volume is planned during 1990 when 141.7 is proposed. In addition, an approximately 10 mm Bd. ft of firewood, pulp, and other nonchargeable volume is proposed for sale each year.

The FORPLAN model schedules clearcut harvests on 3,433 acres and shelterwood for 2,360 per year in the first decade. The proposed Ten Year Timber Sale Program schedules 2,719 clearcut acres with 2,697 acres seed tree or shelterwood cut (shelterwood and clearcut).

The difference in harvest acres between FORPLAN and the ten-year schedule is due mostly to sanitation salvage and selection harvest or uneven-aged management which are not modeled in FORPLAN.

The management area(s) (allocation) listed is/are the principal area(s) proposed for the sale. Most sales will have minor amounts of riparian allocations included in the sale area.

A summary of proposed sale volume is shown in the following tables.

Maps of the general sale locations are available for review at the Forest Supervisor's Office.

The following are abbreviations used in the Tables:

HCC - Harvest by Clear Cutting	DF - Douglas-fir
HSH - Harvest by Shelterwood Seed Cutting.	AF - Sub-Alpine fir
HPR - Harvest using other Partial Removal methods including final removal of overstory trees, thinning and uneven-aged management selected harvest.	PP - Ponderosa Pine
HFR - Harvest removing all large trees but leaving an understory of young seedlings.	LPP - Lodgepole Pine
ORS - Overstory removal cutting.	PSF - Pacific silver fir
	WH - Western hemlock

10 YEAR TIMBER SALE SUMMARY

Ranger District	Units By Year																			
	90		91		92		93		94		95		96		97		98		99	
	MMBF Volume	Acres	MMBF Volume	Acres	MMBF Volume	Acres	MMBF Volume	Acres	MMBF Volume	Acres	MMBF Volume	Acres	MMBF Volume	Acres	MMBF Volume	Acres	MMBF Volume	Acres	MMBF Volume	Acres
Chelan-Entiat	19.2	1,378	12.0	1,350	12.0	740	12.0	1,700	12.0	905	12.0	980	12.0	1,180	12.0	950	12.0	1,400	12.0	1,950
Cle Elum	34.3	2,222	35.0	1,782	35.0	1,820	35.0	1,595	35.0	1,050	35.0	1,140	35.0	1,700	35.0	1,520	35.0	2,005	35.0	1,705
Lake Wenatchee	30.0	1,391	29.0	958	30.0	1,588	31.0	1,166	31.0	921	30.0	1,140	29.0	903	30.0	1,159	30.0	1,115	30.0	1,178
Leavenworth	9.0	500	9.2	380	9.0	930	8.0	800	9.0	500	9.0	175	9.0	500	9.0	500	9.0	750	9.0	500
Naches	49.5	3,923	49.3	4,312	50.4	3,098	48.2	3,225	49.5	2,930	49.0	3,065	43.5	3,375	48.8	3,436	48.5	3,470	48.5	3,995
TOTALS	142.7	9,414	134.5	8,782	136.4	8,176	134.2	8,486	136.5	6,306	135.0	6,500	128.5	7,658	134.8	7,565	134.5	8,740	134.5	9,328

Proposed sell volume for 1990 is above FORPLAN levels due to Dinkleman fire salvage. The ten-year total equals 1,356.4 MM board feet

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst.	
<u>FY 1990 - Entiat & Chelan Ranger Districts</u>							
Tamarack Fire Salvage	T25N, R19E, S 24	HCC HSH	200 450	5.0	0.0	0.0	Salvage of fire killed timber. About 15 DF clearcuts (avg. 13 acres). About 4.0 MMBF helicopter yarding. GF Mgt. area.
Upper Indian Buyback	T26N, R18E, S 12	HCC HFR	142 11	3.7	0.0	0.0	12 AF/LPP/DF clearcuts (avg. 12 acres). Rootrot and decadent stands GF Mgt. area.
Tyee Buyback	T27N, R19E, S20	HCC HFR	124 241	5.6	0.0	0.0	8 DF/PP/GF clearcuts (avg 14 acres) in mistletoe and rootrot infected stands Removal of DF/PP overstory from 80 year old DF pole stands GF Mgt. area.
Berg Creek LPP	T27N, R18E, S3	HCC	120	4.0	1.5	0.0	8-12" LPP for specialty roundwood or refractory chips. Protect hiker trail. About 8 LP clearcuts (avg. 15 acres) in mature 90 year old stands on tractor ground GF Mgt area.
Misc. Small Sales	District Wide	HCC	90	0.9	0.0	0.0	
SUBTOTAL			1,378	19.2	1.5	0.0	
<u>Cle Elum Ranger District</u>							
Willow Gulch	T18N, R15E, S 12-13, 24	HCR	140	4.1	2.4	1.0	EW-1 Management area
Drop Kick	T20N, R18E, S 1-3, 12-13 T21N, R18E, S 34-36	HCC HSH HCR	597 128 116	5.0	3.0	0.0	Ragan High, Drop Creek EW-1 Management area

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TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1990 - Cle Elum Ranger District</u>							
E.Taneum Ridge	T19N, R14E, S 24, 26 T19N, R15E, S 26-28, 30, 32-34	HCC	54	10.4	4.0	0.0	ST-2, OG-2, and GF Management areas.
		HSH	189				
		HCR	104				
		HFR	23				
Upper Hurley	T21N, R17E, S 13, 23-25, 30-31, 36 T21N, R18E, S 17-21, 29-31 T20N, R17E, S 1-2	HCC	70	1.7	1.5	0.5	ST-1, ST-2, and GF Management areas.
		HSH	35				
		HCR	50				
		HFR	81				
Carton	T22N, R12E, S 13-14, 23-24 T22N, R13E, S 19, 30	HCC	73	7.3	6.5	1.5	BOX CANYON GF Management area.
		HSH	170				
		HOR	43				
S.Cle Elum Ridge	T19N, R15E, S 20-24, 13-16, 27-28	HCC	64	3.7	2.0	2.0	ST-2, OG-2, and GF Management area
		HSH	115				
		HTH	22				
		HOR	48				
Salvage		HSV	60	1.5			
Misc.		HSH	40	0.6			
SUBTOTAL			2,222	34.3	19.4	5.0	
<u>Lake Wenatchee Ranger District</u>							
Howard Overwood	T27N, R15E, S 14-15, 21-22, 28.	HCC	97	8.0	2.7	1.6	Sale plans removal of large overstory DF from pole sized true fir understory GF and ST-2 Mgt. areas.
		HFR	110				

• NOTE: All Volumes Are Net Merchantable Sawtimber.

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst.	
<u>FY 1990 - Lake Wenatchee Ranger District (Continued)</u>							
White Pine	T26N, R15E, S 2, 10-12 T26N, R16E, S 6	HCC	46	8 0	3.7	2.2	Sale visible from US Highway 2 ST-1 and ST-2 Mgt area.
		HSH	138				
		HTH	7				
Maverick	T27N, R18E, S 21, 27-28, 33-34.	HCC	87	10.0	2 2	1.0	Sale area covers steep slopes of Entiat Ridge. Sale is predominantly DF, PP. ST-2 Mgt area.
		HSH	440				
		HFR	66				
District Sales (District Wide)		HTH	250	4.0	0.0	0.0	Salvage and commercial thinning sales
		HCC	50				
		HSV	100				
SUBTOTALS			1,391	30 0	8.6	4.8	
<u>Leavenworth Ranger District</u>							
Rainbow	T24N, R16E, S 6,8 T24N, R15E, S 1	HCC	200	7.7	3.8	0.0	Clearcuts in true fir type Partial cuts in visually sensitive areas. ST-2, and GF.
Cromwell	T25N, R18E, S 5, T26N, R18E, S 32-34	HCC	100	2 0	3.0	0.0	DF clearcuts and PP overstory removal. GF and ST-2
		HFR	200				
SUBTOTAL			500	9.7	6 8	0.0	
<u>Naches Ranger District</u>							
Smokey	T12N, R12E, S 2-3, 9-11	HCC	97	6 5	2.0	0 0	GF Management area.
		HSH/HCR	139				
		HFR	61				
Tenday	T11N, R12E, S 4 T12N, R12E, S 34	HCC	96	7 0	5.6	0.0	GF Management area.
		HSH/HCR	84				

A-25

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1990 - Naches Ranger District (Continued)							
B.B Brown	T17N, R15E, S 12, 14, 24, 26, 36	HSH/HCR HFR	254 77	3.3	0.0	5.5	GF Management area.
Pine Bluff	T13N, R12E, S 13-15, 22	HCC	163	8.0	0.0	0.0	Area scene from U.S. Hwy. 12. ST-2 Mgt area
	HSH/HCR		203				
Rim	T17N, R13E, S 13, 24	HSH/HCR	184	9.6	7.1	0.0	ST-2 Management area
	T17N, R14E, S 7-8, 17-18	HFR	147				
Final Dry	T15N, R14E, S 1-3	HSH/HCR HFR	5 357	2.0	0.0	0.0	EW-2 Management area
McPlug	T15N, R13E, S 1, 12	HSH/HCR	10	3.0	0.0	0.0	GF Management area.
	T15N, R14E, S 6-9	HFR	400				
		HPR	50				
Pine	T17N, R14E, S 10-11, 13-14, 23-24	HSH/HCR	487	4.5	0.6	0.0	GF Management area
	T17N, R15E, S 18	HFR	83				
Leftover	T15N, R14E, S 25-27, 34-36	HSH/HCR	226	1.5	0.0	0.0	GF Management area.
C.S SSTS	T13N, R13E, S 13-16, 21	HFR	171	0.5	0.0	0.0	Overstory removal in established plantations. GF Management area.
King Louie	T13N, R14E, S 3-4, 9-10	HFR	289	0.5	0.0	0.0	ST-2 Management area
	T14N, R14E, S 27						
Plate	T19N, R11E, S 36	HFR	22	0.2	0.0	0.0	ST-2 Management area.
Fifes	T17N, R13E, S 1	HCC	42	1.4	0.0	0.0	GF and ST-2 Mgt. area.
	T17N, R14E, S 4-6	HFR	137				
	T18N, R13E, S 31						
	T18N, R14E, S 31						
Weddle	T14N R15E S 24, 34	HSH/HCR HPR	49 40	1.2	0.6	0.0	ST-1 and EW-1 Mgt. area.

A-26

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1990 - Naches Ranger District (Continued)							
Salvage	District-wide	HPR	50	0.3	0 0	0 0	Small salvage sales
SUBTOTAL			3,923	49 5	15.9	5 5	
1990 TOTAL			9,414	142.7	52.2	15 3	

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst	
<u>FY 1991 - Entiat & Chelan Ranger Districts</u>							
Undercat LPP	T27N, R18E, S 10	HCC	160	4.0	1.5	0.0	8-12" LPP for specialty roundwood or refractory chips. About 10 LPP clearcuts (avg. 16 acres) in mature 90 year old stands on tractor ground. Protect hiker trail. GF Mgt. area.
High Spud	T27N, R20E, S 29	HCC	140	4.6	9.3	1.4	About 14 DF clearcuts (avg 10 acres) in mistletoe infected stands. Removal of PP overstory from 80 year old DF poles Protect deer fawning habitat Establish fuelbreak, close roads to public use. GF Mgt. area
		HFR	760				
Mud Forest	T27N, R20E S 15	HCC	50	2.9	1.0	0.0	About 5 DF clearcuts (avg 10 acres) in mistletoe and rootrot infected stands. Removal of PP/DF overstory from 80 year old DF pole stands Fuelbreak, close roads to public access GF Mgt.
		HFR	190				
Misc Small Sales	District Wide	HCC	50	0.5	0.0	0.0	
SUBTOTAL			1,350	12.0	11.8	1.4	
<u>Cle Elum Ranger District</u>							
Frostbite	T18N, R15E, S 4, 8, 17-79	HCR	14	5.0	13.2	0.0	Frosty Area ST-1 and GF Mgt. area.
		HSN	160				
		HCC	80				
Easton Ridge	T21N, R13E, S 36	HCC	25	5.0	1.0	0.0	ST-2 Management area.
	T20N, R14E, S 6, 8	HSN	122				
South Tyro	T22N, R13E, S 26	HCC	90	2.8	0.5	0.0	GF and ST-2 Mgt area.

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst	
<u>FY 1991 - Cle Elum Ranger Districts (Continued)</u>							
Whisper	T22N, R11E, S 3	HCC	9	2.2	0.5	0.0	Roaring Ridge ST-2 Management area.
	T21N, R11E, S 2	HTH	12				
		HSH	54				
Blue Hurley	T21N, R17E, S 11, 14-15,	HCC	380	5.3	3.2	2.8	GF and ST-2 Mgt. area.
	17, 19-21, 27-29, 33	HSH	95				
	T21N, R18E, S 7, 18						
Stafford Bear	T22N, R17E, S 26, 34-36,	HCC	121	4.9	6.5	0.0	Jack Cr. GF Management area.
	30-32; T21N, R16E, S 4	HSH	149				
	T21N, R17E, S 4	HOR	17				
Deer Gulch	T20N, R17E, S 11-15	HSH	63	2.3	3.5	0.0	GF Management area.
		HCC	90				
		HTH	75				
		HCR	14				
Lucky Pierre	T22N, R14E, S 30	HCC	51	5.0	5.2	0.0	French Cabin Cr. ST-2 and GF Mgt. area.
	T22N, R13E, S 34, 36	HSH	86				
	T21N, R13E, S 2, 12						
Salvage		HSV	50	1.9	0.0	0.0	
Misc.		HPR	25	0.6	0.0	0.0	
SUBTOTAL			1,782	35.0	33.6	2.8	
<u>Lake Wenatchee Ranger District</u>							
West Theseus	T27N, R15E, S 8-9	HCC	106	8.1	2.0	0.5	Sale is predominantly DF, WH, and true fir. GF and ST-2 Mgt.
Basalt	T29N, R17E, S 32-33 T28N, R17E, S 5.	HCC	76	9.0	5.6	0.0	Sale previously proposed & appealed due to roadless sensitivity. GF and ST-2
		HSH	24				
		HFR	66				

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1991 - Lake Wenatchee Ranger District (Continued)</u>							
Mad Goose	T27N, R17E, S 7-8	HCC	26	6.0	0.0	1.0	Sale will harvest steep inaccessible ground below Maverick Peak. GF and ST-2
		HFR	180				
		HSH	130				
District Sales (District Wide)		HCC	50	5.9	0.0	0.0	Salvage and commercial thinning sales
		HTH	250				
		HSV	50				
SUBTOTALS			958	29.0	7.6	1.5	
<u>Leavenworth Ranger District</u>							
Tronsen Ridge	T21N, R18E, S 2-4, 11 T22N, R18E, S 26-27, 34-35	HCC	150	6.2	3.5	0.0	Douglas fir and true fir types. ST-2 Mgt area.
		HSH					
Spromberg	T25N, R18E, S 8-9	HCC	80	1.5	0.5	0.0	Clearcuts in diseased DF stands GF Mgt. area.
Sunitch	T25N, R17E, S 1-2, & 11-12	HCC	50	1.5	1.0	1.0	Douglas fir, ponderosa pine type GF and ST-2 Mgt areas
		HFR	100				
SUBTOTAL			380	9.2	5.0	1.0	
<u>Naches Ranger District</u>							
Devil	T15N, R14E, S 9-16, 21-24, 28	HSH/HCR	400	3.0	0.5	0.0	GF and ST-2 Management areas
		HFR	100				
		HPR	50				
Thunder	T14N, R13E, S 25-26 T14N, R14E, S 19-20, 29-30	HSH/HCR	236	2.5	0.0	0.0	GF Management area.
		HFR	122				
		HPR	24				
Kamiakan	T13N, R12E, S 1-3, 9-11, 15-16	HSH/HCR	64	3.9	1.0	0.0	ST-1 Management area.
		HFR	309				
		HPR	82				

A-30

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1991 - Naches Ranger District (Continued)							
Rimrock	T13N, R13E, S 7-11	HSH/HCR HFR HPR	113 96 60	2.2	0 0	0.0	ST-1 Management area.
Bumpy	T15N, R12E, S 3 T16N, R11E, S 25, 36 T16N, R12E, S 11-14, 23-24, 26-28, 32-35 T16N, R13E, S 6-7	HCC HSH/HCR	100 100	4.8	1.8	1 0	ST-1 and ST-2 Management areas.
Lynne	T14N, R14E, S 1-2, 10-15, 23-24; T14N, R15E, S 2, 4, 6, 8, & 18. T15N, R14E, S 36	HSH/HCR HFR	200 200	4 0	2.0	3.0	GF and ST-2 Management areas.
Withrow	T12N, R12E, S 1, 12-13, T12N, R13E, S 5-8, 17-18, T13N, R13E, S 14-15, 22-23, 32	HSH/HCR	225	4 5	3.0	3.0	GF and ST-2 Management areas
Buttermilk	T17N, R14E, S 1-3, 10-12, T17N, R15E, S 6; T18N, R14E, S 35-36	HCC HSH/HCR HFR	80 200 40	4 5	3.0	1.0	GF and OG-2 Management areas.
Tigger	T18N, R13E, S 1-3, 10-12, 14-15; T19N, R13E, S 30, 36	HCC HSH/HCR	183 90	9 0	5.0	2.0	GF Management area.
Dill	T13N, R14E, S 2-5, 9-11, 16; T14N, R14E, S 26-28, 33-35	HCC HSH/HCR HFR	100 450 50	7.0	0.0	2.0	GF and EW-1 Management areas
Wedgey	T18N, R14E, S 21-22, & 27	HFR	50	0 2	0 0	0 0	GF Management area.
P W Bear	T13N, R13E, S 10, 12, 14-15	HCC	30	0 5	0.0	0.0	Stand is heavily infected with root rot. ST-2 Mgt area.
Larch	T18N, R13E, S 7 & 9	HPR	20	0 1	0.0	0 0	Sale will create a WL seed production area GF Mgt. area.

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst.	
FY 1991 - Naches Ranger District (Continued)							
Corral Post	T17N, R13E, S 1; T17N, R14E, S 4-6; T18N, R13E, S 36; T18N, R14E, S 31	HFR	50	0.2	0.0	0.0	GF Management area
Up the Nile	T16N, R13E, S 1, 12-13	HFR	175	0.7	0.0	0.0	GF Management area.
Boo Boo Bear	T12N, R12E, S 1-2, 11-12, 24, 26, T13N, R13E, S 29-31	HFR	183	0.9	0.0	0.0	GF and ST-2 Management areas.
Toe	T16N, R14E, S 26-29	HCC	50	0.8	0.0	0.0	GF and EW-1 Management areas.
Salvage	District-wide	HPR	80	0.5	0.0	0.0	Small salvage sales
SUBTOTALS			4,312	49.3	16.3	12.0	
1991 TOTAL			8,782	134.5	74.3	18.7	

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1992 - Entiat & Chelan Ranger Districts</u>							
James LPP	T27N, R18E, S 9	HCC	150	3.0	1.5	0.0	8-12" LPP for specialty roundwood or refractory chips, about 8 LPP clearcuts (avg. 20 acres) in mature 90 year old stands on tractor ground. GF Mgt. area.
Grade Helo	T30N, R21E, S 31	HCC	100	6.0	5.0	2.0	Protection of critical wildlife habitat. Removal of DP/DF overstory from 20 and 60 year old DF pole stands. 4.0 MMBF helicopter yarding GF and ST-2
	T28N, R21E, S 31	HFR	140				
Lower Duncan Ridge	T29N, R18E, S 15	HCC	100	2.5	2.0	0.0	Protection of existing hiker trail and trailhead. Partial Retention of existing scenic values along trail. About 18 DF/AF clearcuts (avg 10 acres) in decadent and mistletoe stands. GF and ST-2 Management areas
		HFR	200				
Misc. Small Sales	District Wide	HCC	50	0.5	0.0	0.0	
SUBTOTAL			740	12.0	8.5	2.0	
<u>Cle Elum Ranger District</u>							
Loghorn	T20N, R12E; S30	HCC	100	1.6	2.6	0.0	Log Cr. GF Management area
	T19N, R12E, S2						
	T19N, R13E; S6						
Upper Granite	T20N, R14E, S32	HSH	250	0.2	6.3	0.3	GF and ST-2 Management area.
	T19N, R13E; S12						
	T19N, R14E; S4,6,8,10,14						

A-33

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1992 - Cle Elum Ranger Districts (Continued)</u>							
Blue Divide	T21N R17E; S7-10,15-22	HSB	150	5.0	2.0	0.0	Hovey Area. GF Management area.
		HCC	250				
		HTH	20				
Moondeam	T22N R16E; S36 T22N R17E; S31 T21N R16E; S1,12,13 T21N R17E; S5-8	HCC	100	12.0	0.0	7.0	GF Management area
		HSB	80				
		HCR	120				
Larch	T19N R15E; S35,36 T18N R15E, S1,2,6	HSB	80	1.0	1.0	0.0	Tamarack T S. Area ST-2 Management area.
		HCC	95				
Barrel	T22N R14E; S6,8,16,20 T22N R13E, S2,10,12,14	HCC	250	7.0	5.0		Cooper, Pollalie Ridge ST-2 Management area.
		HSB	200				
		HFR	40				
Sky-Price	T21N R12E, S10,14,24	HCC	65	4.0	1.3		Price Cr., Amabilis Mtn. ST-2 Management area.
		HSB	20				
Salvage				3.5			
Misc				0.7			
SUBTOTAL			1,820	35.0	18.2	7.3	
<u>Lake Wenatchee Ranger District</u>							
Chikaminnow	T28N, R17E, S 4-9, 16-17	HCC	244	11.0	8.9	1.0	Sale is predominantly DF and PP. GF and ST-2 Mgt. areas.
		HSB	230				
Loaf	T26N, R18E, S 2, 10-11, 14	HCC	72	6.0	4.4	3.0	Sale area is on steep slopes of Entiat Ridge below Sugar- loaf Peak GF and ST-2 Mgt. area
		HSB	332				
Upper Chiwawa	T30N, R17E, S 27, 34 T28N, R16E, S 2-3, 11, 14, 23 25-26, & 36	HCC	40	7.0	1.0	7.0	Portion of sale is adjacent to heavily used Chiwawa River Road #62 ST-1 Management area
		HSB	270				

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1992 - Lake Wenatchee Ranger District (Continued)</u>							
District Sales (District Wide) SUBTOTAL		HCC	50	6 0	0.0	0.0	Salvage and commercial thinning sales.
		HTH	300				
		HSV	50				
			1,588	30.0	14.3	11.0	
<u>Leavenworth Ranger District</u>							
Chumstick	T25N, R19E, S 20-22, 28,29	HCC	190	3.8	1 0	2.0	Douglas fir, ponderosa pine GF Management area
		HFR	190				
Wedge	T24N, R17E, S 34	HFR	300	1.2	0 0	1 0	Douglas fir, Ponderosa pine overstory removal. GF Mgt area.
Ruby	T22N, R18E, S 6-8, T22N, R17E, S 12	HCC	150	4.0	1.0	0.0	Douglas fir, Ponderosa pine GF and ST-2 Management areas.
		HFR	100				
SUBTOTAL			930	9 0	2.0	3.0	
<u>Naches Ranger District</u>							
County	T18N, R11E, S 1-2 & 12, T18N, R12E, S 2-4, 9-10; T19N, R11E, S 36; T19N, R12E, S 34	HCC	133	7.0	1 0	0.0	GF Management area.
		HSH/HCR	100				
Spiral	T13N, R11E, S 1, T13N, R12E, S 1-5, 11-12, T14N, R12E, S 32-35	HPR	300	3.0	0 0	0.0	ST-1 Management area.
Cub Scout	T18N, R13E, S 3-5, 9-10; T19N, R13E, S 17-23, 26-30 32-35	HCC	100	4.0	3 0	0.0	GF and ST-2 Management areas.
		HSH/HCR	50				
		HFR	50				
		HPR	10				

A-35

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1992 - Naches Ranger District (Continued)							
Buckhorn	T12N, R13E, S 2-3;	HCC	92	7.3	3.0	0.0	GF and ST-2 Management areas.
	T13N, R13E, S 13-14, 23-26	HSH/HCR	160				
	34-36, T13N, R14E, S 19, 30-31	HFR	40				
Quartzite	T18N, R14E, S 10, 14-16, 20-29, 32-34	HCC	100	5.5	1.0	5.0	GF and ST-2 Management areas.
		HSH/HCR	175				
Rock	T16N, R15E, S 4-5;	HSH/HCR	150	2.5	1.0	4.0	GF Management area
	T17N, R15E, S 14, 16,	HFR	100				
	20-22, 26, 28, 30, 32 & 34						
Alder Brush	T18N, R12E, S 11-15, 22-24	HCC	150	5.4	1.5	3.0	GF and ST-2 Management area
	T18N, R13E, S 7-10, 14-18,	HSH/HCR	58				
	21-22	HPR	20				
Intake	T13N, R14E, S 1-2,	HSH/HCR	100	4.5	1.0	5.0	GF and ST-2 Management area.
	T14N, R14E, S 23-26, 35-36	HPR	350				
	T14N, R15E, S 19-22, 28-32						
Bakeovtn	T12N, R13E, S 3-5;	HCC	150	7.0	11.0	0.0	GF and ST-2 Management area.
	T13N, R13E, S 21-22, 27-29	HSH/HCR	200				
Purdy	T17N, R14E, S 4-5;	HCC	5	0.5	0.0	0.0	ST-1 Management area.
	T18N, R14E, S 31-33 & 19,	HSH/HCR	5				
	T18N, R13E, S 14-15, 23-25,	HPR	30				
	9-10 & 4-6;						
	T19N, R12E, S 36 & 34.						
T18N, R12E, S 1-2 & 4							
Elderberry	T14N, R15E, S 2, 10, 16, 20	HSH/HCR	200	1.0	0.5	3.0	EW-1 Management area.
Chippie	T17N, R13E, S 11-14, 21-23, 27-28 & 33	HCC	50	1.5	1.5	0.5	ST-1 Management area.
		HSH/HCR	50				
Crane	T13N, R14E, S 5-6,	HFR	20	0.5	0.0	0.0	
	T14N, R13E, S 31-33	HPR	50				
White Pass W.C	T14N, R14E, S 28	HPR	10	(0.1)	0.0	0.0	Volume is unregulated

A-36

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1992 - Naches Ranger District (Continued)							
Chinook Pass W.C.	T17N, R14E, S 35-36	HPR	10	(0 1)	0.0	0.0	Volume is unregulated
Salvage	District-wide	HPR	80	0 5	0.0	0.0	Small salvage sales.
SUBTOTAL			3,098	50.4	24.5	20.5	
1992 TOTAL			8,176	136.4	67.5	43.8	

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
Miners Ridge LPP	T27N, R18E, S 35	HCC	200	3.0	1.0	0.0	8-12" LPP for specialty roundwood or refractory chips About 20 LPP clearcuts (avg. 10 acre) in 90 year old mature stands on tractor ground Partial Retention of scenic values along Entiat Summit Road Protect hiker trail.
Pot Peak	T28N, R20E, S 9	HCC HFR	250 200	3.5	3 0	0.0	Protect hiker trails, Partial Retention of scenic values along Shady Pass Road Removal of PP overstory from 80 year old DF pole stands About 16 DF clearcuts (avg 15 acres) in mistletoe and rootrot infested areas. Access depends on 3 0 miles capital investment road.
Stormy Creek	T27N, R20E, S 6	HFR	1,000	5.0	4 0	2.0	Protect hiker trail, removal of PP/DF overstory from 80 year old DF poles. Includes 3 5 MMBF of helicopter yarding. Right-of-way may be needed for Stormy Creek Road. Access depends on 4.0 miles capital investment road.
Misc Small Sales	District Wide	HCC	50	0 5	0.0	0.0	
SUBTOTAL			1,700	12.0	8 0	2.0	

A-38

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks	
		Method	Acres		Const	Reconst.		
<u>FY 1993 - Cle Elum Ranger District</u>								
Garnet	T21N R18E; S29, 32, 33 T20N R18E, S4, 5, 8, 17, 18, 20	HSB	150	4.0	1.0	1.0	Hawkeye Area	
		HCC	200					
Huck Basin	T23N R14E, S24, 25	HSB	100	4.0	1.0	0.0		
		HCC	50					
Wildcat	T20N R17E, S5, 8-10, 15	HSB	100	3.0				
		HCC	25					
Half Tuck	T20N R14E; S30	HTH	80	2.1	3.0	0.0		Tucker Cr.
		HCC	40					
Little Buck	T18N R15E, S19-23, 25-29, 34, 36	HSB	150	7.0	7.0	0.0		Manastash Area
		HCC	50					
		HCR	100					
Amabilis Point	T21N R13E, S6, 12, 18	HSB	80	3.5	3.0	0.0	Amabilis Mtn.	
		HCC	60					
Beartooth	T20N R12E, S10, 12, 14, 24, 26 T20N R11E; S12, 14	HCC	160	6.0	3.5	0.0	Cabin Cr., Bearpaw Butte	
Diamond Lil	T21N R18E; S12-15, 22-23, 26-27	HTH	80	2.0	2.0	0.0	Mt Lillian, Diamond Head	
		HCC	70					
		HSB	100					
Salvage				3.0				
Misc.				0.4				
SUBTOTAL			1,595	35.0	20.5	1.0		
<u>Lake Wenatchee Ranger District</u>								
Marble Gate	T28N, R17E, S 11, 14-15, 21-24, 26-27.	HCC	349	12.0	9.5	1.0	Most of sale is in roadless area	
Mill Overwood	T26N, R13E, S 12	HSB HFR	220 54	7.0	2.9	3.0	Sale is adjacent to U S Highway 2. Predominately true fir and MH.	

A-39

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst.	
<u>FY 1993 - Lake Wenatchee Ranger District (Continued)</u>							
River Bottom	T27N, R16E, S 16 & 18 T27N, R15E, S 4, 10-13	HSH	143	7.0	0.3	2.0	Sale is adjacent to Little Wenatchee River. Predominantly DF.
District Sales (District Wide)		HCC HSH HTH	50 50 300	5.0	0 0	0.0	Salvage and commercial thinning sales
SUBTOTAL			1,166	31.0	12.7	6.0	
<u>Leavenworth Ranger District</u>							
Negro	T22N, R17E, S 2 T23N, R17E, S 26, 30	HCC	250	2.0	0 5	0.0	Douglas fir, Ponderosa pine
Camas	T23N, R18E, S 19, 29-30, & 32	HCC	250	2.0	0.0	0.5	Douglas fir, Ponderosa pine
Swauk	T22N, R18E, S 17-21 29	HCC HSH	200 100	4 0	1.0	1.0	Swauk Corridor Plan along hiway 97
SUBTOTAL			800	8 0	1.5	1.5	
<u>Naches Ranger District</u>							
Nile	T16N, R14E, S 10-16 22-25, T16N, R15E, S 18-19 & 30	HSH/HCR HFR	170 100	3 0	0.0	2.0	
Fish	T13N, R13E, S 13 & 24; T13N, R14E, S 5-9 16-21 & 28-30	HCC HSH/HCR HFR HFR	50 350 100 40	7 0	2 0	3.0	
Eleven Day	T12N, R12E, S 13, 24 & 26, T12N, R13E, S 18-20	HCC HSH/HCR	200 115	6 3	2.0	3.0	
Mal	T14N, R13E, S 1 & 12, T15N, R13E, S 25 & 36; T14N, R14E, S 5-7, T15N, R14E, S 19-21, 28-33	HCC HSH/HCR HFR	50 450 100	8 2	1.0	0.0	

A-40

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1993 - Naches Ranger District (Continued)							
Stained Glass	T16N, R13E, S 13-15, 22-24; T16N, R14E, S 16-21	HCC	50	6.5	1.5	4.0	
		HSH/HCR	300				
		HFR	75				
Pup Tent	T12N, R12E, S 1-3 & 9-12; T12N, R13E, S 6; T13N, R12E, S 36; T13N, R13E, S 20, 29-32	HCC	50	6.5	1.0	3.0	
		HSH/HCR	250				
		HFR	50				
		HPR	75				
Deep Creek	T15N, R11E, S 13, 24-25; T15N, R12E, S 2-5, 8-10, 15-17, 20-21 & 29; T16N, R11E, S 36; T16N, R12E, S 11-14, 23-24, 26-27 & 32-35	HCC	100	5.2	0.0	0.0	
		HSH/HCR	50				
F.A. Bear	T13N, R13E, S 7-18, 20-21, 28-29; T13N, R14E, S 7 & 18	HCC	30	1.0	0.0	0.0	Stand is heavily infected with root rot.
Salvage	District-wide	HPR	100	0.5	0.0	0.0	Small salvage sales.
Misc.	District-wide	HCC	60	4.0	0.0	0.0	4-8 small sales.
		HSH/HCR	80				
		HFR	150				
		HPR	80				
SUBTOTAL			3,225	48.2	7.5	15.0	
1993 TOTAL			8,486	134.2	50.2	25.5	

A-41

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst	
FY 1994 - Entiat & Chelan Ranger Districts							
Busch LPP	T29N, R19E, S 33	HCC	180	3.0	2.0	0.0	6-10" LPP for specialty roundwood or refractory chips, about 18 LPP clearcuts (10 acres) in 90 year old mature stands on tractor ground. Protect trail. Partial Retention of scenic values along Shady Pass Road. Protect special interest values in Pawn Lakes area. Access depends on 3.5 miles of capital investment road.
Overlook	T28N, R20E, S 24	HCC HFR	150 150	2.0	2.0	1.0	About 10 DF clearcuts (avg 15 acres) in mistletoe and rootrot stands. Removal of DF/PP overstory from DF pole stands Full Retention of scenic values from Lake Chelan
North Fork Entiat	T29N, R18E, S 10	HCC HFR	80 70	2.0	2.0	0.0	8 clearcuts (avg. 10 acres) in rootrotted and decadent stands Removal of PP overstory from 80 year old DF small saw timber stands Full Retention of scenic values along North Fork Trail Protect trailhead. Temporary crossing of river only during low water Protection of wildlife habitat
Panther	T27N, R18E, S 11	HCC	225	4.5	2.0	0.0	About 15 DF/AF clearcuts (avg 15 acres) in decadent, root-rotted stands
Misc. Small Sales	District Wide	HCC	50	0.5	0.0	0.0	
SUBTOTAL			905	12.0	8.0	1.0	

A-42

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1994 - Cle Elum Ranger District</u>							
Bakers Acres	T22N R12E; S26.30 T21N R12E; S2	HCC	100	4.0	1.0	0.0	Baker Lake, Keechelus Ridge
Lakeview	T21N R13E, S20.28	HFR HSH	50 50	2.0	0.8	0.0	East Amabilis Area
Cattleguard	T18N R15E; S10.16	HSH HCC	50 10	2.7	1.2	1.0	Manastash Area
First Green	T20N R18E; S18.19.30 T20N R17E; S25	HSH HCC	75 75	0.5	3.5	1.2	First Cr.
Hex	T22N R14E, S28.33.34 T21N R14E; S4	HSH HCC	100 50	3.1	5.3	0.0	Hex Mtn
Tumble Creek	T22N R13E; S4,10,16,22	HCC	150	12.0	3.8	0.0	Tumble & Noname Creeks
Kachess Ridge	T21N R13E, S4,8,10,16, 22,26	HTH HSH	50 50	4.0	2.0	0.8	Kacheast Area
Lone Wolf	T22N R11E; S26.36	HCC HSH	50 50	2.0	1.0	0.1	Wolfe Cr Area
Upper Iron	T22N R17E; S32-34 T21N R17E; S2-5,8-11	HSH HCC	30 100	2.1	4.0	1.0	Iron Cr
Salvage				2.0			
Misc				0.6			
SUBTOTAL			1,050	35.0	22.6	4.1	
<u>Lake Wenatchee Ranger District</u>							
East Chikamin	T28N, R17E, S3-4, 10, 14-15 22-23	HCC	371	13.0	11.0	1.0	Most of sale is in current roadless area.

A-43

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks			
		Method	Acres		Const.	Reconst.				
<u>FY 1994 - Lake Wenatchee Ranger District</u>										
Upper Mill	T26N, R14E, S 23-24, 26 T26N, R13E, S 24	HCC	50	4.0	0.9	2.4	Sale may develop new ski opportunities for			
		HFR	50							
West Chiwawa	T28N, R17E, S 6-7, 17-18, 20, 28-29 T28N, R16E, S 1.	HCC	70	10.0	5.5	2.0		Sale would develop new road access on west side of Chiwawa River.		
		HSH	330							
District Sales (District Wide)		HCC	50	4.0	0.0	0.0			Salvage and commercial thinning sales	
		HSV	50							
		HTH	250							
SUBTOTAL			921	31.0	17.4	5.4				
<u>Leavenworth Ranger District</u>										
Johnny Mac	T24N, R16E, S 2, 10, 14, 24 T24N, R17E, S 30, 32, 34.	HCC	100	7 0	0.0	1.0				Possibly some helicopter, visual concerns
		HSH	100							
Fairview	T23N, R19E, S 34	HFR	300	2 0	1 0	0.0	Pine overstory removal			
SUBTOTAL			500	9 0	1.0	1 0				
<u>Naches Ranger District</u>										
Lost Creek	T16N, R14E, S 1-3, 10-12, T17N, R14E, S 22-23, 26-27, 34-36	HSH/HCR	200	2 5	1.0	0.0				
		HFR	100							
Orr	T16N, R13E S 23-26; T16N, R14E, S 19-23 26-30	HCC	50	3 0	0.0	0.0				
		HSH/HCR	150							
Hazy	T13N R12E, S 11-12 T13N, R13E, S 6-8	HSH/HCR	75	2.0	0.0	0.0				
		HPR	100							
Show Horn	T13N, R12E, S 1; T14N, R12E, S 25 &36; T13N, R13E, S 4-6; T14N, R13N, S 29-33	HSH/HCR	160	5 0	0.0	0 0				
		HPR	50							

A-44

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1994 - Naches Ranger District (Continued)							
Rubescens	T12N, R12E, S 2-3,	HCC	100	5 5	4.0	0.0	
	T13N, R12E, S 13-14, 22-26, 35-36;	HSH/HCR	120				
	T13N, R13E, S 17-20, 30						
Shortstop	T12N, R13E, S 4-5,	HCC	50	5.0	2.4	2.0	
	T13N, R13E, S 21-22, 27-28	HSH/HCR	150				
	32-34						
Rabble	T17N, R13E, S 1-3,	HCC	100	7 0	1.5	3.0	
	T17N, R14E, S 4-6,	HSH/HCR	240				
	T18N, R13E, S 25-27, 34-36,	HFR	50				
	T18N, R14E, S 30-32						
L. Rattlesnake	T14N, R14E, S 1-10;	HCC	50	8.0	1.7	3.0	
	T15N, R14E, S 21-28, 32-36	HSH/HCR	310				
		HFR	100				
		HPR	50				
Whistler	T17N, R13E, S 3-6, 8-10,	HCC	95	7.0	1.5	2.0	
	T18N, R13E, S 27-29, 31-34	HSH/HCR	100				
		HFR	30				
Salvage	District-wide	HPR	100	0.5	0.0	0.0	Small salvage sales
Misc	District-wide	HCC	75	4 0	0 0	0.0	4-8 small sales
		HSH/HCR	75				
		HFR	150				
		HPR	100				
SUBTOTAL			2,930	49.5	12 1	10.0	
1993 TOTAL			6,306	136.5	61.1	21.5	

A-45

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1995 - Entiat & Chelan Ranger Districts</u>							
Basin LPP	T29N, R19E, S 27	HCC	180	3.0	2.0	0 0	6-10" LPP specialty roundwood or refractory chips. About 18 LPP clearcuts (avg. 10 acres) in mature 90 year old stands on tractor ground. Protect special interest values in Pawn Lakes area. Access depends on 2 miles capital investment road construction.
Three Creek Skyline	T29N, R18E, S 21	HCC	100	5.0	6 0	0 0	About 10 DF clearcuts (avg 10 acres) in mistletoe and rootrot infected stands. Full Retention of existing scenic values along Entiat River Road and trails. 3.0 MMBF Longspan downhill yarding helicopter yarding. Protect wildlife habitat along river and planned trail. 6.0 miles capital investment road.
		HFR	400				
Mad Hornet	T26N, R19E, S 5	HCC	150	3 5	5.0	2.0	About 15 DF clearcuts (avg 10 acres) in mistletoe, rootrot and decadent stands. Full Retention of existing scenic values along Mad River Trail. Protect wildlife habitat along river. Removal of PP/DF overstory from 80 year old DF pole stands. 5.0 miles capital investment road.
		HFR	100				
Misc Small Sales	District Wide	HCC	50	0.5	0 0	0 0	
SUBTOTAL			980	12 0	13.0	2 0	

A-46

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1995 - Cle Elum Ranger District</u>							
Little Gale	T22N R12E, S23,24,26 T22N R13E; S19,30	HCC	100	3 0	0.0	0.0	Deferred Part of Carton
Lo Ball	T21N R13E, S30,32	HCC	85	3 0	0.6	0.0	High Top Area
Twilight	T21N R11E; S4	HCC	45	3.0	0 5	0.4	Lost Lake Area
Powerline	T21N R12E; S10,14,22, 26,36	HTH HCC	100 35	4 0	1.1	1.5	Martin T.S. Area
Long Branch	T21N R13E, S12 T22N R14E, S29,32 T21N R14E, S6,8	HFR HCC	75 80	8 0	2.9	0 7	Branch Cr.
Dingbat	T21N R14E, S10,14,16,22, 26,28,36	HTH HCC HSH	100 80 100	4.0	8 2	6.0	
Coaldust	T18N R15E; S14	HCC	40	2 0	0.6	1 0	Coal Bunker
Old Blue	T21N R17E, S1,2,11,12 T21N R18E; S4-6	HFR HCC HTH	120 80 100	5.0	2.5	2.6	Swauk Pass
Salvage				2 5	0.0	0.0	
Misc				0 5			
SUBTOTAL			1.140	35.0	16.4	12.2	
<u>Lake Wenatchee Ranger District</u>							
Indian Knob	T28N, R16E, S 11-14. & 24	HCC HTH	264 142	10 0	4 5	1.0	Most of sale is in current roadless area

A-47

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst.	
<u>FY 1995 - Lake Wenatchee Ranger District (Continued)</u>							
Smith	T27N, R14E, S 36.	HCC	96	5.0	1.8	1.0	Sale is predominantly true fir and MH.
	T26N, R14E, S 1-2.	HSH	75				
	T27N, R13E, S 25	HFR	7				
West Snowy	T27N, R15E, S 19, 29-30	HCC	80	6.0	3.2	0.0	Sale is predominantly true fir and MH.
		HFR	34				
Upper Wenatchee	T28N, R13E, S 13, 24-25.	HCC	58	5.0	0.7	0.0	Sale is adjacent to Little Wenatchee River. Predominantly DF and MH.
		HSH	34				
District Sales (District Wide)		HCC	50	4.0	0.0	0.0	Salvage and commercial thinning sales
		HSH	50				
		HTH	250				
SUBTOTAL			1,140	30.0	10.2	2.0	
<u>Leavenworth Ranger District</u>							
Deadhorse	T26N, R17E, S 21, 28 33	HCC	100	5.0	1.5	0.5	Douglas fir, ponderosa pine along hiway 2
Rock Island	T24N, R16E, S 6, T24N, R15E, S 1-3	HCC	75	3.5	0.5	0.0	Visually sensitive, along Icicle
MISC				0.5			
SUBTOTAL			175	9.0	2.0	0.5	
<u>Naches Ranger District</u>							
Old Crow	T18N, R12E, S 13 & 24; T18N, R13E, S 14-30, T18N, R14E, S 30	HCC	100	10.0	1.5	0.0	
		HSH/HCR	200				
		HFR	417				
		HPR	100				
Hause	T14N, R14E, S7-10, 14-23 26-28	HSH/HCR	330	7.0	0.0	0.0	

A-48

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1995 - Naches Ranger District (Continued)							
Conrad	T11N, R12E, S 2, 4, 9-10, T12N, R12E, S 12-14, 22-23, 26, 28 & 34	HCC	100	7 0	1.5	2.0	4-8 Small Sales
		HSH/HCR	130				
Little	T16N, R13E, S 1-2, 10-15; T16N, R14E, S 3-10, 16-18, T17N, R14E, S 32-35	HCC	50	5.0	1.0	3.0	
		HSH/HCR	280				
Have a Heart	T13N, R13E, S 1-4, T14N, R13E, S 21, 25-28, 33-36, T14N, R14E, S 30-31	HCC	90	5.0	1.3	0.0	
		HSH/HCR	200				
Timmy	T18N, R12E, S 1-2, 11-12; T18N, R13E, S 5-9	HCC	175	7.0	2.0	0.0	
		HSH/HCR	68				
		HFR	33				
		HPR	150				
Slowout	T19N, R12E, S13-15, 22, 24, 26 & 36 T19N, R13E, S 18 & 30	HCC	70	3.5	2.0	3.0	
		HSH/HCR	64				
		HFR	28				
Salvage	District-wide	HPR	100	0.5	0.0	0.0	
Misc.	District-wide	HCC	60	4.0	0.0	0.0	
		HSH/HCR	80				
		HFR	160				
		HPR	80				
SUBTOTAL			3,065	49.0	9.3	8.0	
1995 TOTAL			6,500	135.0	50.9	24.2	

A-49

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst.	
<u>FY 1996 - Entiat & Chelan Ranger Districts</u>							
Tommy LPP	T28N, R18E, S 3	HCC	180	3.0	2.0	1.0	6-10" LPP for specialty roundwood or refractory chips About 18 clearcuts (avg. 10 acres) in mature 90 year old stands, on tractor ground. Protect trailheads. Scenic Retention along valley. Access depends on 2.0 miles capital investment road
Windy Camp	T28N, R20E, S 34	HCC	100	2.5	3.0	1.0	About 10 AF/DF clearcuts (avg 10 acres) Removal of DF/PP overstory from 80 year old DF pole stands Partial Retention of existing scenic values from trail.
		HFR	150				
Ridge Tyee	T27N, R19E, S 28	HCC	200	4.0	2.0	0.0	About 15 DF clearcuts (avg 13 acres) in mistletoe infected stands. Removal of PP overstory from 80 year DF pole stands. Full Retention of scenic values along Mad River Trail.
		HFR	100				
Tiny Bisping	T26, R20E, S 15	HCC	50	2.0	3.0	1.0	Removal of PP overstory from 80 year DF pole stands About 5 DF clearcuts (avg 10 acres) in mistletoe infected stands. Protection of wildlife habitat Survey property lines. Access depends on 3.0 miles of capital investment road.
		HFR	350				
Misc. Small Sales	District Wide	HCC	50	0.5	0.0	0.0	
SUBTOTAL			1,180	12.0	10.0	3.0	

A-50

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1996 - Cle Elum Ranger District</u>							
Big Red	T22N R13E; S24,26	HFR	100	3.0	3.8	1.5	Red Mtn.
	T22N R14E, S30	HCC	50				
Mac' Pond	T21N R11E; S10	HCC	65	3.0	0.5	0.0	Lost View
Hard Rock	T19N R14E, S4,10	HCC	100	4.0	1.0	0.0	Granite Area
	T20N R14E; S32	HFR	120				
Ozzie	T19N R15E, S22-27	HFR	80	2.0	1.0	1.0	Osborn Point
		HCC	150				
		HSH	85				
Rampart	T22N R11E; S14,24	HSH	50	4.0	2.0	0.0	Ski View
		HCC	50				
Stirrup	T21N R11E; S8,14,16,22	HCC	300	5.0	1.0	0.5	Meadow Creek
Honker	T19N R15E, S25-27,34-36	HFR	100	4.0	0.5	0.5	Gooseberry
		HSH	200				
		HCC	50				
Lion Ridge	T21N R18E; S19 T21N R17E, S24,27,34,35 T20N R17E; S23	HFR	50	4.0	3.0	1.0	Sandstone
		HSH	50				
		HCC	50				
Tacoma Cabin	T21N R12E, S34 T20N R12E; S2,12	HCC	50	2.0	0.5	0.0	Cabin Ridge
Salvage				3.0			
Misc				1.0			
SUBTOTAL			1,700	35.0	13.3	4.5	
<u>Lake Wenatchee Ranger District</u>							
High 14	T28N, R14E, S 23-26.	HCC	68	6.0	2.5	0.0	Sale is predominantly true fir and MH.
		HSH	142				
		HFR	48				

A-51

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks	
		Method	Acres		Const.	Reconst		
<u>FY 1996 - Lake Wenatchee Ranger District (Continued)</u>								
Fish Fall	T28N, R13E, S 23-26	HCC	145	17.0	6.3	1.1	Sale would harvest old growth stands from area that is currently roadless.	
		HFR	100					
District Sales (District Wide)		HCC	50	6.0	0.0	0 0		Salvage and commercial thinning sales
		HSV	50					
		HTH	300					
SUBTOTAL			903	29.0	8.8	1 1		
<u>Leavenworth Ranger District</u>								
Little Chumstick	T26N, R18E S8,9,17,18	HCC	150	2 5	0.0	1.0		Douglas fir
Tumwater	T24N, R17E, S2	HCC HSH	50 150	2 0	0 5	0.0		Douglas fir, visuals
Rag	T22N., R19E, S20-22, 28	HCC HFR	50 200	4.0	2.0	0 0		Ponderosa Pine overstory Removal
MISC				0.5				
SUBTOTAL			700	9.0	2 5	1.0		
<u>Naches Ranger District</u>								
Copper City	T15N, R11E, S 13, 24-25; T15N, R12E, S 2-5, 8-10, 15-17, 20-21 & 29; T16N, R11E, S 36, T16N, R12E, S 11-14, 23-24, 26-27 & 32-35	HCC	100	5.0	2.0	5 0		
		HSH/HCR	50					
Manastash Ridge	T16N, R15E, S 1-4, 10-15, 23-26, 35-36, T17N, R15E, S2, 10, 12, 14, 24 26, 36	HCC	60	5.0	0 5	2 0		
		HSH/HCR	150					
		HFR	220					
		HPR	100					
No Sweat	T16N, R14E, S 23-36, T15N R14E S 1-4; T16N, R15E S 30-31	HCC	50	3 0	0 0	0.0		
		HSH/HCR	100					
		HFR	150					

A-52

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1996 - Naches Ranger District (Continued)</u>							
Longmire	T18N, R13E, S 11-14, 23-24; T18N, R14E, S 4-9, 16-21, 29 & 30	HCC	100	7.0	1 0	0 0	
		HSH/HCR	160				
		HFR	100				
Weddle II	T14N, R15E, S 24, 26, 34, 36	HCC	30	2 0	0 0	0 0	
		HSH/HCR	100				
		HFR	20				
Cedar	T17N, R13E, S 12-13, 24; T17N, R14E, S 4-5, 7-9, 17, 18	HCC	150	7 0	1 5	1 0	
		HSH/HCR	200				
Cliffdell	T16N, R13E, S 1-2, T17N, R13E, S 24-25, 36; T16N, R14E, S 6; T17N, R14E, S 4, 8-9, 15-22, 26-34	HCC	130	7 0	0 0	0 0	
		HSH/HCR	200				
		HFR	75				
Big Rattlesnake	T15N, R14E, S 1-4, 9-17, 21-24, 28	HSH/HCR	450	8.0	0.0	0.0	
		HFR	200				
Salvage	District-wide	HPR	100	0.5	0.0	0.0	Small salvage sales
Misc.	District-wide	HCC	60	4.0	0.0	0 0	4-8 small sales.
		HSH/HCR	80				
		HFR	160				
		HPR	80				
SUBTOTAL			3,375	43.5	3 0	3.0	
1996 TOTAL			7,858	128.5	37 6	12.6	

A-53

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst	
<u>FY 1997 - Entiat & Chelan Ranger Districts</u>							
Duncan LPP	T29N, R18E, S 4	HCC	200	3 0	2 0	0 0	6-10" specialty roundwood or refractory chips. About 20 LPP clearcuts (avg. 10 acres) in mature 90 year stands on tractor ground. Partial Retention of scenic values along Duncan Ridge Trail. Protect trail and trailhead
Mad Alma	T27N, R18E, S 25	HCC	250	4.5	4 5	1 0	About 25 DF clearcuts (avg. 10 acres) in mistletoe and rootrot infected stands. Full Retention of existing scenic value along Mad River Trail Protect wildlife habitat along river Access depends on 4 5 miles of capital investment road.
		HFR	50				
Sheep Creek	T29N, R18E, S 13	HCC	400	4.0	3 0	1.0	Full Retention of scenic values along Valley Road. About 30 DF/AF clearcuts (avg. 13 acres) in decadent stands.
Misc. Small Sales	District-wide	HCC	50	0 5	0 0	0 0	
SUBTOTAL			950	12.0	9 5	2 0	
<u>Cle Elum Ranger District</u>							
Last Resort	T22N R11E; S36	HCC	80	3.0			Resort Creek Area
Hawkins Camp	T23N R14E, S13,14,24 T23N R15E, S17-21,28-30	HSH	100	5.0			Hawkeye Area
		HCC	100				
Garrison	T20N R18E S26,27, 31-33,34,35	HCC	200	3 0			Willie Area
		HFR	50				

A-54

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1997 - Cle Elum Ranger Districts</u>							
North Face	T19N R15E; S14,16,18	HCC	100	5.0			Last Chance, Boundary Area
		HSH	150				
Scatter	T23N R14E; S2	HSH	45	1.0			Scatter Cr.
		HFR	30				
Little Sac	T22N R14E; S14,22	HSH	85	3.0			Salmon La Sac Cr.
		HCC	40				
Red Rock	T21N R16E; S12,13,24,25 T21N R17E; S18,19,30,31 T20N R17E, S5,6	HSH	90	3.0			West Red Area
		HCC	40				
Teanaway Fork	T22N R15E; S10,11,13,14 23,24 T22N R16E, S19	HCC	20	1.0			Jungle Cr , Teanaway Area
		HSH	20				
		HTR	20				
Wallbanger	T18N R15E; S12,13,24	HCR	100	3.0			Willow Gulch Area
		HCC	50				
North Mole	T19N R14E, S24,26,36 T18N R14E; S1,2 T19N R15E; S26-28,30 32,33	HSH	100	4.0			Taneum Ridge Area
		HCC	100				
Salvage				3.0			
Misc.				1.0			
SUBTOTAL			1,520	35.0			

A-55

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1997 - Lake Wenatchee Ranger District</u>							
Shoofly	T28N, R13E, S 25, & 35-36 T27N, R13E, S 2.	HCC	87	12 0	2 8	2.4	Sale is predominantly DF, MH and Cedar
		HSH	125				
		HFR	19				
High Canyon	T28N, R15E, S 23 & 25	HCC	151	7.0	0 0	0.0	Sale is predominantly DF and true firs
		HTH	30				
		HSH	40				
Natapoc	T26N, R17E, S 2-3, 10-11, 14 & 15. T27N, R17E, S 35 & 36.	HCC	125	5.0	2.2	0.0	Portions of sale area may be visible from Plain.
		HFR	29				
		HSH	56				
		HTH	97				
District Sales (District Wide)		HCC	100	6.0	0.0	0 0	Salvage and commercial thinning sales
		HSV	100				
		HTH	200				
SUBTOTAL			1,159	30.0	5 0	2 4	
<u>Leavenworth Ranger District</u>							
Sand Creek	T22N, R17E, S 10, 14-15	HCC	150	4.5	2.5	0 0	Douglas fir, ponderosa pine
		HFR	50				
Douglas	T26N, R18E, S 20-21, 29	HCC	200	4.5	1.5	1.0	Douglas fir, Ponderosa pine
		HFR	100				
SUBTOTAL			500	9 0	4 0	1.0	
<u>Naches Ranger District</u>							
North Basin	T18N, R11E, S 1-2	HCC	52	1 3	2.0	0.0	
Windy Gap	T19N, R11E, S 14, 22, 24, 26, 34 & 36; T19N, R12E, S 12, 26, 34	HCC	160	9.0	4 5	2 0	
		HSH/HCR	200				
Bluff	T13N, R12E, S 13-15, 22	HSH/HCR	250	5.0	1 0	0 0	
		HFR	50				
		HPR	200				

A-56

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1997 - Naches Ranger District							
Mac	T15N, R13E, S 1-2, 12; T15N, R14E, S 4-10, 16-17, 20	HSH/HCR	200	5.0	0.0	0.0	
		HFR	100				
		HPR	100				
Panther Ridge	T18N, R13E, S 1-3, 10-12, 14 & 15, T19N, R13E, S 30, 36	HCC	100	6.0	1.5	1.0	
		HSH/HCR	115				
		HFR	89				
		HPR	40				
Pinus	T17N, R14E S 10-15, 23-26, 36, T17N, R13E, S 30 & 36	HCC	50	5.0	0.0	0.0	
		HSH/HCR	175				
		HFR	50				
View	T13N, R13E, S 7-11	HSH/HCR	100	3.0	0.0	0.0	
		HPR	200				
Pebble	T16N, R15E, S 4-5; T17N, R15E, S 14, 16, 20, 22, 26, 28, 30, 32 & 34	HSH/HCR	300	5.0	0.0	0.0	
		HFR	125				
Discovery Creek	T12N, R12E, S 1, 12, 13, T12N, R13E, S 4-8, 17-20; T13N, R13E, S 32	HCC	50	5.0	1.5	1.0	
		HSH/HCR	150				
		HFR	100				
Salvage	District-wide	HPR	100	0.5	0.0	0.0	
Misc.	District-wide	HCC	60	4.0	0.0	0.0	4-8 small sales.
		HSH/HCR	80				
		HFR	160				
		HPR	80				
SUBTOTAL			3,436	48.8	10.5	4.0	
1997 TOTAL			7,565	134.8	(29.0)	(9.4)	

A-57

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst.	
<u>FY 1998 - Entiat & Chelan Ranger Districts</u>							
Miners Creek LPP	T27N, R18E, S 27	HCC	200	3.0	1.0	0.0	8-12" LPP for specialty roundwood or refractory chips. About 20 LPP clearcuts (avg. 10 acres) in 90 year old mature stands on tractor ground. Partial Retention of scenic values along Entiat Summit Road. Protect hiker trail.
Big Creek	T29N, R19E, S 22	HCC	650	5.0	6.0	2.0	About 40 DF clearcuts (avg. 15 acres) in decadent stands Partial Retention of scenic value along Shady Pass Road. Access depends on 6.0 miles of capital investment road.
Upper Lake	T29N, R19E, S 34	HCC	500	3.5	3.0	1.0	About 30 DF clearcuts (avg. 11 acres) in mistletoe infected stands. Protect hiker trails Access depends on 3.5 miles of capital investment road. Partial Retention of scenic values along trails
Misc. Small Sales	District-wide	HCC	50	0.5	0.0	0.0	
SUBTOTAL			1,400	12.0	10.0	3.0	
<u>Cle Elum Ranger District</u>							
Boxcar	T22N R12E, S13 T22N R13E, S18-20	HCC HSH	175 100	8.0			Carton, Box Skyline
Upper Mineral	T21N 17E; S13,17,19-30, 33-36 T21N 18E; S18-20,29-31	HCR HSH	200 250	4.0			Blue Hurley-Upper Hurley

A-58

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst	
<u>FY 1998 - Cle Elum Ranger Districts</u>							
Freezeout	T18N R15E; S4,8,17-19	HCR	100	3 0			Frostbite
		HSH	150				
North Thorp	T22N R13E, S26	HFR	65	1 5			Thorp Creek
Dropoff	T21N R18E; S34-36 T20N R18E; S1-3,11-14	HFR	100	3.0			Dropkick
		HCC	100				
		HTH	100				
South Easton	T20N R14E; S6,8	HSH	80	2.0			Easton Ridge
		HCC	20				
West Roaring	T22N R11E; S34 T21N R11E; S2	HSH	65	2 0			Whisper
Jack Staff	T22N R17E, 26,30-32, 34-36. T21N R16E, S4 T21N R17E; S5,6	HCC	100	3.0			Staff-Bear
		HSH	100				
Half Moon	T22N R16E; S36 T22N R17E; S31 T21N R16E; S1,12,13 T21N R17E; S5-8	HCC	100	5.0			Moonbeam
		HCR	100				
		HSH	100				
Salvage				3.0			
Misc				0.5			
SUBTOTAL			2,005	63.5			
<u>Lake Wenatchee Ranger District</u>							
Butcher	T26N, R16E, S 1-2 T27N, R16E, S 36.	HCC	26	4 0	0.3	3.7	Portion of sale is visible from US Hwy 2 Predominantly DF and PP.
		HFR	220				

A-59

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1998 - Lake Wenatchee Ranger District (Continued)</u>							
Upper Theseus	T27N, R15E, S 5-9, 16-17, & 20.	HCC HFR	280 49	17.0	10.0	0.0	Most of sale is in current roadless area.
Rainy Pass	T27N, R13E, S 25 T27N, R14E, S 25-26, 35, & 36	HCC HFR	93 47	5.0	2.6	0.0	
District Sales (District Wide)		HCC HSV HTH	100 100 200	4.0	0.0	0.0	Salvage and commercial thinning sales
SUBTOTAL			1,115	30.0	12.9	3.7	
<u>Leavenworth Ranger District</u>							
Dry Creek	T26N, R18E S 23-24, 14-15	HCC HFR	100 50	3.0	1.5	0.0	Douglas fir, Ponderosa pine
Scotty Rdg.	T22N, R18E, S 19-20	HFR	300	3.0	0.0	0.0	Ponderosa pine, Douglas fir
Williams	T24N, R18E, S 1-2, 12, 14	HCC	300	3.0	0.0	0.0	
SUBTOTAL			750	9.0	1.5	0.0	
<u>Naches Ranger District</u>							
Upper Quartz	T18N, R14E, S 10, 14-16, 20-29, & 32-34	HCC HSH/HCR HFR	90 200 300	7.0	2.0	1.0	
Boomer	T14N, R13E, S 13, 24-26 T14N, R14E, S 18-20, 28-30	HSH/HCR HFR HPR	130 150 20	3.0	0.0	1.5	
Soda Springs	T17N, R13E, S 11-14, 21-23, 27-28, & 33	HCC HSH/HCR HPR	80 100 80	3.0	1.5	0.0	

A-60

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst.	
FY 1998 - Naches Ranger District (Continued)							
Bear Canyon	T14N, R15E, S 2, 10, 16, 20	HSH/HCR HFR	170 80	3.0	0 0	1.5	
Chief	T13N, R12E, S 1-3, 9-11, 15, 16, 20-21, 28-29, 32	HCC HSH/HCR HFR HPR	40 120 40 80	3.0	0.0	1.0	
Little Lynn	T14N, R14E, S 1-2, 10-15, 23 & 24, T14N, R15E, S 2, 4, 6, 8 & 18, T15N, R14E, S 36	HCC HSH/HCR HFR	95 100 100	4.0	2.0	1.5	
Nalley	T13N, R14E, S 2-5, 9-11, 15 & 16; T14N, R14E, S 26-28, & 33-35	HCC HSH/HCR	75 175	5 0	3.0	0.0	
Alnus	T18N, R12E, S 11-15 & 22-24 T18N, R13E, S 7-10, 14-18, 21-22	HCC HSH/HCR HPR	100 100 50	5 0	2.0	0.0	
Divide Ridge	T12N, R13E, S 2-3; T13N, R13E, S 13-14, 23-26 34-36; T13N, R14E, S 19, 30-31	HCC HSH/HCR HFR HPR	80 100 75 30	5.0	2 5	1.0	
County II	T18N, R11E, S 1-2, 12, T18N, R12E, S 2-4, 9-10; T19N, R11E, S 36; T19N, R12E, S 34	HCC HSH/HCR HFR	100 60 40	5.0	1.0	0.0	
Salvage	District-wide	HPR	100	0.5	0.0	0.0	Small salvage sales
Misc.	District-wide	HCC HSH/HCR HFR HPR	90 80 160 80	5.0			5-10 small sales.
SUBTOTAL			3,470	48 5	14 0	7.5	
1998 TOTAL			8,740	134 5	(38 4)	(14.2)	

A-61

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst	
<u>FY 1999 - Entiat & Chelan Ranger Districts</u>							
Upper Big Creek LPP	T29N, R19E, S 26	HCC	200	.3.0	2.0	0 0	6-10" LPP for specialty roundwood or refractory chips. About 15 LPP clearcuts (avg. 13 acres) in mature 90 year old stands. Partial Retention of existing scenic values along Shady Pass Road Access depends on 2 0 miles of capital investment road.
McKenzie	T26N, R19E, S 2	HCC	100	3.5	0 0	1 0	About 10 DF clearcuts (avg 10 acres) in mistletoe infected stands Removal of DF/PP overstory from 80 year DF pole stands. Full Retention of scenic value along Mad River Trail.
		HFR	900				
South Tommy	T28N, R18E, S 15	HCC	500	5.0	4.0	1 0	About 30 DF clearcuts (avg 15 acres) in mistletoe infected stands Remove DF/PP overstory from 90 year old DF poles. 2 0 MMBF helicopter yarding Full Retention of scenic values from hiker trail. Protect trails Access depends on 4 0 miles of capital investment road.
		HFR	200				
Misc. Small Sales	District-wide	HCC	50	0 5	0 0	0.0	
SUBTOTAL			1.950	12 0	6.0	2.0	

A-62

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
<u>FY 1999 - Cle Elum Ranger District</u>							
Upper Lodge	T21N R12E; S12	HCC HSH	40 40	3.0			N.Amabilis
Hicks	T19N R14E, S10	HCC HSH	75 75	2.0			Upper Granite
Snowshoe	T21N R18E; S29,32,33 T20N R18E' S4,5,8,17,18,20	HCC HSH	100 150	3 0			Garnet
Keenan	T18N R15E, S20-23,25-29, 35,36 T17N R15E; S1	HCR HSH	100 100	3.0			Little Buck
Keg	T22N R14E, S4,8,10,20 T23N R14E, S34 T22N R13E; S14	HCC HSH	100 50	4.0			Barrel Area
Tumble Dry	T22N R13E; S10,16,22	HCC	200	5 0			Tumble Cr.
Cedar Ridge	T19N R15E, S13-16,20-24	HCC HTH	100 100	3.0			S Cle Elum Ridge
High Log	T19N R12E; S2,12 T20N R12E, S36 T19N R13E, S6	HCC	60	2 0			Log Horn
Hovey Divide	T21N R17E; S7-10,15-18 21,22	HCC HSH	100 100	2 0			Blue Divide
Reindeer	T20N R17E; S10-15 T20N R18E; S18	HCC HSH	80 50	1.5			Deer Gulch
French Fry	T22N R13E, S34,36 T22N R14E, S30 T21N R13E; S2,12	HCC	85	2 0			Lucky Pierre
Salvage				3 0			
Misc				1.5			
SUBTOTAL			1,705	35 0			

A-63

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const	Reconst.	
<u>FY 1999 - Lake Wenatchee Ranger District (Continued)</u>							
Raging Creek	T28N, R16E, S 13-14, 23-24. T28N, R17E, S 18.	HCC	161	8.0	4.1	0.0	Predominantly DF.
		HFR	57				
Upper Duck	T26N, R15E, S 18-20	HCC	57	7.0	4.3	0.0	Most of sale is in current roadless area.
		HFR	111				
Barnard Creek	T27N, R16E, S 12 & 13. T27N, R17E, S 17-18	HCC	89	7.0	4.5	4.0	Portion of sale is visible from Lake Wenatchee.
		HSH	150				
		HFR	50				
Lower Beaver	T26N, R18E, S 7-8.	HCC	120	4.0	1.0	2.0	Predominant species DF, PP and Grand fir.
		HSH	40				
District Sales (District Wide)		HCC	100	4.0	0.0	0.0	Salvage and commercial thinning sales
		HSH	100				
		HTH	200				
SUBTOTAL			1,178	30.0	13.9	6.0	
<u>Leavenworth Ranger District</u>							
E Mission	T22N, R19E, S 27, 34.	HCC	100	6.0	0.0	0.0	
		HSH	100				
Magnet Creek	T22N, R18E, S 27, 34	HFR	300	3.0			Some helicopter
SUBTOTAL			500	9.0	0.0	0.0	
<u>Naches Ranger District</u>							
Tieton Canyon	T13N, R14E, S 1-2; T14N, R14E, S 23-26, 35 & 36, T14N, R15E, S 19-22, 28-32	HSH/HCR	100	3.0	1.0	1.0	
		HPR	250				
Little Egypt	T16N, R14E, S 10-16, 22-25; T16N, R15E, S 18-19, 30	HSH/HCR	230	4.0	0.0	2.0	
		HFR	130				

A-64

TEN YEAR TIMBER SALE ACTION SCHEDULE

Sale Name	Township, Range, & Section	Harvest		Sale Volume (MMBF)	Road (miles)		Principal Management Area and Remarks
		Method	Acres		Const.	Reconst.	
FY 1999 - Naches Ranger District (Continued)							
Puppy	T13N, R11E, S 1;	HSH/HCR	75	2 0	0.0	1.0	
	T13N, R12E, S 1-5, 11-12;	HPR	100				
	T14N, R12E, S 32-35						
Skim Milk	T17N, R14E, S 1-4, 10-12;	HCC	50	7.0	1.0	2.0	
	T18N, R14E, S 34-36;	HSH/HCR	400				
	T17N, R15E, S 4, 6 & 8	HFR	30				
Camper	T12N, R12E, S 1-3 & 9-12;	HCC	50	5.0	1.5	1.5	
	T12N, R13E, S 6,	HSH/HCR	150				
	T13N, R12E, S 36;	HFR	100				
	T13N, R13E, S 20, 29-32	HPR	50				
Strobach Mtn.	T13N, R13E, S 13 & 24,	HCC	75	5 0	0.5	3.0	
	T13N, R14E, S 5-9, 16-21 & 28-30	HSH/HCR	150				
		HFR	25				
		HPR	75				
Broken Glass	T16N, R13E, S 13-15, 22-24;	HCC	70	4.0	1.0	1.0	
	T16N, R14E, S 16-21	HSH/HCR	100				
		HFR	130				
Timberwolf Mtn.	T14N, R13E, S 1 & 12;	HCC	75	5.0	1.5	0.0	
	T15N, R13E, S 25 & 36;	HSH/HCR	150				
	T14N, R14E, S 5-7,	HFR	100				
	T15N, R14E, S 19-21, 28-33						
Narrowneck Gap	T12N, R12E, S 13, 24 & 26,	HCC	70	4 0	1 5	0 0	
	T12N, R13E, S 18-20	HSH/HCR	210				
		HFR	200				
Salvage	District-wide	HPR	100	0.5	0.0	0.0	Small salvage sales
Misc.	District-wide	HCC	100	9.0	0.0	0.0	9-18 small sales.
		HSH/HCR	150				
		HFR	300				
		HPR	200				
SUBTOTAL			3,995	48.5	8.0	11.5	
1999 TOTAL			9,328	134.5	(27 9)	(19 5)	

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**VEGETATION MANAGEMENT PRACTICES
(ANNUAL AVERAGE IN FIRST DECADE FOR SUITABLE LANDS)**

Practice	Acres
Regeneration harvest:	
Clearcut	2,719
Shelterwood and seed tree	
- Preparatory cut	100
- Seed Cut	2,697
- Removal cut	2,320
Selection	112
Intermediate harvest:	
Commercial thinning	252
Salvage/sanitation	210
Timber stand improvement	<u>4,200</u>
Reforestation	<u>4,300</u>

Based on the 10 year action schedule the Ranger Districts estimate 2,719 acres of clearcut harvest. This is about 32 percent of the acres planned for harvest. Clearcutting reduces damage to future stands from dwarf mistletoe. Manipulation of species composition by planting can also reduce future losses to root disease and can be accomplished best using either shelterwoods or clearcut methods.

Shelterwood cutting can be done in two or three steps. As shown in Table IV-8, most of the Forest's planned shelterwoods in the next 10 years involve only seed cut and final removal. Preparatory cuts are seldom used due to the extra cost of a third entry into the stands. An additional entry also increases risks of soil compaction and wildlife disturbance.

Commercial thinning is also little used in the pure sense on the Forest. Few acres were selected by FORPLAN for commercial thinning. Based on maximizing present net value, approximately 3 percent or 252 acres of the general forest area are planned for commercial thinning. Additional commercial thinning could increase yields and revenues, but the costs exceed the benefits at the present time on most acres. Most of the current commercial thinning planned is for metallurgic chips from overstocked stands. Both direct costs and revenues are low for these sales as currently being prepared and administrated.

Salvage and sanitation acres are rough estimates and may be less than will actually be completed. These types of sales are in high demand by small operators as they usually required less capital and equipment than normal sales. Most people do not like to see forest residues from dead or windthrown trees accumulate and, therefore, salvage of this material has a higher acceptance by the public than harvest of "green" trees. However, greater

recognition of the need for wildlife trees and forest residue will keep salvage at a lower level than in the past.

"Selection" cutting or unevenaged management acres are probably the most difficult to predict. These will be identified on a site specific basis by the silviculturist on the Districts. Depending on definition, many of the acres managed for other resource emphasis will approach unevenaged management due to the long rotations and constant tree cover strived for. However, the primary difference between the proposed management and unevenaged management is that a definite heavy harvest to stimulate regeneration is planned on most of these acres. In pure unevenaged management a little regeneration is expected each year with no set "regeneration" cut proposed.

EARNED HARVEST

As shown in the monitoring plan, an increase or decrease of suitable acres or in intensive management of +10 percent will result in a recalculation of the annual sale quantity. Below is the calculation of the earned harvest factors

Calculation of the Earned Harvest Factors (EHF)

Planned Level: Includes prompt restocking with genetically selected planting stock on 75 percent of the clearcut and shelterwood acres. Precommercial thinning is proposed on 3,700 acres annually during the first decade. An estimated 500 acres of release is planned and often is done currently with thinning. These two items will be considered as an aggregate and termed timber stand improvement (T.S.I.). No fertilization is proposed at the planned level.

Earned Harvest Adjustment Level: If timber stand improvement (release and precommercial thinnings) vary by more than +10 percent from the goal of 4,200 acres, and adjustment in the annual sale quantity will be made. This adjustment will be based on the change in potential yield for management with precommercial thinning (GF-1) and management without precommercial thinning (GF-4) based on the managed yield tables. This is approximately 553 cubic feet of increased wood for each acre precommercially thinned. This is based on approximately equal "dry" and "wet" thinning.

Therefore, an increase or decrease of +10 percent in timber stand improvement acres would translate to a 165.9 M cubic feet change in annual sale quantity, (300 acres x 553 = 165.9 M cubic feet or .9 MM board feet).

Precommercial Thinning Earned Harvest Factor = 553 cubic feet/AC treated.

Fertilization Earned Harvest Factor = 471* cubic feet/AC treated. As the base level is 0 treatment, any fertilization completed can be used to increase in the annual sale quantity. An increase in the sale quantity should be made when the increase from fertilization equals + 10 percent of the annual allowable quantity or 238 M cubic feet. This would occur with a threshold fertilization amount of approximately 2,000 acres per year.

* Based on research findings from operational fertilization on the Cle Elum Ranger District. Approximately equal to results Region-wide reported by Miller 1979.

RANGE ALLOTMENT ANALYSIS AND REANALYSIS

Project Name	Type	District	Unit of Measure	Units By Year												
				90	91	92	93	94	95	96	97	98	99	01		
Horse Thief	Reanalysis	Chelan	Plans	1												
Table Mountain	Reanalysis	Cle Elum	Plans	1												
Potato Creek	Reanalysis	Entiat	Plans	1												
Leavenworth Sheep	Reanalysis	Leavenworth	Plans	1												
Soop Creek	Reanalysis	Naches	Plans		1											
Lake Sheep Combined	Reanalysis	Lake Wenatchee	Plans		1											
McFarland	Reanalysis	Chelan	Plans		1											
Manastash	Reanalysis	Cle Elum	Plans		1											
Mosquito Ridge	Reanalysis	Entiat	Plans			1										
Tieton	Reanalysis	Naches	Plans			1										
Antoine Creek	Reanalysis	Chelan	Plans			1										
Stafford	Reanalysis	Cle Elum	Plans			1										
#2 Canyon	Reanalysis	Leavenworth	Plans				1									
Wildhorse	Reanalysis	Lake Wenatchee	Plans				1									
Conrad Meadows	Reanalysis	Naches	Plans				1									
Alta Coulee	Reanalysis	Chelan	Plans				1									
Swauk	Reanalysis	Cle Elum	Plans				1									
Upper Hay Canyon	Reanalysis	Leavenworth	Plans					1								
Rattlesnake	Reanalysis	Naches	Plans					1								
Buttermilk	Reanalysis	Chelan	Plans					1								
Horsethief	Reanalysis	Chelan	Plans					1								
Cooper French	Reanalysis	Cle Elum	Plans						1							
Horse Lake	Reanalysis	Leavenworth	Plans						1							
Naches	Reanalysis	Naches	Plans						1							
Round Mountain	Reanalysis	Chelan	Plans						1							
Corral Fortune	Reanalysis	Cle Elum	Plans							1						
Entiat	Analysis	Entiat	Plans							1						
Lower Hay Canyon	Reanalysis	Leavenworth	Plans							1						
Nile	Reanalysis	Naches	Plans							1						
Slide Ridge	Reanalysis	Chelan	Plans								1					
Railroad Creek	Reanalysis	Chelan	Plans								1					
Virden	Reanalysis	Cle Elum	Plans								1					
Range 42	Reanalysis	Naches	Plans								1					
Washington Creek	Reanalysis	Chelan	Plans									1				
Lutz SV	Reanalysis	Chelan	Plans									1				
Icicle Ridge Rec	Reanalysis	Leavenworth	Plans									1				
White Pine Rec	Reanalysis	Lake Wenatchee	Plans									1				
25 Mile Admin	Reanalysis	Chelan	Plans										1			
Cle Elum River Rec	Reanalysis	Cle Elum	Plans											1		
Mad River Rec	Reanalysis	Entiat	Plans											1		
Chiwaukum Rec	Reanalysis	Leavenworth	Plans											1		
White River Rec	Reanalysis	Lake Wenatchee	Plans												1	
Crow Creek Rec	Reanalysis	Naches	Plans												1	
Sun Mountain Rec	Reanalysis	Chelan	Plans												1	
Taneum Rec	Reanalysis	Cle Elum	Plans												1	
Operational Costs	---	All	M\$	108	108	108	108	108	108	108	108	108	108	108	108	108

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RANGE IMPROVEMENTS

Project Name	Type	District	Unit of Measure	Units By Year											
				90	91	92	93	94	95	96	97	98	99	01	
Forest-wide Reconstruction	Fence	All	Miles	4											
Lt. Murray Boundary (KV)	Fence	Cle Elum	Miles	5											
McFarland	Fence	Chelan	Miles	1											
Frost/Buck Meadows	Fence	Cle Elum	Miles	3											
Section 25	Fence	Entiat	Miles	1 5											
Forest-wide Replacement	Springs	All	Each	5											
Bird Springs	Spring	Cle Elum	Each	1											
Union Valley	Spring	Chelan	Each	1											
Osborn Stock Water	Spring	Entiat	Each	1											
Beaver Creek T.S.	Spring	Lake Wenatchee	Each	3											
Eagle-Blagg	Spring	Leavenworth	Each	1											
Frost/Buck Meadows	Cattleguard	Cle Elum	Each	2											
Section 25	Cattleguard	Entiat	Each	1											
Minnie Meadows	Cattleguard	Naches	Each	1											
Union Valley	Corral	Chelan	Each	1											
Forest-wide Weed Maint.	Weed Control	All	Acres	200											
Antoine Veg Improv.	Veg. Imp	Chelan	Acres	150											
Swauk Highway	Weed Control	Cle Elum	Acres	25											
Forest-wide Reconstruction	Fence	All	Miles		3										
Union Valley	Fence	Chelan	Miles		1										
Naneum Meadows Reconstruct	Fence	Cle Elum	Miles		1										
Haney Meadows Reconstruction	Fence	Cle Elum	Miles		1										
Johnson/First Creek (KV)	Fence	Cle Elum	Miles		0.5										
Number 2 Canyon	Fence	Leavenworth	Miles		2 0										
Wildcat Drift	Fence	Naches	Miles		2.0										
Columbia Breaks	Fence	Entiat	Miles		1										
Forest-wide Replacement	Springs	All	Each		4										
McFarland	Spring	Chelan	Each		1										
Antoine	Spring	Chelan	Each		1										
Slide Ridge	Spring	Chelan	Each		1										
Corral Creek Reconstruction	Spring	Cle Elum	Each		1										
Coyote Springs	Springs	Entiat	Each		2										
Coyote Springs	Pipeline	Entiat	Miles		1.5										
Upper Hay Canyon	Spring	Leavenworth	Each		1										
Sec. 24	Spring	Naches	Each		1										
Union Valley	Cattleguard	Chelan	Each		1										
South Fork Road (KV)	Cattleguard	Cle Elum	Each		1										
North Fork Road	Cattleguard	Cle Elum	Each		1										
Trinity (Upper Chiwawa)	Corral	Lake Wenatchee	Each		1										
Valley Seeding (KV)	Seeding	Cle Elum	Acres		150										
Beaver Creek Seeding (KV)	Seeding	Lake Wenatchee	Acres		187										
Soup Creek Control	Weed Control	Naches	Acres		5										
Tieton Control	Weed Control	Naches	Acres		10										

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RANGE IMPROVEMENTS

Project Name	Type	District	Unit of Measure	Units By Year												
				90	91	92	93	94	95	96	97	98	99	01		
Forest-wide Weed Maint.	Weed Control	All	Acres		100											
Forest-wide Reconstruction	Fence	All	Miles			3.5										
Slide Ridge	Fence	Chelan	Miles			1										
Reecer Rail Reconstruction	Fence	Cle Elum	Miles			1										
Taneum West Bdry Reconst.	Fence	Cle Elum	Miles			2										
Buck Meadows West Boundary	Fence	Cle Elum	Miles			1										
Tyee/Windy	Fence	Entiat	Miles			0.2										
Roudy/Windy	Fence	Entiat	Miles			1.75										
Forest-wide Replacement	Spring	All	Each			6										
Union Valley	Spring	Chelan	Each			1										
Antoine	Spring	Chelan	Each			1										
Swauk Pass	Spring	Cle Elum	Each			1										
Long Springs (3 Tanks)	Spring	Entiat	Each			1										
Long Springs	Pipeline	Entiat	Miles			0.75										
Willow Springs (4 Tanks)	Spring	Entiat	Each			1										
Willow Springs	Pipeline	Entiat	Each			0.75										
Number 2 Canyon	Spring	Leavenworth	Each			1										
Slide Ridge	Cattleguard	Chelan	Each			1										
South Cle Elum Ridge	Cattleguard	Cle Elum	Each			1										
Skull Springs Road	Cattleguard	Cle Elum	Each			1										
Tyee/Windy	Cattleguard	Cle Elum	Each			2										
Cle Elum Valley Sheep	Corral	Cle Elum	Each			1										
Forest-wide Weed Maint	Weed Control	All	Acres			100										
Union Valley	Veg Imp	Chelan	Acres			200										
Cool Bunker (KV)	Seeding	Cle Elum	Acres			100										
Sandstone (KV)	Seeding	Cle Elum	Acres			50										
Labyrinth (KV)	Seeding	Lake Wenatchee	Acres			96										
Little Wenatchee (KV)	Seeding	Lake Wenatchee	Acres			109										
Soup Creek Revegetation	Seeding	Naches	Acres			140										
Rattlesnake	Weed Control	Naches	Acres			40										
Peavine	Driveway	Lake Wenatchee	Miles			0.1										
Forest-wide Reconstruction	Fence	All	Miles				5.75									
Antoine	Fence	Chelan	Miles				1									
Table Mountain Rim Reconst.	Fence	Cle Elum	Miles				0.1									
Lion/Wilson Bdy	Fence	Cle Elum	Miles				0.5									
Bowers/Wilson Bdy. (KV)	Fence	Cle Elum	Miles				0.5									
Tyee Division	Fence	Entiat	Miles				1.75									
Bernett Ridge Drift	Fence	Entiat	Miles				0.25									
Moe Canyon	Fence	Entiat	Miles				0.25									
Forest Wide Replacement	Springs	All	Each				5									
Union Valley	Spring	Chelan	Each				1									
McFarland	Springs	Chelan	Each				2									

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RANGE IMPROVEMENTS

Project Name	Type	District	Unit of Measure	Units By Year											
				90	91	92	93	94	95	96	97	98	99	01	
Slide Ridge	Spring	Chelan	Each				1								
Windy Unit (2 Tanks)	Spring	Entiat	Each				1								
Windy Unit	Pipeline	Entiat	Miles				1.5								
Upper Tye	Pipeline	Entiat	Miles				1.5								
Tye Extension	Spring	Entiat	Each				1								
Tye Extension	Pipeline	Entiat	Miles				0.25								
Bow Camp	Spring	Entiat	Each				1								
Bow Camp	Pipeline	Entiat	Miles				0.25								
Antoine	Cattleguard	Chelan	Each				1								
Grat Flat West Road	Cattleguard	Cle Elum	Each				1								
Quartz Mountain Road	Cattleguard	Cle Elum	Each				1								
Bernett Ridge	Cattleguard	Entiat	Each				1								
Moe Canyon	Cattleguard	Entiat	Each				1								
Cle Elum Valley C-V	Corral	Cle Elum	Each				1								
Forest-wide Weed Maint.	Weed Control	All	Acres												
McFarland Veg Imp.	Veg. Imp	Chelan	Acres				200								
Blue Hurley Seeding (KV)	Seeding	Cle Elum	Acres				150								
Willie Seeding (KV)	Seeding	Cle Elum	Acres				100								
Meadowside T.S. (KV)	Seeding	Lake Wenatchee	Acres				95								
Peavine T S. (KV)	Seeding	Lake Wenatchee	Acres				45								
Jumpoff Revegetation	Veg. Imp	Naches	Acres				200								
Swamp Creek	Driveway	Naches	Miles				3								
Forest-wide Reconstruction	Fence	All	Miles					2							
Union Valley	Fence	Chelan	Miles					1							
McFarland	Fence	Chelan	Miles					1							
Johnson Bdy Reconst.	Fence	Cle Elum	Miles					2							
Virden Bdy Reconst. (KV)	Fence	Cle Elum	Miles					0.5							
Roaring Ridge	Fence	Entiat	Miles					1.25							
Wilkinson	Fence	Entiat	Miles					2.25							
Forest-wide Replacement	Springs	All	Each					6							
Roth Rock with pipe	Spring	Entiat	Each					1							
Roaring with pipe (3 Tanks)	Spring	Entiat	Each					1							
Roaring Unit	Springs	Entiat	Each					4							
Union Valley	Cattleguard	Chelan	Each					1							
Ragan Road	Cattleguard	Chelan	Each					1							
Liberty Beehive	Cattleguard	Chelan	Each					1							
Roaring Ridge	Cattleguard	Entiat	Each					1							
Forest-wide Weed Maint	Weed Control	All	Acres					100							
Lower Reecer	Seeding	Cle Elum	Acres					50							
Forest-wide Weed Control	Weed Control	All	Acres					275							
Little Wenatchee TS Driveway	Bridge	Lake Wenatchee	Each					1							
Forest-wide Reconstruction	Fence	All	Miles						5.25						
McKenzie Drift	Fence	Entiat	Miles						1.5						

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RANGE IMPROVEMENTS

Project Name	Type	District	Unit of Measure	Units By Year												
				90	91	92	93	94	95	96	97	98	99	01		
Potato Creek	Fence	Entiat	Miles						0.5							
Decker Canyon	Fence	Entiat	Miles						0.25							
Fuller Drift	Fence	Entiat	Miles						0.5							
Mud Murdock	Fence	Entiat	Miles						1.5							
Forest-wide Replacement	Springs	All	Each						5							
Randal Pond	Pond	Entiat	Each						1							
Potato Creek Unit	Tanks	Entiat	Each						7							
Potato Creek Unit	Pipeline	Entiat	Miles						3.5							
Potato Creek Unit	Cattleguard	Entiat	Each						1							
Johnson Creek	Cattleguard	Entiat	Each						1							
Fuller	Cattleguard	Entiat	Each						1							
Forest-wide Weed Maint.	Weed Cont.	All	Acres						225							
Antoine Veg Imp.	Veg. Imp	Chelan	Acres						150							
Forest-wide Reconstruction	Fence	All	Miles							5						
Bigspring Drift	Fence	Entiat	Miles							0.5						
Forest-wide Construction	Fence	All	Miles							4						
Forest-wide Replacement	Springs	All	Each							6						
Union Valley	Spring	Chelan	Each							1						
McFarland	Spring	Chelan	Each							1						
Wilkinson	Spring	Entiat	Each							1						
Baldy Ridge	Spring	Entiat	Each							1						
Baldy Mountain	Spring	Entiat	Each							1						
Middle Mud	Spring	Entiat	Each							1						
Harris Creek Road	Cattleguard	Entiat	Each							1						
Forest-wide Weed Maint	Weed Control	All	Acres							100	100	100	100	100	100	100
Forest-wide Weed Control	Weed Control	All	Acres							100	100	275			200	200
Union Valley Veg Imp	Veg. Imp	Chelan	Acres							200					200	
McFarland Veg Imp	Veg Imp.	Chelan	Acres							75	75				75	75
Slide Ridge Veg Imp	Veg Imp.	Chelan	Acres								100					
Forest-wide Reconstruction	Fences	All	Miles								6	6	6	6	6	6
Union Valley	Fence	Chelan	Miles								1					
McFarland	Fence	Chelan	Miles								1					
Antoine	Fence	Chelan	Miles										1			
Slide Ridge	Fence	Chelan	Miles										1			
Forest-wide Construction	Fence	All	Miles								1.5	1.5	3.5	3.5	3.5	3.5
Forest-wide Replacement	Springs	All	Each								7	7	7	7	7	7
Union Valley	Spring	Chelan	Each										1			
McFarland	Spring	Chelan	Each										1			
Antoine	Spring	Chelan	Each										1		1	
Slide Ridge	Spring	Chelan	Each										1		1	
Forest-wide	Springs	All	Each										3	3	3	5
Union Valley	Cattleguard	Chelan	Each										1			
Forest-wide	Cattleguard	All	Each										1	1	1	1

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WATERSHED IMPROVEMENT PROJECTS - TREATED ACRES

District	Unit of Measure	Units By Year									
		90	91	92	93	94	95	96	97	98	99
Entiat (NFSW)	Acres	100	100	75	10	10	10	10	10	10	10
Entiat (CWKV)	Acres	20	20	20	15	10	5	5	5	5	5
Chelan (NFSW)	Acres	80	100	90	5	5	5	10	5	5	5
Chelan (CWKV)	Acres	5	-	5	-	5	-	5	-	5	-
Leavenworth (NFSW)	Acres	5	120	20	20	20	15	5	5	5	5
Leavenworth (CWKV)	Acres	15	15	15	15	15	15	15	15	15	15
Lake Wenatchee (NFSW)	Acres	10	10	15	15	15	15	15	15	15	15
Lake Wenatchee (CWKV)	Acres	5	5	5	5	5	5	5	5	5	5
Naches (NFSW)	Acres	15	15	15	15	15	15	15	15	15	15
Naches (CWKV)	Acres	5	5	10	10	10	10	10	10	10	10
Cle Elum (NFSW)	Acres	15	15	15	15	15	15	15	15	15	15
Cle Elum (CWKV)	Acres	5	5	10	10	10	10	10	10	10	10
Watershed Imp. Mtce. (Forest-wide)	Acres	10	10	10	10	10	10	10	10	10	10

MINERALS PROGRAM

Project Name	Unit of Measure	Units By Year									
		90	91	92	93	94	95	96	97	98	99
<u>ENERGY MINERALS</u>											
(1) Processing Notices of Intent, Plans and Leases	Cases	35	35	40	40	45					
(2) Administering Activities	Cases	10	10	12	12	15					
(3) Inventory Leasable Mineral Resources <u>1/</u>	1000 Acres	20	20	20	20	20					
<u>NON-ENERGY MINERALS</u>											
<u>Locatable and Leasable</u>											
(1) Processing Notices of Intent, Plans, Leases, and Permits	Cases	77	79	80	80	85	90				
(2) Administering Activities	Cases	20	22	24	24	30	32				
(3) Site-specific Investigation	Sites	5	6	8	9	9	9				
(4) Contest and Hearings	Cases	2	3	3	3	3	3				
(5) Inventorying Locatable Mineral Resources <u>2/</u>	1000 Acres	22	23	22	22	22	23				
<u>COMMON VARIETY MINERALS</u>											
(1) Processing Sales and Permits	Cases	60	65	65	68	70	70	71	73		
(2) Administering Permits	Cases	15	17	17	18	20	20				
(3) Inventorying Common Variety Mineral	Acres	500									
(4) Site Evaluation for F S. Use	Sites	5	7	7	7	7	8	8	10	8	8
<u>GEOLOGIC RESOURCES</u>											
(1) Evaluate Sites and Develop Plans	Plans	7	8	7	8	6	5	8			
(2) Conducting Site Investigations for F S Road Construction	Sites 1000	8	11	9	10	10	11	9	9		
(3) Inventorying Geologic and Materials Resources	Acres	18	18								
(4) Geologic Technical Investigation	Sites	2	2								

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"LANDS" ACTIVITIES

Activity	Unit of Measure	Units By Year									
		90	91	92	93	94	95	96	97	98	99
Property Line Survey	Mile*	75	75	75	70	70	70	65	65	65	65
Property Line Maintenance	Mile	-----57-----									
Cost Sharing	Supplements	16	14	14	14	14	12	10	10	8	8
Right-of-Way Acquisition	Easements**	6	6	6	5	5	5	5	4	4	4
Right-of-Way Grants	Permits & Easements	6	6	6	6	5	5	5	4	4	4
FERC Projects	Permits & Licenses	28	28	22	22	22	20	20	15	10	10
Withdrawal Reviews	Cases	6	5	5	4	4	4	3	3	3	3
Trespass and Title Claims	Cases	6	6	6	6	5	5	5	4	4	4
Small Tract Act	Cases	4	4	4	4	4	3	3	3	2	2
Special Use Administration	Cases	740	755	765	775	785	790	795	800	805	815

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Land Exchange (See Appendix B)
Purchase (See Appendix B)

* Estimated 65 miles solely Forest Service work and the remainder shared with neighboring landowners.

** Outside of cost sharing program.

ROAD AND BRIDGE CAPITAL INVESTMENT

Activity/Project	FIRST FIVE YEARS		SECOND FIVE YEARS	
	Cost (Thousands)	Outputs (Miles)	Cost (Thousands)	Outputs (Miles)
Rainy Cr./Laby Mt. 6700 000	315	5.6		
Cle Elum Culvert	130	9		
Cost Share #1	216	0.0		
Bridge R/R	120	0.6		
Bethel Ridge Rd 1500 000	164	3.6		
Waptus TH access 4316 111	50	.9		
Boulder Cave Acc. 1704 000	196	2.8		
Chiwawa river Rd 6200 000	260	2.1		
N Fk Teanaway 9737 000	575	9.9		
Cost Share #2	238	0.0		
Icicle/Eightmile 7600 000	750	6.0		
Nile Loop 1600 000	210	3.0		
Lake Cr. Basin 5904 200	67	3.5		
Cle Elum River CG 4300 123	41	5		
Wishpoosh CG 4300 112	53	2.7		
Glacier View Rd 6607 000	90	1.3		
Cost Share #3	70	0.0		
S. Fk Tieton Pave 1000 000	960	7.3		
Entiat Valley 5100 000	235	5.1		
Bumping Dam Rd 1800 394	60	0.8		
Bumping Lk Pave 1800 000	50	0.3		
Swauk 9700 112	54	2.0		
Cayuse Camp 4300 132	50	0.7		
Box/Gale Surf 4830 000	165	4.8		
Hurley Cr Surf 9711 000	95	4.8		
Lion Rock 3500 124	50	0.6		
Station Asphalt 4812 000	146	1.2		
Bridge Repl #1	350	1.0		
Bridge Repl #2			350	1.0
Yakima Fish Hab			75	0.5
Lodgepole Access			75	3.0
Tieton (Yakima cty) 12			400	1.0
Bridge Repl #3			350	1.0
Table Mountain 3500 000			50	4.2
Kittitas Fish Hab			75	0.5
Liberty Beehive 9712 000			100	2.1
Tyee Rdg Pave #2 5700 000			100	4.0
Chelan Fish Hab			75	0.5
Taneum Pave 33			270	6.8
Mission Creek 7100 000			315	12.7
Lodgepole Acc #2			75	3.0
Nile Loop Pave 1600 000			250	3.0
Shady Pass 5900 000			725	15.8
Grade Creek 8200 000			205	4.2
Derby 7400 000			100	0.7

BRIDGE REPLACEMENT/REHABILITATION FORECAST

BRIDGE NAME	BRIDGE NUMBER	TIME PERIOD	BRIDGE TYPE	BRIDGE LENGTH	BRIDGE WIDTH	YEAR BUILT	WORK REQUIRED	EST COST (\$1000'S)
Bear Paw Butte	4111-0 3	1990-1995	UT	40	14	1967	Replacement in kind	30
Snowshoe Butte	4113-1 4	1990-1995	UT	46	14	1968	Replacement in kind	35
Meadow Creek	5480-1.6	1990-1995	TT	70	14	1956	Replace with permanent structure	75
Lower Resort Creek	4832-3.7	1990-1995	UT	36	14	1966	Replace in kind	25
Tumble Creek Spur	4600127-0 8	1995-2000	UT	41	14	1965	Replace in kind	30
Boulder Creek	4330-4 2	1995-2000	TT	28	14	1957	Replace with permanent structure	30
Fortune	43302405-7 1	1995-2000	TT	60	14	1958	Replace in kind	60
Candle Wick	4308122-0.1	1990-1995	UT	34	14	1962	Replace	25
Lakeview	9070125-0 1	1990-1995	UT	51	14	1966	Replace in kind	35
Mineral Springs	9700120-0.1	1990-1995	TT	55	14	1955	Resurface deck	10
Stafford Creek	9737-1 3	1990-1995	TT	66	14	1958	Resurface deck	10
Beverly Creek	9737-3.8	1990-1995	TT	64	14	1956	Resurface deck	10
N.F. Taneum	3300-8 0	1990-1995	TT	32	14	1957	Replace deck	10
S F. Manastash	3100-11/4	1990-1995	UT	24	14	1959	Replace in kind	25
M Fk Teanaway Rv	4305113-11 0	1990-1995	TT	75	14	1955	Resurface deck	10
Pipe Creek	9700140-0 1	1990-1995	UT	21	13	1962	Replace in kind	20
Porky Basin	9700121-0 1	1990-1995	UT	20	14	1968	Replace in kind	20
Standup Creek	9703-0.7	1990-1995	TT	40	14	1956	Resurface deck	10
Bear Creek	9703-2 5	1990-1995	TT	39	14	1955	Resurface deck	10
Beverly Creek #1	9737112-0.7	1990-1995	UT	33	14	1968	Replace in kind	25
Beverly Creek #2	9737112-1 2	1995-2000	UT	32	14	1967	Bridge to be removed and closed at this point	5
Thorp Trail	4312121-0.1	1990-1995	UT	26	16 2	1980	Replace	35
Cooper River Rd	4616-2 8	1990-1995	UT	33 7	16	1964	Replace	35
N F Entiat	5100-23	1990-1995	C	41	11	1948	Repair deck spall	10
Moe Ridge	5801-0.1	1990-1995	UT	43	17	1977	Replace in kind	35
Rainy Creek #1	6701-0 7	1990-1995	TT	47	14 1	1956	Resurface	10
Smithbrook	6700-1.0	1990-1995	UT	53	14	1973	Replace with TT	50
Mill Creek 2	6960-3 8	1990-1995	UT	51	11	Unknown	Replace in kind	30
Mill Creek 3	6960-4 5	1990-1995	UT	35	14	Unknown	Replace	30
Mission Creek	7100-1 0	1990-1995	TT	32	14	1949	Replace in kind	30
Peshastin #1	7320-0.1	1995-2000	UT	73	14	1977	Replace	75
Eight Mile #1	7601-0 1		C	157	14	1966	Utilize at less than legal rating	N/A
Eight Mile #2	7601-3.7	1990-1995	UT	60	20	1970	Utilize at less than legal rating	30
Crow Creek	1902-0 3	1990-1995	TT	44 ₃	14 ₂	1954	Replace in kind	50
Lower Clear Creek	1200740-1 3	1985-1990	UT	151 ₃	18 ₂	1936	Replace portion	135
French Cabin #2	4308-5.2	1990-1995	UT	32	16	1962	Replace in kind	25
Mad River Trail	1409 1-1 2	1990-1995		52	6	1963	Replace	36
Tommy Creek Trail	1424-0 1	1990-1995		54	6	1971	Replace	37
Mad River Trail	1409-10.5	1995-1999		36	6	1966	Replace	25

C-CONCRETE, S-STEEL, TT-TREATED TIMBER, UT-UNTREATED TIMBER OR LOG

A-77

PRIORITIZED FA&O CAPITAL INVESTMENT PROJECT LIST
(> \$100,000)

Project Description	Unit	Cost Est. (\$M)
1. Office Addition (9000 Sq.Ft.)	Cle Elum	\$ 890
2. Office Addition (4700 Sq.Ft.)	Lake Wen.	\$ 376
3. Office Addition (3000 Sq.Ft.)	Entiat	\$ 240
4. 6-plex Bunkhouse (5400 Sq Ft.)	Lake Wen	\$ 378
5. 30-person Bunkhouse (4500 Sq.Ft.)	Entiat	\$ 315
6. Warehouse (3000 Sq Ft.)	Entiat	\$ 180
7. Colocation, FSL/NTC	NTC	\$ 472
8. 24-person Bunkhouse	Cle Elum	\$ 200

PRIORITIZED FOREST CAPITAL INVESTMENT PROJECT LIST
(< \$100,000)

Project Description	Unit	Cost Est. (\$M)
1. Office Addition (930 Sq Ft)	Chelan	\$ 75
2. Office Addition (1200 Sq Ft)	Lake Wen	\$ 96
3. Office Renovation	Leavenworth	\$ 100
4. Annex Addition (1500 Sq Ft.)	Chelan	\$ 100
5. Fire Office Renovation	Leavenworth	\$ 55
6. Parking Area Construction	Chelan	\$ 10
7. Parking Area Construction	Lake Wen.	\$ 100
8. 10-person Bunkhouse (1400 Sq.Ft.)	Chelan	\$ 100

APPENDIX B

LANDOWNERSHIP SITUATION

The land ownership guidance for the Forest is contained in the Forest management prescriptions for this Forest Plan. (See 24.81--J11 Landownership Planning in each prescription.) This language in the prescriptions directs every acre of the forest into one of the five (5) landownership classification categories defined on pages 100 and 101 of Chapter IV of this plan.

The location of the lands within each of these categories is shown on the Landownership Classification Map in this appendix.

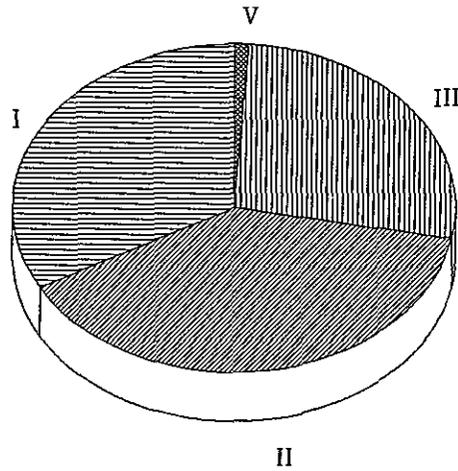
Total acreages by prescription and category are displayed on the pie chart in this appendix.

In addition, further guidance relating to the acquisition of recreation lands is contained in the Chelan, Lake Wenatchee, and Icicle Creek Composite plans. Copies of these documents are located at the Chelan, Lake Wenatchee, and Leavenworth Ranger Stations.

A projection of acres to be exchanged and purchased over the first decade of the plan follows. In the land exchange projection, the acres shown are the non-federal acres being acquired by the United States. A similar acreage of National Forest land should be considered as going into private ownership.

ACTIVITY	UNIT OF MEASURE	OUTPUT UNITS BY YEAR									
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
LAND EXCHANGE	M-Acres	9.0	10.0	3.0	10.0	3.0	3.0	3.0	3.0	3.0	3.0
PURCHASE*	M-Acres	0.6	0.6	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.1

* Purchase includes acquisition in fee (total) and acquisition of partial interests, such as scenic easements

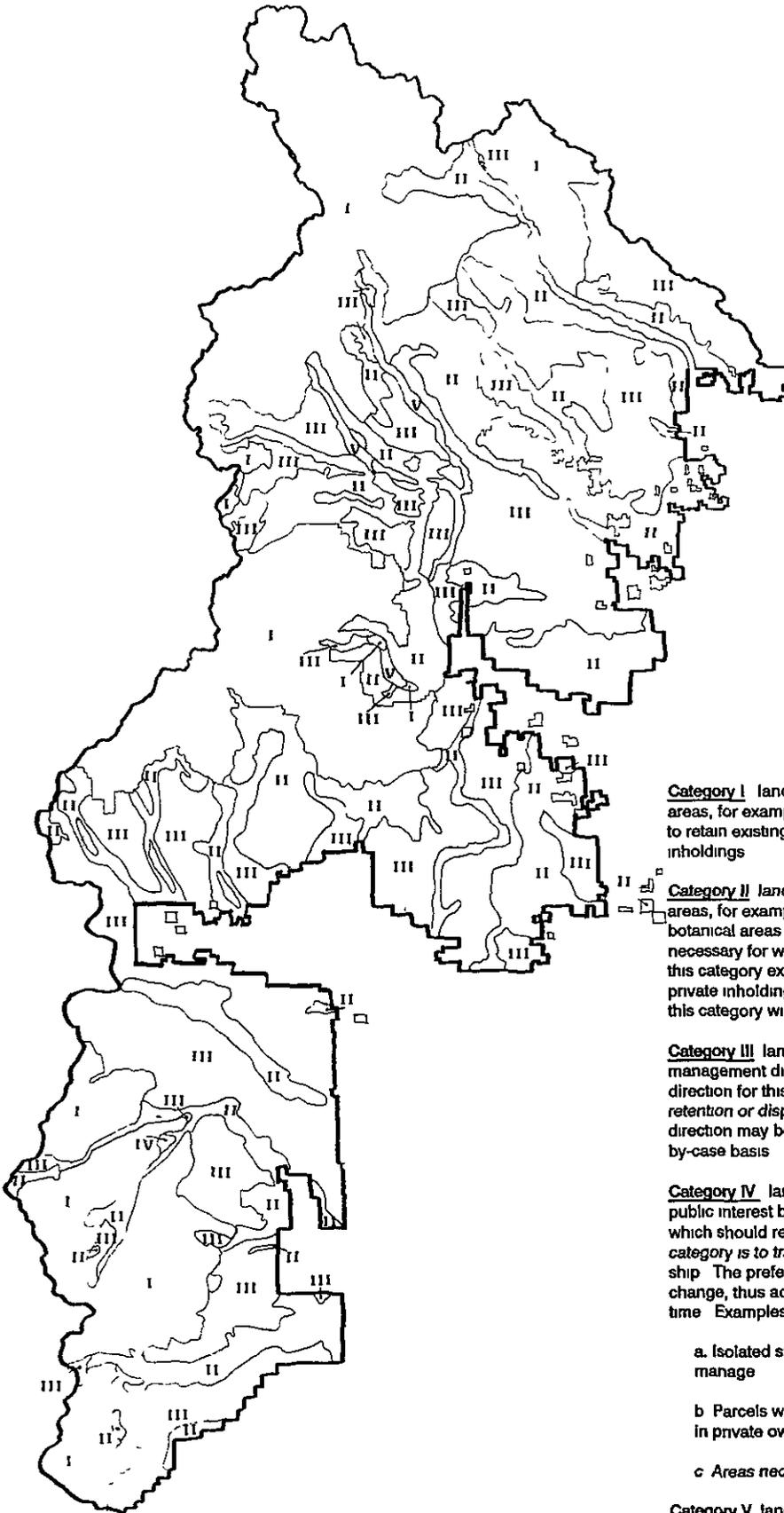


LAND OWNERSHIP CLASSIFICATION OWNERSHIP DIRECTION
by MANAGEMENT PRESCRIPTION

Category	Management	National Forest Acres	Other ownership Acres
Category I	WI-1 and WS-3	841,034	2,204
Category II	EF-1	4,770	--
	EW-1	118,742	24,670
	EW-2	47,361	--
	EW-3	19,059	--
	OG-1	79,840	--
	OG-2	49,015	--
	RE-1	6,021	--
	RE-2	96,355	20,780
	RE-3	116,092	15,670
	RN-1	2,247	40
	SI-1	70,512	16,790
	SI-2	2,798	-
	ST-1	83,635	40,900
	MP	13,717	--
CATEGORY III	GF	389,089	125,130
	RE-4	6,614	--
	RM-1	17,702	1,480
	ST-2	174,880	40,860
	UC-1	* -	950
CATEGORY IV	N.A	--	--
CATEGORY V	WS-1, 2	16,917	
	RE-1	1,378	2960
	Mission Ridge Ski Area Only		

*acres distributed among other management areas
note: Other ownership has been estimated for this table

LAND CLASSIFICATION



Category I lands are those within congressionally designated areas, for example a Wilderness. The direction for this category is to retain existing National Forest lands and acquire private inholdings.

Category II lands are those within administratively designated areas, for example, scenic areas, Mather Memorial Parkway, botanical areas and other lands which have been determined to be necessary for wildlife, visuals or recreation needs. Generally, in this category existing National Forest lands will be retained and private inholdings will be acquired. Acquisition of private lands in this category will be pursued as opportunities arise.

Category III lands are primarily within the land allocations where management direction emphasizes commodity production. The direction for this category is to avoid placing priorities on either retention or disposal of lands. Ownership changes in either direction may be appropriate. They will be considered on a case-by-case basis.

Category IV lands are National Forest lands which will serve the public interest best in private ownership and existing private lands which should remain in private ownership. The direction for this category is to transfer the National Forest lands into private ownership. The preferred method for accomplishing this is land exchange, thus advancing other land management goals at the same time. Examples of lands which fit this classification are:

- a. Isolated small parcels of land which are impractical to manage
- b. Parcels where a greater general public value can be derived in private ownership
- c. Areas necessary for community expansion

Category V lands are those which require an intensive study before priorities for ownership can be recommended. The direction for this category is to initiate the necessary studies at the earliest opportunity.

APPENDIX C

INTRODUCTION

The Wenatchee National Forest is within the area ceded to the U.S. Government by the Treaty with the Yakima, 1855. This treaty reserved to the confederated tribes and bands of the Yakima Indian Nation certain rights and privileges to these ceded lands. Among the most important rights with respect to management of the Forest are those identified in Article 3: "...the right of taking fish at all usual and accustomed places in common with the citizens of the territory, and of erecting temporary buildings for curing them; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land..." This right includes consideration by the Forest Service of the environmental effects of their land management activities on the water quality and anadromous fish habitat of the Forest.

Certain additional uses of the Forest lands by the American Indians are authorized by P.L. 95-341, the Joint Resolution on American Indian Religious Freedom (AIRFA). This Act states that it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express and exercise their traditional religions. This includes, but is not limited to, access to sites, use and possession of sacred objects and the freedom to worship through ceremonials and traditional rites. This Act directs Federal Departments and Agencies to evaluate their policies and procedures in consultation with Native traditional religious leaders in order to determine appropriate changes necessary to protect and preserve Native American religious rights and practices.

The following are complete copies of the Treaty with the Yakima, 1855 and the American Indian Religious Freedom Act.

TREATY WITH THE YAKIMA, 1855

June 9, 1855

12 Stat. 961
Ratified Mar 8 1859
Proclaimed Apr 18,
1859

Articles of agreement and convention made and concluded at the treaty-ground, Camp Stevens, Walla-Walla Valley, this ninth day of June, in the year one thousand eight hundred and fifty-five, by and between Isaac L. Stevens, governor and superintendent of Indian affairs for the Territory of Washington, on the part of the United States and the undersigned head chiefs, chiefs, head-men, and delegates of the Yakama, Palouse, Pisuouse, Wenatshapam, Klikatat, Klinguit, Kow-was-say-ee, Li-ay-was, Skin-pah, Wish-ham, Shyiks, Oche-chotes, Kah milt-pah, and Se-ap-cat, confederated tribes and bands of Indians, occupying lands hereinafter bounded and described and lying in Washington Territory, who for the purposes of this treaty are to be considered as one nation, under the name of "Yakama," with Kamariakun as its head chief, on behalf of and acting for said tribes and bands, and being duly authorized thereto by them.

Cession of lands to
the United States

ARTICLE 1. The aforesaid confederated tribes and bands of Indians hereby cede, relinquish, and convey to the United States all their right, title, and interest in and to the lands and country occupied and claimed by them, and bounded and described as follows, to wit.

Boundaries

Commencing at Mount Ranier, thence northerly along the main ridge of the Cascade Mountains to the point where the northern tributaries of Lake Che-lan and the southern tributaries of the Methow River have their rise; thence southeasterly on the divide between the waters of Lake Che-lan and the Methow River to the Columbia River; thence, crossing the Columbia on a true east course, to a point whose longitude is one hundred and nineteen degrees and ten minutes, (119° 10'), which two latter lines separate the above confederated tribes and bands from the Oskinakane tribe of Indians; thence in a true south course to the forty-seventh (47°) parallel of latitude; thence east on said parallel to the main Palouse River, which two latter lines of boundary separate the above confederated tribes and bands from the Spokanes; thence down the Palouse River to its junction with the Moh-hah-ne-she, or southern tributary of the same; thence in a southeasterly direction, to the Snake River, at the mouth of the Tucannon River, separating the above confederated tribes from the Nez Percé tribe of Indians, thence down the Snake River to its junction with the Columbia River: thence up the Columbia River to the "White Banks" below the Priest's Rapids, thence westerly to a lake called "La Lac," thence southerly to a point on the Yakama River called Toh-mah-luke; thence, in a southwesterly direction, to the Columbia River, at the western extremity of the "Big Island," between the mouths of the Umatilla River and Butler Creek; all which latter boundaries separate the

TREATY WITH THE YAKIMA, 1855.

above confederated tribes and bands from the Walla-Walla, Cayuse, and Umatilla tribes and bands of Indians; thence down the Columbia River to midway between the mouths of White Salmon and Wind Rivers, thence along the divide between said rivers to the main ridge of the Cascade Mountains; and thence along said ridge to the place of beginning

ARTICLE 2 There is, however, reserved, from the lands above ceded for the use and occupation of the aforesaid confederated tribes and bands of Indians, the tract of land included within the following boundaries, to wit Commencing on the Yakama River, at the mouth of the Attah-nam River, thence westerly along said Attah-nam River to the forks; thence along the southern tributary to the Cascade Mountains; thence southerly along the main ridge of said mountains, passing south and east of Mount Adams, to the spur whence flows the waters of the Klickitat and Pisco Rivers, thence down said spur to the divide between the waters of said rivers; thence along said divide to the divide separating the waters of the Satass River from those flowing into the Columbia River; thence along said divide to the main Yakama, eight miles below the mouth of the Satass River; and thence up the Yakama River to the place of beginning.

All which tract shall be set apart and, so far as necessary, surveyed and marked out, for the exclusive use and benefit of said confederated tribes and bands of Indians, as an Indian reservation; nor shall any white man, excepting those in the employment of the Indian Department, be permitted to reside upon the said reservation without permission of the tribe and the superintendent and agent. And the said confederated tribes and bands agree to remove to, and settle upon, the same, within one year after the ratification of this treaty. In the mean time it shall be lawful for them to reside upon any ground not in the actual claim and occupation of citizens of the United States, and upon any ground claimed or occupied, if with the permission of the owner or claimant

Guaranteeing, however, the right to all citizens of the United States to enter upon and occupy as settlers any lands not actually occupied and cultivated by said Indians at this time, and not included in the reservation above named.

And provided, That any substantial improvements heretofore made by any Indian, such as fields enclosed and cultivated, and houses erected upon the lands hereby ceded, and which he may be compelled to abandon in consequence of this treaty, shall be valued, under the direction of the President of the United States, and payment made therefor in money; or improvements of an equal value made for said Indian upon the reservation. And no Indian will be required to abandon the improvements aforesaid, now occupied by him, until their value in money, or improvements of an equal value shall be furnished him as aforesaid.

ARTICLE 3. *And provided,* That, if necessary for the public convenience, roads may be run through the said reservation; and on the other hand, the right of way, with free access from the same to the nearest public highway, is secured to them; as also the right, in common with citizens of the United States, to travel upon all public highways

The exclusive right of taking fish in all the streams, where running through or bordering said reservation, is further secured to said confederated tribes and bands of Indians, as also the right of taking fish at all usual and accustomed places, in common with the citizens of the Territory, and of erecting temporary buildings for curing them, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.

Reservation.

Boundaries

Reservations to be set apart etc., and Indians to settle thereon
Whites not to reside thereon

Improvements on ceded lands

Roads may be made

Privileges secured to Indians

TREATY WITH THE YAKIMA, 1855

Payments by the United States

ARTICLE 4. In consideration of the above cession, the United States agree to pay to the said confederated tribes and bands of Indians, in addition to the goods and provisions distributed to them at the time of signing this treaty, the sum of two hundred thousand dollars, in the following manner, that is to say: Sixty thousand dollars, to be expended under the direction of the President of the United States, the first year after the ratification of this treaty, in providing for their removal to the reservation, breaking up and fencing farms, building houses for them, supplying them with provisions and a suitable outfit, and for such other objects as he may deem necessary, and the remainder in annuities, as follows: For the first five years after the ratification of the treaty, ten thousand dollars each year, commencing September first, 1856; for the next five years, eight thousand dollars each year; for the next five years, six thousand dollars per year; and for the next five years, four thousand dollars per year

How to be applied

All which sums of money shall be applied to the use and benefit of said Indians, under the direction of the President of the United States, who may from time to time determine, at his discretion, upon what beneficial objects to expend the same for them. And the superintendent of Indian affairs, or other proper officer, shall each year inform the President of the wishes of the Indians in relation thereto.

United States to establish schools

ARTICLE 5. The United States further agree to establish at suitable points within said reservation, within one year after the ratification hereof, two schools, erecting the necessary buildings, keeping them in repair, and providing them with furniture, books, and stationery, one of which shall be an agricultural and industrial school, to be located at the agency, and to be free to the children of the said confederated tribes and bands of Indians, and to employ one superintendent of teaching and two teachers: to build two blacksmiths' shops, to one of which shall be attached a tin-shop, and to the other a gunsmith's shop, one carpenter's shop, one wagon and plough maker's shop, and to keep the same in repair and furnished with the necessary tools, to employ one superintendent of farming and two farmers, two blacksmiths, one tinner, one gunsmith, one carpenter, one wagon and plough maker, for the instruction of the Indians in trades and to assist them in the same, to erect one saw-mill and one flouring-mill, keeping the same in repair and furnished with the necessary tools and fixtures, to erect a hospital, keeping the same in repair and provided with the necessary medicines and furniture, and to employ a physician, and to erect, keep in repair, and provided with the necessary furniture, the building required for the accommodation of the said employees. The said buildings and establishments to be maintained and kept in repair as aforesaid, and the employees to be kept in service for the period of twenty years

Mechanics' shops

Sawmill and flouring mill
Hospital

Salary to head chief house, etc

And in view of the fact that the head chief of the said confederated tribes and bands of Indians is expected, and will be called upon to perform many services of a public character, occupying much of his time, the United States further agree to pay to the said confederated tribes and bands of Indians five hundred dollars per year, for the term of twenty years after the ratification hereof, as a salary for such person as the said confederated tribes and bands of Indians may select to be their head chief, to build for him at a suitable point on the reservation a comfortable house, and properly furnish the same, and to plough and fence ten acres of land. The said salary to be paid to, and the said house to be occupied by, such head chief so long as he may continue to hold that office

Kamaiakun is the head chief

And it is distinctly understood and agreed that at the time of the conclusion of this treaty Kamaiakun is the duly elected and authorized

TREATY WITH THE YAKIMA, 1855.

head chief of the confederated tribes and bands aforesaid, styled the Yakama Nation, and is recognized as such by them and by the commissioners on the part of the United States holding this treaty, and all the expenditures and expenses contemplated in this article of this treaty shall be defrayed by the United States, and shall not be deducted from the annuities agreed to be paid to said confederated tribes and band of Indians. Nor shall the cost of transporting the goods for the annuity payments be a charge upon the annuities, but shall be defrayed by the United States

ARTICLE 6. The President may, from time to time, at his discretion, cause the whole or such portions of such reservation as he may think proper, to be surveyed into lots, and assign the same to such individuals or families of the said confederated tribes and bands of Indians as are willing to avail themselves of the privilege, and will locate on the same as a permanent home, on the same terms and subject to the same regulations as are provided in the sixth article of the treaty with the Omahas, so far as the same may be applicable

Reservation may be surveyed into lots and assigned to individuals or families

ARTICLE 7. The annuities of the aforesaid confederated tribes and bands of Indians shall not be taken to pay the debts of individuals.

Annuities not to pay for debts of individuals

ARTICLE 8 The aforesaid confederated tribes and bands of Indians acknowledge their dependence upon the Government of the United States, and promise to be friendly with all citizens thereof, and pledge themselves to commit no depredations upon the property of such citizens.

Tribes to preserve friendly relations

And should any one or more of them violate this pledge, and the fact be satisfactorily proved before the agent, the property taken shall be returned, or in default thereof, or if injured or destroyed, compensation may be made by the Government out of the annuities.

To pay for depredations

Nor will they make war upon any other tribe, except in self defence, but will submit all matters of difference between them and other Indians to the Government of the United States or its agent for decision, and abide thereby. And if any of the said Indians commit depredations on any other Indians within the Territory of Washington or Oregon, the same rule shall prevail as that provided in this article in case of depredations against citizens. And the said confederated tribes and bands of Indians agree not to shelter or conceal offenders against the laws of the United States, but to deliver them up to the authorities for trial

Not to make war but in self-defense

To surrender offenders

ARTICLE 9. The said confederated tribes and bands of Indians desire to exclude from their reservation the use of ardent spirits, and to prevent their people from drinking the same, and, therefore, it is provided that any Indian belonging to said confederated tribes and bands of Indians, who is guilty of bringing liquor into said reservation, or who drinks liquor, may have his or her annuities withheld from him or her for such time as the President may determine.

Annuities may be withheld from those who drink ardent spirits

ARTICLE 10. *And provided.* That there is also reserved and set apart from the lands ceded by this treaty, for the use and benefit of the aforesaid confederated tribes and bands, a tract of land not exceeding in quantity one township of six miles square, situated at the forks of the Pisuouse or Wenatshapam River, and known as the "Wenatshapam Fishery," which said reservation shall be surveyed and marked out whenever the President may direct, and be subject to the same provisions and restrictions as other Indian reservations.

Wenatshapam fishery reserved

ARTICLE 11. This treaty shall be obligatory upon the contracting parties as soon as the same shall be ratified by the President and Senate of the United States

When treaty to take effect

In testimony whereof, the said Isaac I. Stevens, governor and superintendent of Indian affairs for the Territory of Washington, and the undersigned head chief, chiefs, headmen, and delegates of the afore-

said confederated tribes and bands of Indians, have hereunto set their hands and seals, at the place and on the day and year hereinbefore written.

ISAAC I. STEVENS,
Governor and Superintendent. [L s]

Kamaiakun, his x mark	{ L s }	Wish-och-kmpits, his x mark.	{ L s }
Skloom, his x mark	{ L s }	Koo-lat-toose, his x mark	{ L s }
Owhi, his x mark	{ L s }	Shee-ah-cotte, his x mark	{ L s }
Te-cole-kun, his x mark	{ L s }	Tuck-quille, his x mark	{ L s }
La-hoom, his x mark	{ L s }	Ka-loo-as, his x mark	{ L s }
Me-ni-nock, his x mark	{ L s }	Scha-noo-a his x mark	{ L s }
Elit Palmer, his x mark	{ L s }	Sla-kish, his x mark.	{ L s }

Signed and sealed in the presence of—

James Doty, secretary of treaties,
Mie Des Pandosy, O M T,
Wm C McKay,
W H Tappan, sub Indian agent, W T,
C Chrouse, O M T,
Patrick McKenzie, interpreter,
A. D Pamburn, interpreter,
Joel Palmer, superintendent Indian affairs, O T,
W D Biglow,
A. D Pamburn, interpreter

American Indian Religious Freedom

• Act of August 11, 1978 (P L. 95-341, 92 Stat. 469; 42 U.S.C. 1996(note))

Whereas the freedom of religion for all people is an inherent right, fundamental to the democratic structure of the United States and is guaranteed by the First Amendment of the United States Constitution;

Whereas the United States has traditionally rejected the concept of a government denying individuals the right to practice their religion and, as a result, has benefited from a rich variety of religious heritages in this country;

Whereas the religious practices of the American Indian (as well as Native Alaskan and Hawaiian) are an integral part of their culture, tradition and heritage, such practices forming the basis of Indian identity and value systems,

Whereas the traditional American Indian religions, as an integral part of Indian life, are indispensable and irreplaceable,

Whereas the lack of a clear, comprehensive, and consistent Federal policy has often resulted in the abridgment of religious freedom for traditional American Indians;

Whereas such religious infringements result from the lack of knowledge or the insensitive and inflexible enforcement of Federal policies and regulations premised on a variety of laws;

Whereas such laws were designed for such worthwhile purposes as conservation and preservation of natural species and resources*but were never intended to relate to Indian religious practices and, therefore, were passed without consideration of their effect on traditional American Indian religions;

Whereas such laws and policies often deny American Indians access to sacred sites required in their religions, including cemeteries,

Whereas such laws at times prohibit the use and possession of sacred objects necessary to the exercise of religious rites and ceremonies;

Whereas traditional American Indian ceremonies have been intruded upon, interfered with, and in a few instances banned: Now, therefore, be it

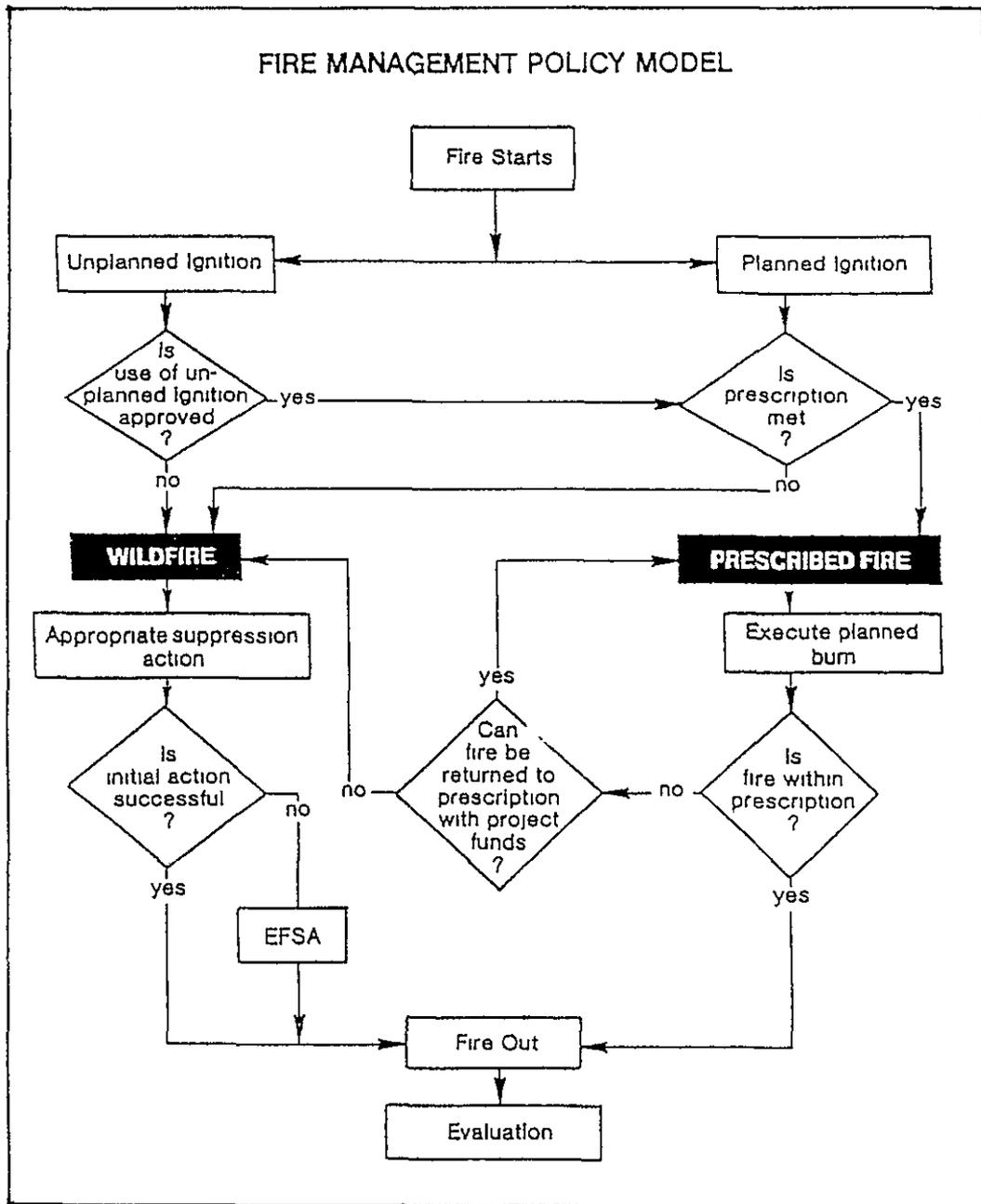
Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,

That henceforth it shall be the policy of the United States to protect and preserve for American Indians their innerent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

Sec. 2. The President shall direct the various Federal departments, agencies, and other instrumentalities responsible for administering relevant laws to evaluate their policies and procedures in consultation with native traditional religious leaders in order to determine appropriate changes necessary to protect and preserve Native American religious cultural rights and practices. Twelve months after approval of this resolution, the President shall report back to the Congress the results of his evaluation, including any changes which were made in administrative policies and procedures, and any recommendations he may have for legislative action.

APPENDIX D

The following is the fire management policy model (Matrix) referred to in the Protection section of Chapter IV.



APPENDIX E

WILDERNESS MANAGEMENT

A. WILDERNESS MANAGEMENT GOALS

1. Manage wildernesses to perpetuate wilderness character and wilderness resource values.
2. Manage wildernesses to allow natural ecological processes to operate freely and as independently of human activity as possible.
3. Manage wildernesses to provide opportunities for recreation experiences appropriate in wilderness.

B. WILDERNESS MANAGEMENT OBJECTIVES

1. Provide a variety of primitive recreation opportunities in a natural environment within the scope of the Wilderness Acts.
2. Provide a trail access system in wilderness that allows visitors to enjoy a variety of recreation experiences and minimizes negative impacts on wilderness resources.
3. Provide a range of challenges for wilderness users through trails of varying difficulty for foot, saddle and pack animal travel, and opportunities for cross-country travel.
4. Manage visitor use to ensure that physical and biological impact on the soil, vegetation, air, and water do not result in significant change in these resource values.
5. Manage visitor use to minimize social impact on recreation experiences and avoid user conflicts.
6. Restore and rehabilitate resource values degraded by present or past land management activity or recreation visitor use.
7. Manage human influences to maintain the system of natural processes that governs the distribution of plant communities and to insure that natural biotic communities and life cycles are undisturbed except by natural forces.

C. WILDERNESS RECREATION OPPORTUNITY SPECTRUM CLASSES

Individual wildernesses vary greatly in their degree of wilderness or pristine character, degree of isolation from the sounds and influences of people, and amount of recreation visitor use. There are also significant differences within each wilderness. The Wilderness Recreation Opportunity Spectrum (WROS) provides a way to describe these variations through the establishment of classes and the defining of resource and social conditions that exist in each class. All areas within each wilderness have been analyzed for the characteristics that are present in these areas and the physical, biological, and social conditions that are judged by wilderness managers to be necessary for each area, in order to meet wilderness management objectives. These present conditions and future objectives are then delineated as a class. Possible classes range from Pristine to Transition.

1. PRISTINE

The area is characterized as an extensive, unmodified, natural environment. Natural processes and conditions have not been measurably affected by the actions of users. The area will be managed as free as possible from the influences of human activity. Terrain and vegetation allow extensive and challenging cross-country travel.

This area provides the most outstanding opportunity for isolation, solitude, risk, and challenge. Encounters with other visitors will be infrequent.

There shall be no system trails in this class. Destination points will be accessed only by cross-country travel. Areas in this class are of sufficient size to assure a remote experience away from sights or sounds of human activity.

2. PRIMITIVE

The area is characterized by an essentially unmodified, natural environment. Concentrations of visitors are low and evidence of human use is minimal. The area has high opportunity for isolation, solitude, exploration, risk, and challenge.

This class receives very low visitor use due to low density of system trails and difficult terrain.

This class provides the user outstanding opportunities for cross-country travel, utilizing a high degree of outdoor skills often in an environment that offers a high degree of challenge and risk.

3. SEMI-PRIMITIVE

The area is characterized by a predominantly unmodified environment of at least moderate size. System trails and campsites are present and there is evidence of other uses. A minimum of on-site controls and restrictions are implemented to protect physical, biological, and social resources. Some facilities may be present to reduce visitor impact.

This class extends at least 500 feet on both sides of trail corridors, but may be wider around lakes, in drainage basins, and heavily used areas where the sights and sounds of people are noticed at greater distances.

A moderate to high degree of opportunity exists in this class for exploring and experiencing isolation from the sights and sounds of civilization. The environment offers a moderate to high degree of challenge and risk.

4. TRANSITION

The area is characterized by a predominantly unmodified environment, however, the concentrations of visitors may be moderate to high at various times. The area is characterized as having a large number of day users who are often mixed with overnight and long-distance travelers on trails near trailheads and wilderness boundaries.

The transition area is generally small and extends into wilderness a short distance to where side trails begin to distribute use. The class extends at least 500 feet on both sides of a trail and may be wider around lakes or heavily used areas.

Opportunities for exploration and experiencing isolation are reduced and visitors can expect to encounter the greatest number of people compared to other WROS Classes. This class introduces users to the wilderness setting, but the higher standard trails offer reduced challenge and risk.

TABLE E-1
ACRES IN EACH WILDERNESS RECREATION
OPPORTUNITY SPECTRUM CLASS BY WILDERNESS ^{1/}

Wilderness	Pristine	Primitive	Semi-Primitive	Transition
Lake Chelan-Sawtooth	5,510	29,520	17,350	1,340
Glacier Peak	148,220	79,490	46,700	6,570
Goat Rocks	10,050	15,810	9,430	1,050
Henry M. Jackson	4,160	16,000	5,760	1,280
Norse Peak	12,780	14,420	8,500	-0-
William O. Douglas	27,200	93,580	29,480	1,300
Total:	207,920	248,820	117,220	11,540

^{1/} Allocations for Alpine Lakes Wilderness are identified in the Alpine Lakes Management Plan.

D. GENERAL WILDERNESS MANAGEMENT

The wilderness Standards and Guidelines and management direction for the Wenatchee National Forest were coordinated with the Mt. Baker-Snoqualmie, Gifford-Pinchot, and Okanogan National Forests since the Cascade wildernesses in Washington State are located on portions of all four Forests.

The direction in this section applies to all wildernesses on the Forest except for the Alpine Lakes. Direction for management of this wilderness is contained in the Alpine Lakes Area Land Management Plan.

1. RECREATION

Wilderness provides unique and highly favored recreational experiences, however, recreational use of wilderness must be closely managed and monitored to assure that degradation of resource values does not occur. The following standards and guidelines are established to help achieve this end.

- a. If monitoring of on-site conditions indicates that wilderness resource values are being degraded or changed to a point that limits of acceptable change are being closely approached, management actions must be implemented to reverse the declining trend. Recreational visitor activities may be regulated, reduced, or excluded from specific sites or areas. Management actions designed to solve user impact problems will generally be fully implemented before entry quota systems are employed. (See Section H.)
- b. Visitor entry permit quotas should generally be applied to heavy use areas before they are applied to an entire wilderness.
- c. If it becomes necessary to establish priorities for wilderness visitation, highest priority should be given to uses which (1) least alter the wilderness environment and (2) are activities dependent upon the wilderness environment to be fully realized. Other uses should be encouraged to occur outside wilderness.
- d. Proposed temporary structures, such as corrals, hitch rails, or toilets must be necessary for the protection of wilderness resources and not for the convenience of users. Structures, if appropriate to the WROS Class, must be built of native or natural appearing materials and harmonize with the environment.
- e. Recreation visitors should not be permitted to cache or store equipment, personal property or supplies in wilderness. Caching is defined as leaving equipment unattended for more than 48 hours.
- f. Deviations or waivers from party size limitations may be approved by District Rangers. Waivers should consider the following criteria: (1) Capability of site and/or routes to withstand environment impacts, (2) Heavy use periods, (3) Heavy use areas, (4) Other parties on same route or destination at the same time, (5) Other visitors seeking solitude, (6) Areas not easily dominated by an oversized party, (7) Capacity of an area for camp sites and forage for livestock, (8) Action cannot be held outside wilderness, (9) Inter-district trips must be coordinated. Waivers should in no situation allow party size to exceed 12 people and 18 head of stock.

The following criteria should be used when considering waivers to allow caching of equipment in wilderness for a period longer than 48 hours.

1. Granting of the waiver is part of a managed corrective action aimed at getting control of historical occupancy and use problems.
2. The requested area is not highly controversial with the public.
3. The requested area is not located where there is frequent competition for available sites.
4. The site can accommodate the planned use.
5. The waiver will not exceed a length of stay prohibited by another order, ie: 14 Day Stay limit.
6. The site is not located in high visibility areas such as trail foregrounds, mountain passes or critical meadows.
7. The waivers can be monitored for compliance.
8. The waiver will facilitate an important wilderness enjoyment purpose, for which reasonable alternatives are lacking.

2. ADMINISTRATION

Ranger Districts will prepare annual Wilderness Management Action Plans for each wilderness. These plans will identify planned administrative actions, project work, and various management activities. Action Plans will be approved by the District Ranger.

Management activities and regulations should be coordinated with adjoining National Forests and Ranger Districts sharing management of wildernesses to ensure reasonable uniformity where necessary.

All administrative activity shall be conducted to minimize impact on social and biological resources. Wilderness Ranger patrols will conform to the Management Controls direction identified for each WROS Class.

Facilities such as cabins, trail shelters, or corrals, will not be constructed or maintained for administrative purposes. The wildernesses of the Forest are not of sufficient size or of sufficient logistical complexity to warrant these structures in wilderness.

Forest management activities outside of wilderness that influence the administration and visitor use of wilderness, will carefully consider potential negative impacts on wilderness resources in the planning phases.

Temporary signs, twine, stakes, matting, etc., used in site rehabilitation, may be necessary to inform the public and meet revegetation objectives. Visitor awareness of on-going rehabilitation projects should begin with District Receptionists and be carried through in trailhead information and wilderness Ranger contacts.

Permitted, but non-conforming, uses specified in the Wilderness Act will be administered to minimize negative impacts on wilderness. They will be reviewed and acted upon on a case-by-case basis.

3. SIGNING

Rough cut, chamfered edge, unfinished white oak shall be the standard sign material in wilderness. Lettering should be routed and scorched to a blackened color. Pacific Crest National Scenic Trail logo will be branded on white oak.

White oak signs should be placed on trees whenever possible. Where posts are necessary, use untreated native material that will weather over time.

All existing signs should be individually evaluated to determine if they meet signing objectives. Signs that do not meet the design and material standards should be scheduled for replacement with the objective of having all signs up to standard in three to five years. The number of signs should conform to standards for each WROS Class. The users should be allowed appropriate opportunities for discovery.

Mileages shall not be placed on signs within wilderness.

Signs needed for management and regulation of use, including site restoration areas and trail closures, shall be the minimum size possible, be easily seen and shall be installed to minimize both physical impact on the site and psychological impact on the users. Whenever possible, universal symbols should be used and signs worded in a positive tone. Signs will be removed when their purpose is completed.

Direction signs at system trail junctions should be limited to two per junction with a maximum of two route indicators per sign. Signs should not be used to direct users to trailless areas or to destinations on non-system trails.

Wilderness boundary signs should be placed at sufficient locations and distances so that outside activities will not encroach upon the wilderness. In the case of other management activities, project planning should include boundary posting.

Identification of hazardous stream crossings, trail conditions, prescribed fires or other information for the benefit of wilderness visitors will occur at trailhead bulletin boards or in recreation information handouts.

Emergency signing may be posted in the most logical place to be readily observed by Wilderness visitors.

4. CULTURAL RESOURCES

The preservation of cultural resources for enjoyment and educational purposes is an objective of wilderness designation. Historical structures and Native American sites must be managed and protected in accordance with State and Federal Law, and also in keeping with the intent of the Wilderness Act. All structures that have potential historical significance should be inventoried and evaluated. After evaluation, any decision to abandon or remove structures which meet the criteria for the National Register shall be preceded by the process outlined in 36 CFR 800. Any retained or maintained structure shall be managed to have a minimum impact on wilderness resources. If it is determined, after appropriate evaluation, that a structure is not of significance, it may be removed by a practical method compatible with the Wilderness Management Objectives. The decision to allow a structure that has cultural significance to gradually deteriorate is a management decision that must be preceded by proper evaluation.

Native American sites discovered at campsites or recreation use areas need to be protected and evaluated according to State and Federal laws.

5. TRAILS, BRIDGES, AND TRAVEL

Trails in wilderness are facilities or structures that allow adequate access for purposes of recreational use and enjoyment, and provide access for protection and administration. As well as providing access to destination points, trails can contribute to the recreation experience for many users. Trails, although generally necessary, do constitute a significant impact on physical and biological resources. Trails must be maintained, reconstructed, relocated, or new trails constructed in a manner that minimizes the impact on soil, water, vegetation, and wildlife. Trails must be safe enough to accommodate the planned use but should also contribute to the risk and challenge of wilderness travel.

Trail purpose and management objectives will be established for each trail. These objectives will be key factors in determining the standard and maintenance level for each trail.

Trails will be managed to maintain a balanced spectrum of travel opportunities in accordance with WROS Class criteria, trail objectives, mode of travel, and destinations.

Trails should be reconstructed, rerouted, or eliminated as needed to protect the wilderness resource and meet the objectives of each WROS Class. Priorities should be identified in the Wilderness Action Plans.

Bridge and footlogs may be provided to meet Wilderness Management Objectives and when no other route or crossing is reasonably available for visitor safety. Bridges should not be installed for visitor convenience or installed to extend the use season unless necessary to meet management objectives.

Trail locations and relocations should avoid wet areas and meadows. New trail drainage structures should be constructed of native materials and designed to minimize visual obtrusiveness. Existing metal or fiber drainage structures will be replaced where trail reconstruction becomes necessary and will be hidden from view until replaced.

Existing trails no longer needed or no longer compatible with WROS objectives should be restored to as near natural state as possible and monitored for use periodically.

The Pacific Crest National Scenic Trail shall be maintained to conform with the Wilderness Management objectives for the area which the trail passes through. Trail objectives and WROS class criteria will be the guiding direction for maintenance standards.

6. VEGETATION

Care should be taken to avoid the introduction of non-native plant species into wilderness. To minimize the possibility of accidental introduction through saddle and pack animal feed, the use of hay and unprocessed grain will be prohibited.

The use of processed grains and pelletized feed should be included in information provided to horse and pack animal users and outfitter-guide operations.

The areas surrounding campsites should be closely monitored for the presence of a near natural component of dead, deteriorating, woody debris. Areas lacking this component will be closed to campfires until natural accumulation recovers and excess wood is available. This requires some subjective judgment and is a factor in monitoring impact of visitor use.

7. FISH AND WILDLIFE

The Forest and Ranger Districts shall continue to work closely with the Washington State Departments of Wildlife and Fisheries in all aspects of fish and game management in wilderness. Ranger District action plans shall address specific coordination needs. Recommendations to State agencies will be based on protection of wilderness resources. Hunting, trapping, and fishing shall be permitted in accordance with State laws and regulated by State Agencies.

Management of native wildlife species is stressed. Wildlife species may be reintroduced if the species was once indigenous to an area and was eliminated through man's influence. Mechanized or motorized transport may be used with Regional Forester approval for reintroductions if use of non-motorized equipment is not feasible. Reintroduction should favor federally listed threatened or endangered species.

Fish stocking programs in lakes or streams should be developed in coordination with the State and in concert with Wilderness Management Objectives. This coordinated planning will be documented in annual action plans. Fish stocking programs will be administered under the direction provided in FSM 2323.34.

Fish and wildlife habitat manipulation projects can occur if they are done to perpetuate wilderness resources, to change a condition resulting from abnormal human influences, and if they meet the criteria identified in FSM 2323.35. These projects require approval from the Chief of the Forest Service. 

Trails and camping areas should be located so as not to reduce wildlife habitat effectiveness.

8. RECREATION LIVESTOCK GRAZING

Education of saddle horse and pack animal users will be an emphasis item during the life of this plan. Grazing and tethering of recreation livestock have the potential to result in significant impact on vegetation, soil, and water resources in a very short time period.

Horse and pack animal users should follow, at a minimum, the following practices:

- a. Avoid picketing or tying animals to feed in one location for a long period of time. Hobble animals or allow them to roam free during feeding periods.
- b. Do not graze, hitch, tether, or hobble any pack or saddle livestock within 200 feet slope distance of the shoreline of any lake.
- c. Tie stock on well-placed high lines during periods when not feeding.
- d. Feed animals in nose bags or feed bags to avoid littering a site.

Horse and pack animal users should generally be encouraged to pack in their basic feed supply for a trip, relying on available forage as a supplement. In heavily used areas and areas where forage is in short supply, the total feed needs of the animals should be packed in. Packing in feed usually requires additional animals. In making decisions regarding feed packing requirements, be mindful of the potential physical and biological impact of additional animals as well as the larger party size.

9. PERMITTED LIVESTOCK GRAZING ALLOTMENTS

Grazing allotments authorized within wilderness will be managed to blend with Wilderness Management Objectives. Forage utilization by permitted livestock will not be allowed to result in vegetative change that constitutes degradation of wilderness resource values.

Allotment Management Plans will address all stocking levels, maintenance and reconstruction of range improvements, and allotment management practices necessary on the allotments. These plans will describe all management activities necessary to meet allotment objectives and Wilderness Management Objectives.

Forage utilization will be monitored in the process of allotment inspection. Appropriate adjustments in grazing systems or permitted livestock numbers will be made to assure the protection of wilderness resource values.

10. WATER QUALITY

Human activity should not influence the natural quality of any waters within wilderness beyond temporary changes that return to normal when activity ceases.

Constructed facilities such as trails or high-use campsites have high potential to result in accelerated erosion rates that are detrimental to water quality. Areas used by recreation visitors will be closely observed for evidence of accelerated erosion. Water sources and water bodies near campsites should be observed for evidence of soap, other chemicals, and biological contaminants that may be introduced by human activity.

Wilderness Action Plans will identify management actions to be implemented to correct water quality problems. Methods will be developed in the future to monitor physical, chemical, and biological changes in water quality.

11. AIR QUALITY

Air quality in wilderness resulting from outside activities will be maintained to the Federal Clean Air Act and State Air Quality Standards.

Air quality impact resulting from recreation use, generally campfire smoke, will not be allowed to significantly deteriorate the recreation experience of wilderness visitors. Wilderness Action Plans will identify management actions to be implemented should excessive reduction of air quality occur.

Research is currently in planning phases to develop technology and methods to monitor air quality. Air quality related values have been identified for each Class I Wilderness and monitoring protocols are being developed.

12. FIRE MANAGEMENT

Natural fires have been an important force in the determination and evolution of the ecosystems present in wilderness. Fire suppression actions conducted since the early 1900's have had significant influence on these natural processes. In an effort to reduce the influences of fire suppression on wilderness ecosystems, a program of fire management has been developed (FSM 2324).

The objectives of fire management in wilderness are to:

- a. Permit lightning-caused fires to play, as nearly as possible, their natural ecological role in wilderness.
- b. Reduce, to an acceptable level, the risks and consequences of wildfire within wilderness or escaping from wilderness.

Upon completion of Wilderness Fire Management Plans, naturally occurring fires will be managed as prescribed fires as long as Wilderness Fire Management Objectives are being met (FSM 2324.21). Wildfires or fires burning outside of prescribed conditions will be suppressed. Each natural occurring fire will be considered a prescribed fire until declared a wildfire. Under specific conditions, described in Wilderness Fire Management Plans, prescribed fires may be ignited by forest managers to meet specific wilderness objectives (FSM 2324.22). The cumulative effects of prescribed fire will be considered in the development of decision criteria for fire management plans.

Human caused fires (not ignited by management) will be suppressed.

Fire managers will implement suppression strategies which minimize resource loss and the cost of fire suppression. Suppression tactics will be employed that minimize impacts on Wilderness resource values.

Before natural occurring fires can be managed as prescribed fires, detailed fire management action plans will be prepared for each wilderness; except the Alpine Lakes Wilderness, which has an approved Fire Management Plan. These plans will identify the preplanned specific conditions that must first exist before a fire can be managed as a prescribed fire. Outside of these specific parameters and conditions, fires will be declared wildfires and suppressed. Prescribed fire management will be conducted under conditions defined in FSM 2324.2.

13. RESEARCH

Research projects in wilderness require approval by the Regional Forester. Those applications for research that are wilderness dependent and compatible with Wilderness Management Objectives will be recommended for approval.

Research that helps resolve wilderness management problems or basic research on wilderness resources shall be given highest priority.

Data collected for management purposes, such as use figures and ecological data, should be made available to scientists for research purposes.

All research projects which require public contact, specimen collection, ground reference marking, or exemption from any regulations shall be conducted under a Special-Use Permit.

14. RECREATION SPECIAL-USE PERMITS

Recreation Special-Use Permits may be issued for specific recreation activities which are appropriate in wilderness, wilderness dependent, and in conformance with management objectives. Activities most typical are outfitter-guide operations.

Permits will not be issued for recreation events and competitions such as endurance races, competitive trail rides, rock climbing competition, running events, military exercises, or survival exercises.

15. OUTFITTER-GUIDE PERMITS

Permitted outfitters and guides provide valuable recreation opportunities for a segment of the public who do not have the expertise, equipment, or physical capabilities to enjoy these experiences on their own. Many of these opportunities are appropriate in wilderness within certain parameters, and many are dependent on the wilderness environment. Outfitter guides will continue to provide recreation opportunities in response to public demand for these opportunities.

Outfitter-Guide Permits should be issued or continued when:

- a. There is a demonstrated public need or demand for the service.
- b. Permitted use is compatible with general public use.
- c. Permitted use can occur in an area without exceeding the carrying capacity of an area in Persons-At-One-Time.
- d. Permitted use will not generate unacceptable impact on wilderness resources or changes that approach limits of acceptable change.

The number of permits issued and the amount of use allocated to permit holders should be evaluated periodically to assure an appropriate balance is maintained between general public use and outfitter use. Outfitter guides should not be allowed to dominate the use of an area or occupy favored campsites to the point that use by the general public is limited or constrained.

Outfitter-guide camps should be located away from other popular visitor campsites to reduce social resource impact.

Outfitter-guide permittees should actively assist in the education of wilderness visitors, within the scope of their operations.

Outfitter-guide operations will generally be required to adhere to established party size limitations and use conditions specified for each wilderness. Any deviation from caching or party size limitations must be documented in the annual operating plan and approved by the District Ranger.

16. VISUAL OBJECTIVES/SCENIC QUALITIES

The visual and scenic qualities present in wilderness are very significant to the quality of the recreation experience achieved by visitors. Recreation visitors should be encouraged through educational information and contacts to follow a few basic principles:

- a. Locate campsites away from and out of site of, trails, lakeshores, other campsites, and other points of interest.
- b. Tie or high-line horses and pack animals out of sight of trails, lakeshores, campsites and other points of interest.
- c. Leave no trace or evidence of their visit.
- d. Use equipment that is earth tones in color; avoid bright reds, oranges, blues and yellows.

Facilities and structures built for protection of resource values should be located to the extent practical in areas where visual impact will be minimal.

Trails should be located to take advantage of outstanding views or scenic features of high interest.

Natural events and processes such as rock slides, avalanches, tree mortality due to insects and disease, or fire, will change the visual conditions present. These natural occurrences will not be considered as detrimental to visual qualities. Special management actions should not be taken to mitigate or repair visual damage.

17. MINERALS AND ENERGY

Wilderness areas designated as such under the Wilderness Act were withdrawn from mineral entry on January 1, 1984. New wilderness areas established by the Washington State Wilderness Act were withdrawn from mineral entry as of the date of that Act of 1984. Except when valid prior-existing rights have been established and confirmed (eg, valid mining claims located or mineral leases issued prior to the date of withdrawal), wilderness-impacting mineral and energy resource exploration and development, mining claim location and mineral leasing are precluded. Valid existing rights for leases and permits will depend upon the date of issuance. Valid existing rights for mining claims will be determined by ensuring the date of location precedes the date of withdrawal, by ensuring all mining claim recording requirements have been met, and by confirming through a mining claim validity examination that a "discovery" of a valuable mineral was made prior to the date of withdrawal.

When proposed mineral-related activities require the use of mechanized or motorized equipment or will cause impacts to the wilderness characteristics, a plan of operation must be submitted, processed and approved. During the evaluation of such a proposal not only will the environmental consequences be assessed and valid existing rights to conduct such activity confirmed prior to approval, but a determination will be made as whether the use of such equipment is reasonably necessary for and incidental to the level of exploration or development activity being proposed.

Management objectives for the administration of mineral activity in wilderness are as follows:

- a. Mineral-related activities will be administered in compliance with all appropriate laws, regulations and Forest Service policy concerning wilderness management and the mining and mineral leasing laws.
- b. Those conducting mineral related activities will be required to meet all Federal and State water quality standards, and will be required to reasonably minimize any adverse impacts to wildlife habitat and the wilderness characteristics of the area.
- c. In keeping with any valid existing rights to operate mining claims or mineral leases, administrative efforts will be made to minimize any conflict between the mineral and the recreation users of wilderness areas.
- d. When mineral-related valid existing rights have been confirmed, they will be recognized; and our policy will be to encourage and facilitate those activities while ensuring any adverse impacts to wilderness are minimized. In meeting this objective the technological feasibility and the cost of implementing any enforceable controls will be considered and kept to a reasonable level.
- e. As time permits or as wilderness-impacting activities are proposed, valid existing rights on all unpatented mining claims located within wilderness areas will be evaluated. As part of the validity determination process, mining claimants will be contacted and given an opportunity to participate in that process.

18. WILD AND SCENIC RIVER CLASSIFICATION

Sections of rivers within wilderness are being recommended for classification as Wild Rivers under the Wild and Scenic Rivers Act. The designation of river segments as Wild Rivers is compatible with wilderness designation. Management decisions regarding land use or appropriate recreation activities will be directed by the act which has the most restrictive language regarding a specific question. Impoundment of rivers, which could be approved by the President under the Wilderness Act, Section 4(d)(4), would not be authorized on a river in wilderness designated Wild under the Wild and Scenic River Act, Section 7. Recreation use of a designated Wild River in wilderness may be regulated, if such use is creating impacts on wilderness resources that is not in keeping with the Wilderness Act. Management activities and recreation use impacts that occur on wild river segments within wilderness will be monitored for compliance with both Acts.

19. INSECTS AND DISEASE

There are three primary objectives in the management of insects and plant diseases in wilderness:

- a. Allow indigenous insect and plant diseases to play, as nearly as possible, their natural ecological role within wilderness.
- b. Protect the scientific value of observing the effect of insects and disease on the ecosystems.
- c. Control insect and plant disease epidemics that threaten adjacent lands or resources outside wilderness, or exotic pests that threaten an unnatural loss of wilderness resources.

When control measures are necessary in wilderness, they shall be carried out by measures that have the least adverse effect on wilderness resources and are compatible with Wilderness Management Objectives. Refer to FSM 2324.04, 2324.1, 2151, 3430, 1950.

20. THREATENED AND ENDANGERED SPECIES

Many wildernesses provide important habitat for threatened and endangered species of plants and wildlife. Actions necessary to protect or recover threatened or endangered species, including habitat manipulation and special protection measures, may be implemented in wilderness. Such actions must be necessary for perpetuation or recovery of the species and be actions that cannot be done more effectively outside wilderness. Refer to FSH 2309.19, 23.14, and 24.1.

21. SEARCH AND RESCUE

Search and rescue activities on National Forest Lands come under the jurisdiction of the County Sheriff in the county where an incident has occurred. The role of the Forest Service is to provide assistance, when requested, within the scope of the 1962 Memorandum of Understanding between the Forest Service and the Washington State Sheriff's Association. Procedures to follow in the event of a request for assistance from a Forest visitor in an emergency situation, are described in the Forest Mobilization Plan. Specific District procedures should be included in Annual Wilderness Action Plans.

Requests for use of motorized equipment or helicopters in search and rescue activities in wilderness, must be approved by the Forest Supervisor.

E. MANAGEMENT SPECIFIC TO EACH WROS CLASS

1. PRISTINE

a. Physical-Biological Standards

(1) Vegetation

- (a) Area of vegetation loss, and compacted bare mineral soil at any campsite, should not exceed 225 square feet.
- (b) Trampled area of vegetation with season recovery should not exceed 400 square feet.
- (c) No loss of trees, or trees with exposed roots at any campsite.
- (d) No noticeable modifications of natural plant succession due to stock grazing or human activity.
- (e) No loss of dead trees or noticeable loss of dead, woody debris due to campfires.

(2) Soils

- (a) Displacement and erosion of soil resulting from human activity will be limited to a rate that approximates the natural process.
- (b) Soil compaction should not occur in this class outside existing established campsites.

(3) Water Quality

There should be no measurable change in water quality due to human activity.

(4) Air Quality

Air quality will not be degraded as a result of campfire smoke, or Forest Service Management activities outside of wilderness in Class I areas.

(5) Fish and Wildlife

Visitor use shall seldom and only temporarily displace wildlife populations.

(6) Visual Impact and Scenery

- (a) No campsites should be visible from any other campsite.
- (b) Human activity inside Wilderness should remain subordinate in foreground viewing and not be recognizable in middle-ground viewing areas.

(7) Livestock Allotment

This class should not include commercial livestock allotments so that the area is free as possible from human influences and to maintain the total integrity of natural ecological processes.

b. Social Standards

(1) Encounters

There should be an 80 percent probability that not more than one individual or party will be encountered per day during the primary use season.

(2) Party Size

The maximum party size shall not exceed a combination of 12 people and/or livestock, (12 people and 18 animals in the Lake Chelan-Sawtooth Wilderness). A total of not more than six people will be encouraged in this class, and use of stock will not be encouraged for cross-country travel.

(3) Campsites

There shall be no other campsites visible or audible from any campsite. New user developed campsites will not be allowed to become established. When found, fire rings and tent frames will be disassembled and dispersed.

(4) Pets

Pets must be under reliable voice control or physical restraint. Pets may be banned from this class for protection of wildlife or to avoid other resource impact.

c. Managerial Standards

(1) Regulations and Information

(a) *Posting of information and regulations regarding this class will be located at trailheads.*

(b) *Formal orders and permits may be required to achieve management objectives in this class.*

(c) *Ranger patrols and administrative contacts should be rare in this class and kept to the minimum necessary to meet management objectives.*

(d) *Signs will generally not be present, but may be used in rare circumstances to protect Wilderness resources.*

(e) *Recreation visitor travel routes will not be readily noticeable or may appear to be wildlife trails.*

(2) Trails

There shall be no system trails in this class. User travel should be managed so that travel routes are not readily apparent or appear to be wildlife trails.

(3) Resource Protection Facilities

Facilities such as stock holding corrals are not appropriate in this class. Areas receiving visitor use numbers sufficient that facilities are necessary to protect resources should not be classified Pristine, or use should be controlled to maintain pristine conditions.

Temporary signs may be necessary to inform visitors of soil and vegetation rehabilitation projects.

2. PRIMITIVE

a. Physical-Biological Standards

(1) Vegetation

(a) Area of vegetation loss, and compacted bare mineral soil at any campsite should not exceed 400 square feet.

(b) There should be no loss of trees at any site and fewer than four trees with exposed roots per impacted site.

(c) No noticeable, long-term modification of natural plan succession as a result of livestock grazing or human activity.

(d) Dead trees or dead, woody debris may be utilized for campfires in amounts that can be replaced annually through natural accumulation.

(2) Soils

(a) Displacement and erosion of soil resulting from human activity will be limited to a rate that approximates natural processes.

(b) Soil compaction should not exceed limits which will prevent natural plant establishment and growth except at well established campsites.

(3) Water Quality

There should be no change in water quality except for temporary changes that return to normal when activity ceases.

(4) Air Quality

Air quality will not be degraded as a result of campfire smoke, or Forest Service Management activities outside of wilderness in Class I areas.

(5) Fish and Wildlife

Visitor use may temporarily displace wildlife, but should not displace wildlife from critical habitat during critical periods. (Such as fawning and winter range.)

(6) Visual Impact and Scenery

(a) Campsites will occasionally be visible from other campsites.

(b) Human activity should remain subordinate in foreground viewing and not recognizable in middle-ground viewing.

(7) Livestock Allotments

Commercial livestock is permitted in this class under approved management plans to the extent that this use is compatible with Wilderness resource values.

b. Social Standards

(1) Encounters

There should be an 80 percent probability that not more than either seven parties or seven individuals traveling alone will be encountered per day during the primary use season.

(2) Party Size

The maximum party size shall not exceed 12 people and/or livestock combined, (12 people and 18 animals in the Lake Chelan-Sawtooth Wilderness).

(3) Campsites

There shall be no more than one campsites visible or audible from any campsite, or closer than 500 feet in open country.

(4) Livestock

Grazing stock is permitted except in established camp areas. Repeated stock use in cross-country travel by a single route shall be discouraged.

(5) Pets

Pets must be under reliable voice control or physical restraint. Pets may be banned from this class for protection of wildlife or to avoid other resource impact.

c. Managerial Standards

(1) Regulations and Information

- (a) Posting of information and regulations regarding this class will be located at trailheads.
- (b) Formal orders and permits may be required to achieve management objectives in this class.
- (c) Ranger patrols and administrative contacts will occur periodically. Personnel involved in project work or monitoring will be present. Management personnel should conform to party size limitations and social standards for this class.
- (d) Signs will be kept to the minimum to protect Wilderness resources. No signs will be provided to indicate destinations.
- (e) Visitor travel routes may be noticeable, but should appear as wildlife trails.

(2) Trails

System trails are present in this class generally at low density. Some user developed trails may exist, but are not encouraged for use and rarely upgraded to system trails. If user-developed trails become well established, management action should be taken to rehabilitate damage and discontinue use. Reroutes of existing trails may be done to protect resources or to meet wilderness objectives. New trail construction in trailless drainages or to new destinations must be considered in the Forest Planning process.

(3) Resource Protection Facilities

Facilities that are essential for resource protection and visitor safety are appropriate in this class. Only native or natural appearing construction materials will be used. There will be no facilities provided for user comfort or convenience.

3. SEMI-PRIMITIVE

a. Physical-Biological Standards

(1) Vegetation

- (a) Area of vegetation loss, and compacted bare mineral soil at any campsite, should not exceed 625 square feet.
- (b) There should be no loss of trees at any site and only six trees per site with roots exposed or which show signs of human use impact.
- (c) There should be no long-term modification of plant succession and only short-term modification due to human activity or livestock grazing that can recover in one growing season.
- (d) Dead trees or dead, woody debris may be utilized for campfire wood in amounts that can be replaced annually through natural accumulation.

(2) Soils

(a) Displacement and erosion of soil resulting from human activity will be limited to a rate that approximates natural processes.

(b) Soil compaction should not exceed limits which will prevent natural plant establishment and growth, except at desired campsites, and in designated trail treads.

(3) Water Quality

There should be no change in water quality except for temporary changes that return to normal when activity ceases.

(4) Air Quality

Air quality will not be degraded as a result of campfire smoke or Forest Service Management activities outside of wilderness in Class I areas.

(5) Fish and Wildlife

(a) Visitor use should not displace wildlife from critical areas during critical periods.

(b) Riparian areas should appear to be unchanged by human or livestock use.

(c) Displacement of wildlife due to visitor use may be significant but should be of short duration to assure a natural ecosystem is maintained. Visitor use should not decrease habitat effectiveness for one species more than 20 percent.

(6) Visual Impact and Scenery

(a) Campsites will be visible at times from other campsites.

(b) Human activity in wilderness, should remain generally subordinate in foreground viewing and not recognizable in middle-ground viewing.

(7) Livestock Allotments

Commercial livestock is permitted in this class under approved management plans to the extent that such use is compatible with all resource values.

b. Social Standards

(1) Encounters

There should be an 80 percent probability that not more than either ten parties or ten individuals traveling alone, will be encountered per day during the primary use season.

(2) Party Size

The maximum party size shall not exceed 12 people and/or livestock combined, (12 people and 18 animals in the Lake Chelan-Sawtooth Wilderness).

(3) Campsites

There shall be no more than two campsites visible or audible from any campsite, or closer than 500 feet in open country.

(4) Livestock

Grazing of stock is permitted except in established camp areas.

(5) Pets

Pets must be under reliable voice control or physical restraint. Pets may be banned from this class for protection of wildlife or to avoid other social or biological impact.

c. Managerial Standards

(1) Regulations and Information

(a) Posting of information and regulations regarding this class will generally be done at trailheads. Some regulatory signing may be posted at key locations such as lakeshores and campsites to help gain user compliance.

(b) Formal orders and permits may commonly be used to achieve management objectives in this class.

(c) Ranger patrols and administrative contacts will occur more frequently in this class, particularly at popular destination points and on weekends during the primary visitor use season. Personnel involved in project work or monitoring activities will be present. Major work projects should be planned as much as possible during low visitor-use periods. Management personnel should conform to party size limitations and be aware of their potential to impact visitor experiences.

(2) Trails

The managed trail system should be maintained or constructed toward more and most difficult trail standards (FSH 2309.18). However, trails classified easiest may exist in areas of gentle terrain and valley bottoms. A variety of user restrictions may be implemented to resolve negative resource impacts.

(3) Resource Protection Facilities

Facilities will be as natural appearing as possible or will be constructed out of native material. No facilities will be constructed for user convenience or comfort. Facilities will be placed so as to concentrate heavy impact on areas previously impacted and on sites capable of withstanding high impacts.

4. TRANSITION

a. Physical - Biological Standards

(1) Vegetation

- (a) Area of vegetation loss, and compacted bare mineral soil at any campsite, should not exceed 1000 square feet.
- (b) There should be no loss of trees at any site and only ten trees per site with roots exposed or which show signs of human use impact.
- (c) There should be no noticeable long-term modification of plant succession and only short-term modification due to human activity or livestock grazing, that can recover in one growing season.
- (d) Dead trees, or dead woody debris, may be utilized for campfire wood in amounts that can be replaced annually through natural accumulation.

(2) Soils

- (a) Displacement and erosion of soil resulting from human activity will be limited to a rate that approximates natural processes.
- (b) Soil compaction should not exceed limits which will prevent natural plant establishment and growth, except at desired campsites, and on designated trail treads.

(3) Water Quality

There should be no change in water quality except for temporary changes that return to normal when activity ceases.

(4) Air Quality

Air quality will not be degraded as a result of campfire smoke, or Forest Service Management activities outside of Wilderness in Class I areas.

(5) Fish and Wildlife

- (a) Visitor use should not displace wildlife from critical habitat areas during critical periods. If conflicts occur, management actions should be implemented to reduce the impact.
- (b) Riparian areas should appear to be unchanged by human or livestock use.
- (c) Displacement of wildlife due to visitor use may be significant but should be of short duration to assure a natural ecosystem is maintained. Visitor use should not decrease habitat effectiveness for one species more than 20 percent.

(6) Visual Impact and Scenery

(a) Campsites will be visible at times from other campsites.

(b) Human activity should remain generally subordinate in foreground viewing and not recognizable in middle-ground viewing.

(7) Livestock Allotments

Commercial livestock is permitted in this class under approved management plans to the extent that grazing use is managed to protect wilderness resource values.

b. Social Standards

(1) Encounters

There should be an 80 percent probability that not more than either 10-20 parties or 10-20 individuals traveling alone, will be encountered per day during the primary use season. Generally encounters should not exceed 10, however, in unique situations, encounters may reach 20 per day.

(2) Party Size

The maximum party size will not exceed 12 people and/or livestock combined, (12 people and 18 animals in the Lake Chelan-Sawtooth Wilderness).

(3) Campsites

There shall be no more than three campsites visible or audible from any one campsite, or closer than 500 feet in open country.

(4) Livestock

Grazing of stock is permitted except in camp areas.

(5) Pets

Pets must be under reliable voice control or physical restraint. Pets may be banned from this class for protection of wildlife or to avoid other biological or social impact. Visitors will be encouraged to leave pets at home in areas of higher visitor use.

c. Managerial Standards

(1) Regulations and Information

(a) Posting of information and regulations will generally be posted at trailheads but some regulatory signing may be necessary in key impact areas, or areas where there is potential for use conflicts.

(b) Formal orders and permits will commonly be used to achieve management objectives and visitor compliance in this class.

(2) Administrative Presence

(a) Ranger patrols and administrative contacts will occur most frequently in this class, particularly in high day-use areas and popular destination points. Personnel involved in project work and monitoring activities will be present.

(b) Work projects should be planned to be completed during low visitor use periods to minimize impact on visitors.

(c) Management personnel should conform to party size limitations and be aware of their potential to impact visitor experiences.

(3) Trails

The managed trail system should be maintained or constructed toward more and most difficult trail standards (FSH 2309.18). Trails classified easiest may exist in areas of gentle terrain and valley bottoms. A variety of user restrictions may be implemented to resolve negative resource impacts.

(4) Resource Protection Facilities

Facilities will be natural appearing or will be constructed out of native material. No facilities will be constructed for user convenience or comfort. Facilities will be placed so as to concentrate heavy impact on areas previously impacted and at sites capable of withstanding high impacts.

F. LIMITS OF ACCEPTABLE CHANGE

Recreation visitor use of wilderness cannot occur without some degree of impact on wilderness resources. Impact occurs on the physical and biological features of wilderness as well as the quality of the recreation experience of other visitors. There is a point at which increasing impact of visitor use will result in unacceptable degradation outside the intent and direction of the Wilderness Act. The Regional Nondegradation Policy is described in FSM 2322.03.

The limits of acceptable change concept is a system to establish limits on the change that can be permitted within the nondegradation policy, before management actions must be taken to reverse trends of change. These actions can be either directed to improve the knowledge and abilities of the users or to reduce the numbers of visitors in impacted areas during critical time periods, or both.

The system has incorporated limits or maximum levels for which key indicator resource values can change before management actions are implemented. The system assumes that the condition of key indicators which are easily quantifiable and measurable reflect the general condition of resource values which are not easily measured. The impact of human-caused noise and human disturbance of wildlife are examples of impacts not easily measured.

The limits of acceptable change levels or standards are different for each Wilderness Recreation Opportunity Spectrum Class. The standards for the Pristine Class tolerate the least impact in order to achieve the most pristine wilderness conditions and the least evidence of man's activity. The Transition Class standards are more tolerant reflecting management of the area for a semi-primitive recreation experience and physical evidence of man's activity.

Table E-2 lists the key indicators that will be measured in monitoring the physical, biological, and social conditions and the standards for each Wilderness Recreation Opportunity Spectrum Class.

When monitoring results indicate that the condition of one or more of the key indicators is approaching the standard, or limit of acceptable change, a trend analysis will be done. This analysis will assess the changing conditions and identify all factors of visitor use contributing to the change. Cost effectiveness of possible management actions and recreation opportunity tradeoffs will be considered in the analysis. The analysis will identify alternative courses of action and a most suitable alternative will be chosen and implemented. Section H of this appendix explains potential management actions appropriate to resolve impact problems.

There is a high probability that initial monitoring results in some areas will indicate impact conditions in excess of standards established for particular WROS Classes. In this event, monitoring efforts will need to be intensified to establish the current trends. The objectives in these situations will be to institute management actions to achieve an improving trend. Downgrading the Wilderness Recreation Opportunity Class to a class more tolerant of impact will not be an option.

Over the long term, wilderness management activities should lead to an improving trend in the effects of man's activity on wilderness resources in all WROS classes.

TABLE E-2
LIMITS OF ACCEPTABLE CHANGE STANDARDS

Indicators	Pristine	Primitive	Semi-Primitive	Transition
Vegetation loss and bare, compacted mineral soil at campsites (square feet)	225	400	625	1,000
Number of Trees with roots exposed or percent (whichever is less)	0 0%	4 25%	6 25%	10 50%
Encounters--80% Probability--Maximum number of encounters per day when traveling--primary use season.	1	7	10	10-20 (Generally 10, but up to 20 on a case by case basis)
Party size-- People and stock combined.	12 (Encourage 6 or less people, 0 stock). 12 people and 18 animals in the Lake Chelan-Sawtooth Wilderness	12	12	12
Campsites visible when occupied	0	1	2	3
Dead woody debris available for firewood	Appears to be natural levels compared to adjacent similar areas.			

G. CARRYING CAPACITY

Carrying capacities have been developed to estimate the amount of recreation visitor use that a wilderness or portion of a wilderness, could support without degradation of resource values. Carrying capacity is commonly expressed in Recreation Visitor Days (RVD's) per year or people-at-one-time (PAOT).

In the Recreation Opportunity Spectrum system, coefficients have been developed that help in the estimation of carrying capacity. These coefficients are the estimated RVD's per average acre per year, that a WROS class can support. Different coefficients are identified for each class and are a theoretical estimation of capacity based on average conditions.

The Alpine Lakes Area Management Plan established the following capacity coefficients and carrying capacity in RVD's per year for the Alpine Lakes Wilderness:

TABLE E-3

WROS CLASS	RVD/ACRE/YEAR COEFFICIENT	CARRY CAPACITY RVD's PER YEAR
Trailless	0.5	169,347
Primitive	2.0	20,364
Semi-Primitive	5.0	161,210
Transition	15.0	183,630
		534,551

For the Land and Resource Management Plan for the Wenatchee National Forest, the following carrying capacity coefficients were developed in coordination with adjacent Forests sharing management of the Washington State Cascade Range Wildernesses.

TABLE E-4

WROS CLASS	RVD/ACRE/YEAR COEFFICIENT
Pristine (Dedicated Trailless)	0.25
Primitive (General Trailless)	1.00
Semi-Primitive (Trailed)	5.00
Transition	15.00

The carrying capacity for all wilderness except Alpine Lakes Wilderness, are as follows:

TABLE E-5

WILDERNESS	RVD'S/YEAR CAPACITY
Lake Chelan - Sawtooth	137,748
Glacier Peak	448,595
Goat Rocks	81,222
Henry M. Jackson	65,040
Norse Peak	60,115
William O. Douglas	267,280
Total	1,060,000 RVD'S/YEAR

The acres per WROS Class are described on page E-3

Considering the information and experienced gained in the Alpine Lakes Wilderness since implementation of the Management Plan, it is now clear, that these coefficients and the corresponding carrying capacity estimates are much too high.

With the implementation of the Limits of Acceptable Change process, carrying capacity estimates based on coefficients will no longer be necessary; although comparison may be useful.

The presence or degree of Wilderness resource deterioration will be determined through the analysis of the condition and trend of the measured changes in LAC indicators, at specific levels of visitor use. Carrying capacities determined through this process will be expressed more in terms of PAOT.

Upon completion of inventories of campsites, and baseline data is gathered on the condition of LAC indicators, more precise estimates of carrying capacity will be established for each wilderness. This analysis should be completed before any major actions are implemented to allocate use to specific individuals, or user groups, or limit visitor entry through mandatory permit systems.

Carrying capacity may be increased or reduced over time, depending on the relative degree of resource impact generated by users. It is conceivable that capacities could be increased if users become educated and generate less impact during their recreation trips in wilderness.

H. MANAGEMENT ACTIONS TO MEET MANAGEMENT OBJECTIVES

When analysis of visitor use levels and monitoring results indicate management action is necessary to solve resource impact problems, a process will be followed to select the appropriate management actions.

Areas will be field checked when inventory or monitoring data show that resource standards are being approached and the trend is downward toward greater deterioration. The field review will determine if the indicators were properly measured and if the indicators accurately reflect the resource conditions. If the measured conditions are correct, then the analysis process described in Section G will be implemented.

Tables E-6 to E-9 list a range of potential management actions depending on the specific circumstances that may be successful in reversing deteriorating conditions. The actions are listed in order of descending priority.

The emphasis in selecting management actions will focus on choosing actions which will be least intrusive to wilderness visitors, yet effective in resolving problems. In cases where problems are extensive, complex, and very visible, management actions will be required that will have some effect on visitors freedom to use certain areas.

In areas where resource impact has been severe, rehabilitation and restoration work will be accomplished to speed up the natural recovery process.

Should the management actions implemented not result in improving conditions, more restrictive and intensive management actions will be instituted. This progression will continue down through the sequence of management actions until the problems are resolved.

Management actions selected, or the extent to which an action is implemented, should also be in accord with the appropriate WROS Class of the area involved.

TABLE E-6

POTENTIAL MANAGEMENT ACTIONS TO IMPROVE CAMPSITE CONDITION
DESCENDING ORDER OF IMPLEMENTATION

Education of users outside wilderness
Information outside wilderness, at trailheads
Contact repeat users such as organized groups, clubs and associations, etc.
Wilderness Ranger contacts
Reroute trails away from lakes
Prohibit stock in campsites
Restrict camping near lakes, streams, and meadows
Prohibit campfires in specific areas
Equipment requirements
Install resource protection facilities on durable sites
Limit party group size
Limit number of stock per group
Length of stay limit in problem areas
Close campsites to specific users
Rehabilitate damaged areas
Special law enforcement efforts
Campsite closure
Campsite permits
Entry quota permit system

TABLE E-7

POTENTIAL MANAGEMENT ACTIONS TO REDUCE CAMPSITE DENSITY
DESCENDING ORDER OF IMPLEMENTATION

Education of users outside wilderness
Information outside wilderness, at trailheads
Contact repeat users such as organized groups, clubs and associations, etc.
Campsite obliteration and rehabilitation
Prohibit camping within prescribed distances of trails, lakes, streams, and meadows
Make access to problem areas more difficult
Campsite closures, may be seasonal
Closure of large areas to camping

TABLE E-8

**POTENTIAL MANAGEMENT ACTIONS TO REDUCE TRAIL
AND CAMPSITE ENCOUNTERS
DESCENDING ORDER OF IMPLEMENTATION**

Education of users outside wilderness
Information outside wilderness, at trailheads
Encourage use outside peak periods
Limit group size
Seasonal campsite closures
Restrict camping near trails
Close campsites to certain users
Close specific areas to camping
Change trailhead and access conditions
Length of stay limits
Allow only one-way travel on some trails
Campsite permits
Entry quota permit system

TABLE E-9

**POTENTIAL MANAGEMENT ACTIONS TO IMPROVE VEGETATIVE CONDITION
IMPACTED BY RECREATION STOCK AND PACK ANIMAL GRAZING
DESCENDING ORDER OF IMPLEMENTATION**

Education of users outside wilderness
Information outside wilderness, at trailheads
Allow no hay or unprocessed grain
Require use of supplemental feed
Limit total number of stock per party
Limit group size
Prohibit stock in specific areas
Prohibit stock in campsites
Eliminate facilities that are attractions
Provide facilities where impacts should be concentrated on durable sites
Allow no stock to feed within specified distance of lakes, streams, and wet areas
Seasonal Closures
Close drainages to stock on a rotating basis
Length of stay limits
Closure of large areas to stock

I. MONITORING

A wilderness monitoring program will be conducted to determine the influence of man's activity on the physical, biological, and social resources of each wilderness.

1. OBJECTIVES OF THE MONITORING PROGRAMS

- a. Determine through observation, measurement, and analysis, if man's activity, inside or outside wilderness, is resulting in change in the condition of resource values.
- b. Measure the effectiveness of management actions and programs in achieving wilderness management objectives.
- c. Provide a process for maintaining an up-to-date inventory of campsites, facilities, impacted areas, and visitor-use patterns.

2. MONITORING PROGRAM ELEMENTS

Monitoring plans for individual wilderness shall include at least the following elements:

- a. Measure the indicators of the limits of acceptable change to identify if changes in resource conditions are occurring.
- b. Observe and record general impressions of resource conditions and trends of decline or improvement.
- c. Measure or estimate the effectiveness of management actions implemented to improve or maintain resource conditions.
- d. Note and report new activities which are impacting or may lead to impact on wilderness resources.
- e. Complete or update inventories of campsites, trails, and high-use areas. Resource conditions associated with trails, such as excessive soil erosion rates, can be recorded during trail condition surveys.
- f. Gain perspective through contacts with wilderness users, if their visits to wilderness are satisfying, and if their expectations are being met.
- g. Estimate recreation visitor use.

3. MONITORING METHODS

- a. Monitoring will be conducted within the parameters described in Forest Service Handbook 2309.19, Section 21.3, Monitoring Recreation Impact.
- b. The research publication "Monitoring The Condition of Wilderness Campsites," by David N. Cole, (Research Paper INT. 302) should serve as a general guideline in monitoring the condition of campsites and heavily used areas.

4. MONITORING FREQUENCY

The frequency of monitoring actions will be described in individual management action plans for each wilderness. Frequencies should be established which will assure the attainment of wilderness monitoring objectives.

As a general rule, campsites and heavy-use areas where resource conditions approach or exceed LAC standards should be monitored at least every one to three years to establish the trends of change.

Areas of significant recreation use that are stable and are not approaching LAC indicator standards should be monitored at least every five years.

APPENDIX F

FOREST PLAN MONITORING REQUIREMENTS

A. INTRODUCTION

The monitoring approach for each major resource area is documented on one or more worksheets. The following information about the worksheets clarifies the monitoring activities associated with the resource area.

ISSUE: Numerous management issues, concerns and opportunities were identified early in the planning process. These were used to formulate, analyze, and select the preferred alternative. In order to determine how well the Forest Plan was responding to these items, certain areas of management activity were identified to receive concentrated monitoring review. These are identified under the general heading of issue area.

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: This statement should include the forest goal, desired future condition or the desired output for the issue stated on the worksheet.

MANAGEMENT AREAS AFFECTED: Many resources are addressed by management in specific management areas. This section indicates those management areas which are significant with respect to the resource at hand. Monitoring activities can generally be limited to these management areas.

RISK ASSESSMENT: This is an index of the risk involved in the resource area. The index is a function of: (1) the cost of an error which results in not meeting Forest Plan objectives and (2) the likelihood of such an error occurring. **COST OF ERROR** is estimated as "high," "moderate," or "low," depending on the value of the commodity or environmental components involved. **LIKELIHOOD OF ERROR** is estimated as "high," "moderate," or "low," depending on the level of knowledge regarding pertinent cause-effect relationships, and on the amount of pressure which is put on the resource(s) in question.

A numerical value of 1 is assigned to "low" values, 2 is assigned to "moderate" values, and 3 is assigned to "high" values. The **RISK INDEX** is the product of the **COST** and **LIKELIHOOD** values. It can range from "1" to "9." A value of "1" indicates that there is very little risk involved, and low precision, reliability, and monitoring effort is adequate. A **RISK INDEX** of "9" indicates that there is very high risk involved--therefore, high precision, reliability, and effort, are warranted.

MONITORING QUESTION: The monitoring questions are the core of the Monitoring Plan. The essence of each question is, "Are things going as the Forest Plan intended?" Information is generally included in the question to indicate that level of probability at which the question should be answered, and the variance from the target quantity which is acceptable. Information to answer these will be obtained and analyzed using value statistical procedures.

Questions are written to address varying periods of time, such as variation in annual outputs versus variation in decadal outputs. Selection of time periods and amount of variation is commensurate with the inherent variability of the resource and the risk of not meeting state objectives.

THRESHOLD OF VARIABILITY: For each monitoring question, the variation from expected outputs or activities that is permitted before corrective action or further evaluation is taken. It will be a plus or minus variation, or a phrase describing the event that will take place before further action or evaluation are initiated. The amount of variation tolerable is related to the risk involved as determined by the risk assessment.

SUGGESTED METHODS/SAMPLING PROCEDURE: For each monitoring question, methods and/or sampling procedures are suggested/directed. The purpose of this section is to suggest realistic and reasonable methods or sources of information, and it is not intended to exclude other methods as long as they will respond completely to the questions at a reasonable cost.

The sampling procedure specifies the sampling rate and sampling period for each monitoring question, as appropriate. Data will be gathered in a manner that will ensure meeting statistical parameters suggested by the monitoring questions. Suggested methods/sampling procedures are commensurate with the risk of not meeting objectives.

REPORTING PERIODS: For each monitoring question, the years in which it must be answered are indicated. A report will be prepared for each set of monitoring questions and will be summarized with all the reports due that year. Copies of this summary and the individual reports will be kept on file at the Supervisor's Office for the entire planning period. The summary will also be available to other agencies and the public.

RESPONSIBILITY: Who is responsible for accomplishing the monitoring tasks listed? The people listed here will have the assigned responsibility.

ANNUAL COST OF MONITORING: Costs are estimated and are shown as the average annual increase over current costs for all monitoring activities associated with the resource area. Although the reports are due in specific years, the data gathering and analysis work will be spread through the entire planning decade as much as possible.

FOREST PLAN MONITORING WORKSHEET

ISSUE: STANDARDS AND GUIDELINES - GENERAL

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Ensure implementation and validation of Plan standards and guidelines is effective at accomplishing Forest goals, outputs, and the desired future condition.

MANAGEMENT AREAS AFFECTED: All

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

MONITORING QUESTIONS:

1. Are Forest Plan standards and guidelines being implemented?
2. Are implemented standards and guidelines achieving the expected results?

THRESHOLD OF VARIABILITY:

1. Standards and guidelines are implemented as described in the Forest Plan.
2. Same tolerances as those described for individual monitoring items on other worksheets.

SUGGESTED SAMPLING METHODS:

1. Conduct a two stage field review of at least one project/District. The 1st stage is after NEPA analysis and documentation and after project design. The 2nd stage is after project completion.
2. Compare observed findings during field review of 2nd stage with the measurements from other monitoring items described on other worksheets.

REPORT PERIOD (YEARS):

1. Annual review with a detailed report at 5 year intervals that discusses the significance of findings.
2. Documented results of annual review and discussion. A detailed report is prepared at 5-year intervals when findings from

RESPONSIBILITY: Planning Staff Officer

ANNUAL COST OF MONITORING: \$10,000 of which we are already doing \$5,000

REMARKS: NFMA states that we should monitor "how closely Management Standards have been applied." Some monitoring should be planned for all the Standards in the Plan. Monitoring will include full interdisciplinary review of the range of Management Standards. This review will determine whether the Forest Plan standards are being implemented as intended, and if implementation of these standards is meeting management area goals and objectives.

Could use this system of monitoring to identify which S&G are necessary for mitigation of the effects of activities and which are actually enhancement. Results could change funding sources for activities and be useful in preparing the TSPIRS report.

This may also meet the requirements for a "feed back" loop for the use of information from monitoring to adjust management on the ground.

FOREST PLAN MONITORING WORKSHEET

ISSUE: CHANGES IN ROS SETTINGS DUE TO MANAGEMENT ACTIVITIES INCLUDING SEMI-PRIMITIVE RECREATION SETTING

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide a well balanced array of recreation opportunities across the breadth of the Recreation Opportunity Spectrum (ROS) in accordance with public demand and expectations for outdoor recreation.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

MONITORING QUESTION:

Are Forest management activities resulting in change in ROS settings so that end results do not meet the experience levels expected in the Plan?

THRESHOLD OF VARIABILITY:

Change in setting resulting in a more developed condition than that identified for a specific management area.

SUGGESTED SAMPLING METHODS:

Review randomly selected environmental documents to assure that ROS has been addressed during project design and alternative selection. Field review randomly selected areas to verify that implemented activities meet ROS standards for that area.

REPORT PERIOD (YEARS):

Annual review with a detailed report at 5 year intervals that presents a discussion of the significance of findings.

RESPONSIBILITY: District Rangers, Recreation Staff Officer

ANNUAL COST OF MONITORING: \$3,500 of which we are already doing \$1,000

REMARKS: Maintaining semi-primitive or undeveloped recreation opportunities is a Regional issue. Completion of this monitoring item can also be tied into the Forest/Management Team process for project review.

FOREST PLAN MONITORING WORKSHEET

ISSUE: FOREST TRAILS, INCLUDING OFF ROAD VEHICLE (ORV) USE

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage trail use to provide recreation opportunity in a wide range of recreation settings and in harmony with other resource management objectives.

MANAGEMENT AREAS AFFECTED: All.

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

MONITORING QUESTIONS:

1. Are trails providing the variety of opportunities intended in the Forest Plan?
2. Is trail use occurring without impairment of other resource values? Refer to FSM 2355.05 for definitions.
3. Are trails with mixed users (eg. horse/hiker, hiker/ORV) meeting the expectations for all intended users?

THRESHOLD OF VARIABILITY:

1. Miles of trail constructed and maintained are within 25% of the annual amount estimated in the Plan and within 10% for the decade.
2. Trail features show a stable to improving trend.
3. Comments from the public indicate an increasing trend in conflict among trail users.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

1. Review of project accomplishment reports.
2. Trail condition surveys.
3. Letters and other correspondence as well as field contacts and interviews.

All. Annual review with a detailed report at 5 year intervals that presents a discussion of significant findings.

RESPONSIBILITY: District Rangers and Recreation Staff Officer

ANNUAL COST OF MONITORING: \$15,000 of which we are already doing \$7,500

REMARKS: Required by Executive Orders 11644 and 11989 for off-road vehicles.

FOREST PLAN MONITORING WORKSHEET

ISSUE: MANAGEMENT OF DEVELOPED RECREATION FACILITIES

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide safe, well maintained developed recreation facilities for public use commensurate with recreation demand.

MANAGEMENT AREAS AFFECTED: RE-1

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

MONITORING QUESTIONS:

1. Are available developed recreation facilities meeting public demand?
2. Are developed recreation sites, areas and facilities being adequately maintained to serve the public and protect resource values and recreation improvements?

THRESHOLD OF VARIABILITY:

1. Use, as measured by RVDs, exceeds 60% of capacity for a site as measured by PAOTs.
2. Developed sites, acres and facilities show a declining trend in safety and resource conditions.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

1. Estimate visitor use at developed recreation sites and areas.
2. Inspect recreation sites and areas.

1&2 Annually with a detailed report at 5 year intervals that discusses significance of findings. Special attention needs to be paid to use levels to adequately predict future recreation construction in time to meet demand.

RESPONSIBILITY: District Rangers, Recreation Staff Officer

ANNUAL COST OF MONITORING: \$18,000 of which we are already doing \$12,000

REMARKS: Recreation is a major use and challenge on the Wenatchee National Forest. This item is intended to provide information on use trends.

Fee collections could serve as an indicator of use trends at fee sites.

FOREST PLAN MONITORING WORKSHEET

ISSUE: MANAGEMENT OF DISPERSED RECREATION AREAS

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide opportunities for dispersed recreation activities (summer and winter) where compatible with other resource management objectives.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

MONITORING QUESTIONS:

1. Are dispersed recreation sites meeting public demand?
2. Is the recreation opportunity spectrum (ROS) providing the expected variety for Forest users?

THRESHOLD OF VARIABILITY:

1. Dispersed sites show a declining trend in resource conditions.
2. Prescribed ROS classes are not met for a management area.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

1. Evaluate use at dispersed sites.

1. Annually with a detailed report at 5 year intervals that discusses the significance of findings.

2. Field evaluation of a sample of projects to assure they meet desired ROS class.

2. Annually.

RESPONSIBILITY: District Ranger, Recreation Staff Officer

ANNUAL COST OF MONITORING: \$12,000 of which we are already doing \$6,000

REMARKS: Recreation is a major use of the Forest, with demand outpacing supply in some areas such as semi-primitive ROS classes.

We need better tools to assess use in dispersed areas. Code-a-site type systems could be used to track trends but they do not take into account the effects of use where sanitation facilities are not provided. *Involvement by research may be necessary.*

FOREST PLAN MONITORING WORKSHEET

ISSUE: WILD AND SCENIC RIVERS

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Retain the character and attributes of rivers recommended for wild, scenic, or recreational designation.

MANAGEMENT AREAS AFFECTED: WS-1, WS-2, WS-3

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

MONITORING QUESTION:

Are resource management activities along recommended river corridors being conducted so as to provide appropriate protection at the classification level specified in the designation or study proposal?

THRESHOLD OF VARIABILITY:

When resource condition or level of activity would lower eligibility below the recommended classification.

SUGGESTED SAMPLING METHODS:

Review a sample of project analyses before and after implementation within a recommended river corridor

REPORT PERIOD (YEARS):

Annually with a detailed report at 5-year intervals that presents a discussion of the significance of findings.

RESPONSIBILITY: Recreation Staff Officer, District Ranger

ANNUAL COST OF MONITORING: \$7,000 of which we are not currently doing any since we don't have any designated rivers at this time.

REMARKS:

FOREST PLAN MONITORING WORKSHEET

ISSUE: VISUAL RESOURCE OBJECTIVES

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage vegetation and facilities to provide views that are consistent with the stated visual quality objectives for each management area. Concentrate monitoring on those management areas with visual quality objectives of partial retention or retention that also allow for changes in vegetation, especially through management of the timber resource.

MANAGEMENT AREAS AFFECTED: Forest-wide.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

MONITORING QUESTIONS:

Do the cumulative effects of all resource activities within a viewshed meet the desired visual condition?

THRESHOLD OF VARIABILITY:

Desired conditions met for all areas.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

- | | |
|---|--|
| 1. Review a sample of NEPA documents for projects. Select projects from a variety of management areas. | Annually |
| 2. Field review a sample of projects representing a wide cross section of the Forest. | Annually |
| 3. Conduct a summary viewshed analysis as outlined in R-6 Supplement 65. Establish photo points for a sample of significant views and record scenes before, immediately after, and at 5 year intervals from project implementation. | Prepare a detailed report at 5-year intervals that discusses the significance of findings. |

RESPONSIBILITY: Timber & Visual Resource Management Staff Officer, District Rangers.

ANNUAL COST OF MONITORING: \$14,000 of which we are already doing \$5,000

REMARKS: Needs specific data collection for the selected "piece of ground" for the integrated resource aspect in the monitoring "EVALUATION." Numbers 1 and 2 in suggested sampling methods can probably be accomplished at the same time as many other monitoring items so there should be some cost savings.

Public involvement, ID Team review, research needs in conjunction with public sensitivity.

FOREST PLAN MONITORING WORKSHEET

ISSUE: RECREATION IMPACTS ON WILDERNESS RESOURCE

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage Wilderness to perpetuate wilderness character, natural ecological processes and to provide recreation opportunities appropriate in Wilderness.

MANAGEMENT AREAS AFFECTED: All Wilderness.

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 3 = RISK INDEX 6

MONITORING QUESTIONS:

Is recreation visitor use or management resulting in change in physical, biological or social settings that approach limit of acceptable change (LAC) standards specified in the Forest Plan?

THRESHOLD OF VARIABILITY:

1. When the desired biological or physical settings are within 90% of the LAC standard
2. When the amount of dead woody debris around campsites is observed at less than a natural level.
3. When annual visitor use of an area approaches 95% of the established carrying capacity for that WROS class.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

1&2 Evaluate indicators of LAC through measurement of impacts, campsite condition class estimation, observation of resource conditions and established photo points.

Annually with a detailed report at 5-year intervals that describes the significance of findings.

2. Estimate visitor use through registration, permits, wilderness ranger counts, surveys and photo - electric counts.

RESPONSIBILITY: District Rangers and Recreation Staff Officer

ANNUAL COST OF MONITORING: \$33,000 of which we are already doing \$10,000

REMARKS: This item addresses the policy of nondegradation (FSM 2320.3) and complies with 36 CFR 293 related to maximum levels of use.

The 90% figure for LAC standard means that we are willing to accept a specific amount of change at a setting but we want to know conditions before we get to that point. For example, we may be willing to accept up to 100 square feet of impacted area at a popular Wilderness destination. The 90% limit would mean that we need to start acting when the amount of impact reaches 90 square feet.

FOREST PLAN MONITORING WORKSHEET

ISSUE: CULTURAL AND HISTORICAL SITE PROTECTION

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: To the extent practical, protect cultural and historical resources from vandalism, disturbance from project activities, and natural degradation.

MANAGEMENT AREAS AFFECTED: Forest-wide.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

MONITORING QUESTIONS:

1. Are the National Register characteristics of unevaluated and significant cultural resource properties being protected?
2. Are all reasonably locatable cultural resources being discovered during project area reconnaissance?

THRESHOLD OF VARIABILITY:

1. Significant characteristics are being protected on at least 90% of the cultural resource properties inspected.
2. Discovery of a significant cultural resource during project implementation.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

- | | |
|--|----------|
| 1. Field inspect all significant sites in active project areas. Visit all sites in areas where people, animals, and the environment are likely to cause losses or degradation. | Annually |
| 2. Conduct surveys of all high probability areas on 20% of active projects during ground disturbing activity. | Ongoing |

RESPONSIBILITY: Recreation Staff Officer and District Rangers

ANNUAL COST OF MONITORING: \$10,000 of which we are already doing \$3,000

REMARKS:

FOREST PLAN MONITORING WORKSHEET

ISSUE: CULTURAL AND HISTORICAL SITE REHABILITATION

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Rehabilitate damaged sites eligible for inclusion in the National Register of Historic Places.

MANAGEMENT AREAS AFFECTED: Forest-wide.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

MONITORING QUESTION:

For sites eligible for inclusion in the National Register of Historic Places, is appropriate stabilization or rehabilitation of damage being completed?

THRESHOLD OF VARIABILITY:

Significant sites are being degraded by vandalism, project activity, and/or the environment.

SUGGESTED SAMPLING METHODS: REPORT PERIOD (YEARS):

Review all reports on the condition Annually
of significant sites and measures
taken to repair damage.

RESPONSIBILITY: Recreation Staff Officer, District Rangers.

ANNUAL COST OF MONITORING: \$3,750; we are not currently doing any of this

REMARKS:

FOREST PLAN MONITORING WORKSHEET

ISSUE: COORDINATION AND COMMUNICATION OF FOREST PROGRAMS WITH INDIAN TRIBES.

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Coordinate with appropriate Tribal representatives for all projects in which Indians may have concerns.

MANAGEMENT AREAS AFFECTED: Forest-wide.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

Failure to coordinate appropriate projects with Tribal representatives could result in lawsuits or court injunctions. Failure may also indicate noncompliance with NFMA, ARPA or AIRFA requirements or infringement on Treaty rights.

MONITORING QUESTIONS:

1. Are American Indian rights being protected on National Forest lands?
2. Are projects with activities or areas of concern to Indians being coordinated with appropriate Tribal representatives?

THRESHOLD OF VARIABILITY:

1. All rights are protected by treaty.
2. Same thresholds as for specific resource items of concern to tribes.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

- | | |
|---|---|
| 1. Review a sample of NEPA documents for projects in areas of concern to Indians. | 1&2. Annually with a detailed report at 5-year intervals that describes the significance of findings. |
| 2. Evaluate resource output levels for fish, wildlife, and other resources of concern to Indians. | |

RESPONSIBILITY: District Rangers, Planning Staff Officer, and Staff Officer for Cultural Resources.

ANNUAL COST OF MONITORING: \$15,000 of which we are already doing \$5,000

REMARKS: Examples of religious resources or resources covered by Treaty rights are fish, wildlife and certain plants. Examples of appropriate projects requiring review are trail or campground construction, wildlife and fish habitat improvements, timber harvest, road construction, or range improvements.

FOREST PLAN MONITORING WORKSHEET

ISSUE: MAINTENANCE OF SENSITIVE PLANT POPULATIONS

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide appropriate habitat to maintain viable populations or enhance populations of all threatened, endangered, and sensitive plant species.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

Cost of error is high because although only small areas would be affected at one time, some populations are very limited and error could result in a species being Federally listed. Likelihood of error is moderate because much information on occurrence and habitat requirements still needs to be gathered.

MONITORING QUESTION:

Are sensitive plant species populations being maintained or increasing?

THRESHOLD OF VARIABILITY:

Ten percent decline in the size of a population at a monitoring site for non-category plants, 5% decline for Category 1 or 2 plant populations.

SUGGESTED SAMPLING METHODS:

// A sample of plant populations will be monitored long-term; all category 1 & 2 populations plus about 50 plots for other sensitive species. Selected locations will be monitored to determine trends.

REPORT PERIOD (YEARS):

All activities will include an inventory for sensitive plants as part of NEPA process. Monitoring of specific populations will be completed during and immediately after activity. Populations not affected by proposed activity will be monitored at 5 year intervals to determine changes and trends.

RESPONSIBILITY: District Rangers are responsible for District monitoring, Forest Staff coordinates sampling methods, selects monitor sites, compiles data, and produces Forest report.

ANNUAL COST OF MONITORING: \$5,500 first 5 years \$4,800 second 5 years

We are currently doing about \$4,000 of this.

See REMARKS for details on costs.

REMARKS:

Costs for monitoring 50 permanent plots - ten per year. During the first visit to a site (first five years of LRMP) permanent plots will need to be set up, which will require 1 day of field work and 1/2 day office work per site, or 1.5 days x 10 sites x 2 people (2 @ GS-7) x \$100 per day = \$3,000. For first visits to establish plots, 5 days of a journeyman botanist or ecologist (GS-11/12) will be required for all sites or 5 days x \$150 per day = \$750; for a total of \$3,750. During Subsequent visits to a site (after first five years of Plan), 1 site can be monitored per day including office work, or 1 day x 10 sites x 2 people x \$100 per day = \$2,000. After the second-visit regime begins in the sixth year, we expect one site per year to drop below the 20 percent threshold, the subsequent management review will cost \$1,000. Each year the journeyman botanist/ecologist (GS-11/12) will need to spend three days analyzing data and preparing a report.

$$\text{First 5 years: } \frac{\$3,750 + \$0 + \$450}{(\text{Field Surveys}) + (\text{Review}) + (\text{Compilation/report})} = \$4,200 \text{ (Annual Cost)}$$

$$\text{Thereafter: } \frac{\$2,000 + \$1,000 + \$450}{(\text{Field Surveys}) + (\text{Review}) + (\text{Compilation/report})} = \$3,500 \text{ (Annual Cost)}$$

For monitoring, one-fifth of the selected plots will be evaluated annually. Selection of plant species for sampling will be done in coordination with the Washington Natural Heritage Program. 2 or 3 species at one location counts as 1 site and sites for sampling should cover a number of types of habitat and substrate (e.g. bogs, moist forest, rocky places; granitics, serpentine, basaltic etc.). Where possible, sites selected will be those with the most potential for resource conflicts (timber harvesting, road building, mining, recreation, or areas where unauthorized digging of sensitive plants may occur). If possible, those plants with the fewest known extant populations should receive priority in the sample plots. Each species sampled should have representation from at least two areas (if two areas are known). For a list of the sensitive species see Chapter IV of the Forest Plan.

Permanent photo plots or transects should be set up at all sites. Each site will be monitored every fifth year. Small populations will be individually counted, plant numbers in large populations will be estimated systematically. (Regional Ecologist's techniques for photo plots should be used; consult Forest/Area Ecologist).

Coordinate work on federal candidate species with the USDI Fish and Wildlife Service. Coordinate work on sensitive species with the Washington State Department of Natural Resources-Washington Natural Heritage Program. Coordinate research needs with the appropriate universities and colleges.

At this time the plant species for which this monitoring plan was created include:

- Delphinium viridescens;
- Hackelia venusta;
- Petrophytum cinerascens,
- Sidalcea oregana var. calva; and
- Silene seelyi.

FOREST PLAN MONITORING WORKSHEET

ISSUE: BIODIVERSITY.

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Maintain native and desirable introduced or historic plant and animal species and communities. Provide all seral stages of all plant associations in a distribution and abundance to assure species diversity and viability. A desired future condition is to establish the local needs of management indicator species, rare species, and the proportion of seral stages that allows for natural diversity.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

MONITORING QUESTIONS:

1. Is the trend of biological diversity moving as estimated?

2. Is the model for biological diversity being used on project and sub-drainage evaluations?

THRESHOLD OF VARIABILITY:

There are no established thresholds for biodiversity on the Forest. Thresholds and requirements of individual species (i.e., fish, woodpeckers, spotted owl) have been established and are being monitored as described in other items. Management direction has been set in some cases such as for fish habitat improvement, meadow maintenance and enhancement, and maintenance of early seral stages for wildlife forage and cover. As we accumulate information, sub-drainages may be used to evaluate the trends in biodiversity.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

1. Assess biological diversity using the diversity index.

Annually with a detailed report at 5 year intervals that presents a discussion on the significance of findings.

2. Review 20% of NEPA documents to assure compliance with required assessment of biological diversity on a project and sub-drainage basis.

Annually.

RESPONSIBILITY: Range, Wildlife, Fish, Water, Soil Staff Officer.

ANNUAL COST OF MONITORING: \$3,000 We are not yet doing any of this.

REMARKS: This item is a real unknown. We have not done this kind of monitoring in the past. Most of our evaluations have been based on professional judgement without hard data. We really don't have an index yet but we need to respond to the growing public concern with diversity. Development of an index would be an excellent research opportunity.

The questions and sampling methods discussed above generally refer to monitoring not research. Some of the discussion below refers more to research.

Biodiversity touches many planning issues. Issues related to forest structure distribution over time such as the amount and distribution of old-growth forest, the conversion of hardwood-dominated stands to conifer dominated stands, the amount and rate of timber harvested; the amount, quality, and distribution of animal habitat; and the structure of our streams potentially affect biodiversity. Other issues are more commonly related to species composition concerns. Sensitive plant and animal species, management indicator species, and species diversity are examples. Issues such as long-term forest productivity, management of logging residues, species viability, and forest fragmentation, on the other hand relate to the functions of the forest as an ecosystem. Most of these issues are covered by specific monitoring plans.

Some methods to assess attributes that are integral parts of diversity are enumerated below:

1. Use the resource inventory to determine plant association and seral stage and assess the presence/absence of selected common wildlife species.
2. Use stake tree plots, stand exams, silvicultural visits, unit exams, and ecoplots to map plant associations and existing seral stages. These exams are ongoing and used to update data bases. With the installment of the GIS system the process will be streamlined and can be efficiently used to display distribution of seral stages. The Forest wildlife biologist, ecologist, silviculturist, and botanist will be responsible parties.
3. The Forest botanist will use rare plant surveys and monitoring data to evaluate population abundance and trends in density.
4. Information combined from the above sources on species abundance and distribution will be used by the Forest wildlife biologist and Forest/Area ecologist to evaluate the trends in species richness and evenness.

FOREST PLAN MONITORING WORKSHEET

ISSUE: OLD GROWTH ECOSYSTEMS

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Maintain old growth forest ecosystems as needed for plant habitat, esthetics and biological diversity while still providing appropriate levels of timber for commodity use.

MANAGEMENT AREAS AFFECTED: All areas where old growth occurs.

RISK ASSESSMENT: $COST\ OF\ ERROR\ 3 \times LIKELIHOOD\ OF\ ERROR\ 1 = RISK\ INDEX\ 3$

MONITORING QUESTION:

Is old growth acreage being retained at the expected rate?

THRESHOLD OF VARIABILITY:

Acreage meeting the definition of old growth as identified in the Forest Plan, varies more than 10% from predicted acres.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

Amounts and locations of Old Growth stands are inventoried and changes recorded in appropriate geographic data base (GIS), periodic timber sale accomplishment report (PSTAR) and in the STARS data base.

Detailed report at 5-year intervals that discusses the significance of findings.

RESPONSIBILITY: District Rangers, and Timber & Visual Resource Management Staff and Range, Wildlife, Fish, Soil and Water Staff Officer.

ANNUAL COST OF MONITORING: \$10,000 of which we are already doing \$3,000

REMARKS: Monitoring needs for Old Growth and Mature wildlife indicator species are included in separate monitoring worksheets. Additional research is needed on a variety of old growth ecosystems and related attributes (See information needs section Chapter II).

FOREST PLAN MONITORING WORKSHEET

ISSUE: NORTHERN SPOTTED OWL (Old Growth and Mature Indicator)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide habitat to maintain viable populations for all vertebrate species on the Forest. Maintain spotted owl habitat capability to provide for no less than 116 pairs of spotted owls at the end of the first decade.

MANAGEMENT AREAS AFFECTED: Where suitable spotted owl habitat is found.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 3 = RISK INDEX 9

Cost of error is high because network has a number of large areas without habitat that cause weaknesses. Likelihood of error is high because of lack of information of Spotted Owl use of grand fir type and winter range.

MONITORING QUESTIONS:

1. Is sufficient habitat capability being maintained to meet 1st decade goal?
2. Are network sites occupied by spotted owls at expected rates?

THRESHOLD OF VARIABILITY:

1. Forest total is within 15% of the estimated amount of suitable habitat.
2. Trend for occupancy is stable to increasing.

SUGGESTED SAMPLING METHODS:

1. Use GIS to track suitable habitat.
2. Regional protocol for spotted owl monitoring

REPORT PERIOD (YEARS):

Annually with a detailed report at 5-year intervals that presents a discussion of the significance of findings.

RESPONSIBILITY: District Rangers, Range, Wildlife, Fish, Water and Soil Staff Officer.

ANNUAL COST OF MONITORING: 1. \$4000 of which we are already doing \$3,000
2. \$85,000 all of which we are currently doing

REMARKS:

1. Cooperative research with WDW and PNW on use of grand fir habitat and winter habitat.
2. Demographic study in cooperation with WDW and PNW.
3. Prey base study in cooperation with WDW and PNW.
4. Research silvicultural treatments to create, maintain and/or enhance spotted owl Habitat in cooperation with WDW, PNW and NCASI.

FOREST PLAN MONITORING WORKSHEET

ISSUE: PILEATED WOODPECKER HABITAT (Old Growth and Mature Indicator)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide habitat to maintain viable populations for all vertebrate species on the Forest including habitat effectiveness for at least 50 pileated woodpeckers sites identified in the Forest Plan. (These are in addition to habitat available in SOHAs, Wilderness, areas to remain undeveloped, and other areas to be left in a near natural condition.)

MANAGEMENT AREAS AFFECTED: Identified pileated woodpecker habitat areas.

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

Cost of error is moderate because there are replacement acres where a lost area may be relocated. Likelihood of error is moderate because no harvest will be done in minimum area this decade. Wildfire may eliminate some of the sites.

MONITORING QUESTIONS:

1. Are the number of areas identified in the plan being maintained?
2. Are the established sites being used by pileated woodpeckers?

THRESHOLD OF VARIABILITY:

1. 100% of the MR sites and 80% of additional sites are being maintained as planned.
2. 20% occupancy of established sites.

SUGGESTED SAMPLING METHODS:

1. Review all sites that had other resource management activities occurring.
2. Visit at least 10% of sites.

REPORT PERIOD (YEARS):

Annually with a detailed report at 5-year intervals that presents a discussion on the significance of findings.

RESPONSIBILITY: District Rangers, Range, Wildlife, Fish, Water and Soil Staff Officer.

ANNUAL COST OF MONITORING: \$4,500 We are not yet doing any of this.

REMARKS:

1. Need research on habitat requirements (in cooperation with WDW & PNW).
2. Need to document habitat requirements of species represented by the pileated woodpecker in cooperation with WDW & PNW.
3. Need to inventory population of pileated woodpecker (in cooperation with WDW).
4. Need to map suitable habitat.
5. Develop model for predicting effects on habitat (coop with WDW and PNW).

FOREST PLAN MONITORING WORKSHEET

ISSUE: MARTEN AND NORTHERN 3-TOED WOODPECKER (Old Growth and Mature Indicator)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide habitat to maintain viable populations for all vertebrate species on the Forest and maintain habitat effectiveness of 150 marten and northern 3-toed woodpecker sites. (These are in addition to habitat available in SOHAs, pileated woodpecker areas, Wilderness, and other areas to be retained in a near natural condition.)

MANAGEMENT AREAS AFFECTED: Identified marten and northern 3-toed woodpecker habitat areas.

RISK ASSESSMENT: COST OF ERROR 2 LIKELIHOOD OF ERROR 2 = RISK INDEX 4

Cost of error is moderate because there are other places where the lost sites may be moved. Likelihood of error is moderate because no harvest will be done in minimum areas this decade. Wildfire may eliminate some of the sites.

MONITORING QUESTIONS:

1. Are the areas identified in the plan being maintained?
2. Are the established sites being used by marten and northern 3-toed woodpeckers?

THRESHOLD OF VARIABILITY:

1. 100% of MR and 80% of all other sites are being maintained.
2. A minimum occupancy of 20% is achieved.

SUGGESTED SAMPLING METHODS:

1. Review all sites that had other resource management activities occurring.
2. Visit at least 10% of sites.

REPORT PERIOD (YEARS):

Annually with a detailed report at 5-year intervals that presents a the significance of findings.

RESPONSIBILITY: District Rangers, Range, Wildlife, Fish, Water and Soil Staff Officer.

ANNUAL COST OF MONITORING: \$10,600 We are not yet doing any of this.

REMARKS:

We have the same research and inventory needs for these indicator species as we listed for the Pileated Woodpecker.

FOREST PLAN MONITORING WORKSHEET

ISSUE: MOUNTAIN GOAT HABITAT (Indicator species for high elevation and talus)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Maintain or increase populations. Provide animals for recreation enjoyment. Outputs: Estimate 1,800.

MANAGEMENT AREAS AFFECTED: Where mountain goat habitat is found.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 1 = RISK INDEX 3

Cost of error is high due to high demand for hunting and viewing and the small population. Chance of error is low because most of our habitat is in management areas with direction compatible with goat habitat objectives.

MONITORING QUESTION:

Is each subpopulation being maintained or increasing?

THRESHOLD OF VARIABILITY:

No downward trend.

SUGGESTED SAMPLING METHODS:

Use State estimates.

REPORT PERIOD (YEARS):

Annually with a detailed report at 5-year intervals the presents the significance of findings.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soil Staff Officer, District Rangers.

ANNUAL COST OF MONITORING: \$2,000 of which we are already doing \$1,000

REMARKS:

1. Prepare a Forest-wide Species Management Guide (including specific items for each sub-population) in cooperation with WDW.
2. Map suitable habitat and key areas in cooperation with WDW.
3. Develop model for predicting HSI in cooperation with WDW and PNW.

FOREST PLAN MONITORING WORKSHEET

ISSUE: DEER AND ELK HABITAT (Forest Indicator Species)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Maintain habitat capability to support populations identified in the Forest Plan and provide animals for recreation enjoyment. Outputs (in summer range): Elk 10,000 -15,000; Deer 20,000 -25,000.

MANAGEMENT AREAS AFFECTED: All management areas with identified habitat.

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

Cost of error is moderate because of the demand for big game and the tradeoffs of this resource to manage. The likelihood of error is moderate because of some uncertainty of the quantity of thermal cover and identification of winter range used by big game.

MONITORING QUESTIONS:

1. Are populations being maintained as predicted?
2. Is habitat capability being maintained?

THRESHOLD OF VARIABILITY:

1. Population estimates are at least 80% of projections for any five year period.
2. Forage/cover ratios are within 20% of optimum for any subdrainage.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

- | | |
|---|----------------------|
| 1. State agency census records. | At 5-year intervals. |
| 2. Habitat relationship modeling for projects affecting habitat capability. | As projects occur. |

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soil Staff Officer, District Rangers.

ANNUAL COST OF MONITORING: \$6,000 We are not yet doing any of this.

REMARKS:

1. Prepare species management guides for each winter range in cooperation with WDW.
2. Develop model for predicting HSI in cooperation with WDW and PNW.
3. Map suitable habitat by type.
4. Cooperate with WDW on road closure areas and habitat improvement

FOREST PLAN MONITORING WORKSHEET

ISSUE: **PRIMARY CAVITY EXCAVATORS (Indicator Species Group for dead/defective trees)**

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide habitat to maintain viable populations. Maintain number, size and distribution of trees and snags to meet habitat capability objective by management area as shown in the Forest Plan and provide animals for recreation enjoyment Outputs: at least 40% of the theoretical population Forest-wide.

MANAGEMENT AREAS AFFECTED: All forested management areas

RISK ASSESSMENT: $\text{COST OF ERROR}_2 \times \text{LIKELIHOOD OF ERROR}_2 = \text{RISK INDEX}_4$

Cost of error is moderate because most trees needed by wildlife are soft snags and it takes 10-30 years to replace; however, we have many management areas with an abundance of habitat. Likelihood of error is moderate because we have problems with coordination of salvage and green tree projects, fuelwood gathering and State safety requirements.

MONITORING QUESTIONS:

1. Are primary cavity excavator habitat and replacement trees being left in the proper numbers, sizes and distribution within each management area?
2. Is the habitat being utilized as expected?
3. Are down trees being provided?

THRESHOLD OF VARIABILITY:

1. Habitat availability is nearing the amount specified for a management area.
2. Evidence of use is less than 50% of expected.
3. No downward trend in amount available.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

1. Field review of at least 2 completed projects/District/year.
2. Use transects to estimate use level on a subdrainage basis. Sample 10% of subdrainages in which tree removal occurred.
3. Establish transects to measure amount of down material as in number 2.

Annually with a report on trend at 5-year intervals.

RESPONSIBILITY: District Rangers, Range, Wildlife, Fish, Water, and Soil Staff Officer.

ANNUAL COST OF MONITORING: \$10,000 of which we are already doing about \$3,000

1.Can be combined with the management team review described on the Standards and Guidelines Worksheet but some field measurements will be needed prior to review.

REMARKS:

1. Prepare a Species Management Guide in cooperation with WDW.
2. Document the habitat requirements of all species represented by primary cavity excavators in cooperation with WDW and PNW.
3. Need estimates of populations in near natural conditions.
4. Develop model for predicting Habitat Suitability Index in cooperation with WDW and PNW.
5. Map the Suitable Habitat.

The standard in the Forest Plan is designed to meet Regional direction on a per 40 acre basis.

FOREST PLAN MONITORING WORKSHEET

ISSUE: HAWK AND OWL NEST SITES

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Maintain viable populations and provide animals for recreation enjoyment.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

Cost of error is moderate. Demand for viewing is high. Populations are high and healthy. These species often have high values for falconry. We must meet the requirements of the Migratory Bird Treaty Act. Likelihood of error is also moderate. It is unlikely that we will ever find all hawk and owl nests.

MONITORING QUESTION:

Are nest sites being protected during implementation of habitat disturbing activity?

THRESHOLD OF VARIABILITY:

Previously unknown nests are disturbed during project implementation.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

Timber sale administrators and project CORs watch for nests during project implementation.

As projects occur. A detailed report be prepared at 5-year intervals to evaluate trend.

RESPONSIBILITY: District Ranger, Range, Wildlife, Fish, Water and Soil Staff Officer.

ANNUAL COST OF MONITORING: \$2,000 of which we are already doing \$1,000

There will be incidental annual administrative costs for monitoring but most of the cost is for the 5-year report.

REMARKS:

Information needs include:

1. List species of concern. (WDW)
2. Nesting requirements of each species. (WDW)
3. A useable map of sighting of all species. (WDW)
4. Feeding habitat requirements by each species. (WDW)
5. Species management Guide. (WDW)

FOREST PLAN MONITORING WORKSHEET

ISSUE: **BALD EAGLE HABITAT (T.E.&S. Wildlife)**

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage critical habitat to improve status of threatened and endangered species to a point where they no longer need protection under the Endangered Species Act. Meet recovery levels established in the Pacific States Bald Eagle Recovery Plan.

MANAGEMENT AREAS AFFECTED: Management areas with active and potential nest sites, roost sites and perches.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

Cost of error is high because we have so few active nest sites. Likelihood of error is moderate because we have not located all nest, roost and perch sites.

MONITORING QUESTIONS:

1. Are existing nest sites producing young as anticipated?
2. Are nest, roost and perch sites being maintained?

THRESHOLD OF VARIABILITY:

1. No active site is unused for two successive seasons.
2. All managed sites are maintained until Forest has achieved recovery goal.

SUGGESTED SAMPLING METHODS:

1. Interagency survey of nest sites.
2. Review designated sites.

REPORT PERIOD (YEARS):

Annually with a detailed report at 5-year intervals that presents the significance of findings.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soil Staff Officer, District Rangers.

ANNUAL COST OF MONITORING: \$5,000 of which we are already doing \$3,000

REMARKS:

1. Nest site surveys coordinated with WDW.
2. Locate roosts and perches with WDW.
3. Map of suitable habitat.
4. Model for predicting habitat effectiveness in cooperation with WDW.
5. Develop a Species Management Guide in cooperation with WDW and US FWL.

FOREST PLAN MONITORING WORKSHEET

ISSUE: GRIZZLY BEAR (Threatened Species)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage critical habitat to improve the status of threatened and endangered species to a point where they no longer need protection under the Endangered Species Act.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR₃ X LIKELIHOOD OF ERROR₁ = RISK INDEX₃

Cost of error is high because of extremely low populations. Likelihood of error is low because of an ongoing process to identify habitat.

MONITORING QUESTION:

Are guidelines established for the North Cascades Grizzly Bear Recovery Area being implemented?

THRESHOLD OF VARIABILITY:

Projects are found that do not comply with guidelines.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

Review 20 percent of NEPA documents and follow up with field verification on 1 or 2 projects/District/year.

Annually

RESPONSIBILITY: District Rangers, Range, Wildlife, Fish, Water and Soil Staff Officer.

ANNUAL COST OF MONITORING: \$1,000 We are currently operating at this level.

REMARKS:

1. Continue habitat inventory.
2. Continue documentation of bear sightings. (WDW)
3. Respond to Recovery Plan when completed. (USFWS, WDW)

FOREST PLAN MONITORING WORKSHEET

ISSUE: PEREGRINE FALCON HABITAT (T.E.&S. Wildlife)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage critical habitat to improve status of threatened and endangered species to a point where they no longer need protection under Endangered Species Act. Cooperate in development of the recovery plan. Outputs: 1 - 2 active nests.

MANAGEMENT AREAS AFFECTED: Areas where habitat is found.

RISK ASSESSMENT: $\text{COST OF ERROR}_3 \times \text{LIKELIHOOD OF ERROR}_3 = \text{RISK INDEX}_9$

Cost of error is high because we have a threatened species with no identified sites on Forest. Cost of error is high because we have few inventories of habitat and may inadvertently make errors.

MONITORING QUESTIONS:

1. Are recovery sites being maintained?
2. Are sites occupied?

THRESHOLD OF VARIABILITY:

1. All recovery sites are maintained.
2. Occupancy of Wenatchee National Forest sites is equal to other recovery sites east of the Cascade crest.

SUGGESTED SAMPLING METHODS:

1. Review condition of recovery sites.
2. Survey sites for occupancy.

REPORT PERIOD (YEARS):

Annually with a detailed report at 5-year intervals that presents the significance of findings.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soil Staff Officer, District Rangers.

ANNUAL COST OF MONITORING: \$3,000 of which we are doing \$500

REMARKS:

1. Prepare a Species Management Guide in cooperation with WDW.
2. Complete Nesting Habitat Survey in cooperation with WDW.
3. Map suitable habitat.
4. Develop a HSI model in cooperation with WDW.

FOREST PLAN MONITORING WORKSHEET

ISSUE: GRAY WOLF HABITAT (Endangered Species)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage critical habitat to improve the status of threatened and endangered species to a point where they no longer need protection under the Endangered Species Act. Participate in the development of recovery plan objectives.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 3 = RISK INDEX 9

Cost of error is high because populations are low. Likelihood of error is high because we have no inventories of habitat.

MONITORING QUESTIONS:

Is habitat capability on an increasing trend?

THRESHOLD OF VARIABILITY:

A downward trend.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

Map habitat and track changes through GIS.

Annually with a report at 5-year intervals to establish a trend in habitat capability.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soil Staff Officer: District Rangers.

ANNUAL COST OF MONITORING: \$1,000 We are not doing any of this.

REMARKS:

1. Research on habitat requirements (PNW, WDW)
2. Map of habitat (WDW)
3. Inventory population (WDW)
4. Prepare Species Management Guide (WDW)
5. Prepare model for predicting HSI (WDW, PNW)

FOREST PLAN MONITORING WORKSHEET

ISSUE: HABITAT FOR SPECIES IDENTIFIED AS CANDIDATES FOR THREATENED STATUS

(California wolverine, Swainson's and ferruginous hawks, lynx, long-billed curlew, Townsend's big eared bat, big horned sheep)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Enhance habitat to prevent the need for listing species as Federally Threatened or Endangered.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR₃ X LIKELIHOOD OF ERROR₃ = RISK INDEX₉

Cost of error is high because we have low populations. Likelihood of error is high because we have no research, no specific direction, no inventories of populations or habitat. We have little or no experience managing habitat.

MONITORING QUESTIONS:

Is the trend in habitat capability for each candidate species increasing?

THRESHOLD OF VARIABILITY:

A declining trend.

SUGGESTED SAMPLING METHODS:

Map changes in habitat through GIS.

REPORT PERIOD (YEARS):

Annually with reports at 5-year intervals that describe the trend.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soil Staff Officer, District Rangers.

ANNUAL COST OF MONITORING: \$6,000 We are not doing any of this.

Most of the cost will be in development of the report for each species.

REMARKS:

1. Research on habitat requirements (PNW, WDW)
2. Map of habitat (WDW)
3. Inventory population (WDW)
4. Prepare Species Management Guide (WDW)
5. Prepare model for predicting HSI (WDW, PNW)

FOREST PLAN MONITORING WORKSHEET

ISSUE: TIMBER OFFERED (Allowable Sale Quantity [ASQ] and Timber Sale Program Quantity [TSPQ])

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Achieve planned and assumed volumes of timber sold annually and for the planning period in ASQ and TSPQ.

MANAGEMENT AREAS AFFECTED: For ASQ, all volumes from Management Areas with suitable lands. For TSPQ, all Management Areas where timber harvest is allowed to meet any resource objective.

RISK ASSESSMENT: $\text{COST OF ERROR}_2 \times \text{LIKELIHOOD OF ERROR}_1 = \text{RISK INDEX}_2$

MONITORING QUESTIONS:

1. Is the Forest offering the cubic foot volume (board feet in first decade) of chargeable timber established by the plan ASQ?
2. Is the Forest offering the cubic foot volume (board feet in first decade) of non-chargeable timber necessary to achieve the estimated TSPQ?

THRESHOLD OF VARIABILITY:

The annual amount of timber offered is within 25% of scheduled ASQ and TSPQ. The decade total is within 5% of the Forest Plan projection.

SUGGESTED SAMPLING METHODS:

Use STARS data base and compare volume in MCF to projected decade trend.

REPORT PERIOD (YEARS):

Annually with a report at years 5 and 8 of each decade. Adjustments to timber sale schedule made at these times if necessary.

RESPONSIBILITY: Timber & Visual Resource Management Staff Officer, District Rangers.

ANNUAL COST OF MONITORING: \$3,500 We are currently doing all of this.

REMARKS: To assure decade ASQ not exceeded. To test Plan assumption regarding TSPQ.

Need to have an accurate method to convert board feet to cubic feet or a system which allows accurate cubic foot cruising.

For meeting Plan amounts, we can monitor on a board foot basis during the first decade but we still need to get serious about converting our measurements to cubic feet.

FOREST PLAN MONITORING WORKSHEET

ISSUE: TIMBER HARVEST UNITS (Size, shape and location)

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage vegetative cover to meet direction on size of openings created by National Forest timber harvest.

MANAGEMENT AREAS AFFECTED: All Management Areas where scheduled or non-scheduled timber harvest can occur.

RISK ASSESSMENT: $\text{COST OF ERROR}_2 \times \text{LIKELIHOOD OF ERROR}_1 = \text{RISK INDEX}_2$

MONITORING QUESTION:

Are the Forest Plan standards and guidelines regarding the size and dispersal of openings and condition of adjacent vegetation (eg. height of trees in adjacent areas) being appropriately implemented?

THRESHOLD OF VARIABILITY:

No allowance for non conformance with size restrictions that do not fit exceptions provided by NFMA and the Regional Guide. At least 90% of activities must fully meet shaping and blending objectives

SUGGESTED SAMPLING METHODS:

Review of a sample of created openings in the field.

REPORT PERIOD (YEARS):

Annual review of created openings with a report at 5 year intervals that presents a discussion of the significance of findings.

RESPONSIBILITY: District Ranger, Timber & Visual Resource Management Staff Officer

ANNUAL COST OF MONITORING: \$5,000 of which we are doing \$4,000

REMARKS:

FOREST PLAN MONITORING WORKSHEET

ISSUE: TIMBER HARVEST

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Ensure that regeneration harvests are not prescribed for areas where average annual growth has not generally reached culmination of mean annual increment.

MANAGEMENT AREAS AFFECTED: All areas where timber harvest is expected.

RISK ASSESSMENT: $\text{COST OF ERROR}_2 \times \text{LIKELIHOOD OF ERROR}_2 = \text{RISK INDEX}_4$

MONITORING QUESTIONS:

1. Are stands being harvested at an age and condition that produces the expected growth measured on an average annual cubic foot basis?
2. Is the amount of volume removed consistent with amounts sold?

THRESHOLD OF VARIABILITY:

1. Stands being scheduled for regeneration are within 5% of culmination of mean annual increment.
2. Volume removed is within 10% of amount sold.

SUGGESTED SAMPLING METHODS:

1. Review a sample of silvicultural harvest prescriptions calling for regeneration.
2. Cut and sold reports.

REPORT PERIOD (YEARS):

Annual comparison and a report at 5-year intervals that presents a discussion of the significance of findings.

RESPONSIBILITY: District Rangers and Timber & Visual Resource Management Staff Officer.

ANNUAL COST OF MONITORING: \$12,000 of which we are doing \$6,000

REMARKS: Question 1 is intended to tie prescriptions to CMAI. Needs to be monitored because yield tables and rotations in long-term yield calculations are based on harvesting stands at or near CMAI. Question 2 added to provide better tie between timber offered/sold and timber harvested. Question becomes less significant as we move toward sales with payment units or implement a timber management program based on acre controls.

FOREST PLAN MONITORING WORKSHEET

ISSUE: SILVICULTURAL PRACTICES

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Assure that silvicultural prescriptions are appropriate, effective and consistent with resource objectives for each management area.

MANAGEMENT AREAS AFFECTED: All Management Areas where scheduled or non-scheduled timber harvest can occur.

RISK ASSESSMENT: $COST\ OF\ ERROR_2 \times LIKELIHOOD\ OF\ ERROR_3 = RISK\ INDEX_6$

MONITORING QUESTIONS:

1. How many acres of each planned silvicultural practice (eg. precommercial thinnings, regeneration harvest, planting with appropriate genetic stock) have been accomplished?
2. Have silvicultural prescriptions met objectives desired for each management area?
3. Are managed stands growing at the rates estimated by Forest Plan yield models (PROGNOSIS)?

THRESHOLD OF VARIABILITY:

1. Planned versus accomplished silvicultural practices are within 10% annually and 5% for the decade.
2. Prescriptions produce desired end products on at least 90% of treated acres.
3. Average annual growth is within 10% of predicted rates.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

1 & 2. Field exams for attainment purposes. Use the SILVA, TSI and Reforestation attainment data element within the TRACS data base.

Make annual field exams and comparisons, with a full report at 5 year intervals that presents a discussion of the significance of findings.

3. Modified stand exams in sapling stands and at regular intervals thereafter.

First measurement when trees reach sapling size. Report presenting findings will be prepared at year 8 of the first decade and at 10-year intervals thereafter.

RESPONSIBILITY: Timber & Visual Resource Management Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$20,000 of which we are doing \$6,000

REMARKS: Needed for Plan implementation and support of ASQ. Long-term need to verify that projected growth rates from PROGNOSIS are in fact being realized on the ground.

Question 2 added to tie silvicultural practices to integrated resource management.

Question 3 added to meet RPA section 3(d)(1) for identification of lands with stands of trees not growing at best potential rate.

FOREST PLAN MONITORING WORKSHEET

ISSUE: REFORESTATION

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Minimize the amount of time between the removal of existing trees and reforestation with desired species.

MANAGEMENT AREAS AFFECTED: All those where timber harvest occurs.

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

MONITORING QUESTIONS:

1. Is stocking for each management area and silvicultural method achieved within the time frame established?
2. Have adequate numbers of trees of desired species been established to realize optimum growth for the management area?

THRESHOLD OF VARIABILITY:

1. The average elapsed time from harvest to reforestation is 3 years or less on 90% of the acres harvested.
2. Average number of trees of desired species are within 10% of recommended levels.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

1. Use the annual accomplishment report to track areas harvested, site preparation completed date, and date of reforestation.

Annually.

2. Conduct field surveys.

Years 1 and 3 after planting.

RESPONSIBILITY: District Ranger and Timber & Visual Resource Management Staff Officer

ANNUAL COST OF MONITORING: \$100,000 Most of this cost is for the field surveys which we are already doing.

REMARKS: This item is intended to test the planning premise supporting planned ASQ. We need to track accomplishment of site preparation within 1 year of availability of the unit and reforestation within 3 years unless there are documented extenuating circumstances.

Question 2 added to meet RPA section 3(d)(1) and NFMA 36 CFR 219.12(k)(5).

FOREST PLAN MONITORING WORKSHEET

ISSUE: LANDS NOT SUITABLE FOR TIMBER MANAGEMENT

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Verify that technology and/or other information has not been developed to justify reclassifying lands from a not suitable status to suited, or vice versa.

MANAGEMENT AREAS AFFECTED: All management areas which include lands from which timber may be harvested.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

MONITORING QUESTIONS:

1. Have the lands that were identified in the Plan as not being suitable for timber management now become suitable for timber management?

2. Is the suitable/not suitable land classification accurate as identified in the Forest Plan data base?

THRESHOLD OF VARIABILITY:

1. More than a 10 percent change in acres classified as unsuitable.
2. More than a 10 percent error in suitable/unsuitable classification.

SUGGESTED SAMPLING METHODS

Record Forest Plan data base in GIS. Update these records based on site specific analyses documented through the NEPA process. Records include reasons for lands being not suited.

REPORT PERIOD (YEARS):

Annual recording of information with a report at 10-year intervals that presents a discussion of the significance of findings.

RESPONSIBILITY: Timber & Visual Resource Management Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$12,000 We are not yet doing this.

REMARKS: Question 2 added to monitor accuracy of information going into Forest Plan. Important item because of direct relationship to acres being used to calculate ASQ.

FOREST PLAN MONITORING WORKSHEET

ISSUE: MAINTENANCE OF LONG-TERM SOIL PRODUCTIVITY

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage the soil resource by implementing management practices that maintain or enhance its productive properties.

MANAGEMENT AREAS AFFECTED: All management areas.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 3 = RISK INDEX 9

Soil is considered to be an irreplaceable resource. Although there is some possibility that compaction, displacement, loss of organic matter, and other changes can be rectified, cost are usually prohibitive. The risk of downstream impacts due to erosion and sedimentation are also usually costly.

MONITORING QUESTION:

Is soil productivity being adequately protected?

THRESHOLD OF VARIABILITY:

Less than 20% of an activity area is in a compacted, puddled or displaced condition; severely burned; or actively moving.

SUGGESTED SAMPLING METHODS: (Also see REMARKS) REPORT PERIOD (YEARS):

- | | |
|--|---|
| 1. Soil disturbance monitoring will be done in accordance with the Forest soil monitoring guide. | 1&2. Annually with a detailed report at 5-year intervals that discusses the significance of findings. |
| 2. For surface erosion - Utilize Allutn or other acceptable methodology on approximately 12 sites Forest-wide per year | |
| 3. For mass erosion, evaluation of individual mass failures larger than 200 cubic yards if mid-slope, or 50 cubic yards if in a streamside zone. | Variable as events occur. |
| 4. Tree growth measurements will be taken on twenty of the major soil types mapped on the Forest. Paired sample sites (disturbed vs. undisturbed) will be located on each soil type. Both foliar and soil test analysis will be made for each site and at the same frequency as are tree measurements. | At 10-year intervals per site. |

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soils Staff Officer: District Rangers.

ANNUAL COST OF MONITORING: \$19,500 (Also see REMARKS) We are not yet doing this.

REMARKS: This monitoring effort will evaluate the individual effects of soil compaction, soil displacement, surface erosion, mass erosion, organic matter loss, and nutrient loss on long-term soil productivity.

Monitoring may require the combined skills of a soil scientist, a research scientist, silviculturist, and one or more technicians. The specific project analysis will need to be scheduled on a district basis and carried out as a district project, but coordinated through the Supervisors office so that duplications of sites does not become a problem. PNW Forest & Range Research Station scientists will be asked to assist in the evaluation of the monitoring procedures and results.

1.Soil compaction/displacement/puddling monitoring - Monitor 20% of tractor harvested acres per year; Approximately 10,000 acres are harvested each year of which, approximately 30% is harvested by tractors. Therefore, 20% of the 3000 acres would be 600 acres per year. Distribute monitoring over the Forest on a weighted basis by District.

2.Surface erosion monitoring - Select timber harvest area, wildfire area, or other disturbed site that could directly effect water quality and or fish habitat.

3.Mass erosion monitoring - Monitoring this kind of condition may require the use of several different skills: geologist, soil scientist, silviculturist, and watershed technician. Monitoring should evaluate both management related mass failures and naturally occurring mass failures that have a potential adverse effect upon water quality or fish habitat. We should be trying to determine the cause/effect relationships of each event we monitor. An emphasis should be placed on determining the cause/effect relationships of mass erosion events.

Monitoring of individual events: Case by case basis. Field drilling and seismic analysis usually needs to be done at least two times per year (spring and fall). Cross sections and measurements need to be done when the soil mass has stopped moving for the season and it is dry enough support equipment and people. This is also a good time to establish and monitor the photo points. Photo points should be retaken at least every 5 years.

4.Tree growth monitoring - site selection will be based on soil types. Coordinate tree growth measurement work with the timber stand exam program wherever possible. The foliar and soil samples will be taken each time that tree measurements are taken. The local PNW Research Soil Scientist will be asked to help write the monitoring plans and also to interpret monitoring results.

ANNUAL COST OF MONITORING (Continued)

1.Estimated cost for monitoring soil compaction/displacement/puddling:
\$6,000.00/year (approximately 6 timber sales/year)

2.Estimated costs for surface erosion monitoring:
Estimate \$300.00/site X 12 sites/year = \$3,600.00

3. Estimated costs for mass erosion monitoring:

a. Photo analysis : 20 days/district x \$125/day
\$2,500.00/District x 1 District/year = \$2,500
(assumes resource photo availability)

b. Costs to monitor specific events will vary greatly depending on the size, location, etc.
Costs could run as high as \$10,000.00 per occurrence if drilling/seismic and survey work is required. Photo point monitoring of an event could average \$200/site.

4. Estimated cost for monitoring tree growth:

Field - \$250.00/site (ten paired sites per year) = \$5000.00
Lab analysis - foliar = \$50.00/sample X 20 samples = \$1000.00
soil = \$50.00/sample X 20 samples = \$1000.00
\$7000.00 Total/yr

FOREST PLAN MONITORING WORKSHEET

ISSUE: FISH HABITAT TRENDS FOR MANAGEMENT INDICATOR SPECIES

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Maintain or enhance fish habitat capability to at least retain existing capability.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

MONITORING QUESTION:

Are the habitat trends for Management Indicator Species stable to improving, based on fish production objectives (anadromous) and habitat capability (resident)?

THRESHOLD OF VARIABILITY:

A declining trend in habitat in a drainage for a specific species.

SUGGESTED SAMPLING METHODS;

Anadromous fish numbers obtained from Washington Dept. of Fisheries (spawning and dam counts). Resident population trends (including bull trout) coordinated with Washington Dept. of Wildlife index spawning surveys.

REPORT PERIOD (YEARS):

Annual surveys with a detailed report at 5 year intervals that discussed the significance of findings.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soil Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$6,000 of which we are doing \$1,000

REMARKS: Significant coordination required with fish management agencies.

Baseline stream inventory and project level stream inventory will augment this information on indicator species population trends.

These monitoring efforts are closely linked with those for several other issues, such as the evaluation of long-term trends in watershed condition and fish habitat capability. Refer to other Soil, Water and Fish Habitat Monitoring Worksheets for more detailed information regarding each monitoring component and its linkages within the program.

FOREST PLAN MONITORING WORKSHEET

ISSUE: EFFECTS OF FOREST MANAGEMENT ON RIPARIAN DEPENDENT RESOURCES, INCLUDING WATER QUALITY, FISH AND WILDLIFE HABITAT

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide riparian habitat as specified in the Forest-wide Standards and Guidelines to meet water quality, fish and wildlife habitat objectives.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: $\text{COST OF ERROR}_3 \times \text{LIKELIHOOD OF ERROR}_3 = \text{RISK INDEX}_9$

- Sensitivity of riparian areas/riparian dependent resources
- Water quality is a major public concern
- Emphasis on fish habitat management to meet "Rise to the Future" program, Indian Treaty rights, and NWPPC goals for anadromous fish production.

MONITORING QUESTION:

Is project implementation resulting in expected conditions for riparian areas?

THRESHOLD OF VARIABILITY:

Non-attainment of a practice or set of practices with Forest Plan standards and guidelines, such as those for riparian area management and water quality.

SUGGESTED SAMPLING METHODS:

EA review with field review of a sample of projects for implementation and effectiveness.

REPORT PERIOD (YEARS):

Annual review with a detailed report at 5-year intervals that presents a discussion of the significance of findings.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soils Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$26,000 (Also see REMARKS) We are doing about \$5,000 now

REMARKS: The following guidance for implementation and effectiveness monitoring of project activities is considered a minimum level program to address this issue. It must be recognized that this monitoring effort will be supplemented by other components of the Forest-wide program, such as implementation monitoring that will occur during project activity as regular support, soil productivity monitoring, etc.

If a specific project or area requires a more intensive monitoring effort, then that should be prescribed in the project NEPA document.

SUGGESTED SAMPLING METHODS

1. Implementation Monitoring - Evaluation of the extent and quality of implementation of management practices prescribed in the project NEPA document. Include an evaluation of whether the proper practices and controls were included in the NEPA document as well as an assessment of their implementation. (See footnote for suggested minimum sample size.)

a. Review NEPA documents/contracts to determine if Forest Plan standards and guidelines and management prescriptions are being included in project design.

b. On-site review of a sub-sample of completed projects to determine if practices are being implemented as planned in the NEPA document.

2. Effectiveness Monitoring - Evaluation of the extent to which management practices prescribed in NEPA documents meet Forest-wide standards and guidelines.

a. On-site review of a sub-sample of completed projects to evaluate overall compliance with Forest-wide standards and guidelines. See following for suggested sample size.

Suggested minimum sample size by resource element:

Timber: at least 1 completed timber sale/district/year (completed thru slash disposal activities); emphasis on monitoring of road construction and maintenance activities as well as the effectiveness of riparian zone treatments.

Range: at least one allotment/year on the Forest; Also refer to the "Range Forage Condition" monitoring worksheet for information on riparian area and upland monitoring of the range resource.

Recreation (ORV, Wilderness Uses)/Minerals/Special Uses: as identified in the project NEPA document.

b. Monitoring of a sub-sample of projects before, during and after activity to evaluate effectiveness of practices and projects in meeting Forest-wide standards and guidelines. Emphasis on quantitative assessment using such parameters as stream temperature, turbidity, sediment deposition, etc.

(1) Emphasis on timber harvest/roading activities.

(2) This component of effectiveness monitoring will be coordinated Forest-wide. Emphasis will be placed on collection of quality data on a limited number of projects. Suggested minimum sample size 3 large sales during the first half of the 10 year timber sale action plan.

(3) This level of effectiveness monitoring will involve integration of monitoring results from the following levels:

- **On-site monitoring** of practice/project on the slope
- **Upstream tributary monitoring** of channel conditions within or immediately adjacent to the activity area
- **Mainstream monitoring** of conditions at a downstream critical reach

(4) Refer to worksheet on Maintenance of Long-Term Soil Productivity for details regarding project monitoring for the soil resource.

c. Soil, Water and Fish Habitat Resources - See monitoring worksheet for "Trends in watershed condition and fish habitat capability".

d. Wildlife Habitat Capability in Riparian Areas - Population trend data for Ruffed Grouse and Beaver will be obtained from WDW. Plots will be established in a sub-sample of Class III and IV streams to evaluate population trends for amphibians after timber harvest activities (1-5 years).

ANNUAL COST OF MONITORING (Continued)

For water quality/fish habitat = \$22,500

For riparian wildlife habitat = \$3,500

FOREST PLAN MONITORING WORKSHEET

ISSUE: CUMULATIVE EFFECTS OF FOREST MANAGEMENT ACTIVITIES ON WATERSHED

CONDITION AND FISH HABITAT

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage the soil resource of the Forest by using management practices that will maintain or enhance its productive properties. Maintain watershed condition to ensure meeting or exceeding State water quality standards. Maintain and improve current and long-term fish habitat capability.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 3 = RISK INDEX 9

MONITORING QUESTION:

Are activities being scheduled in time and space in a manner that minimizes the potential for adverse cumulative effects on watershed condition and fish habitat?

THRESHOLD OF VARIABILITY:

The threshold for this issue is related to the results from other monitoring elements such as fish habitat capability and population trends, watershed condition, and meeting or exceeding State water quality standards.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

Review the results of other monitoring items and evaluate project EAs with field observations including evaluation of activities on land in other ownerships. (See REMARKS section for more detail.)

Annual review with a detailed report at 5-year intervals that discusses the significance of findings.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soils Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$6,000 of which we are doing \$1,000

(Cost for data compilation and evaluation; assumes data from individual monitoring efforts have already been compiled and interpreted)

REMARKS: This monitoring effort is closely linked with those for most other issues, especially to the evaluation of baseline trends in watershed condition and fish habitat. Refer to the "TRENDS IN WATERSHED CONDITION AND FISH HABITAT CAPABILITY" for more detailed information regarding this monitoring component and its linkages within the program.

SUGGESTED SAMPLING METHODS

Provide for an integrated analysis of project planning, scheduling and monitoring results for watersheds. This analysis will include:

1. Compilation and evaluation of ten year timber sale action plans, project EAs, harvest records, IDT evaluations of project compliance with EAs and contracts and information on activities on lands in other ownerships.

2. Compilation and evaluation of monitoring results, such as baseline trends in water quality and fish habitat, effects of forest management activities on watershed condition and fish habitat, etc. as outlined under other monitoring issues.

Review of project scheduling and analyses should occur annually on a sample basis. Review of monitoring results for identification of cumulative effects should occur on a subdrainage basis at least every five years.

FOREST PLAN MONITORING WORKSHEET

ISSUE: TRENDS IN WATERSHED CONDITION

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage the soil resource by using management practices that will maintain or enhance its productive properties. Maintain watershed condition to ensure meeting or exceeding water quality goals as defined by standards established by the State of Washington. Maintain and improve current and long-term fish habitat capability.

MANAGEMENT AREAS AFFECTED: Forest-wide

RISK ASSESSMENT: $\text{COST OF ERROR}_3 \times \text{LIKELIHOOD OF ERROR}_3 = \text{RISK INDEX}_9$

Until additional information is available on current conditions and effectiveness of standards and guidelines, a relatively high risk exists that we may not meet management objectives.

MONITORING QUESTION:

What are the long-term trends in watershed condition as expressed by changes in soil productivity, water quality, and fish habitat capability?

THRESHOLD OF VARIABILITY:

For soil productivity - see worksheet for "Maintenance of Long-Term Soil Productivity."

For fish habitat capability - any measurable decrease. (The trend in fish habitat capability is considered to be a sensitive index of watershed condition.)

For water quality - failure to meet Federal and State water quality standards.

SUGGESTED SAMPLING METHODS: REPORT PERIOD (YEARS):

See the REMARKS section for details.

Because of the time needed to gather baseline information and have enough data for comparisons evaluations can be made, the first detailed report will be in 10 years. Reports for subsequent periods will be at 5-year intervals.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soils Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: Year 1-5 = \$28,500 we are not doing any of this yet.
Year 6-10 = \$53,500 (Also see REMARKS)

REMARKS:

SUGGESTED SAMPLING METHODS

The first thing we need to address this subject is a completed stream survey. From there we can determine the most appropriate locations for monitoring stations on streams and lakes. The process to gather information is explained in this section.

This inventory/monitoring effort will be coordinated with state and other Federal fish and environmental agencies, Indian tribes and private groups.

Baseline Stream Inventory

A major benefit of the stream inventory program will be the ability to compare the data collected for monitoring purposes. An accelerated stream inventory program is scheduled during the first 3-5 years of Plan implementation (approximately 300 stream miles/year). This program will be a coordinated effort between watershed and fish habitat resources, funded as a basic inventory.

Following this initial effort, approximately 100 stream miles will be inventoried each year for the purposes of baseline monitoring. The total annual cost of this monitoring effort is estimated to be approximately \$25,000.00/year (distributed 2/3 fish, 1/3 watershed; beginning year 5).

Baseline stream inventory will include the following parameters:

- habitat units (e.g., pool, riffle, etc.)
- riparian standards (e.g., large wood per unit distance)
- channel type (Rosgen or other)
- cover
- substrate
- hydraulic parameters (e.g., bankfull width, etc.)
- fish populations (e.g., snorkel counts)
- evaluation of migration obstacles

Project level inventory data will be available to supplement the baseline inventory. This project level inventory will involve more detailed information on specific stream reaches.

Baseline Monitoring Network - Streams

Baseline monitoring provides broad overview coverage of the Forest. Baseline monitoring sites on selected streams and lakes representatively sample conditions on the Forest, serving as indicators of long-term trend and to characterize the resource. These sites may also serve as monitoring sites for project level monitoring.

Parameter selection will emphasize those factors for which standards have been defined, such as Forest-wide standards for riparian area condition. For example, selected parameters for streams would include characteristics such as stream temperature, sediment deposition in fish habitat, and macroinvertebrates.

1.Streams

The baseline monitoring network would consist of approximately 25 stations distributed across the Forest. Data from this network would be supplemented by information from climatic stations and stream gages operated by the National Weather Service, Soil Conservation Service and the U.S. Geological Survey. Information from the latter sources will be used for resource characterization and background data for predictive purposes in the analysis of likely consequences of projects.

An annual cost estimate for support of a baseline stream monitoring network would be as follows:

a. Estimate 25 stations Forest-wide, parameters as follows:

- (1) Temperature monitoring: 10 of 25 stations
- (2) Core sampling: 10 stations
- (3) Cobble embeddedness: 25 stations
- (4) Macroinvertebrate monitoring: 10 stations
- (5) Other physical/chemical/biological water quality parameters: 5 stations
- (6) Other stream channel parameters, such as bed material composition: all stations

b. Estimated network cost (25 stations)

(1) Temperature monitoring	\$ 1,330
(2) Core sampling	\$ 5,000
(3) Cobble embeddedness	\$ 5,000
(4) Macroinvertebrates	\$ 6,000
(5) Phy/Chem/Bio	\$ 1,500
(6) Stream channel parameters	<u>\$ 5,000</u>
	\$24,000

2. Lakes

Evaluation of habitat capability and population trends on a minimum of 10 lakes in coordination with WDW. Coordination emphasis on monitoring of growth and catch rates. Integrate this effort with baseline monitoring for the air resource management program. Estimated cost for evaluation of 5 lakes per year is \$4,500.

Costs summarized from the above narrative:

Baseline Monitoring -Streams \$24,000/year during years 1-10
Network -Lakes \$4,500/year during years 1-10

Baseline Stream Inventory \$25,000/year during years 6-10

TOTAL Years 1-5 \$28,500
Years 6-10 \$53,500

These monitoring efforts are closely linked with those for several other issues, such as the evaluation of the cumulative effects of forest management activities on fish habitat capability.

FOREST PLAN MONITORING WORKSHEET

ISSUE: **RANGE OUTPUTS**

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Manage the range resource to maintain and improve vegetative conditions. Full utilization of forage allocated to livestock will be encouraged.

MANAGEMENT AREAS AFFECTED: All areas where livestock grazing is permitted.

RISK ASSESSMENT: $\text{COST OF ERROR}_2 \times \text{LIKELIHOOD OF ERROR}_2 = \text{RISK INDEX}_4$

MONITORING QUESTION:

Are the annual outputs (AUMs) for permitted commercial livestock being achieved as projected in the Forest Plan?

THRESHOLD OF VARIABILITY:

A 10% change from projected AUM outputs.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

Review and compare actual with predicted AUM outputs from the annual grazing statistical reports.

Annually with a detailed report at 5-year intervals that describes the significance of findings.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soils Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$3,000 of which we are doing \$2,000

REMARKS:

FOREST PLAN MONITORING WORKSHEET

ISSUE: FORAGE UTILIZATION

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide opportunities to enhance other resource values through the use of livestock to shape desired plant communities.

MANAGEMENT AREAS AFFECTED: All areas where livestock grazing is permitted.

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

MONITORING QUESTION:

Are the forage utilization levels consistent with goals for riparian and upland areas?

THRESHOLD OF VARIABILITY:

A 10% increase in forage utilization over prescribed standards with a resulting downward trend in condition in riparian and upland areas.

SUGGESTED SAMPLING METHODS: REPORT PERIOD (YEARS):

Using FSH 2509.21, sample at least 30% of allotments annually with all sampled at least once every 4 years. Highest priority is in known or suspected problem areas.

Annually with a detailed report at 5-year intervals that provides a discussion of the significance of findings.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soils Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$5,000 We are doing all of this now.

REMARKS: Riparian area sampling is a shared monitoring item with watershed, fish and wildlife.

FOREST PLAN MONITORING WORKSHEET

ISSUE: RANGE FORAGE CONDITIONS

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Improve forage condition with an upward trend in ground cover and species composition, contributing to the protection and enhancement of soils, watershed and wildlife forage.

MANAGEMENT AREAS AFFECTED: All areas where livestock grazing is permitted.

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

MONITORING QUESTIONS:

1. Is vegetation condition and trend being maintained or improved in riparian and upland areas, so as to meet Forest Plan objectives?
2. Have areas in unsatisfactory condition improved to satisfactory condition?

THRESHOLD OF VARIABILITY:

1. An 10% or greater increase in area showing a downward trend.
2. An upward trend for an area previously identified as being in an unsatisfactory condition.

SUGGESTED SAMPLING METHODS

REPORT PERIOD (YEARS):

Riparian areas: Terrestrial transects and photographs, stream channel cross-section measurements, stream-bank condition evaluation (Haugen, 1987), photo point standard documentation ("Recording the changes", R-6-10-095-1982). Observations, temperature measurements. Comparison with "PC" criteria.

Annually with a detailed report at 5-year intervals that presents a discussion of the significance of findings.

Upland areas: Condition and trend transects, field observations, photo points ("Recording the Changes" R-6-10-095- 1982).

As established in allotment management plans but at least once every 10 years.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soils Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$20,000 of which we are doing \$10,000

REMARKS: Riparian area sampling will be shared with watershed, fish and wildlife. This monitoring is that which is in addition to the normal amount of sampling in riparian areas which would occur without the special riparian area distinction.

FOREST PLAN MONITORING WORKSHEET

ISSUE: RANGE IMPROVEMENTS

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Maintain all structural improvements at, or as near as possible to, the standard to which they were constructed.

MANAGEMENT AREAS AFFECTED: All areas where livestock grazing is permitted.

RISK ASSESSMENT: $\text{COST OF ERROR}_2 \times \text{LIKELIHOOD OF ERROR}_1 = \text{RISK INDEX}_2$

MONITORING QUESTIONS:

Are structural range improvements being maintained so that they continue to function at the level they were intended?

THRESHOLD OF VARIABILITY: Ten percent of improvements are not functioning as designed.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

Review allotment records and a sample structural improvements.

Annually with detailed reports at 5-year intervals.

RESPONSIBILITY: Range, Wildlife, Fish, Water and Soils Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$6,000 of which we are doing \$3,000

REMARKS:

FOREST PLAN MONITORING WORKSHEET

ISSUE: ROAD MILEAGE AND MANAGEMENT

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: To plan, design, operate, and maintain a safe economical transportation system providing efficient access for the movement of people and materials involved in the use and protection of National Forest lands.

MANAGEMENT AREAS AFFECTED: All areas where roads are appropriate.

RISK ASSESSMENT: $COST\ OF\ ERROR\ 2 \times LIKELIHOOD\ OF\ ERROR\ 1 = RISK\ INDEX\ 2$

MONITORING QUESTIONS:

1. Does the transportation system serve the intended resource objectives for the management area?
2. How do the miles of road construction estimated in Forest Plan schedules compare with actual construction?

THRESHOLD OF VARIABILITY:

1. No variability, all non conforming projects will be redesigned.
2. The miles should be within 25% of annual projections and within 10% for the 10 year period.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD:

1. Conduct an interdisciplinary field review of a sample of road projects and the transportation system serving specific management areas.

Annual review with a report at 5 year intervals that includes a discussion of significant findings.

2. Record accomplishment in various existing systems such as STARS, TSPIRS, Roads, etc.

Annual recording with a detailed report at 5 year intervals.

RESPONSIBILITY: District Rangers and Engineering, Lands and Minerals Staff Officer

ANNUAL COST OF MONITORING: \$8,000 of which we are doing \$6,000

REMARKS: Question 2 added to address issue of road management and cost.

FOREST PLAN MONITORING WORKSHEET

ISSUE: INSECT AND DISEASE CONTROL

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Assure that management practices do not contribute to increases in the incidence of destructive insects and diseases such as spruce budworm, Douglas-fir tussock moth, pine beetle, mistletoe, root rots, and others.

MANAGEMENT AREAS AFFECTED: All forested lands.

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

MONITORING QUESTION:

Are destructive insect and disease organisms remaining below potentially damaging levels following management activities?

THRESHOLD OF VARIABILITY:

Insect populations and/or infection centers show an increase since the last measurement/survey.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

1. Review of ID&C survey maps to determine trends.
2. Conduct special surveys to determine effects on growth.

1. Annually review with report at 5 year intervals that present a discussion of the significance of findings.
2. A field survey at 10 year intervals.

RESPONSIBILITY: Timber & Visual Resource Management Staff Officer; District Rangers.

ANNUAL COST OF MONITORING: \$5,000 of which we are doing \$1,000

REMARKS: This item is intended to track the effects of insect and disease agents on Forest stands and their effect on growth rates.

FOREST PLAN MONITORING WORKSHEET

ISSUE: **FOREST FIRE PROTECTION**

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide protection from wildfire for forest users, improvements, and forest resources in an efficient manner.

MANAGEMENT AREAS AFFECTED: Forest-wide.

RISK ASSESSMENT: COST OF ERROR 3 X LIKELIHOOD OF ERROR 2 = RISK INDEX 6

MONITORING QUESTIONS:

1. Are implemented fire suppression strategies adequately protecting the public, improvements, and forest resources?
2. Are the costs of protection in line with those projected by the National Fire Management Analysis System?

THRESHOLD OF VARIABILITY:

1. A decrease greater than 15% in the ability of the Forest to provide any of the resource outputs outlined in the Plan.
2. If the total fire program costs (FFP + FFF) and resource loss exceed the value described in the most current NFMAS documentation by more than 20% for two consecutive years.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS):

- | | |
|---|---|
| 1. Compare expected outputs with accomplishment. | 1&2 Annually with a report at 5 year intervals that discusses the significance of findings. |
| 2. Review program costs and resource loss for each fiscal year. | |
| Review fire suppression costs and resource losses for each fire that exceeds 100 acres. | As needed. |

RESPONSIBILITY: Air, Fire & Aviation Staff Officer, and District Rangers.

ANNUAL COST OF MONITORING: \$7,000 of which we are doing \$3,500

REMARKS: Interagency coordination is a major portion of the workload. The monitoring costs include time to accomplish the following: 1) Update NFMAS; 2) Ensure compliance with National, Regional, and Forest policy and standards; 3) Work with other disciplines and agencies to review the appropriateness of fire suppression actions.

FOREST PLAN MONITORING WORKSHEET

ISSUE: USE OF PRESCRIBED FIRE

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Appropriate, efficient application of prescribed fire in support of the Forest Management program.

MANAGEMENT AREAS AFFECTED: All areas where this tool is appropriate.

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 2 = RISK INDEX 4

MONITORING QUESTIONS:

1. Are the acres being treated with prescribed fire meeting expected resource management objectives?
2. Are forest fuel loadings exceeding natural levels and therefore placing Forest users, improvements, and/or resource values at risk?

THRESHOLD OF VARIABILITY:

1. Acres treated are for the purposes prescribed and within 25% of annual projections and 10% for the decade.
2. Fuel loadings, expressed in tons/acre, are within 25% of those expected under natural conditions. Risk assessment is a subjective evaluation with no identifiable threshold.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD (YEARS)

- | | |
|---|---|
| 1. Review smoke management documentation, burn plan objectives, and results of completed activity. | Annually with a detailed report at 5 year intervals that presents a discussion of the significance of findings. |
| 2. Fuel loading inventories in conjunction with an assessment of the significance of the findings relative to nearby areas. | Part of Forest inventoried annually with a report at 5 year intervals. |

RESPONSIBILITY: District Rangers; Air, Fire & Aviation Staff Officer.

ANNUAL COST OF MONITORING: \$30,000 of which we are doing \$10,000

REMARKS: This item applies to all uses of prescribed fire, not just the need to use fire as a tool for site prep and fuel reduction.

FOREST PLAN MONITORING WORKSHEET

ISSUE: AIR RESOURCE MANAGEMENT

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Maintain air quality in conjunction with all cooperating agencies.

MANAGEMENT AREAS AFFECTED: Forest-wide.

RISK ASSESSMENT: COST OF ERROR 1 X LIKELIHOOD OF ERROR 2 = RISK INDEX 2

Errors result in short-term degradations which could have long-term effects on how forest management activities are viewed by the public. Likelihood of error is moderate because of the variability of weather and our ability to accurately predict.

MONITORING QUESTIONS:

1. Are the impacts on air quality being considered in the management activities being proposed?
2. Is the Forest in compliance with direction outlined in the Clean Air Act, the Washington State Implementation Plan, and National Forest Policy?

THRESHOLD OF VARIABILITY:

1. All NEPA documents for projects with a potential to affect air quality include an evaluation of the likely effects of proposed activities on air quality.
2. Violation of the Washington State Smoke Management plan will initiate review. Negative effects on Air Quality Related Values in any Class I area will result in review.

SUGGESTED SAMPLING METHODS: REPORT PERIOD (YEARS)

- | | |
|---|---|
| 1. Review a sample of NEPA documents. | 1&2 Annually with a detailed report at 5-year intervals that presents a discussion of the significance of findings. |
| 2. Examine smoke management documents. Review consumption documentation on 20% of prescribed fire projects. | |

RESPONSIBILITY: District Ranger; Air, Fire & Aviation Staff Officer.

ANNUAL COST OF MONITORING: \$10,000 of which we are doing \$3,000

REMARKS: This is a rapidly expanding program. Priority projects include implementing an Air Quality Related Values Monitoring Plan for the Alpine Lakes Wilderness and establishing baseline values for this airshed. Second priority is to establish AQRVs for additional wildernesses on the Forest and expand monitoring program as necessary. Additional skills may be needed to deal with modeling programs which involve atmospheric variables.

An additional \$50,000 to \$100,000 will be spent annually on monitoring Air Quality Related Values associated with the Class I Wilderness Airsheds. That kind of monitoring is beyond the scope of the effort needed for monitoring the effects of implementing the Forest Plan and is not a part of this plan.

FOREST PLAN MONITORING WORKSHEET

ISSUE: COMMUNITY EFFECTS

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide local communities with a constant source of opportunity for the use of goods and services that provide for desired community growth. Changes in the kinds of business opportunities available today are likely over time.

MANAGEMENT AREAS AFFECTED: Forest-wide.

RISK ASSESSMENT: $\text{COST OF ERROR}_3 \times \text{LIKELIHOOD OF ERROR}_1 = \text{RISK INDEX}_3$

MONITORING QUESTIONS:

1. Are payments to Counties changing?
2. Are local populations changing?
3. Are local employment patterns changing?
4. Are payments to counties changing?
5. Are lifestyles, attitudes, beliefs or values changing?
6. Are Forest contributions to area forest products industries changing?

THRESHOLD OF VARIABILITY:

1. $\pm 25\%$ annual change.
2. Subjective analysis.
3. Subjective analysis.
4. $\pm 25\%$ annual change.
5. Subjective analysis.
6. Subjective analysis.

SUGGESTED SAMPLING METHODS:

REPORT PERIOD: Annual

1. U.S. Census, State Publications, County and local agency reports.
2. U.S. Census, State Publications, County and local agency reports.
3. U.S. Census, State Publications, County and local agency reports.
4. Review Payments to Counties Reports.
5. Interviews.
6. Tracking of raw material flow to mills, industry mix.

RESPONSIBILITY: Planning Staff Officer.

ANNUAL COST OF MONITORING: \$5,000 of which we are doing \$2,500

REMARKS: The National Forest is recognized as a major attraction by many adjacent communities. Revenues generated from National Forest programs are also an important aspect of local community economic health.

FOREST PLAN MONITORING WORKSHEET

ISSUE: **RESOURCE BUDGETS**

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Provide funding levels necessary to achieve outputs in Forest Plan.

MANAGEMENT AREAS AFFECTED: All

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 1 = RISK INDEX 2

MONITORING QUESTION:

Are the budgets received adequate for achieving the objectives described/ projected in the Forest Plan?

THRESHOLD OF VARIABILITY:

Outputs are within 20 percent of figure specified by Forest Plan. If outputs are below this level, monitor resource budgets to see if they are the reason for the fall down in output.

SUGGESTED SAMPLING METHODS:

Comparison of budgets and outputs in the Forest Plan with budgets received and outputs actually produced.

REPORT PERIOD (YEARS):

Compare annually with a more detailed report at years 3, 5, and 7 to verify that trends are consistent with projections for output and service levels.

RESPONSIBILITY: Planning Staff Officer

ANNUAL COST OF MONITORING: \$3,500 We are not doing any of this yet.

REMARKS: Addresses requirement in 36 CFR 219.12(k): Quantitative estimate of performance comparing outputs and services with those projected by the Forest Plan.

Intent of this item is to keep track of budget trends so timely adjustments can be made. May need to look at a wider range of funding sources to adequately monitor; i.e., challenge cost share, partnerships, etc. in addition to CIP and other appropriated dollars.

It is more important to achieve outputs and services than to concentrate on the question of whether we got the funding we estimated we needed.

FOREST PLAN MONITORING WORKSHEET

ISSUE: COSTS AND VALUES

FOREST GOALS, DESIRED FUTURE CONDITION, OUTPUTS: Implement the Forest Plan in a cost efficient manner.

MANAGEMENT AREAS AFFECTED: N/A

RISK ASSESSMENT: COST OF ERROR 2 X LIKELIHOOD OF ERROR 3 = RISK INDEX 6

MONITORING QUESTIONS:

1. Are major costs used in Forest Plan analysis consistent with actual implementation costs?
2. Are current values for Forest resources consistent with those used in Forest Plan analysis?

THRESHOLD OF VARIABILITY:

1. Moving average of costs for past three years is within 25 percent of those in the Forest Plan.
2. Moving average of timber values for past five years is within 25 percent of those used in Forest Plan. Other values will come from RPA updates and should be within 25 percent of Forest Plan costs.

SUGGESTED SAMPLING METHODS:

1. Costs can be determined by reviewing unit costs in PAMARS.
2. Timber values determined from cut & sold reports; developed recreation values in part from fee site records; other values from RPA.

REPORT PERIOD (YEARS):

1&2. Annual review with a detailed report at 5-year intervals that discusses the significance of findings.

RESPONSIBILITY: Forest Economist

ANNUAL COST OF MONITORING: \$3,500 We are not doing any of this yet.

REMARKS: Major costs include capital investment costs for recreation, trails, fish and wildlife, range and timber. Timber costs that need monitoring are reforestation, timber stand improvement, timber sale support, timber sale preparation and administration.

Question 1 responds to 36 CFR 219.12(k) requirement: Costs associated with carrying out planned management prescriptions as compared with costs estimated in the Forest Plan.

Purpose of monitoring is to validate those costs and values used in Forest Plan analysis. Significant differences could result in revisions because of changes in suitability/efficiency of producing some resource outputs or in application of specific S&G.

United States
Department of
Agriculture

Forest Service

Pacific
Northwest
Region

1990



Record of Decision

Land and Resource Management Plan

Wenatchee National Forest



RECORD OF DECISION

FOR THE

LAND AND RESOURCE MANAGEMENT PLAN
FINAL ENVIRONMENTAL IMPACT STATEMENT

WENATCHEE NATIONAL FOREST

CHELAN, KITTITAS, YAKIMA COUNTIES
WASHINGTON STATE

USDA FOREST SERVICE
JANUARY 1990

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RECORD OF DECISION

I. INTRODUCTION

BASIS AND NEED FOR DECISION

This Record of Decision documents my decision and rationale for approving the Land and Resource Management Plan (also referred to as the Plan or the Forest Plan) for the Wenatchee National Forest.

A record of decision is required by the Council on Environmental Quality regulations for implementing the National Environmental Policy Act (40 CFR 1500 et seq.) when a Federal agency undertakes an action requiring an environmental impact statement.

The Final Environmental Impact Statement (FEIS) and Forest Plan were developed under the implementing regulations of the National Environmental Policy Act (NEPA), Council on Environmental Quality (40 CFR 1500-1508) and the National Forest Management Act (NFMA, 36 CFR 219).

The Plan is part of the 50-year framework for long-range resource planning established by the Forest and Rangeland Renewable Resources Planning Act (RPA) as amended by the National Forest Management Act (NFMA). As such, it establishes general direction for a period of time, usually between 10 and 15 years. Information regarding outputs and effects beyond this period are provided only to broadly indicate the currently anticipated consequences of each Plan alternative if it is selected to continue into the future. However, the Plan must be revised at least every 15 years. Once adopted, the Plan replaces all previous resource management plans prepared for the Forest, subject to existing rights, contracts, and specific direction for special areas such as Wilderness, Wild and Scenic Rivers, National Recreation Areas, and National Trails. One exception is the Alpine Lakes Land Management Plan which was Congressionally mandated. The management direction from this plan has been incorporated into the Forest Plan.

In publishing the Forest Plan, the Forest Service is trying to satisfy two purposes

Compliance with the statutory mandate of NFMA to develop and maintain a management system so that an "interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other agencies" will be applied to all future decisions (16 USC 1604(b), (c), (f), and (g)).

Linkage with the Forest and Rangeland Renewable Resource Planning Act (RPA) Program and Assessment through current modeling techniques to make forecasts of outputs which could be produced under the Forest Plan and alternatives to the Forest Plan.

Production levels for various uses presented in the Plan are projections. While all outputs in the Plan can be accomplished from a physical, biological, economic, and legal perspective, the Forest Plan does not guarantee these levels will be accomplished. However, these projections will be adjusted as needed through amendments or revision of the Plan.

The Forest Plan provides a long-range management program for all natural and renewable resource management activities and determines general management requirements for implementation. It provides for coordinated multiple-use management of outdoor recreation, range, timber, watershed, wildlife and fish, minerals, and wilderness resulting in sustained yields of goods and services for the benefit of the American people.

AFFECTED AREA

The Wenatchee National Forest lies on the east side of the Cascade Mountain Range in Central Washington. It extends about 140 miles from north to south and an average of 35 miles east to west. The Forest has a net area of 2,164,180 acres, larger than Delaware and Rhode Island combined.

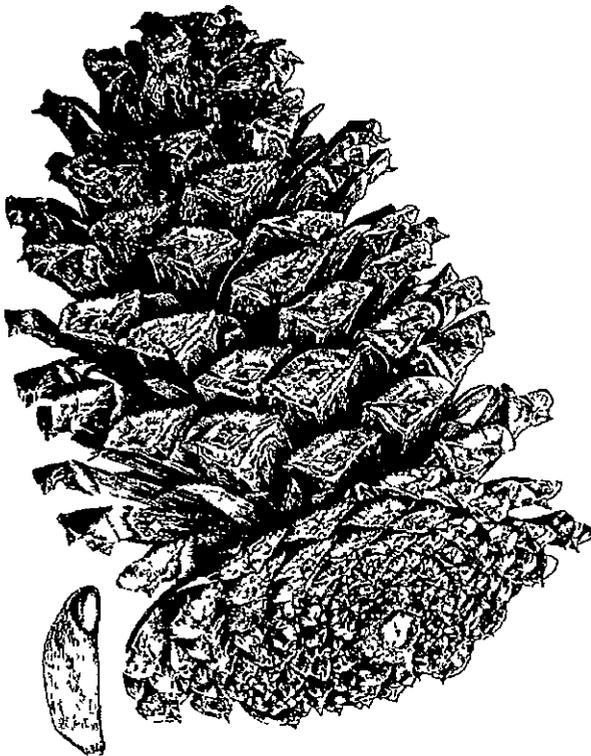
Steep, rugged mountains and heavy snowpacks characterize the western portions of the Forest. In contrast, near desert conditions prevail in the eastern grass and shrub covered foothills and valleys. Between the two extremes are diverse forest and plant communities resulting from the variations in soils, elevation, aspect, temperature, precipitation, and fire influences. Major drainage systems include the Chelan, Entiat, Wenatchee, and Yakima. Principal forest resources include timber, wildlife, fish, recreation, water, and wilderness. Almost two out of every five acres on the Forest (39 percent) are congressionally designated wilderness.

The Forest is primarily located in Chelan, Kittitas, and Yakima Counties, with two acres in Douglas County. The area administered by the Wenatchee National Forest and considered in this planning document includes a 515,843 acre parcel of the Snoqualmie National Forest. These lands are located on the Naches Ranger District in the southern portion of the Forest. In addition, an isolated 9,032 acre parcel of the Wenatchee National Forest in the Liberty Bell portion of Chelan County is being administered by the Okanogan National Forest and will be included in the Okanogan Forest Plan.

Major cities and towns in or near the planning area are Chelan, Entiat, Cashmere, Leavenworth, Wenatchee, and East Wenatchee in the north, Cle Elum, Roslyn, and Ellensburg in the center, and Yakima, Selah, and Naches in the south. More than 270,000 people live in the four county area. The Forest is also easily accessible from metropolitan Puget Sound with a population of well over two million people.

PROCESS AND CHRONOLOGY FOR THE PREPARATION OF THE FOREST PLAN

<u>YEAR</u>	<u>PROCESS</u>
1980	Notice of Intent Published in the Federal Register
1984	Preliminary Identification of Issues and Concerns
1985	Analysis of Management Situation Formulation and Analysis of Alternatives Evaluation of Alternatives Draft Preferred Alternative Selection
1986	Draft Environmental Impact Statement Published Public Comment Period
1988	Supplement to DEIS Published
1989	Public Comment Period for Supplement to DEIS Evaluation of Public Comment Formulation, Analysis and Modification of Final Alternative Final Plan Published
1990	Plan Implementation, Monitoring and Evaluation



II. DECISION

WHAT THE DECISION IS AND IS NOT

The Forest Plan is a general strategy for managing the National Forest lands on the Wenatchee National Forest. It is not a plan for the specific administrative activities needed to carry on the Forest Service's day-to-day internal operations. For example, the Plan does not address personnel matters, fleet equipment, or internal organization changes. However, it is a plan for managing the Wenatchee National Forest System in an environmentally sound manner to produce goods and services in a way that maximizes long-term public benefits.

The emphasis of the Plan is not an aggregate of site-specific decisions or specific resource outputs. Rather, the emphasis is on applying various general management practices at various intensities to areas of land to achieve multiple-use goals and objectives in a cost efficient manner.

To respond to changing needs and opportunities, Congressional land designations, catastrophic events, new information and inventories, or major new management or production technologies, the Plan may have to be amended or revised. If there is a significant change to the Plan, it must be altered by a procedure identical to that used in the development and approval of the original Plan. If the change does not significantly affect the Plan, the Forest Supervisor may amend it by a less extensive procedure to include public notification.

ELEMENTS OF THE DECISION

The program decisions I make here are accompanied by the necessary supporting NEPA analysis and disclosure required by law and regulation. Additional NEPA analysis for these decisions is not expected to be done and is not required. A final decision may be revisited or reassessed during implementation, but it does not have to be. These decisions are as follows:

1. Forest-wide goals and objectives.
2. Forest-wide desired future condition.
3. Forest-wide standards and guidelines.
4. Management area goals and location.
5. Management area desired future condition.
6. Management area standards and guidelines.
7. Monitoring plan and evaluation process.
8. Incorporation of specific extant plans or projects. (For example, the Alpine Lakes Plan)
9. Identification (location) of lands considered suitable and selected for timber harvesting.
10. Establishment of the Forest-wide allowable sale quantity.

INTENDED ACTIVITIES

I also intend to accomplish certain scheduled activities. Unlike the programmatic decisions listed above, these are not accompanied by all supporting NEPA analysis and disclosure required by law and regulation. Additional NEPA analysis will be done during the implementation of the Plan. Those proposed and probable activities are discussed in the activity schedules in the appendix of the plan.

1. Forest-wide objectives (outputs).
2. Proposed and probable activities for each management area and roadless area as reflected in the activity schedule.

It is important to note that all proposals in the Plan can be accomplished from a physical, biological, economic, social, and legal perspective. It is not certain that these proposals will be accomplished. First, the outputs proposed by the Plan are projections or targets. Outputs are estimates and projections based on available inventory data and assumptions, subject to the annual budget. For example, the number of acre-feet of water meeting water quality goals is a target number the Forest will strive to attain. Another example is allowable sale quantity of timber. That is the maximum regulated volume of timber that can be sold over the planning period, not necessarily the volume that will be sold.

Secondly, all activities, many of which are interdependent, may be affected by annual budgets. The Plan is implemented through various site-specific projects, such as the building of a road, development of a campground, or the sale of timber. If the budget changes for any given year covered by the Plan, the projects scheduled for that year may have to be rescheduled. However, the goals and land activity assignments described in the Plan would not change unless the Plan itself were changed. If budgets change significantly over a period of several years, the Plan itself may have to be amended and, consequently, would reflect different target outputs and environmental conditions. The significance of budget related or other changes is determined in the context of the particular circumstances.

As a long-range strategy for the Forest, this Plan and accompanying Environmental Impact Statement are programmatic. During implementation, when the various projects are designed, more site-specific analyses are performed. These analyses may result in environmental assessments, environmental impact statements, or categorical exclusions and, possibly, an amendment or revision of the Plan. Any resulting documents are to be tiered to the Final Environmental Impact Statement for this Plan, pursuant to 40 CFR 1508.28.

RECOMMENDATIONS

I also am recommending certain decisions to others with the authority to make those final decisions. Like my final decisions, recommendations are accompanied by all supporting NEPA analysis and

disclosure required by law and regulation. However, the authority to make a final decision on the issue lies outside the authority of the Regional Forester. If the higher authority accepts the recommendation, the resulting final decision will not ordinarily be revisited or reassessed by the Forest Service during implementation.

Recommendations include:

1. Identification (location) of recommended additions to the Wild and Scenic Rivers System.
2. Identification (location) of recommended additions to the Research Natural Areas.

SUMMARY OF THE DECISION

My decision is to approve and adopt the Forest Plan which accompanies the Final Environmental Impact Statement, this decision is referred to as Alternative C for the management of the Wenatchee National Forest. Alternative C has been modified from the DEIS version in response to public comments and new information.

Changes include a revised spotted owl network, increased roadless area allocations, several new prescriptions, increased allowable timber sale quantity, increased acreage of special interest areas and an increase in the number of rivers recommended for inclusion into the Wild and Scenic River system.

FOREST MULTIPLE USE GOALS AND DESIRED FUTURE CONDITIONS

The Forest Plan establishes multiple use goals, objectives and desired future condition in Chapter IV. A summary of the goals follows:

Recreation

Provide a well balanced array of recreation opportunities across the breadth of the recreation opportunity spectrum in accordance with resource capability, public demands, and expectations for outdoor recreation.

Provide a diverse system of safe, well-maintained trails for the enjoyment of all users.

Respond to new opportunities to develop partnerships and joint ventures with other agencies and the private sector to magnify our abilities to meet expanding public demand for outdoor recreation.

Provide an information program to assist the public in understanding management of various resources and to assist them in their search for a variety of challenging and pleasing experiences

Provide for the identification, protection, interpretation, and management of cultural resources so as to preserve their historical, cultural, archaeological, and/or architectural values for the benefit of the public.

Maintain and enhance the visual landscape character of the Forest.

Provide to the Forest visitors a variety of landscape character with visually appealing scenery.

Wilderness

Manage designated wilderness to perpetuate wilderness character, natural ecologic processes and to provide appropriate outdoor recreation opportunities

Wildlife, Fish, and Sensitive Plants

Manage critical wildlife habitat to improve the status of threatened and endangered species to a point where they no longer need protection under the Endangered Species Act of 1973

Enhance habitat to prevent the need for listing species on the Regional Forester's sensitive species list.

Manage fish and wildlife habitats to provide for recreation opportunities for fishing, hunting, and viewing.

Protect, restore, and enhance current and long-term fish habitat capability.

Riparian Areas

Maintain and enhance riparian management areas to perpetuate their distinctive resource values to: (a) achieve and maintain habitat conditions necessary to maximize long-term natural production opportunities for desired fish species, (b) maintain water quality that meets or exceeds State AA Water Quality Standards, and (c) provide diverse wildlife habitat.

Range

Develop, protect and manage the range resource to maintain and improve vegetative conditions compatible with the management area goal.

Provide opportunities to enhance other resource values through the use of livestock to shape desired plant communities.

Timber

Provide for timber harvest to help meet local and national demand for wood products and provide an economic benefit to the American people.

Use silvicultural techniques that insure prompt and adequate regeneration of appropriate species. Optimize growth, minimize disease and insect losses, and protect or enhance long-term site productivity.

Manage vegetation to maximize total net public benefits compatible with management area objectives.

Provide information about the opportunities available through the timber management program including firewood, Christmas trees, greenery, post and poles, transplants, and other specialty products.

Provide silvicultural advice and information through the Cooperative Forestry Program to local private forest landowners.

Water

Maintain favorable conditions of streamflow to insure meeting or exceeding Federal and Washington State water quality standards.

Soil

Manage the soil resource of the Forest by using management practices that will maintain or enhance its productive properties.

Air

Prevent significant adverse effects of air pollutants and atmospheric deposition on Forest resources through compliance with the Clean Air Act and State and local regulations.

Minerals

Help meet the demand for mineral resources by encouraging and facilitating the exploration, development, and production of mineral and energy resources, while ensuring that these activities are integrated with the use and protection of other resources.

Lands

Strive towards a land ownership pattern that will provide for better management, protection, and access to the forest.

Provide for occupancy and use of National Forest System land consistent with this Forest Plan and applicable laws and regulations.

Provide energy and transportation corridors to meet Regional and National needs.

Facilities

Develop a transportation system that is designed and operated to standards appropriate to the planned uses, considering safety, cost of transportation, and effects upon lands and resources.

Provide for the development, betterment, and maintenance of fire and general purpose administrative facilities in support of National Forest System needs.

Maintain Forest facilities for the safety, enjoyment, and well-being of the user.

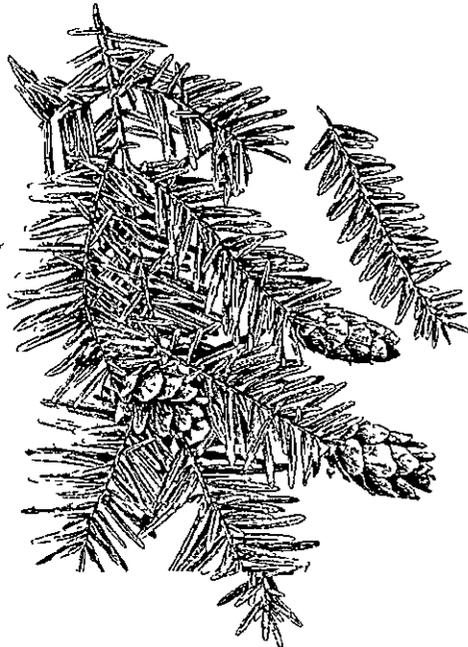
Protection

Implement an efficient fire protection program which is responsive to resource management objectives and prioritizes the protection of life, improvements, and private property.

Use prescribed fire to meet resource and land management objectives.

Protect Forest resources and facilities, and cooperate with State and local law enforcement agencies in the protection of visitors and protection of their property from theft, vandalism, or destruction.

Prevent or reduce losses due to insect and disease by treatment of vegetation to reduce the risk of epidemic outbreaks.



Research Natural Areas

Protect existing and nominated areas for the Research Natural Areas System to provide:

1. Baseline areas against which effects of human activities can be measured.
2. Sites for study of natural processes in undisturbed ecosystems.
3. Gene pool preserves for all types of organisms, especially rare and endangered types.

Diversity (Biodiversity)

Maintain representatives of native and desirable non-native plant and animal species and the plant communities in which they are found. Provide for all successional stages of terrestrial, aquatic and riparian plant associations in a distribution and abundance to accomplish this goal. Maintain or enhance ecosystem function to provide for long-term integrity and productivity of biological communities.

FOREST OBJECTIVES

The following table (Table 1) identifies the projected outputs associated with the decision to select Alternative C. As stated earlier, the actual outputs for individual years may vary from projected outputs due to fluctuations in conditions, funding, personnel, and priorities. Although the outputs are for a decade, each is expressed as an average annual value unless stated otherwise in the Table.

TABLE 1
RESOURCE OUTPUTS AND ACTIVITY SUMMARIES

Output/Activity	Unit of Measure	First Decade
<u>Developed Recreation Use</u>	Thousand RVD's/yr	3,140.9
Developed Site Construction or Reconstruction	PAOT	721
<u>Non-Wilderness Dispersed Recreation Use</u>		
Roaded	Thousand RVD's/yr	1,977.8
Unroaded Motorized	Thousand RVD's/yr	278.6
Unroaded Non-Motorized	Thousand RVD's/yr	98.6
<u>Unharvested Acres Remaining In Unroaded Areas</u>	Thousand Acres	387.8
<u>Trail Construction and Reconstruction</u>	Miles/yr	81.6
<u>Wild & Scenic Rivers Proposed</u>		
Wild	Miles	82.5
Scenic	Miles	29
Recreational	Miles	118.5
<u>Cultural Resource Management</u>		
Inventoried Acres	Thousand Acres/Decade	400
Site Documentation	Sites/Decade	500
Site Evaluations	Sites/Decade	100
Testing/Data Recovery	Sites/Decade	5
Management Plans	Plans/Decade	5
Interpretive Projects	Number/Decade	13
<u>Visual Quality Objectives</u>		
Preservation	Thousand Acres	843.3
Retention	Thousand Acres	521.8
Partial Retention	Thousand Acres	332.9
Modification	Thousand Acres	147.8
Max Modification	Thousand Acres	318.3
<u>Wilderness Use</u>	Thousand RVD's/yr	423.5
Acres Managed	Thousand Acres	841.0
<u>Wildlife and Fish Use</u>		
Wildlife	Thousand WFUD's/yr	753.8
Fish	Thousand WFUD's/yr	550.4

TABLE 1 (Continued)

RESOURCE OUTPUTS AND ACTIVITY SUMMARIES

Output/Activity	Unit of Measure	First Decade
<u>Anadromous Fish</u>		
Commercial Harvest	Thousand Pounds/yr	328
Habitat Improvement over present	Thousand Pounds/yr	0 ^{1/}
<u>Management Indicator Species</u>		
<u>Chinook Salmon</u>		
Spring Chinook	Thousand Adults	6 0
Summer Chinook	Thousand Adults	2 0
Sockeye Salmon	Thousand Adults	31 8
Summer Steelhead	Thousand Adults	1 7
Cutthroat Trout	Thousand Adults	203
<u>Mule Deer</u>		
Summer	Number	25,100
Winter	Number	10,100
<u>Elk</u>		
Summer	Number	12,500
Winter	Number	5,600
<u>Mountain Goats</u>		
Beaver	Number	1,600
Ruffed Grouse	Number	350
<u>Bald Eagle</u>		
Active Nest Sites		4
Recovery Nest Sites		8
<u>Peregrin Falcon</u>		
Active Nest Sites		2
Recovery Nest Sites		10+
<u>Primary Cavity Excavators</u>		
	% Potential	73
<u>Spotted Owl</u>		
Pileated Woodpecker	Pairs	120
Marten/N 3-Toed Woodpecker	Pairs	380
	Pairs	1200
<u>Old-Growth</u>		
	Thousand Acres	307.3
<u>Wildlife Habitat Improvement</u>		
	Acre Equiv./yr Structures/yr	1,900
		400

^{1/} This production estimate was made using the mid-point of the decade. Because of the life history of anadromous fish, no production increase can be predicted in this short time frame, even though habitat improvements will be done. However, fish population trends will be monitored on an annual basis (Fish numbers will be obtained from the appropriate state agencies)

TABLE 1 (Continued)

RESOURCE OUTPUTS AND ACTIVITY SUMMARIES

Output/Activity	Unit of Measure	First Decade
<u>Range</u>		
Grazing Capacity	Thousand AUM's/yr	38 7
Permitted Use	Thousand AUM's/yr	23 0
Improved Allotments	% upward trend	45
Fence Const & Reconst	Miles/yr	9 0
Springs Const & Reconst	Number/yr	12
Noxious Weed Control	Acres/yr	375
Suitable Acres	Thousand Acres	406 9
<u>Timber</u>		
Suitable Lands	Acres	630,514
Acres Harvested by		
Clearcut	Avg. Acres/yr	3,433
Shelterwood	Avg Acres/yr	2,360
Selective cut	Avg Acres/yr	2,896
<u>Timber Offered</u>		
ASQ	Million CF/yr	24.3
	Million BF/yr	136 0
Timber Sale		
Programmed	Million CF/yr	26.1
Quantity	Million BF/yr	146.0
<u>Long-term Sustained Yield</u>	Million CF/yr	27.2
<u>Fuelwood</u>	Thousand CF/yr (37 cord=1 Thousand CF)	3,400
<u>Reforestation</u>		
Plant	Thousand Acres/yr	4.3
<u>Timber Stand Improvement</u>	Thousand Acres/yr	4.2
<u>Water Yield</u>		
Background	Thousand Acre Feet/yr	4,455
Increase over background	Thousand Acre Feet/yr	15 5
<u>Sediment</u>		
Background	Thousand Tons/yr	930 5
Activity over background	Thousand Tons/yr	72 4
<u>Improved Watershed Conditions</u>	Treated Acres/yr	180

TABLE 1 (Continued)

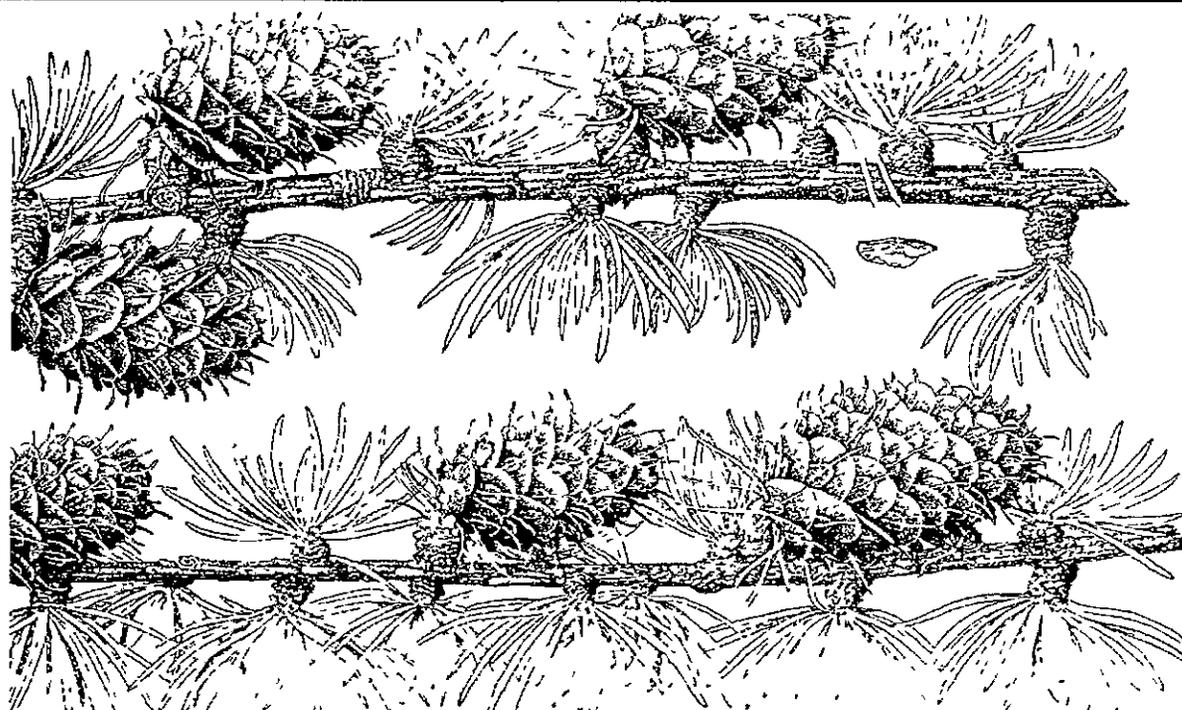
RESOURCE OUTPUTS AND ACTIVITY SUMMARIES

Output/Activity	Unit of Measure	First Decade
<u>Energy Minerals</u>		
	Billion BTU's Produced	0
	Permits, Leases, Plans Processed/yr	35
<u>Area Available Classified Prospectively Valuable For</u>		
Oil and Gas	Acres	205,854
Coal	Acres	425,657
Geothermal	Acres	182,385
<u>Non Energy Minerals</u>		
Locatable	% Produced Under 1985 Management	Negligible Decrease (<0.5%)
	Notices of Intent, Plans Processed and Administered/yr	100-170
<u>Leasable Minerals</u>		
Program Activity	Leases/Permits Plans of Operation/yr	35
Area Available For Leasing		
Oil and Gas	Acres Available	205,854
Coal	Acres Available	425,657
Geothermal	Acres Available	182,385
<u>Area Available for Location</u>		
High Potential	Acres	14,204
Moderate Potential	Acres	45,538
Low Potential	Acres	1,253,377
<u>Common Variety Minerals</u>		
	Tons Produced/yr	90,000
	Pits assessed for FS use/yr	17
	Permits issued/yr	60

TABLE 1 (Continued)

RESOURCE OUTPUTS AND ACTIVITY SUMMARIES

Output/Activity	Unit of Measure	First Decade
<u>Property Line Survey</u>	Miles/yr	70
<u>Arterial and Collector Roads</u>		
Construction	Miles/yr	2 0
Reconstruction	Miles/yr	16 0
<u>Timber Purchaser Roads Const. & Reconst.</u>		
	Miles/yr	83
<u>Roads Suitable for Public Use</u>		
Passenger car	Miles	1,031
High Clearance Vehicle	Miles	3,202
Closed (Year-round)	Miles	1,703
<u>Fire Management</u>		
Fuel Treatment	Acres/yr	6,700
<u>Social/Economics</u>		
Operational Costs	Million \$/yr	17 2
Capital Investment Costs	Million \$/yr	11.8
Total Forest Budget	Million \$/yr	29 0
Returns to Treasury	Million \$/yr	14 0
Payments to Counties	Million \$/yr	3 3
Changes in Income	Million \$	+5 14
Changes in Jobs	Number	+203



FOREST-WIDE STANDARDS AND GUIDELINES

The standards and guidelines are generally applied to measurable elements of the environment. They assist in meeting the above goals, objectives, and in achieving the desired future condition. See Chapter IV of the Forest Plan.

Standards and guidelines are included for:

Recreation
Lands
Wilderness
Facilities
Endangered, Threatened or Sensitive Species Protection
Wildlife and Fish
Timber
Riparian Areas
Water
Soil
Air
Rural Community and Human Resources
Minerals

MANAGEMENT AREAS

The Plan establishes management area prescriptions which apply to specific uses, resource considerations, natural features, or legislatively designated areas. The specific areas are mapped (see Alternative C maps depicting management areas) Specific standards and guidelines (prescriptions) have been developed for each management area.

EF-1 (Experimental Forest)

Provide opportunities to study the effects of forest management and fire on vegetative, soil, and water resources occurring on the east side of the Cascade Mountains. Maintain the area in a form that will not compromise the opportunities for research.

Objectives following the Entiat Burn in August 1970 were to study the effects of fire on complete hydrologic units.

EW-1 (Key Deer and Elk Habitat)

Manage deer and elk winter range to meet habitat requirements for sustaining optimum carrying capacity.

EW-2 (Riparian-Aquatic Habitat Protection Zone)

Maintain and enhance riparian management areas to perpetuate their distinctive resource values to (a) achieve and maintain habitat conditions necessary to maximize long-term natural production opportunities for desired fish species, (b) maintain water quality that meets or exceeds State Standards, and (c) provide diverse wildlife habitat.

EW-3 (Key Big Game Habitat/Unroaded)

Manage deer, elk, and mountain goat winter range and key summer range to meet habitat requirements for sustaining optimum carrying capacity in an unroaded setting

GF (General Forest)

Provide for long-term growth and production of commercially valuable wood products at a high level of investment in silvicultural practices.

MP-1 (Mather Memorial Parkway)

Manage area to maintain and enhance its outstanding scenic and recreation qualities.

OG-1 (Old-Growth Management)

Manage for old growth habitat to achieve "ecosystem diversity, preservation of aesthetic qualities," and/or "wildlife and plant habitat".

OG-2 (Mature Habitat)

Manage for mature to old growth habitat for wildlife and plant species dependent upon this habitat.

RE-1 (Developed Recreation)

Provide developed recreation in an Urban to Semi-Primitive Recreation Opportunity Spectrum (ROS) setting.

RE-2 (Dispersed Recreation, Unroaded, Motorized)

Provide dispersed, unroaded recreation in a semi-primitive motorized recreation opportunity setting.

RE-3 (Dispersed Recreation, Unroaded, Non-Motorized)

Provide dispersed recreation in an unroaded, semi-primitive, non-motorized or primitive setting.

RE-4 (Dispersed Recreation/Unroaded/Timber Harvest)

Provide for dispersed recreation, as well as long-term growth and production of commercially valuable wood products at a very low level of investment in timber cultural practices while maintaining the unroaded characteristics.

RM-1 (Intensive Range Management)

Provide for maximum forage production and utilization by commercial livestock with a high level of investment in range cultural practices.

RN-1 (Research Natural Areas)

Provide for: (1) Preservation of examples of all significant natural ecosystems for comparison with those influenced by man, (2) educational research areas for ecological and environmental studies, and (3) preservation of gene pools for typical and rare and endangered plants and animals.

SI-1 (Classified Special Areas-Scenic and/or Recreation)

Manage Special Areas for recreation use, substantially in their natural conditions.

SI-2 (Classified Special Area - Other)

Manage areas of significant cultural, geological, botanical, zoological, paleontological, or other special characteristics so as to protect, preserve, and enhance their intrinsic values

ST-1 (Scenic Travel - Retention)

Retain or enhance the viewing and recreation experiences along scenic travel routes.

ST-2 (Scenic Travel - Partial Retention)

Provide a near natural appearing foreground and middleground along scenic travel corridors

UC-1 (Utility Corridors)

Provide and manage utility corridors to accommodate energy transmission needs

WI-1 (Wilderness)

Preserve and protect the natural character for future generations, and provide opportunities for solitude, challenge, inspiration, and scientific study.

WS-1 (Proposed Scenic River)

Preserve the Scenic River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

WS-2 (Proposed Recreational River)

Preserve the Recreational River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

WS-3 (Proposed Wild River)

Preserve the Wild River characteristics of the river and surrounding area pending a decision on its legislative designation as part of the Wild and Scenic Rivers System.

The management area allocations for the Forest are summarized in Table 2. Objectives and desired future condition have been described by management area in Chapter IV of the Forest Plan. The FEIS, Chapter II and Appendix B describe the individual management areas in summary form. Also, see the Alternative C map.

TABLE 2
MANAGEMENT AREA ACREAGES

MANAGEMENT AREA		ACRES
EF-1	Experimental Forest	4,770
EW-1	Key Deer and Elk Habitat	118,742
EW-2	Riparian-Aquatic Habitat Protection Zone	47,361
EW-3	Key Big Game Habitat, Unroaded	19,059
GF	General Forest	389,087
MP-1	Mather Memorial Parkway	13,717
OG-1	Old Growth Management (dedicated)	79,840
OG-2	Mature Habitat (managed)	49,036
RE-1	Developed Recreation	6,021
RE-2a	Dispersed Recreation, Unroaded Motorized (w/o 4x4 routes)	79,607
RE-2b	Dispersed Recreation, Unroaded Motorized (w/ 4x4 routes)	16,748
RE-3	Dispersed Recreation, Unroaded Nonmotorized	116,092
RE-4	Dispersed Recreation, Unroaded, Timber Harvest	6,614
RM-1	Intensive Range Management	17,702
RN-1	Research Natural Areas	2,247
SI-1	Classified Special Areas - Scenic and/or Recreation	70,512
SI-2	Classified Special Areas - Other	2,798
ST-1	Scenic Travel - Retention	83,635
ST-2	Scenic Travel - Partial Retention	174,880
UC-1	Utility Corridors	<u>1/</u>
WI-1	Wilderness	841,034
WS-1	Scenic River (Proposed)	5,554
WS-2	Recreational River (Proposed)	11,363
WS-3 <u>2/</u>	Wild River (Proposed)	23,426
Water		7,780

1/ Acres are distributed among other management areas adjacent to utility corridors

2/ All but 170 acres are within wilderness

MONITORING AND EVALUATION PROGRAMS

I adopt the monitoring and evaluation plans displayed in Chapter V of the Forest Plan. In summary, monitoring and evaluation are separate, sequential activities that provide information to determine whether programs and projects are meeting Forest Plan direction. Monitoring collects information, on a sample basis, from sources specified in the Forest Plan. Evaluation of monitoring results is used to determine the effectiveness of the Forest Plan and the need to either change the Plan through amendment or revision or to continue with the Plan.

The overall objective of monitoring and evaluating Forest Plans is to determine whether programs and projects are meeting Forest Plan direction. Within this broad objective, specific goals are to:

1. Ensure that Forest Plan goals and objectives are being achieved and management prescriptions are being implemented as directed.
2. Determine if the costs of implementing the Plan and the management effects are occurring as predicted.

There are three distinct levels of monitoring: (1) implementation monitoring; (2) effectiveness monitoring, and (3) validation monitoring. These levels are defined in FSM 1922 7.

Implementation Monitoring. Forest and Ranger District personnel will conduct implementation monitoring as part of their routine assignments and document the results in project files as part of their management responsibilities. Implementation monitoring will determine if the Plan, prescriptions, projects, and activities are implemented as designed and in compliance with Forest Plan objectives and standards and guidelines.

Effectiveness Monitoring. Effectiveness monitoring will determine if plans, prescriptions, projects, and activities are effective in meeting management direction, objectives, and the standards and guidelines. This level of monitoring will be conducted by resource and/or technical specialists on a limited basis as determined by resource values and risks, and public issues. Effectiveness monitoring will begin only after determining that the Plan, prescriptions, projects, or activities to be monitored have been implemented according to the Plan's direction

Validation Monitoring. Validation monitoring will determine whether the initial data, assumptions, and coefficients used in development of the Plan are correct; or if there is a better way to meet Forest planning regulations, policies, goals, and objectives. Validation monitoring will be conducted when effectiveness monitoring results indicate basic assumptions or coefficients are questionable. Generally, validation monitoring will establish permanent plots or studies in close coordination with research personnel. The scope of validation monitoring will be limited to those coefficients and standards that are not reasonably substantiated by existing research.

EVALUATION OF MONITORING RESULTS

Monitoring and evaluation are separate, sequential tasks. Monitoring is designed to observe and record the results of both natural processes and actions permitted by Forest Land and Resource Management Plans. Evaluation looks at those results, determines how well those results meet Forest Plan direction, and identifies measures to keep the Plan viable

Evaluation techniques include but are not limited to:

1. Site-specific observations by on-site resource specialists,
2. Field assistance trips by other technical specialists,
3. General field observations by Forest Service officials;
4. On-going accomplishment reporting processes;
5. Formal management reviews on a scheduled basis;
6. Discussions with other agencies and the public users,
7. Management team review of monitoring results;
8. Interdisciplinary team reviews of monitoring results;
9. Involvement with existing research activities, and
10. Review and analysis of records documenting monitoring results.

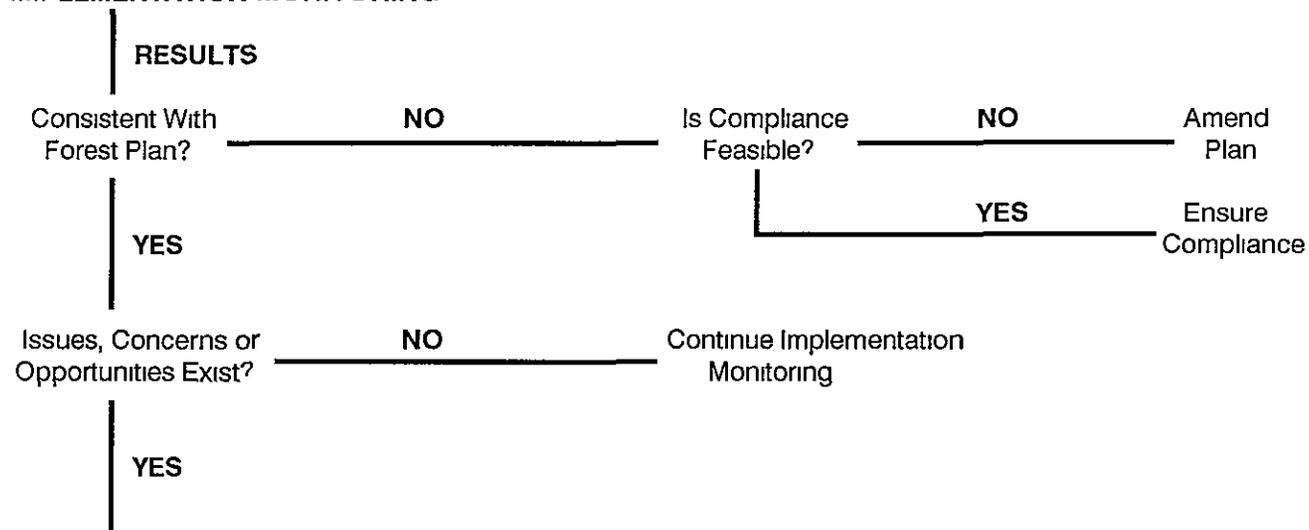
Evaluation in Relation to the Three Monitoring Levels Exhibit 1 displays the process for evaluating monitoring results from each monitoring level. There is a direct, sequential relationship between the levels. This relationship is designed to focus initial attention at the implementation monitoring phase. The approved Forest Plan represents the most appropriate, current management direction, therefore, we must first ensure that it is implemented as designed. Generally, needless expense and confusion may result by going directly to effectiveness or validation monitoring.



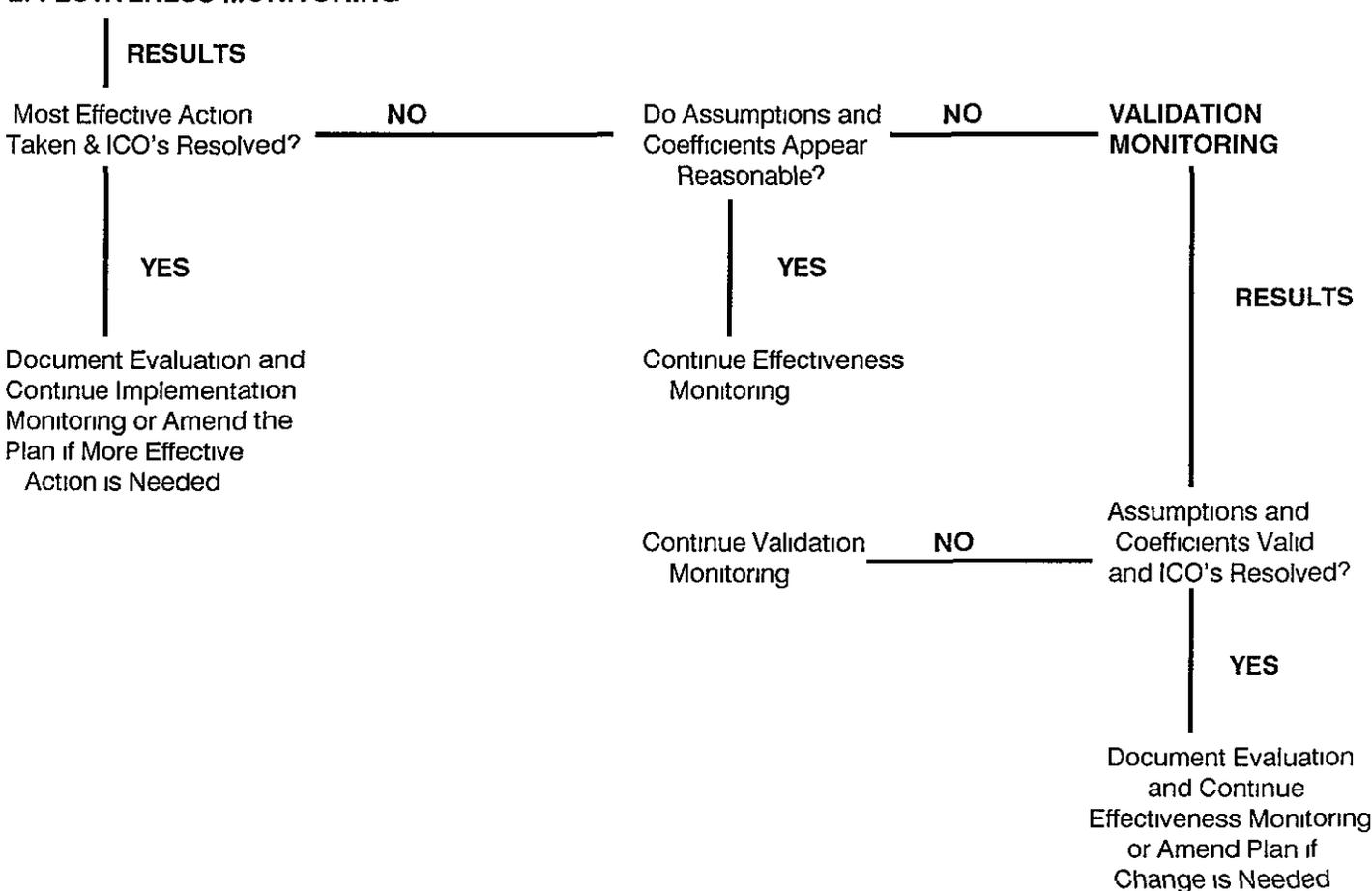
EXHIBIT 1

**EVALUATION OF MONITORING RESULTS
FOR FOREST PLAN IMPLEMENTATION**

IMPLEMENTATION MONITORING



EFFECTIVENESS MONITORING



III. RATIONALE FOR THE DECISION

The rationale for this program decision is presented two ways. First, I will discuss the rationale for resolving each issue. Second, I will compare integrated alternatives as a way of explaining my rationale for choosing the selected alternative.

Between the draft and final, the Forest had over 33 meetings with interested groups for the purpose of issue resolution. Initially, the Forest met with the various interest groups to listen to their concerns and clarify issues. Next, the Forest looked at alternative ways of addressing these concerns and developed a proposal for the major issues which they shared with the groups. Then, these groups gave the Forest feedback on these proposals which was used by the Forest to finalize their recommendation to me.

In arriving at this decision, I reviewed the environmental consequences of the Plan and the alternatives. I gave particular attention to the responsiveness of the selected plan to the public issues and management concerns identified in development of the Final Plan. In my judgment, Alternative C represents an equitable treatment of all resource considerations, and provides for both monetary and non-monetary outputs in a balanced and environmentally sound manner.

RATIONALE FOR RESOLVING EACH ISSUE

ISSUE 1: RECREATION OPPORTUNITIES AND USE CONFLICTS

The Forest receives about 5 million visitor days of use per year. Recreational use is continuing to increase and conflicts between recreational user groups (off-road vehicles or "ORVs", hikers, horses, snowmobilers, cross-country skiers) are becoming more common. In addition, recreation activities can cause resource damage because of the level, type, and location of use.

The preferred Alternative C of the DEIS emphasized continued ORV trail development and perpetuation of the existing land allocations allowing motorized and non-motorized use. Response to the DEIS indicated that the public is deeply divided on the appropriateness of motorized trail use in roadless areas of the Forest. A large number of respondents favored reductions in motorized trail use. On the other hand, ORV supporters were highly complimentary of the existing Forest program, saying it provides a unique recreation opportunity that is not met on other National Forests. Many trail users expressed a concern about the possibility of losing trail mileage as a result of timber management activities.

Between the draft and the final, the Forest initiated an intensive analysis of trail management, including semi-primitive motorized and non-motorized recreation opportunities, on the entire Forest, District by District, based on public comments to the DEIS and personal experience of professionals. The main purpose of the analysis was to find the proper balance between motorized and non-motorized trails for the Forest. A Forest Trail Management Statement was developed that outlined objectives, policy, and trail management criteria for this Forest-wide analysis. The Trail Statement included the following direction:

-The Wenatchee will provide a trail system that considers a diversity of use and the desire of users while caring for the land. Motorized use, bicycling, horse use and hiker use are all considered legitimate uses of the National Forest trail system.

-During the planning period, the emphasis will be placed on non-motorized use and the trail system will expand to meet increased demands from users.

-Motorized use will generally not be introduced onto trails or in areas where this type of use is not established.

-Trails "dead-ending" at the wilderness boundary should generally be closed to motorized use.

-The Forest will meet the direction given through Executive Order #11644 as modified by Executive Order #11989 which sets national policy for off-road vehicle use on the National Forests.

It is my decision to implement the standards and guidelines and management prescriptions relating to trail management in the selected alternative. This will result in several changes in trail use from the existing situation that will provide a proper balance of trail opportunities between motorized and non-motorized users and, hence, reduce the potential for conflict. Significant changes include closure of a major portion of the North Fork Entiat river drainage to motorized use, new trails for both motorized and non-motorized users, and protection of existing trail mileage. This results in a net increase of about 65 miles of motorized trails and a net increase of about 335 miles of non-motorized trails. Although not mandated by law or required by previous agreement, all trails that have been improved with Interagency Committee for Outdoor Recreation funds will remain open for motorized use.

The preferred alternative in the DEIS allowed timber harvesting in the Mather Memorial Parkway on the Naches Ranger District. Much of the public opposed this course of action and in response I developed a new management prescription for the Parkway. The new prescription enhances recreation opportunities in the area and limits scheduled timber harvesting to locations which are not visible from the Parkway or attendant recreation facilities. Harvest may also take place in the event of a catastrophe.

ISSUE 2: MANAGEMENT OF AREAS THAT ARE PRESENTLY UNDEVELOPED

There are twenty-three roadless areas outside of designated wilderness on the Forest. There are 556,272 acres within the roadless areas ranging in size from just under 5,000 acres to over 71,000 acres. These areas could be managed for roadless recreation such as backpacking or for roaded recreation such as vehicle camping. These areas can remain roadless to provide for the values associated with roadless areas or roaded to provide commodity values such as timber.

The preferred alternative of the DEIS proposed that seven of the twenty-three retain more than half of their area in a roadless condition. Out of 556,272 roadless acres the Draft preferred alternative proposed keeping 48% (267,610 acres) in a roadless condition.

The roadless areas are one of the major issues in development of the Forest Plan with 2,550 comments. Most of the comments favored preservation of all the roadless areas, while forest industry supporters stated that the Washington Wilderness Bill of 1984 released the roadless areas for multiple-use management. Off-road vehicle groups supported roadless area preservation because it raises the quality of their recreational experience. They mentioned the Manastash area the most frequently.

The Forest examined a range of alternatives that would maintain from 30 percent to 90 percent of the inventoried roadless area in a roadless condition. Also, the Forest reviewed specific comments for each roadless area and examined options for resolving concerns.

It is my decision to proceed with implementation of the selected alternative which directs that about 54 percent (298,115 acres) of the inventoried roadless area acres be maintained in a roadless character. The remaining 46 percent are allocated to various levels of development, which will result in roading and production of both commodities and amenities.

The additional areas to be managed as roadless respond to specific concerns that the public addressed in response to the DEIS, as well as continued concerns expressed since that time. Some specific places to be managed as roadless include the North Fork Entiat, Devil's Gulch, and Rock Creek.

All of the roadless areas on the Forest have been allocated and management activities will be proceeding in these areas according to their allocation. Proposed timber sales scheduled for roadless areas will receive appropriate environmental analysis and documentation before they are implemented. The existing roadless area allocations in the Alpine Lakes Management Unit

have been incorporated into the selected alternative and will continue to be managed as described in the Alpine Lakes Management Plan.

This decision will provide an equitable balance between preservation and development of the roadless areas.

ISSUE 3: TRANSPORTATION SYSTEM DEVELOPMENT AND MANAGEMENT

The Forest transportation system, including roads, trails, helispots, etc., is necessary for forest management, protection, and use. Presently there are 5,110 miles of roads and 2,463 miles of trail. Management of the transportation system is determined by the management direction for the various resources

Two facets of this issue were emphasized as a result of public comment on the DEIS: road management and the possibility of a road through Naches Pass.

The operation of the road system is of concern to some agencies such as the Washington Department of Wildlife. They contend that too many open roads can reduce habitat effectiveness for certain wildlife species. Implementation of the standards and guidelines for the selected alternative recognizes the value of road management for protection of wildlife. Newly constructed roads will be managed as closed to public vehicular access in most cases.

A private party applied for authorization to construct a road through Naches Pass in 1981. The Regional Forester, at the time, denied permission to build the road. The decision was based on the need to complete the Forest Plan and the land allocation process before a final decision on the roadway was made.

Almost all public comments received on the DEIS were in opposition to construction of the Naches Pass tie road. The private party that initiated the request for the Naches Pass road no longer needs it. Since the DEIS, the Forest has done further analysis to determine if a road across Naches Pass is needed for National Forest management purposes.

My decision makes it clear that a road across Naches Pass is not needed for purposes of National Forest management. A Naches Pass road is not planned by the Forest Service. It should be noted, however, that the land allocations in the area do not prohibit road development. Any public road agency or private party application will require site specific environmental analysis.

ISSUE 4: WATER QUALITY AND QUANTITY

The Forest currently produces more than 4.4 million acre feet of high quality runoff annually. The primary uses are for irrigation, downstream power generation, domestic consumption and aquatic and riparian habitat. Eastern Washington is a water-short area, with the Yakima River Basin having the most problems with supply. The preferred alternative for the DEIS set minimum water quality objectives for all the management areas on the Forest.

This issue received many comments concerning water quality, watersheds in general, timing of runoff, and irrigation. These comments were associated with harvest effects, grazing, sedimentation, and fisheries. Substantive comments on water were received from government agencies, tribal groups, and county commissioners. The standards and guidelines and management prescription direction for water in the selected alternative have been rewritten to respond to public comments.

It is my decision to implement revised standards and guidelines and management prescription direction for soil, water, fish and riparian areas. These standards and guidelines, including "Best Management Practices," will assure adequate protection for soil, water and riparian dependent resources.

ISSUE 5: MIXED OWNERSHIP MANAGEMENT

Land within the Forest boundary totals 2,457,379 acres. Of this, about 12 percent is managed by the Bureau of Land Management, Washington State, and private landowners. Much of this land is scattered throughout the Forest and occurs in "checkerboard" patterns in the Interstate 90 and Highway 2 corridors. Management philosophies, practices, and goals of other owners sometimes differ from those of the Forest Service. This can directly affect management options on National Forest land, influencing roading decisions, timber harvest scheduling, and scenery.

The preferred alternative of the DEIS established priorities for acquisition and areas suitable for exchanging into private ownership.

In general, public comment supported acquisition of private land in mixed ownership situations. However, there was strong opposition to Wild and Scenic River designation because of the possibility of acquiring private land.

It is my decision to implement the standards and guidelines and management prescription direction for all land adjustment activities found in the selected alternative. There does not appear to be a need to acquire private land within the river corridors that I am recommending for inclusion into the Wild and Scenic River System with one exception. A 200 foot strip of right-of-way may be needed to provide public access to the Wenatchee river near Plain.

ISSUE 6: WILDERNESS MANAGEMENT

The Forest has 841,034 acres classified as wilderness, amounting to about 39 percent of the land area. There are portions of seven wildernesses on the Forest ranging in size from the 36,316 acre Goat Rocks Wilderness to the 289,001 acre Glacier Peak Wilderness. Unlike some wildernesses, which have shown dramatic declines in use, the Wenatchee wildernesses continue to experience increases in use. User conflicts between horse users and hikers and resource protection problems are occurring more frequently

Although public comments on wilderness were relatively few, I have decided to implement the standard and guidelines and management prescription detailed in the selected alternative. This management direction is needed to assure that overuse and unacceptable resource damage do not occur. All of the wilderness on the Forest has been allocated to the following Wilderness Recreation Opportunity Spectrum classes: pristine, primitive, semi-primitive, or transition. Each of these classes has specific management direction that is intended to protect its attributes. Special monitoring using the "limits of acceptable change" method will assure adequate protection of the wilderness on the Forest.

ISSUE 7: WILDLIFE AND FISH

The Wenatchee sustains a wide variety of fish and wildlife species because of its diversity of habitats. Management activities that affect fish and wildlife habitat are timber harvest, recreation, livestock grazing, road management, and fire management. The major wildlife issues on the Forest are with management indicator species such as spotted owl, big-game species, and anadromous fish habitat.

The preferred alternative of the DEIS addressed mature/old growth dependent wildlife species, including spotted owls, in a management prescription which allowed for some timber harvest. Public comments to the DEIS indicated that many people disagreed with our proposal to "manage" mature/old growth habitat through timber harvest. They thought that it would be impossible to retain the necessary characteristics of old growth ecosystems while allowing timber management. Comments from timber industry questioned the requirements of our indicator species to have old growth. They stated that spotted owls and pine marten are found in managed or second growth forests and, therefore, no old growth is needed outside wilderness and other areas identified for preservation.

Between the Draft and Final, a Supplemental Impact Statement was issued by the Pacific Northwest Region of the U.S. Forest Service. The analysis in this document considered the conflicting views and scientific information of others. It provided new criteria for establishing "Spotted Owl Habitat Area" (SOHA) networks on forests in Washington and Oregon, including the Wenatchee National Forest. While the Draft EIS considered a total of 1,700 acres for each SOHA on the Forest, with 300 acres dedicated and 1,400 acres managed, the SEIS required that the Forest either dedicate 2,200 acre SOHA's or manage for 4,100 acre SOHA's

Recently, the U.S. Fish and Wildlife Service proposed listing the Spotted Owl as threatened in the range of the northern subspecies which includes the Wenatchee. Results of this listing process will be used to make appropriate adjustments to the Plan.



It is my decision to adopt a spotted owl habitat network that meets the direction given in the SEIS. Complying with this direction, which is included in the standards and guidelines of the selected alternative, assures continued viability of the spotted owl and other mature/old growth dependent wildlife species.

The spotted owl network consists of dedicated "Spotted Owl Habitat Areas," suitable habitat in wilderness, and other suitable habitat in management areas not allowing a scheduled timber

harvest. The selected alternative will maintain about 353,000 acres or about 68 percent of the 521,000 acres of known suitable spotted owl habitat on the Forest. This network is well distributed throughout the Forest and takes into account both suitable habitat and location of known spotted owls. Refer to "Compatibility With Other Agency Goals and Plans" section for further discussion of Spotted Owl direction.

The Spotted Owl network will also be utilized by the following indicator species: pine marten, three-toed woodpecker and pileated woodpecker. In addition, about 49,000 acres will be managed as "mature" on a 180-year rotation to round out the habitat distribution for these species.

Big game such as deer, elk, and mountain goats make up an important component of wildlife diversity on the Forest. The preferred alternative to the DEIS contained standards and guidelines as well as management prescriptions addressing big game. Although many public comments of a general nature favored the preservation of wildlife, some groups felt that we had more restrictive requirements for timber harvest in deer and elk winter range than was necessary. The Forest analyzed the 260 year timber rotation for deer and elk winter range and found it to be unnecessary. Winter range cover requirements can be met with a 120-130 year rotation.

It is my decision to adopt a 120-130 year rotation requirement for deer and elk winter range. There appears to be no scientific basis for an extended rotation and the same wildlife benefits can be achieved by providing thermal cover on a shorter 120-130 year rotation.

The Forest has about 3,600 miles of perennial streams and 57,000 acres of lakes. Many of these streams and lakes support an anadromous and/or resident fishery. Indian tribes and other agencies felt that our preferred alternative standards and guidelines in the DEIS were inadequate to protect fish habitat. Since that time, the Forest has continued to analyze this issue and talk with concerned Indian tribes and other agencies.

It is my decision to implement a significantly revised set of standards and guidelines and management prescriptions in the selected alternative that will provide for the assurance of contin-

ued high quality fish habitat in the future. The Draft standards and guidelines were stated in general qualitative terms. The new quantitative standards and guidelines in the Final set forth measurable parameters for sediment, temperature, channel morphology and flood plain/riparian vegetation. This will allow the Forest to monitor the environmental impacts of management practices more accurately. In addition, I am implementing an accelerated stream/watershed survey program to assess current habitat conditions.

During the past couple of years, Forest and Regional Offices in Regions 1, 4, and 6 have been working closely with Columbia Basin Indian tribes and the Columbia River Inter-Tribal Fish Commission on the issue of anadromous fish habitat management. At this time, a Forest Service draft policy and policy implementation guide have been developed, and are expected to be approved in the near future. Upon approval of the policy and implementation guide, the Forest Plan will be reviewed and amended if necessary as soon as it is practicable to do so. I believe this policy will be an important factor in helping to achieve a mutual goal of the Tribes and Forest Service to provide strategies for habitat management and anadromous fish production consistent with fish restoration goals of the Columbia Basin Fish and Wildlife Program.

ISSUE 8: MANAGEMENT OF SCENERY

The Wenatchee National Forest is well known for its outstanding mountain, valley, and lakeshore scenery. The landscapes are distinctive in beauty and nature, with sweeping vistas and a variety of topography, ecotypes and life forms.

The public comment on the DEIS showed strong public support for a natural appearing forest, especially along major travel routes such as Stevens and Blewett Passes. Comments from forest industry contended that prescriptions for scenery were too strict.

It is my decision to maintain the scenic qualities along major forest travel routes and particularly roads leading to developed recreation sites or other major facilities. The standards and guide-

lines and management prescriptions for the selected alternative will maintain about 78 percent of the Forest in a natural or near natural appearing landscape over time.

ISSUE 9: TIMBER MANAGEMENT

The existing Timber Management Plans are tracked and controlled on board foot measure. They allow for an annual programmed timber harvest of 176.8 million board feet (MMBF). This includes about 14 MMBF for salvage purposes and about 6 MMBF marginal component (see FEIS Glossary), leaving about 157 MMBF of net green sawlog volume, which is comparable to the "allowable sale quantity." The actual annual harvest has been about 157 MMBF of net green volume for the last 13 years. The DEIS proposed an allowable sale quantity of 129.7 MMBF (23.8 MMCF).

The allowable sale quantity will be tracked and controlled on a cubic foot measure for the Forest Plan. The board foot volume associated with the cubic foot volume (i.e., board foot/cubic foot conversion ratio) varies from stand to stand depending on the size and form of the trees. Both approximate board foot measure and cubic foot measure are displayed here, since board foot has been and continues to be the predominate unit of measure in the area.

Many of the issues raised during the planning process affect the allowable timber harvest level. Some of these issues include cumulative effects, tentatively suitable lands, silvicultural practices, meeting other resource standards and guidelines, and trade-offs between present net value and harvest level. The public is divided as to what the appropriate timber harvest level should be on the Wenatchee. Some feel that the existing timber harvest level is too high. They do not want to see existing unroaded areas roaded and are concerned about the harvest effects on wildlife, water quality, soils, scenery, and recreation. Forest industry, most County Commissioners, and some Chambers of Commerce feel that there is enough wilderness and that the roadless areas outside wilderness should be developed.

Timber industry submitted an alternative calling for an annual allowable sale quantity of 180 MMBF (35.3 MMCF) The Forest thoroughly analyzed the alternative presented by timber industry and made a number of FORPLAN computer runs to finalize the allocations and attempt to meet the 180 MMBF (35.3 MMCF) requested. This alternative has been included as a fully developed alternative in the FEIS. It is known as Alternative "J" and produces an allowable sale quantity of about 173.8 MMBF (34.1 MMCF). When compared with selected Alternative C, this alternative produces significantly less roadless area acreage, reduced scenic quality, and much less present net value. This is contrary to the amenity values that are of concern to a large segment of the public. See Table 4 for specific information.

The Forest considered alternatives ranging from an allowable sale quantity of 12.9 MMCF (71.9 MMBF) to 34.1 MMCF (173.8 MMBF) in the FEIS. It should be noted that the DEIS considered a range of alternatives from 13.6 MMCF (74.1 MMBF) to 34.3 MMCF (186.9 MMBF). The difference in the range of alternatives between the DEIS and FEIS reflects the reduction in the capability of the Forest to produce timber due to implementation of the requirements of the Supplement to the EIS for an Amendment to the PNW Regional Guide regarding Spotted Owls.

Because of concerns raised by timber industry in response to the DEIS, the Forest further analyzed suitability, growth and standing inventory volume, programmed more intensive timber management practices to improve tree growth and removed the commercial thinning constraint from the FORPLAN model. These modifications were completed as recently as 1988 and 1989. They allowed an increase in allowable sale quantity from the amount in the DEIS preferred alternative (FEIS Appendix B). We will continue to update our data base during implementation and make adjustments to allowable sale quantity if the new information justifies it. See related discussion in AMENDMENT AND REVISION PROCESS.

Purchasers of Wenatchee National Forest timber depend on the Forest for approximately 60 percent of their timber supply needs. The Plan assumes that demand for all the timber the Wenatchee produces will continue to exist. But,

the Forest cannot produce more than the selected Allowable Sale Quantity and still meet the other resource requirements.

On October 5, 1989 timber industry filed suit in the U.S. District Court for Eastern District of Washington seeking Declaratory and Injunctive relief. On December 6, 1989 the Court denied Plaintiff's requested relief and dismissed the Complaint without prejudice on grounds of lack of ripeness for judicial review and failure to exhaust administrative remedies.

After considering all factors, it is my decision to implement the selected alternative calling for an allowable sale quantity that averages 24.3 MMCF (136.0 MMBF) per year. This level of timber harvest strikes an equitable balance between jobs, demand for wood products, income to the Treasury and protection of the various amenity values enhancing the quality of life for Forest users.

In addition to the 24.3 MMCF (136.0 MMBF) of sawlogs, it is expected that there will be about 1.8 MMCF (10.0 MMBF) of material unsuitable for sawlogs that will be sold each year. This material includes firewood, cull logs, small logs, and miscellaneous forest products such as fence posts and poles. This is about the same as the historical level of output for these products.

Many comments to the DEIS expressed a dislike for the clearcutting method of timber harvest. The Forest looked at alternatives ranging from about 600 acres per year to over 8,000 acres per year. In the past, the Forest used this method of harvest on an average of 3,000 to 4,000 acres per year. The selected alternative predicts that this practice will be used on about 3,400 acres per year, or about 40 percent of the area entered for timber harvest. However, the decision on the most appropriate method of timber harvest will be made on an individual timber sale project basis in compliance with NFMA and standards and guidelines of the selected alternative.

Refer to Issue 16 for further discussion of timber-related issues.

ISSUE 10: ENERGY

An adequate supply of energy, as well as its conservation, is a high priority national objective. Forest lands play an important role in the production and transmission of energy. These include coal, hydroelectric power, oil and natural gas, geothermal, and renewable forest products.

In the preferred alternative of the DEIS, this issue dove-tailed with the minerals issue. The standards and guidelines and management prescriptions covered both mineral development and energy development. The Draft preferred alternative also identified energy corridors for current and future transmission lines.

There were few public comments on this issue. It is my decision to implement the selected alternative with the standards and guidelines and management prescription direction for energy. These standards and guidelines will adequately protect the environment while allowing for necessary development and use to help meet the foreseeable energy needs of the region.

ISSUE 11: THE ROLE OF FIRE

Although fire has long been considered an enemy of the forest, it has always been a natural and integral component of the ecosystem. It helps shape much of the habitat which many species need to survive. While fire suppression efforts are necessary, a total exclusion of fire from the forest ecosystem can result in adverse effects such as unnaturally large build ups of fuels which can lead to larger and more intense fires in the future.

Under properly controlled circumstances, fire can often benefit wildlife habitat, silviculture and recreation by recycling nutrients back into the soil and invigorating certain plant species. Prescribed fire can, at times, conflict with the requirements of the Clean Air Act and the views of some sectors of the public.

It is my decision to allow the use of prescribed fire forest-wide to enhance resource values and reduce the risk of catastrophic wildfires. This decision includes allowing naturally caused fires in

designated wilderness to burn only within tightly drawn constraints as set forth in detailed fire management plans. These fire management plans shall spell out very limited circumstances which must occur before a naturally caused fire will be allowed to burn. If, after close monitoring, the fire threatens to exceed those parameters, then immediate steps to suppress the fires shall be taken

ISSUE 12: RANGE MANAGEMENT

Livestock grazing presently takes place on the Forest through grazing permits issued to 37 livestock owners. Within the Forest, there are 401,100 acres within vegetation types and on slopes suitable for grazing by livestock. There are an additional 500,871 acres outside wilderness potentially capable of livestock forage following timber harvests. The current management potential of the Forest to provide forage for livestock has been calculated at 37,031 animal unit months (AUM's) annually. Current permitted livestock use is 23,000 annually. Current demand is also 23,000 AUM's annually.

Livestock grazing has the potential to conflict or complement other resources. The Forest received a large number of general comments opposing increased grazing. There was concern expressed over preservation of sensitive native plants, conflicts with big game, and subsidizing individuals holding grazing permits.

The preferred alternative of the DEIS showed an expected permitted use of 22,000 AUM's annually for the first decade, 25,500 AUM's annually for the second decade, and 36,000 AUM's annually for the fifth decade.

It is my decision to limit livestock grazing to 23,000 AUM's annually for the first decade, which corresponds to the expected demand. Grazing will be confined to existing allotments. In addition, I have updated the management prescriptions and standards and guidelines to insure that livestock grazing does not conflict with sensitive native plants and big game.

ISSUE 13: MINERALS

This issue is closely related to the energy issue. Mineral resource activities in the central part of the Wenatchee National Forest took a dramatic upturn in March 1983 following a major gold discovery in Dry Gulch, a few miles off the Forest near the city of Wenatchee. This triggered the location of more than 6,000 claims on National Forest land in Chelan County and at least 1,000 claims in Kittitas County. This claim activity is continuing today with finds of another potential mine site close to the Forest. The basic issue is how much of the potential mineral lands will be allocated to uses that prohibit or severely limit exploration and mining opportunities.

The preferred alternative for the DEIS set direction for mineral development and exploration over the Forest and more specific direction for each management area.

The public comment showed concern over the term "highly restricted" in the DEIS and the possible impact of the proposed plan on recreational mining. Other individuals were concerned about the impact of mineral development on other resources.

The document has been changed to clarify the situation as to mineral development and recreational mining. It is my decision to implement the standards and guidelines and management prescription direction for minerals. This will provide for mineral development and recreational mining on appropriate lands while protecting other resources such as fisheries and water quality.

ISSUE 14: CULTURAL RESOURCE MANAGEMENT

The Wenatchee National Forest contains over 500 cultural resource sites (archeological sites, historic structures, etc.) that have been reported within or adjacent to the Forest. Those sites represent a broad cross-section of uses, spanning a period of several thousand years. A central concern is to provide a balance between these other uses and the protection of cultural sites so as to provide adequately for their preservation.

The preferred alternative of the DEIS provided forest-wide standards and guidelines and specific direction for each management area for cultural resources. There was some concern by some members of the public whether the forest has adequate staffing to implement the proposed guidelines.

It is my decision to implement the standards and guidelines and management prescription direction for cultural resources and I expect these measures to be adequate to mitigate any adverse effects to significant sites due to project activities.

ISSUE 15: CUMULATIVE EFFECTS

Cumulative effects are the collective long-term environmental impacts which result from natural processes and human activities on the land. For the Wenatchee National Forest the principal area of concern is the cumulative impacts of timber harvest activities on watersheds, fish, and wildlife. Other areas of concern are cumulative effects on scenery and recreational resources. The DEIS covered the direct, indirect, and cumulative effects of alternatives.

The public comments dealt mostly with cumulative effects of management activities on soil and water. There was concern that the DEIS did not effectively consider cumulative effects. This issue is directly tied to other issues such as intermingled ownerships, fish and wildlife, scenery, recreation, water quality, and timber harvest.

I have completed a cumulative effects analysis on selected watersheds. Changes in timber harvest scheduling were made to reduce the risk of watershed degradation in appropriate cases. It is my decision to do a detailed cumulative effects analysis on sub-drainages whenever it is an issue or whenever more than 40 percent of the forested area in a 1,000 acre or larger sub-drainage is in openings less than 15 feet in height, and new projects are proposed in the area. The detailed watershed analysis will be considered at the time of site specific project environmental analysis, as appropriate, to meet NEPA requirements and standards and guidelines in the Forest Plan. This will protect water quality, fish and wildlife, recreation, and scenery resources.

ISSUE 16: SOCIAL/ECONOMIC

The central Washington area consisting of Yakima, Kittitas, and Chelan Counties covers 9,503 square miles with a population of 270,000 people. Residents are affected by the Forest through availability of recreation, payments to county governments from Forest receipts, production of market goods such as lumber and beef, and other amenities such as enjoyment of the visual character of the forest. Economic activities affecting local individuals include logging, sawmill operations, commercial livestock operations, tourism, and various recreational pursuits. The Forest is a couple of hours drive from the Puget Sound area and is an important recreation area for its residents.

The preferred alternative of the DEIS proposed a decrease in allowable sale quantity from 28.7 MMCF (156.8 MMBF) to 23.8 MMCF (129.7 MMBF). There was an increase in amenity values such as roadless areas, old-growth wildlife habitat areas, big-game winter range, and scenic areas.

The public comments from the Seattle area generally supported increased amenity outputs. The public input from central Washington was split, with those who work in the forest products industry calling for a higher harvest level than proposed in the DEIS. Others in central Washington that lived in tourist-dependent communities or in the larger towns supported increased amenity outputs.

As noted under the timber management section, it is my decision to implement an allowable sale quantity of 24.3 MMCF (136.0 MMBF) in the selected alternative. Even though this is a substantial drop from the volume that could be sold under the existing Timber Management Plan, the selected alternative meets the intent of the National Forest Management Act requirements while the existing Timber Management Plan pre-dates NFMA. Alternative A/NFMA, which maintains current management for the Forest and meets the requirements of the National Forest Management Act produces 21.8 MMCF (121.4 MMBF)

In response to economic concerns the Forest looked for ways to increase the harvest level while meeting public expectations regarding amenities and adequate resource protection. The selected alternative helps protect jobs and receipts to counties as well as amenity values that are of concern to a large segment of the public.

Decisions contained in the Forest Plan will affect communities. The Forest Service will work with communities to address these effects within the framework of the Pacific Northwest Strategy.

ISSUE 17: OLD GROWTH

Old growth means different things to different people. To some, old growth provides habitat for certain wildlife species. To others, old growth provides a spiritual and aesthetic experience. Old growth can also provide examples of relatively undisturbed ecosystems. For others, old growth provides a source of high quality wood.

The Wenatchee used the Forest Service definition for Old Growth found in the Regional Guide, "An Old Growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics: stands contain mature and overmature trees in the overstory and are well into the mature growth stage; stands will usually contain a multilayered canopy and trees of several age classes; standing dead trees and down material are present; and evidence of man's activities may be present, but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand..." (Regional Guide page A-11).



The analysis in the DEIS focused on provision of old growth for old growth dependent wildlife species such as spotted owl. Though the other values of old growth were taken into account, the discussion of old growth was limited to wildlife species.

Old growth was one of the major issues based on the number of public comments with responses generally more emotional than on other issues. Most wanted preservation of existing old growth. In the minds of many people this issue was closely tied to roadless area preservation.

The discussion in the FEIS has been expanded to include other facets of the old growth issue besides wildlife. The amount of existing old growth, according to the Regional Guide definition, is about 318,800 acres including about 148,500 acres in wilderness and 63,700 acres in "no harvest" allocations. It should be noted that the planned rate of cutting of old growth will allow changes if the public places more or less value on old growth in the future. For instance, about 307,300 acres or 96 percent of the existing old growth will remain after the first ten years of plan implementation. Even after 50 years of implementation, about 261,200 acres or about 83 percent will remain. The old growth inventory will be updated and refined as new data becomes available. It is my decision to implement the standards and guidelines and management prescription direction for old growth for the selected alternative.

ISSUE 18: WILD AND SCENIC RIVERS

In October 1968, Congress enacted the Wild and Scenic Rivers Act which established the Wild and Scenic Rivers System. The criteria for eligibility are that the rivers be free-flowing and possess one or more outstandingly remarkable, scenic, recreational, geologic, fish and wildlife, historic, cultural, or ecological values.

The DEIS, released in 1986, considered seven rivers and recommended three for further study and possible inclusion into the Wild and Scenic Rivers system. In response to the DEIS, the public recommended numerous additional rivers

for possible inclusion into the National Wild and Scenic River system. Also, some of the public wanted some rivers within wilderness to be formally classified. No input from landowners was received in response to the Draft.

As a result of the public comment, the Forest studied 20 rivers totalling about 470 miles for eligibility. Nine of these rivers were determined to be eligible. The suitability study recommended eight rivers for inclusion in the system in a Supplement to the DEIS that was released in October 1988.

1988
DEIS

Some respondents to the Supplement liked the Wenatchee's proposal, others wanted additional rivers proposed that the Forest had said were ineligible or not suitable and still others, including most landowners and County Commissioners, felt that no rivers should be included in the Wild and Scenic River System and that personal rights and local control of the rivers were more important than Federal regulation, particularly on private lands.

In response to public comments, the Forest studied yet an additional 13 rivers for eligibility and reexamined those ineligible rivers addressed by the public. As a result, the Wapatus River was determined to be eligible and suitable for "wild" classification. In addition, the Forest seriously reviewed eligible rivers with private lands along their banks to determine how to respond to landowner and County Commissioners' concerns including appropriateness of County zoning and need for acquisition of easements. Our recommendation on classification correlates closely with State laws and County zoning.

FEIS

The analysis the Forest has done is adequate; it is my decision to recommend nine of the ten eligible rivers, totalling about 230 miles with their attendant classifications, for inclusion into the Wild and Scenic Rivers System without further study. A list of recommended rivers and their classifications follows:

		Cumulative #		
		considered	eligible	suitable
1986	DEIS	7	-	-
1988	DEIS Supp.	20	9	8
1990	FEIS	33	10	9
				31

1986
DEIS

NINE SUITABLE RIVERS

River	Recommended Classification	Miles	Segment
American	Wild	6.0	Headwaters to confluence with Rainier Fork
	Scenic	16.0	Confluence with Rainier Fork to confluence with Bumping River (in Mather Memorial Parkway corridor).
Chiwawa	Wild	5.0	Headwaters to Glacier Peak Wilderness boundary
	Recreational	24.0	Glacier Peak Wilderness boundary to Goose Creek
	Recreational	6.0	Goose Creek to confluence with Wenatchee River
Cle Elum	Wild	4.0	Headwaters to Alpine Lakes Wilderness boundary
	Scenic	2.0	Alpine Lakes Wilderness boundary to above Lake Tucquala
	Recreational	14.0	Above Lake Tucquala to Salmon La Sac bridge.
	Recreational	4.5	Salmon La Sac bridge to Lake Cle Elum.
Entiat	Wild	12.5	Headwaters to Glacier Peak Wilderness boundary
	Scenic	4.0	Glacier Peak Wilderness boundary to Cottonwood Trailhead
	Recreational	15.0	Cottonwood Trailhead to above Burns Creek
Icicle	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary.
	Recreational	14.0	Alpine Lakes Wilderness boundary to above Leavenworth city water intake.
Napeequa	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary
	Recreational	1.0	Glacier Peak Wilderness boundary to confluence with White River
Waptus	Wild	12.0	Headwaters to Alpine Lakes Wilderness boundary
	Wild	1.0	Alpine Lakes Wilderness boundary to confluence with Cle Elum River.
Wenatchee	Recreational	21.0	Lake Wenatchee to Tumwater Campground
	Recreational	7.0	Tumwater Campground to Forest boundary
White	Wild	15.0	Headwaters to Glacier Peak Wilderness boundary.
	Scenic	7.0	Glacier Peak Wilderness boundary to above Tall Timbers Ranch
	Recreational	12.0	Above Tall Timbers Ranch to Lake Wenatchee

This decision recommends many of the rivers with private lands at less than their highest potential classification. It is my intent that the Forest work with county governments and utilize State and local controls for administration of private lands within the designated river corridors as much as possible. Appendix E of the FEIS contains additional guidelines for developing future detailed river management plans in line with this decision.

I have determined that the Little Wenatchee river is not suitable for inclusion into the Wild and Scenic river system, even though it is eligible, because of the value of other resources. I believe that the outstandingly remarkable value, the sockeye salmon, can be effectively managed through other management prescriptions and standards and guidelines.

This recommendation is a preliminary administrative recommendation that will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. The Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic Rivers System. Recommended rivers will be managed to protect those characteristics that contribute to the eligibility of these rivers at their highest potential classification until Congress formally determines their status.

RATIONALE FOR ALTERNATIVE SELECTION

ALTERNATIVES CONSIDERED

In the DEIS, including the supplement, ten alternatives were analyzed and presented in detail. In addition, 14 benchmark alternatives were developed and utilized in the analysis process. The benchmarks served as analysis reference points to define bounds for comparison purposes only. They were not developed with the intent of being implemented. In the FEIS, 11 alternatives are analyzed in detail, including an alternative submitted by the timber industry, Alternative J.

The Current Direction Benchmark with National Forest Management Act (NFMA) is now Alternative A/NFMA in the FEIS

Summary Description of Final Alternatives

Alternative A/NFMA

This is the No Action Alternative. It was formulated to maintain the current management direction for the Forest. Sources of that direction were the Alpine Lakes Management Plan, the Chelan and Kittitas Unit Plans, and the Ranger District multiple use plans. Alternative A/NFMA portrays how these plans would influence the flow of goods and services over the life of this plan (10-15 years) based upon the use of current National Forest Management Act of 1976 (NFMA) planning data.

This alternative has been corrected from the DEIS version (Alternative A) and meets all NFMA requirements as explained in the "Correction and Supplemental Information" which was included with the Reviewer's Guide when the DEIS was mailed to the public. The Supplement to the DEIS also contained corrected information and displayed this alternative as Alternative A/NFMA. Essentially the difference between Alternative A in the original DEIS and Alternative A/NFMA is that this alternative now meets all of the NFMA management requirements including protection of habitat for wildlife dependent upon old-growth and mature habitat types.

One of the features of this alternative is that it contains significantly fewer acres of EW-1 (Key Deer and Elk Habitat) than any of the other alternatives except the No Change Alternative. The reason for this is that most of the existing plans did not contain specific allocations for key deer and elk habitat.

The major changes in this alternative from the DEIS and the Supplement to the DEIS include:

Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS, and “dedicating” old growth spotted owl habitat areas rather than “managed” old growth.

Alternative B

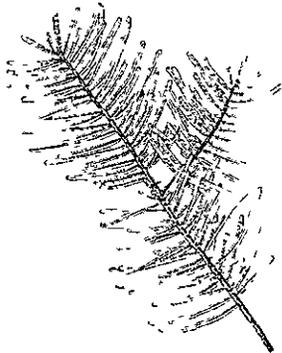
This alternative was developed in an attempt to meet the 1980 Resources Planning Act program which has been assigned to the Forest through the Regional Guide.

The 1980 RPA timber target strongly influenced our approach. This alternative uses the Alternative D land allocations. It portrays the Forest’s second highest timber producing capability while considering other resource needs. This alternative would result in the greatest amount of development of the Forest.

A feature of this alternative and Alternative D is the higher allocation to General Forest (GF) and a corresponding decrease in the unroaded and scenic travel allocations compared to most other alternatives except Alternative J. The major difference between this alternative and Alternative D is that in Alternative B more intensive timber management will be practiced on the General Forest land allocation which will result in higher yields and higher annual sale quantities

The major changes in this alternative from the DEIS and the Supplement to the DEIS include

Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and “dedicating” old growth spotted owl habitat areas rather than “managing” old growth.



Alternative C

This alternative was developed by adjusting the current direction (Alternative A/NFMA) to a land allocation which would maximize net public benefits and would provide a balanced program in response to the issues and concerns. The purpose of Alternative C is to respond to concerns for protecting wildlife and other amenity resources and provide a variety of recreation opportunities while managing the Forest for commodity outputs. This was accomplished by modifying existing plans and practices to respond to public concerns received during issue identification early in the planning process. Further modification of this alternative has been done to respond to comments received through the public response on the Draft EIS and Supplement to the DEIS

Another way Alternative C differs from Alternative A/NFMA is that it allocates many more acres to key big game range and increases the acreage allocated to roadless management

The major changes in this alternative from the DEIS and the Supplement to the DEIS include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and “dedicating” spotted owl habitat areas rather than “managing” them.
- Increase inventoried roadless area acreage from 267,610 acres to 298,115 acres.
- Development and application of the Mather Memorial Parkway prescription (MP-1) which allows only unscheduled timber harvest within the seen area of the Parkway corridor
- An addition of two new allocations: EW-3 (Unroaded Wildlife) and RE-4 (Unroaded Harvest).
- Changes in the classification on some of the recommended Wild and Scenic Rivers, and the addition of the Waptus River to those recommended for designation
- Increase in acreage of Special Interest Areas
- Increase in the allowable sale quantity of timber by the use of intensive timber management practices on more acres.

Alternative D

This alternative emphasizes production of resources such as timber, range forage, developed recreation, minerals, and other resources which have the potential to return revenue to the Federal Treasury and local counties. Management of other resources is at economically and environmentally feasible levels consistent with the emphasis on market oriented outputs

A feature of this alternative and Alternative B is the higher allocation to General Forest (GF) and a corresponding decrease in the unroaded and scenic travel allocations. The major difference between this alternative and Alternative B is the economic emphasis. This results in less intensive timber management on the GF land allocation and a lower annual sale quantity with an increased present net value compared to Alternative B.

The major changes in this alternative from the DEIS and the Supplement to the DEIS include.

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.

Alternative E

This alternative allocates all currently roadless areas outside of the existing wilderness and the Alpine Lakes Management Area to a management prescription which will maintain their roadless status. It also emphasizes the protection of natural scenery, fish and wildlife habitat, and other amenity values. Management of other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

The major changes in this alternative from the DEIS and the Supplement to the DEIS include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.

- Development and application of the Mather Memorial Parkway prescription (MP-1) which does not allow for scheduled timber harvest within the seen area of the Parkway corridor

Alternative F

This alternative emphasizes unroaded recreation, protection of natural scenery, fish and wildlife habitat, and other amenity values. It allocates approximately 80 percent of the currently roadless area outside of the existing wilderness and Alpine Lakes Management Area to roadless management prescriptions with heavy emphasis on non-motorized recreation. Management of other resources would be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

The Forest was assisted in the development of this alternative by a coalition of environmental groups from throughout the State

The major changes in this alternative from the DEIS and the Supplement to the DEIS include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.

- Development and application of the Mather Memorial Parkway prescription (MP-1) which does not allow for scheduled timber harvest within the seen area of the Parkway corridor.

Alternative G

This alternative is an attempt to balance the land allocations between amenity values and commodity production emphasis. The goal was to intensify commodity production on the lands not allocated to roadless management. Of the currently roadless areas outside of existing Wilderness and the Alpine Lakes Management Area which are suitable for timber production, approximately half was allocated to roadless management with a heavy emphasis toward motorized recreation and the remainder was allocated to commod-

ity production. On the lands allocated to timber production, a trade-off was reached between maximizing present net value and maximizing timber production.

The Forest was assisted in the development of portions of this alternative by representatives of off-road vehicle users groups from throughout the State.

The major changes in this alternative from the DEIS and the Supplement to the DEIS include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.

Alternative H

This alternative was developed to portray the maximum timber producing capability of the Forest under the present land allocations of the existing management plans. This alternative has the same land allocations as Alternative A/NFMA. The major difference of this alternative compared to Alternative A/NFMA is that more intensive timber management will be practiced on the General Forest land allocation which will result in higher yields and higher annual sale quantities with a corresponding decrease in present net value.

The major changes in this alternative from the DEIS and the Supplement to the DEIS include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and "dedicating" old growth spotted owl habitat areas rather than "managing" old growth.
- Changes in classification on some of the recommended Wild and Scenic Rivers and deletion of some eligible segments with private land issues.

Alternative I

Alternative I is a departure from the base sale schedule established under Alternative C, the selected alternative. It has the same land allocation as Alternative C. The timber harvest schedule for Alternative C is based upon nondeclining flow, never exceeding long-term sustained yield. Alternative I has the same long-term sustained yield capacity as Alternative C but deviates from nondeclining flow. The level of timber harvest in the first decade approximates the average annual sell volume for fiscal years 1975 through 1984 under the existing Timber Management Plan. The level of timber harvest gradually declines in the second and third decades, equaling that of Alternative C in the fourth decade. This would allow local industry to phase into a lower level of timber harvest more gradually than in Alternative C. The effects on other resources could be greater in the early decades due to the accelerated rate of timber harvest under the departure

The major changes in this alternative from the DEIS and the Supplement to the DEIS include:

- Revision of the spotted owl network in response to the Supplement to the Regional Guide EIS and "dedicating" spotted owl habitat areas rather than "managing" them.
- Increase roadless areas from 267,610 acres to 298,115 acres.
- Development and application of the Mather Memorial Parkway prescription (MP-1) which does not allow for scheduled timber harvest within the Parkway corridor.
- An addition of two new allocations; EW-3 (Unroaded Wildlife) and RE-4 (Unroaded Harvest).
- Changes in the classification on some of the recommended Wild and Scenic Rivers and the addition of the Waptus River to those recommended for designation.

Alternative J

This alternative was developed by representatives of the timber industry after release of the Wenatchee DEIS. They referred to it during the public input process as the "Essential Alternative." The goal of this alternative is to maintain timber harvest and other commodity outputs at their highest levels, while providing as much amenity outputs as possible without dropping the ASQ below the level of the existing timber management plans.

Features of this alternative include:

- The highest acreage of GF land allocation of any of the alternatives with correspondingly lower roadless and scenic travel allocations
- No scenic travel retention allocations outside of the Alpine Lakes management area. I-90, Highway 2 (Stevens Pass) and Highway 97 (Swauk Pass) are in this management unit.
- Limited Partial Retention allocation on Mather Memorial Parkway, Entiat, Lake Wenatchee, and a part of the Chiwawa River road

The No Change Alternative (Alternative NC)

The No Change Alternative was developed in response to decisions made regarding appeal number 1588 brought by the Northwest Forest Resource Council on May 19, 1986. The appeal centered on a decision by Regional Forester James F. Torrence to "require inclusion of management requirements (MR's) in the Current Direction Alternative for each Forest Plan." In response to this, a No Change Alternative has been developed to represent the existing Timber Management plans and consequently does not comply with all provisions of the National Forest Management Act of 1976 (NFMA) and regulations (36 CFR 219) promulgated by the Secretary of Agriculture to implement NFMA.

Alternative NC displays the objectives, outputs, and effects of the Wenatchee National Forest's Timber Management (TM) Plans so that they can be compared with the other alternatives. However, since the development of the TM plans, new inventories, assumptions about resource interrelationships, and new methods for predicting timber growth and yields have been developed. Therefore, a reviewer should be aware that information provided for Alternative NC is frequently based on outdated inventories and yield tables and is not always comparable to information provided for the other alternatives.

COMPARISONS OF ALTERNATIVES

Table 3, "Comparison of Alternatives by Management Areas," and Table 4, "Comparison of Alternatives by Key Issue Areas," provide a comparison of the various alternatives considered in the FEIS.



**TABLE 3
COMPARISON OF ALTERNATIVES BY MANAGEMENT AREAS 1/**

MANAGEMENT AREAS	ALTERNATIVES									
	A/NFMA	B	C	D	E	F	G	H	I	J
Water 2/	7,780	7,780	7,780	7,780	7,780	7,780	7,780	7,780	7,780	7,780
EF-1	4,770	4,770	4,770	4,770	4,770	4,770	4,770	4,770	4,770	4,770
EW-1	17,151	77,784	118,742	77,784	148,189	148,189	146,493	17,151	118,742	123,025 7/
EW-2	53,849	58,046	47,361	58,046	38,012	40,832	47,573	52,301	47,361	52,470
EW-3	0	0	19,059	0	0	0	0	0	19,059	0
GF	393,306	613,344	389,089	613,344	153,955	202,949	224,743	393,243	389,089	615,887
OG-1	66,823	71,063	79,840	71,063	62,901	69,028	66,039	66,823	79,840	71,297
OG-2	56,074	55,671	49,015	55,671	14,862	15,688	45,071	56,075	49,015	57,813
RE-1	4,494	8,544	6,021	8,544	4,388	7,526	7,929	4,494	6,021	8,544
RE-2a	64,597	69,706	79,607	69,706	94,002	91,373	197,204	64,597	79,607	61,332
RE-2b	3/	7,865	16,748	7,865	38,754	38,754	26,437	3/	16,748	1,081
RE-3 4/	59,551	84,462	116,092	84,462	320,038	259,088	100,362	59,551	116,092	79,480 5/
RE-4	0	0	6,614	0	0	0	0	0	6,614	0
RM-1	33,708	81,663	17,702	81,663	6,106	7,166	7,632	33,708	17,702	62,244
RN-1	1,717	2,247	2,247	2,247	2,247	2,247	2,247	1,717	2,247	2,247
SI-1	136,911	72,950	70,512	72,950	74,010	74,010	70,491	136,911	70,512	70,893
SI-2	382	2,056	2,798	2,056	6,402	6,233	742	382	2,798	2,056
ST-1	125,484	55,163	83,635	55,163	191,947	177,085	147,469	120,968	83,635	36,655
ST-2	286,733	50,032	174,880	50,032	133,858	147,193	210,476	286,733	174,880	65,572
UC-1	4/	4/	4/	4/	4/	4/	4/	4/	4/	4/
WI-1 5/	841,034	841,034	841,034	841,034	841,034	841,034	841,034	841,034	841,034	841,034
WS-1	6,742	0	5,554	0	15,519	18,041	6,614	12,423	5,554	0
WS-2	3,074	0	11,363	0	3,816	3,752	3,074	3,519	11,363	0
WS-3 6/	6,636	0	23,426	0	26,924	26,776	6,632	23,426	23,426	0
MP-1	0	0	13,717	0	13,717	13,717	0	0	13,717	0

1/ Acres not shown for Alternative NC as it does not have management areas. Roughly equivalent acres would be 841,034 for WI-1, 7,780 acres for Water, 1,081,049 acres for GF, 8,200 acres for RE-1, 36,337 acres for RE-2a, 276 for RN-1, 1,104 acres for SI-2, and 164,000 acres for ST-1

2/ Water outside of wilderness only

3/ Included in RE-2a

4/ Acres distributed among other management areas

5/ Wilderness includes 3,244 acres of water

6/ WI-1 acreage totals include WS-3 acres (except 1,590 acres in Alt E, and 1,442 acres in Alt F)

7/ Alternative J does not meet cover requirements of the EW-1 prescription

TABLE 4
COMPARISON OF ALTERNATIVES BY KEY ISSUE AREAS 1/

	A/NFMA	D	C	G	F	H	I	E	J	B
Present Net Value (million \$)	1,976	1,937	1,910	1,889	1,897	1,864	1,837	1,834	1,825	1,756
Average Annual Net Receipts										
Decade 1 (MM \$)	-10 5	-12 6	-15 0	-15 3	-13 8	-16 0	-16 3	-16 8	-25 1	-26 1
Decade 5 (MM \$)	-6 2	-7 9	-8 5	-9 7	-9 1	-9 8	-14 2	-13 4	-1 6	-1 4
Average Annual Non-cash Benefits										
Decade 1 (MM \$)	81 3	81 2	81 3	81 4	80 3	81 3	81 2	81 3	81 2	81 2
Decade 5 (MM \$)	115 4	114 1	115 3	115 8	114 9	115 4	115 0	115 9	114 9	114 2
First Decade Payment to Counties (MM \$)	+3 0	+3 4	+3 3	+2 5	+2 0	+3 1	+3 7	+1 9	+2 1	+2 0
First Decade Changes in Jobs Compared to 1982 Base Period	+39	+279	+203	-225	-473	+324	+413	-520	+630	+577
First Decade Change in Income (MM \$)	+ 65	+7 2	+5 14	-6 54	-13 3	+8 43	+10 86	-14 56	+16 76	+15 31
Allocation of Inventoried Roadless Areas										
Roaded Mgmt (%)	55 2	58 8	46 4	31 0	22 0	55 2	46 4	10 2	62 4	58 8
Unroaded Mgmt (%)	44 8	41 2	53 6	69 0	78 0	44 8	53 6	89 8	37 6	41 2
Key Wildlife Habitat (Acres)	17,151	77,784	118,742	146,493	148,189	17,151	118,742	148,189	123,025	77,784
Old-Growth Retained Decade 5 (M Acres)	261 6	254 5	261 2	254 3	275 7	258 4	261 2	277 7	250 1	250 4
Anadromous Commercial Fish Harvest (M Lbs /yr) 2/	328	328	328	328	328	328	328	328	328	328
Visual Quality Objectives										
Preservation (%)	38 9	38 9	38 9	38 9	38 9	38 9	38 9	38 9	38 9	38 9
Retention (%)	22 4	18 0	24 2	29 7	35 2	22 5	24 2	38 3	16 1	18 0
Partial Retention(%)	21 2	10 5	15 4	16 9	12 3	21 1	15 4	11 4	11 0	10 5
Modification (%)	2 6	7 6	6 8	7 4	7 4	2 6	6 8	7 4	8 8	7 6
Maximum Mod (%)	14 9	25 0	14 7	7 1	6 2	14 9	14 7	4 0	25 2	25 0
First Decade Average Annual Harvest - Programmed Timber Sales(MMCF)	23 4	27 4	26 1	18 7	14 6	28 9	29 6	13 8	36 5	36 0
Long-Term Sustained Yield (MMCF)	27 7	30 8	27 2	23 4	19 2	29 0	27 1	18 7	34 8	34 2
Suitable Timber Lands (Acres) 3/	591,794	643,639	576,074	503,326	421,265	603,620	576,074	410,935	686,918	681,186

1/ Alternatives are ranked in order of decreasing present net value (except for NC which does not have a PNV computed) Resource outputs cannot be reasonably estimated for Alternative NC because the TM plans were based on different yield tables and resource relationships

2/ These production estimates were made using the mid-point of the decade Because of the life history of the fish, the effects of the different alternatives are not apparent in this short time frame

3/ Figures represent acres of suitable timber lands scheduled by the FORPLAN computer model for management

DISCUSSION OF ALTERNATIVES WITH HIGHER PRESENT NET VALUE

There are two alternatives: Alternative A/NFMA and Alternative D with a higher Present Net Value (PNV) than the selected alternative. Alternative A/NFMA has a PNV of 1,976 million dollars, 1,937 million dollars for Alternative D, and 1,910 million dollars for selected Alternative C.

In calculating present net value, a dollar value is assigned to various outputs. Some of these output values are market-determined and produce a revenue, such as timber. Other resource outputs use assigned values derived from research studies, such as recreation. However, present net value does not include a value for some resources that neither produce revenue nor have a basis from which to estimate a value as in the case of visual quality. Therefore, present net value cannot be the only criterion used in deciding which alternative to select. The criterion used was the maximization of net public benefit, which includes both the present net value of the priced outputs and the consideration of the nonpriced outputs.

In making my decision, I felt it was necessary to evaluate how opportunities could change by selecting alternatives with varying combinations of present net value and nonpriced outputs. This helped me understand the interactions occurring between resources in determining net public benefit. Table 4 displays each alternative along with an estimate of present net value arranged in order of decreasing present net value. In addition, Table 4 shows estimated outputs for selected priced and nonpriced resources which relate to the key issues used in deciding on the selected alternative.



Alternative A/NFMA

Alternative A/NFMA has the highest present net value of all the alternatives at 1,976 million dollars. This is 66 million dollars higher when compared to selected Alternative C.

This difference in PNV is due to the low recreation budget in Alternative A/NFMA, while recreation use and, therefore, benefits remain high. The low recreation budget, as compared to the selected alternative, will adversely affect the quality of the recreation experience for visitors to the Forest. This results in substantial reductions to net public benefits. It would also run counter to public comments which called for an increased emphasis on the recreation program.

Alternative A/NFMA has the fewest acres allocated to the management of key big-game habitat. Alternative A/NFMA has 17,151 acres allocated to key deer and elk range compared to 118,742 acres for the selected alternative. The public comments received on the DEIS stressed the importance of wildlife in the management of the Wenatchee.

Compared to the selected alternative, A/NFMA has fewer acres allocated to roadless management. In A/NFMA, 55 percent of the roadless areas will be roaded compared to 46 percent for the selected. Again, there were many public comments calling for protection of roadless areas.

Alternative A/NFMA lacked three management prescriptions that were included in the selected alternative. These were an Unroaded/Wildlife prescription, a special management prescription for the Mather Memorial Parkway, and an unroaded harvest prescription. The Unroaded/Wildlife prescription has been developed in response to public comments of having some wildlife areas remain unroaded. The Mather Memorial prescription recognizes the unique and special characteristics of the Mather Memorial Parkway. The unroaded harvest prescription protects the roadless character of an area while allowing some timber harvest.

Alternative C produces more wildlife habitat, a higher quality recreation experience, provides more roadless lands, and recognizes the unique character of areas like the Mather Memorial

Parkway. For these reasons, I think that Alternative C provides a more balanced resource program for the Wenatchee National Forest than Alternative A/NFMA, resulting in higher net public benefits.

Alternative D

Alternative D has the second highest present net value of all the alternatives at 1,937 million dollars. This is 27 million dollars more than selected Alternative C. This is due to the high acreage allocated to timber management coupled with the maximization of present net value. This alternative emphasizes the production of resources such as timber, range, forage, developed recreation, minerals, and other resources which have the potential to return revenue to the Federal Treasury and local counties.

Alternative D has the second fewest acres allocated to roadless management of the alternatives. Fully 59 percent of the roadless areas will be roaded compared to 46 percent for the selected alternative. Alternative D has 77,784 acres allocated to key deer and elk habitat compared to 118,742 acres for the selected alternative. In addition, the selected alternative provides for more old growth protection than Alternative D.

Alternative D results in about 33 percent of the Forest appearing in a modified visual environment over the 50-year planning horizon. This compares with about 20 percent for the selected alternative. Visual quality is a non-quantifiable public benefit that contributes significantly to net public benefits.

Alternative D does not have any rivers recommended for inclusion into the Wild and Scenic River System while the selected alternative recommends nine rivers for inclusion.

The selected alternative provides more wildlife habitat, more old growth, more roadless areas, a more natural appearing visual environment, and more key big-game habitat. It is for these reasons that I think that Alternative C provides higher net public benefits than Alternative D.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

Alternative E is the environmentally preferable alternative. The other alternatives that are environmentally preferable to C are F and G. These alternatives emphasize aesthetic values, fish and wildlife, roadless areas, and dispersed and unroaded recreation. Alternatives E and F emphasize unroaded non-motorized while Alternative G emphasizes unroaded motorized recreation.

I did not select Alternatives E, F, or G as they fail to fully recognize the demands imposed by local communities and the economic realities of our society. Another way of expressing this is that these alternatives do not provide an equitable balance between environmental considerations and economic realities.

For Alternatives E, F, and G, the associated change in employment compared to the 1982 base period is -520, -473, and -225 jobs respectively. The associated change in first decade income is -14.56, -13.30, and -6.54 million dollars respectively. These compare with a net change of +203 jobs and an increase of +5.14 million dollars for the selected alternative.

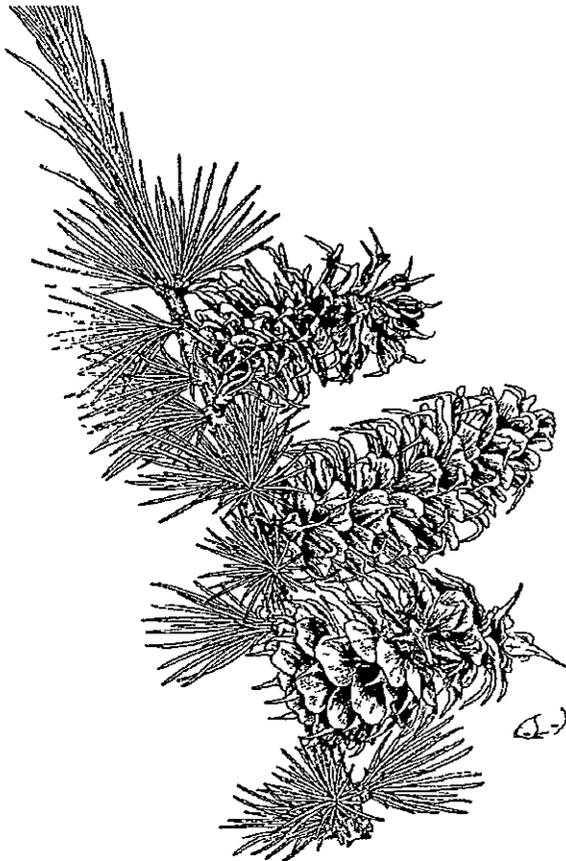
I believe that this reduction in jobs and local income is too high a cost for society in relation to the benefits of these alternatives. While the output of commodity resources from Alternative C is greater than the "environmentally preferable" alternatives, the specificity and detail in allocations, and subsequent mitigation through application of standards and guidelines, assures a high level of environmental protection and retention of future options.

In my judgment, Alternative C provides appropriate environmental safeguards at minimum direct economic cost. This alternative incorporates the perspective that the Forest Service is the trustee of the environment for succeeding generations. Alternative C provides for the proper and continued development of resources in a manner that maintains economic stability, and it retains local natural heritages, such as wildlife habitat, outdoor recreation opportunities, water quality, scenic quality, and open range. The selected alternative strikes the delicate balance between competing demands, which is required by law.

COMPATIBILITY WITH OTHER AGENCY GOALS AND PLANS

The goals of other Government agencies, which could be affected by management direction for the Wenatchee National Forest were considered early in the planning process and used to develop alternatives in the DEIS and FEIS. These agencies expressed their views during the comment period on how well the draft plan met their objectives. (See FEIS, Appendix K for a list of public agencies comments on the DEIS and Proposed Plan; and Appendix A for a list of agencies contacted early in the planning process.)

Alternative C has been carefully coordinated with goals and objectives of the State of Washington and their agencies, the Yakima Indian Nation, the Bureau of Land Management, and the Fish and Wildlife Service. There appear to be no major conflicts between implementation of this Plan and the goals and plans of other agencies. The U.S. Fish and Wildlife Service has proposed listing the northern spotted owl as threatened and is drafting a conservation strategy. Results of this listing process and subsequent changes to the Regional Guide, if any, will be used to make appropriate adjustments to the Plan.



ALTERNATIVE SELECTION

I select Alternative C because, in my judgment, it best maximizes net public benefits. Due to the controversial nature of the decisions, I am sharing with you, the reader, the factors I considered. I examined the possible alternatives and their associated environmental effects. I studied the public comment, including how well agencies felt the preferred alternative of the draft EIS met their plans. I compared the selected alternative to the "environmentally preferred alternatives" and to alternatives with higher present net values.

I believe that Alternative C reflects concern for the landscape and resource diversity of the Forest while providing for the social and economic needs of local and more distant communities. In my judgment, Alternative C provides appropriate environmental safeguards at an acceptable cost to society. All practicable means to avoid or minimize environmental harm from the selected alternative C have been adopted. This alternative provides for the needs of our society and conserves our natural resources for future generations.

IV. IMPLEMENTATION

SCHEDULES

The Forest Plan will be implemented through identification, selection, and scheduling of projects to meet the management goals and objectives provided by the Plan (see Plan Appendix A).

The schedule of proposed and possible projects for the first decade is contained in the appendices of the Forest Plan. Project schedules will be available for review at the Ranger District Offices and Supervisor's Office. Schedules of possible projects will routinely change as projects are implemented or are removed from the listings for other reasons and as new projects take their place. Adjustments to the schedule may be made based on results of monitoring, budgets, and unforeseen events.

The Forest Plan provides direction in the form of goals and objectives, standards and guidelines, monitoring requirements, and probable scheduling of management practices. It does not cover projects on specific sites except in a broad manner. Each proposed project will be subject to site-specific analysis and documentation in compliance with NEPA. Considerations revealed through this process may result in a decision not to proceed with the proposed project, even though the project may be permissible under the Forest Plan.

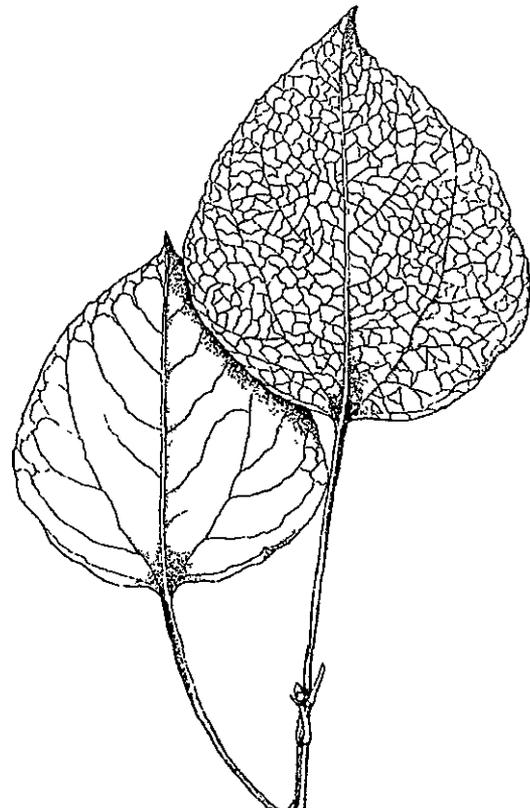
The Plan's scheduled projects are translated into multi-year program budget proposals. The schedule is used for requesting and allocating the funds needed to carry out the planned management direction. Upon approval of a final budget for the Forest, the annual work program will be updated and carried out.

The Forest work program will implement the management direction of the Forest Plan. Outputs and activities in individual years may be significantly different from those shown in Chapter IV of the Forest Plan, depending on final budgets, new information derived from updated inventories and monitoring, and any future amendments or revisions of the Forest Plan.

The Forest Plan supersedes or incorporates all previous land and resource management plans prepared for the Wenatchee National Forest. Upon implementation of the Plan, management activities will be made to comply with it. Appropriations or budgets may alter the schedule of activities. In addition, all permits, contracts, and other instruments for the use and occupancy of National Forest system lands and resource uses must be in conformance with the Forest Plan. Such documents will be revised where needed as soon as practicable, subject to valid existing rights. This updating will generally be done within three years.

All timber sales offered for sale after issuance of the Forest Plan will be in compliance with direction contained in the Plan. Timber sales now under contract will be administered under provisions of the existing contracts. Changes to existing timber sale contracts may be proposed on a case-by-case basis where overriding resource considerations are present.

The Forest Plan will be implemented 30 days after the Notice of Availability of the Forest Plan, EIS, and Record of Decision appears in the Federal Register.



AMENDMENT AND REVISION PROCESS

This Forest Plan may be changed either by an amendment or a revision. Such changes may come about as a result of the monitoring process or project analysis (see Forest Plan Chapter V). An amendment may become necessary as a result of different situations. They could include, for example:

Recommendations of the Interdisciplinary Team based on their review of monitoring results.

The determination that an existing or proposed permit, contract, cooperative agreement, or other instrument authorizing occupancy and use is not consistent with the Forest Plan, but should be approved, based on project level analysis.

Adjustment of management area boundaries or prescriptions.

Changes in proposed implementation schedules.

Changes necessitated by resolution of administrative appeals.

Changes needed to improve monitoring plans or information and assumptions used in the Plan.

Changes to correct minor errors or omissions, including clarification of text and tables.

Changes made necessary by altered physical, biological, social, or economic conditions.

Based on an analysis of the objectives, guidelines, and other aspects of the Forest Plan, the Forest Supervisor shall determine whether a proposed amendment would result in a significant change to the Plan. If the change is determined to be significant, the Forest Supervisor shall follow the same procedure as that required for development and approval of a plan. If the change is determined not to be significant, the Forest Supervisor

may implement the amendment after appropriate public notice and compliance with NEPA. The procedure is described by 36 CFR 219.10(e) and (f), 36 CFR 219.12(k), FSM 1922.51-52 and FSH 1909.12.

As Regional Forester, I will approve significant amendments and the Forest Supervisor "non-significant" amendments. The determination of significance must be documented in a decision notice and would be appealable under 36 CFR 217. A mailing list will be maintained to provide notification and invitation to comment on proposed amendments.

The amendment documentation will include as a minimum.

A statement of why the Forest Plan is being amended (some possible reasons are mentioned above).

The actual amendment showing exactly how it will look.

Rationale for the amendment.

A statement of significance related to FSM 1922.51. (This is the NFMA significance and relates to changes to the Forest Plan)

A statement regarding NEPA compliance (40 CFR 1500-1508, FSM 1950, and FSH 1909 15) regarding effects on the environment and how the effects disclosed in the Plan EIS may change as a result of the amendment

A statement of the appeal rights.

The NFMA requires revision of the Forest Plan at least every 15 years. However, it may be revised sooner if physical conditions or demands on the land and resources have changed sufficiently to affect overall goals or uses for the entire Forest. If a revision becomes necessary, the procedures described in 36 CFR 219.12 will be followed. The Chief must approve the scheduling of such a revision.

I believe the selected alternative maximizes net public benefits. The harvest level associated with the selected alternative represents our best interpretation of the current data. However, technical questions regarding yield tables and suitability continue to be raised. These concerns will be addressed as part of the normal plan implementation process. The Forest Plan is dynamic; as new information and technology is developed, whether through plan monitoring, new inventories or from efforts outside the Forest Service, appropriate changes will be made.

Some of the primary commentators have raised technical issues which they feel have not been resolved to their satisfaction. We will continue to analyze these issues, and if justified, will make appropriate changes during implementation. Accordingly, the Forest is conducting resource inventories that will produce new, detailed information to assist in these analyses. For example, we are continuing our cooperative soil survey program with the Soil Conservation Service and have implemented an accelerated stream survey program. We have also begun a coordinated timber resource inventory. This inventory will produce information that will increase our timber stratifications from the two current ones (see FEIS, Appendix B) to six or seven, allowing us to refine our tables and to locate specific species groups on the ground. To improve our working relationship with the interested public, we have invited them to become involved in this process. The data collection will be completed within three years and the detailed analysis will take approximately two more years.

The results of the new inventories and analyses will then be used to make any necessary adjustments to the Plan. Should intended outputs change significantly due to the new data, I will reconsider certain aspects of decisions I make in this Plan.

MONITORING AND EVALUATION

The Monitoring and Evaluation Program is the management control system for the Forest Plan. It will be used to provide information on the progress and results of implementation. One of the results of monitoring will be an assessment of the need for amending or revising the Plan. The monitoring and evaluation are discussed in more detail in Chapter V of the Plan.

Monitoring is intended to help keep the Forest Plan current and responsive to changes. Monitoring and evaluation each have a distinctly different purpose and scope. Monitoring consists of gathering data, observations, and information. During evaluation, the data and information are analyzed and interpreted. This process provides the information necessary to determine if conditions are within the bounds and intent of the Plan direction. Forest Plan monitoring does not replace or substitute for other Forest monitoring activities. Many activities are currently being monitored on the Forest to comply with administrative and legal responsibilities. (FSM - Admin Review Procedures).

Monitoring and evaluation will provide information to:

1. Compare planned versus applied management standards and guidelines to determine if objectives are achieved (36 CFR 219.12(k)).
2. Quantitatively compare planned versus actual outputs and services (36 CFR 219.12(k)(1)).
3. Measure effects of prescriptions, including significant changes in land productivity (36 CFR 219.12(k)(2)).
4. Determine planned costs versus actual costs associated with carrying out prescriptions (36 CFR 219.12(k)(3)).
5. Determine population trends of the management indicator species and relationship to habitat changes (36 CFR 219.19(a)(6)).
6. Evaluate effects of National Forest management on adjacent land, resources, and communities (36 CFR 219.7(f)).

7. Identify research needs to support or improve National Forest management (36 CFR 219.28)
8. Determine if lands are adequately restocked (36 CFR 219.12(k)(5)(i)).
9. Determine, at least every ten years, if lands identified as unsuitable for timber production have become suitable (36 CFR 219.12(k)(5)(ii)).
10. Determine whether maximum size limits for harvest areas should be continued (36 CFR 219.12(k)(5)(iii)).
11. Ensure that destructive insects and disease organisms do not increase to potentially damaging levels following management activities (36 CFR 219.12(k)(5)(iv)).

Results of the evaluation will lead to decisions of the following types:

1. Continue practice, no change necessary.
2. Refer the problem to the appropriate Forest officer for corrective action.
3. Modify the management practice through Plan amendments.
4. Modify land designation through Plan amendments.
5. Revise output schedules.
6. Revise unit output costs.
7. Revise the Plan.

MITIGATION

Mitigation is the key to sound land management. Mitigation measures are intended to minimize or eliminate potential conflicts or adverse effects of implementation. Mitigation measures have been developed through interdisciplinary efforts and incorporated into the Plans at different levels in several different ways:

1. The standards and guidelines and management area prescriptions in Chapter IV of the Plan are a fundamental and integral part of these measures, and as such they are a basic and essential part of the Plan.
2. The allocations play an important role in mitigation by the separation of incompatible uses, impacts, and conflicts
3. National Forest Management Act (NFMA) requirements were incorporated into the planning process and are reflected in the allocations and standards and guidelines.
4. "General Water Quality Best Management Practices" (USDA Forest Service, Pacific Northwest Region, November 1988) are incorporated by reference under requirements of Section 319 of the Clean Water Act
5. Mitigation measures are developed at the site specific project level of planning, and projects are "tiered" to other planning level measures above

All practical mitigation measures have been adopted and are included in the Forest Plan.

V. APPEAL RIGHTS

This decision may be appealed in accordance with the provisions of 36 CFR 217 by filing a written notice of appeal within 90 days of the date of this decision.

The appeal must be filed with the Reviewing Officer:

**F. Dale Robertson, Chief
USDA Forest Service
P.O. Box 96090
Washington, D.C. 20090-6090**

A copy must be sent simultaneously to the Deciding Officer:

**John F. Butrulle
Pacific Northwest Region
USDA Forest Service
319 S.W. Pine
P.O. Box 3623
Portland, OR 97208-3623**

The notice of appeal must include sufficient narrative evidence and argument to show why this decision should be changed or reversed (36 CFR 217.9).

Requests to stay the approval of this Land and Resource Management Plan shall not be granted (36 CFR 217.10(a)).

For a period not to exceed 20 days following the filing of a first level notice of appeal, the Reviewing Officer shall accept requests to intervene in the appeal from any interested or potentially affected person or organization (36 CFR 217.14(a)).

Decisions on site-specific projects are not made in this document.

The schedule of proposed and probable projects for the first decade is included in the appendices to the Plan. Final decisions on these proposed projects will be made after site-specific analysis and documentation in compliance with NEPA.

I encourage anyone concerned about the Plan or environmental impact statement to contact Sonny J. O'Neal, Forest Supervisor, in Wenatchee, Washington, phone number (509) 662-4335, before submitting an appeal. It may be possible to resolve the concern or misunderstanding in a less formal manner, but the 90 day appeal period will continue to run.



MAR 2 1990

JOHN F. BUTRUILLE

Date

Regional Forester-USDA Forest Service
Pacific Northwest Region
USDA Forest Service

