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Forest Service

Pueblo, Colorado

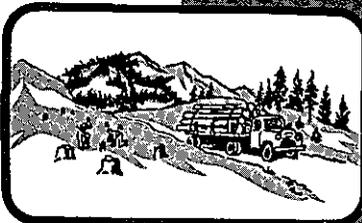


FINAL ENVIRONMENTAL IMPACT STATEMENT

Arthur S. Briggs

Pike and San Isabel National Forests; Comanche and Cimarron National Grasslands

Volume I Chapters I- VII



FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE
PIKE AND SAN ISABEL NATIONAL FORESTS
LAND AND RESOURCE MANAGEMENT PLAN

SUMMARY

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FOR THE
PIKE & SAN ISABEL NATIONAL FORESTS
LAND & RESOURCE MANAGEMENT PLAN
02-12-82-01

Alamosa, Baca, Chaffee, Clear Creek, Custer, Douglas, El Paso,
Fremont, Huerfano, Jefferson, Lake, Las Animas, Otero, Park,
Pueblo, Saguache, and Teller Counties, Colorado Morton and
Stevens Counties, Kansas

Type of Action: Administrative
Lead Agency: USDA Forest Service
Cooperating Agency: Canon City District Office
Bureau of Land Management
U.S. Department of Interior
Responsible Official: James F. Torrence, Regional Forester
Rocky Mountain Region
USDA Forest Service
11177 West 8th Avenue
Lakewood, Colorado 80225

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Abstract: The five alternatives considered in the development of the Land and Resource Management Plan for the Pike and San Isabel National Forests and Cimarron and Comanche National Grasslands are described and evaluated. The Pike and San Isabel National Forests Administrative Unit contains 2,751,736 acres of National Forest System land and includes the Pike National Forest, San Isabel National Forest, Comanche National Grassland, and the Cimarron National Grassland and the Fountain Creek Land Utilization Project. The Unit is located in central and southeastern Colorado, and southwestern Kansas. In addition to the Pike and San Isabel National Forests, this document also displays management alternatives and makes oil and gas leasing availability recommendations for portions of the Rio Grande and Arapaho National Forests related to the Sangre de Cristo Wilderness Study Area and Mt. Evans Wilderness, respectively. It also displays wilderness suitability determinations for the Sangre de Cristo, Greenhorn Mountain, Buffalo Peaks, and Spanish Peaks Wilderness Study Areas, and the Lost Creek Further Planning Area. The alternatives are: Alternative A: emphasizing income producing goods and services, provides strong consideration to the need for wilderness, wildlife habitat improvement, and recreation opportunities in coordination with timber, range, water and minerals management in a multiple use framework; Alternative B: continuation of current management, modified by the minimum requirements of the National Forest Management Act (No Action); Alternative C: emphasis on attaining the 1980 Resource Planning Act outputs and targets assigned to the Forest by the Rocky Mountain Regional Guide; Alternative D: emphasis on the production of timber, range, and mineral outputs in coordination with water management, wildlife habitat improvement, and recreation management in a multiple use framework; and Alternative E: emphasis on the production of timber, range, and mineral outputs in coordination with water management, wildlife habitat improvement, and recreation management in a multiple use framework at a reduced budget level.

Alternative A is the Forest Service Proposed Action and the Forest Plan. The Forest Plan will guide management of the Pike and San Isabel National Forests and Cimarron and Comanche National Grasslands for the next 50 years; it will be updated at least every fifteen years.

Date the Draft Environmental Impact Statement was made available to EPA and the Public.
September 2, 1982.

Date the Final Environmental Impact Statement was made available:

007 1 8 1984

SUMMARY OF THE FINAL ENVIRONMENTAL IMPACT STATEMENT

INTRODUCTION

This Final Environmental Impact Statement (FEIS) discloses the environmental consequences of implementing the Proposed Action and the alternatives to it. The Proposed Action and the alternatives to it were developed in preparation of a proposed Land and Resource Management Plan (Forest Plan) for the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands. The Record of Decision attached to this Final EIS discloses the rationale for the decision which approves the Pike and San Isabel National Forests' Plan.

The Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands are located in central and southeastern Colorado, and southwestern Kansas. (Figure S1) The Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands Administrative Unit contains 2,751,736 acres of National Forest System land, and includes 1,107,946 acres of the Pike National Forest; 1,116,743 acres of the San Isabel National Forest; 418,870 acres of the Comanche National Grassland; and 108,177 acres of the Cimarron National Grassland. Collectively, the Administrative Unit is referred to as "the Forest".

PURPOSE AND NEED

The Forest Plan is required by the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended by the National Forest Management Act (NFMA) of 1976. Assessment of the environmental consequences of the alternatives considered in the development of the Forest Plan is done in conformance with the National Environmental Policy Act (NEPA) of 1969, Council on Environmental Quality (CEQ) regulations, and implementing regulations of NFMA.

The purpose of the Plan is to address local, regional and national issues related to National Forest and National Grassland management; to define a mix of management activities that will promote the sustained use and protection of Forest resources; guides development of multi-year implementation programs for the Supervisor's Office and Ranger Districts; and provides direction to the Supervisor's Office and Ranger Districts for identifying activities and expenditures to achieve on-the-ground results. The Plan addresses conflicting desires and wants between Forest user groups. There is a need to resolve these conflicts, and to update and display information in one Plan that integrates management direction for all Forest resources. The Plan provides a management program reflecting a mix of management activities to achieve a healthy vigorous forest environment.

National, Regional, and Forest planning is an integrated three-level process. At the lower level, the process produces a Forest Plan which guides management of the Forest's lands and resources over a 50-year period. The Regional Guide determines target outputs of goods and services from all the Forests in the Region. At the highest level, the RPA Program set by the Congress, provides guidance for the National Forest System. The Forest Plan will be reviewed, and updated if necessary, at least every five years and will be completely revised at least every fifteen years.

The scope of the issues and concerns to be addressed in the Forest Plan and EIS was identified from comments solicited through public meetings, individual and group contacts and Forest Service staff. The comments were analyzed and summarized into planning questions.

The planning questions are an integral part of the planning process. They are linked to the development and evaluation of the alternatives. They are addressed differently by the proposed plan and the alternatives to it. The planning questions also provide a framework for considering the environmental consequences of implementing the preferred alternative and the other alternatives. The resolution of planning questions by alternative is displayed in Table S-1 of this summary document.

The key element for achieving the goals and objectives of this Plan is a healthy Forest. The Plan and Final EIS discuss numerous needs and rationales for using vegetation treatment as one of the most practical and efficient methods of achieving many goals and objectives. Vegetation treatment is a management technique in administering the multiple-use resources of the National Forest to attain the overall goal of a healthy, vigorous forest. Vegetation treatment is accomplished to increase land productivity and is guided by the Management Requirements of the Plan in all alternatives.

When vast acreages of forest cover are uniformly mature, wildlife diversity is also limited to species dependent on mature forests. Burning, cutting, or other vegetation treatment activities will increase vegetation diversity which will provide wildlife habitat diversity. Treatment also reduces the amounts of unwanted fuels. Mature and overmature forests are more susceptible to epidemic insect attack. The attack can spread over large areas creating undesirable effects similar to large burns or clearcuts. If age, size class, and species diversity is enhanced the risk of wide spread epidemic is reduced. Water yield increases also depend on forest resource management. Other outputs and effects as diverse as maintaining visual quality and firewood availability are closely related to the amount of vegetation treated.

Vegetation treatment can require road construction. Roads take land out of production and impact the soil and water resources. However, Management Requirements in the Plan, Chapter III, ensure impacts are short-term in all alternatives. An environmental analysis occurs before road construction. Considerations are given to the physical and biological land characteristics as well as the goals of the management area in determining how and where to construct the road. These characteristics include slope, soil

erodibility, vegetation cover, wildlife and fisheries protection, stream proximity and visual resource protection. Road use by people, rather than the actual road itself, causes greater impacts on the environment and on other resource uses and activities.

Effective travel management provides resource protection and a safe, environmentally sound, and efficient transportation system. Travel management directs use of existing and future roads in all alternatives. In some areas, no roads will be built. In others, roads will be built, but their use will be restricted. In other instances, roads will be open to public use. As an example, road construction can open up a previously unroaded area. Road use in this area can impact wildlife seclusion and semiprimitive nonmotorized recreation opportunities. Travel management may restrict or close roads leading to, or in, the area based on the goals of the management areas through which the road passes. This road closure or restriction can restore wildlife seclusion, continue semiprimitive nonmotorized recreation opportunities but with improved nonmotorized access to the area, improve access for other resource activities, prevent unacceptable resource damage and reduce maintenance costs.

Public understanding of management area and travel management goals is necessary for public acceptance of the area and road closures or restrictions. Additional discussion of travel management is displayed in Chapter III under the "Facilities" section.

The Colorado Wilderness Act, Public Law 96-560 of December 22, 1980, directed the Secretary of Agriculture to review and within three years after the date of enactment, to report to the President and Congress his recommendations on the suitability or unsuitability of the Buffalo Peaks, Spanish Peaks, Greenhorn Mountain and Sangre de Cristo Wilderness Study Areas and the Lost Creek Further Planning Area in Colorado. These studies are being completed as part of the Land Management Planning process. Recommendations on suitability and unsuitability for inclusion in the National Wilderness Preservation System are disclosed in this Final Environmental Impact Statement.

In addition, this Final EIS establishes criteria for case by case use in recommending oil and gas leasing availability for Pike and San Isabel National Forests lands, 130,700 acres of the Rio Grande National Forest (Sangre de Cristo Wilderness Study Area). Since December 31, 1983, wilderness areas were withdrawn from mineral entry and leasing except where valid mineral rights existed prior to January 1, 1984. Lands not recommended for wilderness designation will be managed as other non-classified lands. It also discloses recommendations on suitability for wilderness designation of 4,910 acres of U.S. Department of the Interior, Bureau of Land Management lands. These lands are contiguous to the Sangre de Cristo Wilderness Study Area and consist of the Black Canyon, South Piney Creek, Papa Keal and Zapata Creek Wilderness Study Areas.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes and compares the range of alternatives analyzed in the Forest planning process, including the Proposed Action. NFMA regu-

lations include criteria to guide alternative development. Five alternatives, including the Proposed Action, are considered in detail. Each alternative meets NFMA feasibility requirements. They are economically, technically, budgetarily, and environmentally feasible and reasonable. Each alternative addresses a set of planning questions differently. Each alternative contains different goals and objectives, resource outputs, activities, costs, and benefits.

Two alternatives were eliminated from detailed study. These were an alternative departing from the Base Timber Sale Schedule and an unconstrained minerals leasing alternative.

ALTERNATIVE A (Proposed Action)

This alternative emphasizes income producing goods and services, gives strong consideration to the need for wilderness and provides a high level of noncommodity outputs. Wildlife and fish habitat would be improved, water yield would increase, and recreation opportunities would be improved if this alternative is implemented. In addition, high levels of commodity outputs such as wood fiber and livestock production would result, primarily because of using vegetation treatment as a tool to increase water yield, improve wildlife habitat, and treat insect and disease problems. This alternative recommends wilderness suitability for 187,169 acres of the Sangre de Cristo Wilderness Study Area (61,657 acres of the San Isabel and 125,512 acres of the Rio Grande National Forest), 36,060 acres of the Buffalo Peaks Wilderness Study Area, and 22,300 acres of the Greenhorn Mountain Wilderness Study Area for a total of 245,529 acres for inclusion in the National Wilderness Preservation System. It also includes 71,291 acres of Wilderness Study Areas recommended unsuitable for wilderness. Unsuitable areas include Buffalo Peaks (20,890 acres), Spanish Peaks (19,570 acres), and 30,831 acres of the Sangre de Cristo Wilderness Study Area. The Lost Creek Further Planning Area (20,723 acres) is recommended as unsuitable for wilderness.

ALTERNATIVE B (Current Program - No Action)

This alternative continues current management direction using goals and objectives from existing plans. This is the required "no action" alternative that provides a basis for comparison with other alternatives. Moderate levels of commodity and noncommodity outputs would result from the implementation of this alternative. This alternative recommends wilderness suitability for 216,700 acres of the Sangre de Cristo Wilderness Study Area (86,000 acres on the San Isabel and 130,700 acres on the Rio Grande National Forest). Slight boundary adjustments are proposed from the original study area boundary to eliminate conflicts with other uses, specifically private land inholdings and motorized recreation uses on the San Isabel National Forest. These adjustments total 1,300 acres. It also includes 98,820 acres of Wilderness Study Areas recommended unsuitable for wilderness. Unsuitable areas include: Buffalo Peaks (56,950 acres), Spanish Peaks (19,570 acres), and Greenhorn Mountain (22,300 acres). The Lost Creek Further Planning Area (20,723 acres) is recommended as not suitable for wilderness.

ALTERNATIVE C (1980 RPA Program)

This alternative attempts to meet the Regional goals described in the Rocky Mountain Regional Guide and the Forests' portion of the 1980 Resources Planning Act (RPA) program targets. This emphasis would be achieved by managing all resources for a moderate-high level of outputs. This alternative recommends wilderness suitability for 316,820 acres of the Buffalo Peaks, Spanish Peaks, Greenhorn Mountain, and Sangre de Cristo Wilderness Study Areas. All of the Lost Creek Further Planning Area (20,723 acres) is recommended as suitable for wilderness.

ALTERNATIVE D (Market Opportunities)

This output alternative emphasizes market opportunities and values and would provide a high level of commodity outputs. Noncommodity outputs would be produced at an acceptable level. Current management direction could be followed for recreation, wildlife and watershed management. Wood products, livestock production and minerals development would be emphasized. In this alternative, none of the Wilderness Study Areas or Further Planning Area are recommended as suitable for wilderness.

ALTERNATIVE E (Reduced Budget)

This alternative emphasizes market opportunities and values and would provide for a moderate-high level of commodity outputs within constrained budget limitations. Noncommodity outputs would be produced at an acceptable, but reduced, level. Wood products, livestock production and mineral development would be emphasized. In this alternative, none of the Wilderness Study Areas or Further Planning Area are recommended suitable for wilderness.

AFFECTED ENVIRONMENT

The affected environment is examined in terms of resource elements, such as minerals, water, range, timber, wildlife and fish habitat, wilderness, recreation and human and community development and in terms of support activities such as fire protection, insect and disease control, air quality, transportation, and the management of lands and soils. Chapter III examines current use, management, and use trends for each resource. Brief descriptions of the Forests' resources follow.

SOCIAL AND ECONOMIC SETTING

The area of direct social influence lies in parts of eighteen counties, sixteen in Colorado and two in Kansas. All the acreage in Kansas is National Grassland; 418,870 acres of the Colorado portion are National Grassland and 2,224,689 are National Forest.

The Forest and rangelands, and associated water areas, are important sources of basic raw materials for local, regional, and national economies. This land base also plays a vital role in the social and cultural life of the populations in or near the planning area. In addition to supplying materials such as timber, minerals, and forage for domestic livestock, the lands also provide wilderness, a wide range of recreational activities, water, wildlife, and fish.

RESOURCE ELEMENTS

RECREATION

Recreation use on the Pike and San Isabel National Forests is an estimated 4.6 million visitor days. Use is expected to increase because of expanding populations of the Front Range cities of Denver, Colorado Springs, Pueblo, and numerous smaller communities. Recreation facilities are filled to capacity and overflow on weekends and holidays during the summer season. Dispersed recreation use has expanded to an all season resource with an increase in winter camping and cross-country skiing.

WILDERNESS

Prior to the Colorado Wilderness Act (P.L. 96-560) there were no wildernesses on the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands. The Colorado Wilderness Act (P.L. 96-560) established five wildernesses with 257,420 acres on the Pike and San Isabel National Forests. Use figures are not yet established for these new areas, however, annual use is estimated at one visitor day per acre. Use levels are expected to increase significantly with demand exceeding supply by the year 2005.

The Colorado Wilderness Act also established four Wilderness Study Areas and left a portion of Lost Creek Further Planning Area to be administratively evaluated for wilderness suitability. The study areas are Buffalo Peaks, Greenhorn Mountain, Spanish Peaks, and Sangre de Cristo. These areas total 237,543 acres.

WILDLIFE AND FISH

The Forests' broad elevation range with its extremes of climate and vegetation produces a wide range of wildlife habitat. Management programs are directed toward improving habitat conditions for deer and elk, and increasing habitat diversity. Rivers and streams on the Forest are generally small. Small, shallow lakes occur at high elevations. Approximately 1200 miles of streams and rivers have been identified as potential fish habitat, and habitat improvements is done on several streams each year. Demand for fish and wildlife resources is expected to increase.

RANGE

The Forest has 1.3 million acres of rangeland providing over 200,000 animal unit months (AUM) of livestock grazing annually. Grazing demand is expected to increase. Application of intensive grazing practices including improvements and water developments, will allow grazing use to increase to about 240,000 AUM's by the year 2030.

TIMBER

The Forest includes approximately one million acres of lands capable, available, and suitable for timber production. Historically, the Forest has not been a major timber producer having an average annual harvest of 6.63 MMBF (million board feet) from 1970 to 1979. Harvest levels (1981)

were approximately 23 MMBF, of which 11 MMBF was sawlogs and 12 MMBF was fuelwood. Recent trends indicate a continued increase in fuelwood consumption creating a strong market for fuelwood. Management is designed to meet local timber demands while achieving other resource objectives.

WATER

The Forest includes portions of the headwaters of both the Arkansas River and the South Platte River. Precipitation falling on the Forest supplies runoff and ground water recharge to areas within and outside the planning area. Surface runoff is estimated to be 1,277,000 acre-feet annually. All water originating within the Forest is in high demand by both local and downstream users. Sixteen local cities receive all or part of their municipal water supplies from National Forest watersheds. Water quality is generally good with most streams meeting or exceeding State water quality standards.

MINERALS

Mining activity occurs throughout the planning area. Major development and production activities include CF&I Monarch Limestone Quarry, the Climax mine near Leadville and precious metals operations in the Alma-Como area. The Leadville, Salida and South Park Ranger Districts are partially in the Colorado Mineral Belt. Mineral and oil, gas and geothermal leasing activities are expected to increase.

HUMAN AND COMMUNITY DEVELOPMENT

The Forest has participated in numerous human resource programs aimed at accomplishing resource activities while providing employment and training. In 1980, 324 persons participated in employment training and development programs.

SOCIAL AND ECONOMIC

The Forest contributes directly to the local economy and dependent local industries by providing resources to complement local economies.

ENVIRONMENTAL CONSEQUENCES

The following tables provide a comparison of environmental consequences between alternatives. Public issues identified during the planning process and management concerns related to Forest management were analyzed and summarized into fifteen Forest planning questions. Table S-1 provides a subjective look at planning question resolution by alternative over the next 50 years. Table S-2 displays a comparison of selected outputs between alternatives. Table S-3 provides a summary of significant effects by alternative.

Table S-1 COMPARISON OF ALTERNATIVES BY PLANNING QUESTIONS

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	
I WHAT SHOULD BE EMPHASIZED IN THE MANAGEMENT AND UTILIZATION OF THE RANGE RESOURCE AND HOW MUCH FORAGE SHOULD BE ALLOCATED TO LIVESTOCK USE ON THE PIKE AND SAN ISABEL NATIONAL FORESTS AND GRASSLANDS?	Livestock grazing (MAUM)	More lands will be managed under intensive grazing practices providing for a greater amount of structural improvements such as water development, range improvement treatments such as reseeding; prescribed burning and rangeland pitting, and grazing system applications such as deferred rotation. Current grazing use is 205 MAUM's	Livestock grazing outputs increase to 213 MAUM's.	Livestock grazing outputs increase to 208 MAUM's.	Livestock grazing outputs decrease to 203 MAUM's.	Livestock grazing outputs increase to 214 MAUM's.	Livestock grazing outputs decrease to 86 MAUM's
(MAUM = 1000 Animal Unit Months)							
II. HOW CAN THE PIKE AND SAN ISABEL NATIONAL FORESTS SUPPLY THE VARIETY OF TIMBER PRODUCTS DESIRED BY THE PUBLIC WHILE INSURING THAT TIMBER HARVEST ACTIVITIES ENHANCE OTHER RESOURCE VALUES?	Acres of vegetation treatment (annual) Volume of timber products (MMBF)*	Improving the stand age class distribution will create a healthier, more vigorous growing forest that will be less susceptible to insect and disease infestations while benefiting wildlife. Timber harvest practices are designed in the Plan's management requirements to increase water yield and improve wildlife habitat diversity, maintain visual quality and meet the predicted demands for wood fiber. Enhances wildlife diversity, addresses insect and disease problems, increases wildlife browse and water yields.	Increase result in water yield and treatment of insect and disease problems. Slight decrease in wildlife habitat diversity.	Enhances wildlife values. Moderate improvements of insect and disease problems and water yields.	Concentrates on most productive forest lands. Moderate increase in water yield.	Enhances resources values such as wildlife diversity, water yield and visual quality. This alternative would produce 11 MMBF of commercial sawtimber.	
		This alternative would produce 26 MMBF of commercial sawtimber.	This alternative would produce 29 MMBF of commercial sawtimber.	This alternative would produce 35 MMBF of commercial sawtimber.	This alternative would produce 67 MMBF of commercial sawtimber.	This alternative would produce 11 MMBF of commercial sawtimber.	

* Sales in this summary pertain to harvests from suitable forest lands only and are included in the Allowable Sale Quantity (ASQ). In addition to volumes shown above, an unspecified amount of wood from trees less than 7 inches in diameter, topwood less than 6 inches in diameter, and trees from catastrophic events such as wildfire and windthrows will be harvested but are not part of the ASQ. A small amount of wood will be harvested from unsuitable lands that are also not included in the ASQ. This additional amount is estimated to be approximately 30 percent of the figures shown above.

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Table S-1 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
Planning Question II continued						
		Long-term sustained yield potential would be 43 MMBF per year (reflects acres being managed for wood fiber production).	Long-term sustained yield potential would be 44 MMBF per year (reflects acres being managed for wood fiber production).	Long-term sustained yield potential would be 37 MMBF per year (reflects acres being managed for wood fiber production).	Long-term sustained yield potential would be 75 MMBF per year (reflects acres being managed for wood fiber production).	Long-term sustained yield potential would be 40 MMBF per year (reflects acres being managed for wood fiber production).
		Commercial vegetation treatment would occur on 10,240 acres.	Commercial vegetation treatment would occur on 11,930 acres.	Commercial vegetation treatment would occur on 8,200 acres.	Commercial vegetation treatment would occur on 15,550 acres.	Commercial vegetation treatment would occur on 3,380 acres.
		Timber stand improvement and reforestation would occur on 1,800 acres.	Timber stand improvement and reforestation would occur on 1,000 acres.	Timber stand improvement and reforestation would occur on 900 acres.	Timber stand improvement and reforestation would occur on 1,500 acres.	Timber stand improvement and reforestation would occur on 400 acres.
III. HOW SHOULD THE PIKE & SAN ISABEL NATIONAL FORESTS BE MANAGED TO RESPOND TO INCREASING DEMANDS FOR WATER YIELD, STORAGE, TRANSMISSION USES, HIGH QUALITY WATER AND PROTECTION OF THE SOIL RESOURCE?						
	Water yield	Modifying vegetation and snowpack conditions will result in changes in timing and yield of runoff. Structural snowpack controls (snowfences) and vegetation management (size, location and shape of harvest units) will increase runoff by reducing the amount of moisture lost to evaporation, transpiration and sublimation.				
	Water yield	Water yield increases are slight in all alternatives. Increased yields are primarily accomplished through commercial timber operations and represent a cost efficient response to vegetation treatment. All alternatives maintain water quality at acceptable levels and provide for special land use allocation for impoundments and transmission facilities.				
		Fifth decade average annual yield = 1277 M acre-feet.	Fifth decade average annual yield = 1277 M acre-feet.	Fifth decade average annual yield = 1278 M acre-feet.	Fifth decade average annual yield = 1279 M acre-feet.	Fifth decade average annual yield = 1277 M acre-feet.
	Soil & water improvement	Treats 1200 ac/yr for soil and water improvement.	Treats 575 ac/yr for soil and water improvement.	Treats 1000 ac/yr for soil and water improvement.	Treats 1000 ac/yr for soil and water improvement.	Treats 575 ac/yr for soil and water improvement.

Table S-1 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION)	(NO ACTION)	(RPA)		
		ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
IV HOW SHOULD WILDERNESS ON THE PIKE & SAN ISABEL NATIONAL FORESTS BE MANAGED TO MAINTAIN A HIGH QUALITY WILDERNESS RECREATION EXPERIENCE UNDER THE NATIONAL WILDERNESS PRESERVATION SYSTEM?	Acre allocation to provide wilderness experience	All wilderness will be managed in accordance with the Wilderness Act of 1964 with controls on visitor numbers and activities to retain maximum integrity of wilderness environments. Of the total area in existing and suitable wilderness, 70% is assigned to emphasize primitive wilderness experiences and 30% is assigned to emphasize semi-primitive wilderness experiences.	Of the total area in existing and suitable wilderness, 53% is assigned to emphasize primitive wilderness experiences and 47% is assigned to emphasize semi-primitive wilderness experiences	Of the total area in existing and suitable wilderness, 44% is assigned to emphasize primitive wilderness experiences and 56% is assigned to emphasize semi-primitive wilderness experiences.	Of the total area in existing and suitable wilderness, 38% is assigned to emphasize primitive wilderness experiences and 62% is assigned to emphasize semi-primitive wilderness experiences	Of the total area in existing and suitable wilderness, 7% is assigned to emphasize primitive wilderness experiences and 93% is assigned to emphasize semi-primitive wilderness experiences
IVa. SHOULD ADDITIONS TO THE NATIONAL WILDERNESS PRESERVATION OR WILD AND SCENIC RIVER SYSTEMS BE RECOMMENDED FOR CERTAIN DESIGNATED AREAS ON THE PIKE & SAN ISABEL NATIONAL FORESTS?	Eligibility of inventoried Wild and Scenic River candidates Suitability of Wilderness Study Areas Suitability of RARE II Further Planning Area	South Platte River-Yes Badger Creek-No Cimarron River-No Buffalo Peaks-Yes (36,060 ac) Spanish Peaks-No Greenhorn Mtn.-Yes, *Sangre de Cristo-Yes (187,169 ac) 1/ Lost Creek-No	South Platte River-Yes Badger Creek-No Cimarron River-No Buffalo Peaks-No Spanish Peaks-No Greenhorn Mtn - No, *Sangre de Cristo-Yes (216,700 ac) Lost Creek-No	South Platte River-Yes Badger Creek-No Cimarron River-No Buffalo Peaks-Yes Spanish Peaks-Yes Greenhorn Mtn - Yes; *Sangre de Cristo-Yes (216,700 ac) Lost Creek-Yes	South Platte River-Yes Badger Creek-No Cimarron River-No Buffalo Peaks-No Spanish Peaks-No Greenhorn Mtn - No; Sangre de Cristo-No Lost Creek-No	South Platte River-Yes Badger Creek-No Cimarron River-No Buffalo Peaks-No Spanish Peaks-No Greenhorn Mtn - No; Sangre de Cristo-No Lost Creek-No

Table S-1 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
1/ When a recommendation as to the suitability or unsuitability for wilderness is made for the Sangre de Cristo Wilderness Study Area, it also includes the same recommendation for the adjacent Black Canyon, South Piney Creek, Papa Keal and Zapata Creek contiguous Wilderness Study Areas administered by the Bureau of Land Management		<p>*Suitable with boundary adjustments as follows: Alternative A - 5,188 acre adjustment on Rio Grande NF and 25,643 acre adjustment on San Isabel NF Alternatives B and C - 1,300 acre adjustment on the San Isabel NF</p> <p>Wilderness Study Area suitability recommendations made in the Record of Decision in this planning effort will not take effect until Congress acts on them. These areas will be managed to protect their wilderness characteristics until such time as Congressional action takes place</p>				
V WHAT CAN BE DONE TO MAINTAIN OR IMPROVE WILDLIFE AND FISH POPULATIONS BY MANAGEMENT OF THEIR HABITATS AND HOW CAN RIPARIAN (WETLANDS) AREA MANAGEMENT BE EMPHASIZED ON THE PIKE AND SAN ISABEL NATIONAL FORESTS?	<p>Wildlife habitat improvement Acre/Year</p> <p>Structure/Year</p> <p>Fish habitat improvement Structure/Year</p> <p>Habitat Capability for Management Indicator Species (Rank)</p>	<p>7,400</p> <p>83</p> <p>60</p> <p>1</p>	<p>3,500</p> <p>50</p> <p>40</p> <p>3</p>	<p>6,500</p> <p>63</p> <p>54</p> <p>2</p>	<p>6,400</p> <p>50</p> <p>24</p> <p>5</p>	<p>800</p> <p>45</p> <p>10</p> <p>4</p>
		<p>Forest Management Requirements, Chapter III in the Forest Plan, provide direction for managing the habitat needs of wildlife and fish and management indicator species for all alternatives. Management Area Prescription 9A has been added since the DEIS was issued to emphasize riparian area management and provide protection for wetlands. Resource use and development will be designed and managed to protect and maintain riparian area values in all alternatives.</p>				

Table S-1 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
VI. HOW SHOULD THE PIKE AND SAN ISABEL NATIONAL FORESTS PROVIDE ACCESSIBILITY OF NATIONAL FOREST SYSTEM LANDS FOR MINERAL ACTIVITIES AND AT THE SAME TIME MINIMIZE THE ADVERSE IMPACTS OF MINING ACTIVITIES ON OTHER RESOURCES?		<p>National Forest System land is available for mineral exploration and development under all applicable laws and regulations in all alternatives. For leasable minerals, the BLM leases tracts of land for exploration and development by the mining industry. Saleable minerals are the only type of mineral commodity for which the Forest can directly affect the supply by selling materials to individuals and private industry. Management requirements for minerals in the Plan are based on statutory and regulatory direction for locatable, leaseable, and salable minerals. Management requirements in Chapter III of the Forest Plan provide surface resource protection and restoration requirements in all alternatives.</p> <p>Criteria have been established for making case-by-case availability recommendations for National Forest System lands for geophysical investigation, oil and gas leasing with surface occupancy, and oil and gas leasing without surface occupancy in this planning effort. Lands must be rehabilitated following activities associated with exploration and development. Specific mitigation direction, coordinated resource management requirements, and special stipulations are contained in the Forest Direction section of Chapter III and Appendix F in the Forest Plan.</p>				
VIIa. HOW CAN THE RESOURCE MANAGEMENT PROGRAMS & ADMINISTRATION ON THE PIKE & SAN ISABEL NATIONAL FORESTS BE IMPROVED THROUGH LAND EXCHANGE, LAND AND RIGHTS-OF-WAY ACQUISITION, AND LAND LINE LOCATION?	Property boundary location	50 miles/year	50 miles/year	Eliminates the backlog of land line location by 2030. 180 miles/year	50 miles/year	50 miles/year
	Land exchange	All alternatives provide for land exchange activities.				
	Land acquisition	Moderate level	Low level	Very high level	Moderate level	None
	Rights-of-way acquisition	High level	Low level	Moderate level	Moderate level	Low level
		Rights-of-way acquisition is directly related to the level of resource management activity in an alternative.				

Table S-1 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p>VIIb. HOW SHOULD THE NEED FOR UTILITY LINES, ELECTRONIC SITES AND OTHER TRANSMISSION FACILITIES BE INTEGRATED INTO THE ADMINISTRATION OF THE PIKE & SAN ISABEL NATIONAL FORESTS AND CAN THE PLAN ACCOMMODATE THE NEEDS OF FUTURE DEVELOPMENT?</p>		<p>The designation of new utility corridors will be studied on a case-by-case basis regardless of the alternative, but will be consistent with the plans and programs of other agencies. The Rocky Mountain Regional Guide establishes standards and guidelines to be used by the Forest in activities related to utility corridors. Expanding compatible uses in existing corridors is emphasized over new corridor development. The permitting and NEPA processes to be followed when authorizing use and occupancy are located in Forest Service Manuals. Management Area Prescription 1D provides for utility corridors in all alternatives. Management activities within these linear corridors strive to be compatible with the goals of the management area through which the corridors pass.</p> <p>Utility corridors have been identified on the Forest Plan map and on each of the Alternative Maps contained in the Final Environmental Impact Statement.</p>				
<p>VIIIa. WHAT IS THE ROLE OF THE PIKE & SAN ISABEL NATIONAL FORESTS AND THE CIMARRON AND COMANCHE NATIONAL GRASSLANDS IN MANAGING INSECTS AND DISEASES?</p>	<p>Acres of vegetation treated</p>	<p>Treats 10,240 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>	<p>Treats 11,930 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>	<p>Treats 8,200 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>	<p>Treats 15,550 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>	<p>Treats 3,380 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>

S-14

Table S-1 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
VIIIb. HOW SHOULD THE FOREST SERVICE CARRY OUT FIRE PROTECTION AND MANAGEMENT INCLUDING WHAT SUPPRESSION METHODS ARE APPROPRIATE WITHIN WILDERNESS?	Acres of fuel treatment	3,000	1,500	3,900	3,000	1,500
<p>Management requirements for fire planning and suppression and for escaped fire suppression are contained in the management direction section of the Forest Plan (Chapter III)</p> <p>All alternatives provide for the same level of fire protection based upon the 1980 Fire Management Budget Analysis. Acres planned for fuel treatment in each alternative are correlated with the amount of fuels generated as the result of vegetation treatment</p> <p>Wildfire within wilderness will be suppressed when adjacent private lands or other resource values on adjoining Forest land are threatened. Suppression methods can include motorized equipment when the need has been identified and the Forest Supervisor approves</p>						
IXa. WHAT RANGE AND QUANTITY OF DEVELOPED AND DISPERSED RECREATION OPPORTUNITIES AND ACTIVITIES SHOULD THE PIKE AND SAN ISABEL NATIONAL FORESTS PROVIDE?	Dispersed recreation use capacity (MMRVD)	Provides for 3.4 million Recreation Visitor Days (MMRVD's)	Provides for 3.2 million Recreation Visitor Days (MMRVD's)	Provides for 3.4 million Recreation Visitor Days (MMRVD's)	Provides for 3.2 million Recreation Visitor Days (MMRVD's)	Provides for 2.8 million Recreation Visitor Days (MMRVD's)
	Miles of trail construction/reconstruction	Provides for 20 miles of trail construction and reconstruction annually	Provides for 12 miles of trail construction and reconstruction annually.	Provides for 46 miles of trail construction and reconstruction annually.	Provides for 12 miles of trail construction and reconstruction annually	No trail construction or reconstruction would occur
	New trail-head construction	Six trailhead facilities would be constructed	Six trailhead facilities would be constructed.	Six trailhead facilities would be constructed.	Six trailhead facilities would be constructed.	No new trail-head facilities would be constructed
	Developed recreation use capacity (PAOT)	Alternatives A, B, C and D provide for a developed recreation capacity of 12,135 persons at one time (PAOT) in 136 camp and picnic grounds. Alternative E would provide 10,643 PAOT's in 108 camp and picnic grounds				

Table S-1 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
IXb HOW SHOULD CULTURAL RESOURCES OF THE PIKE & SAN ISABEL NATIONAL FORESTS BE MANAGED?	Cultural Resource Surveys	All alternatives provide for protection of cultural resources. Activities include working with State Historic Preservation Officers to evaluate identified cultural resources Representative samples of unique cultural resources may be interpreted for public benefit. Cultural resource surveys and inventories will be completed prior to scheduling on-the-ground resource management activities that have the potential for damaging or destroying unidentified sites. Properties which are included or are eligible for inclusion in the National Register of Historic Places will be protected and preserved				
		Management Area Prescriptions 10A and 10C provide for Research Natural Areas and Special Interest Areas in all alternatives.				
		Appropriate cultural resource surveys would provide the opportunity for recognition, preservation and development of cultural resources for public benefit				
Potential adverse effects	This alternative provides for 1,680 acres of cultural resource surveys.	This alternative provides for 1,000 acres of cultural resource surveys.	This alternative provides for 1,320 acres of cultural resource surveys	This alternative provides for 1,320 acres of cultural resource surveys	This alternative provides for 1,000 acres of cultural resource surveys	
	This alternative treats the greatest number of acres in timber and other resource activities and so has the greatest potential to disturb cultural resources. However, since intensive surveys are made prior to resource development activity it conversely provides the best opportunity to identify and protect cultural resources With a moderate increase in developed recreation, important sites are interpreted for public benefit. All significant sites are protected	Provides moderate level of acres treated in timber and other resources and in turn has moderate potential for disturbance Provision for developed recreation gives opportunity for a moderate level of interpretation. All significant sites are protected.	Provides moderate level of acres treated in timber and other resources with moderate potential for disturbance Opportunity for interpretation is moderate outside wilderness and very low inside. Protection is moderate outside wilderness and poor inside	Acres treated in various resources are high and have a high potential for disturbance of cultural resources. Opportunity to find and protect sites is good however. A moderate level of interpretation is provided	Treats the fewest acres in various resource activities, however at the same time it provides the least opportunity to identify or interpret sites With a reduced budget, the level of protection of sites is correspondingly lower	

Table S-1 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION)	(NO ACTION)	(RPA)		
		ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
X WHAT CONSIDERATIONS SHOULD BE MADE IN PROVIDING FACILITIES, INCLUDING TRANSPORTATION SYSTEMS FOR OFF-ROAD VEHICLES AND TRAILS FOR MOTORIZED USE TO MEET PUBLIC AND RESOURCE MANAGEMENT NEEDS ON THE PIKE AND SAN ISABEL NATIONAL FORESTS AND GRASSLANDS?	Road Construction/Reconstruction	Facilities are a support item directly related to the level of activity which they serve Roads are provided for harvest and treatment of timber and other resource management Trails provide opportunity for recreation activities Road standards vary depending on the size of the areas being accessed and the resource use served				
	-Arterial and collector (Miles)	15	5	19	5	0
	-Local (Miles)	17	20	14	26	6
	Trail construction/reconstruction (Miles)	20 0	12 0	46 0	12 0	0
		Motorized use is permitted over large areas of the Forest Management requirements in Chapter III of the Plan specify motorized use for off-road vehicles and where trails are open to these uses				
	Motorized use permitted (thousands of acres)	680	669	655	708	680
	Motorized use prohibited (thousands of acres)	638	604	725	519	519
	Motorized use may be either permitted or prohibited (thousands of acres)	1,433	1,478	1,371	1,524	1,552
	Trails-off-road vehicles use permitted (Miles)	688	688	678	688	688
	Trails-off-road vehicle use restricted	100	112	100	159	159
Trails-off-road vehicle use administratively closed	90	100	88	100	100	

Table S-1 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
XI WHAT KINDS OF HUMAN AND COMMUNITY DEVEL- OPMENT PROGRAMS AND ACTIVITIES ON THE PIKE & SAN ISABEL NATIONAL FORESTS WILL BENEFIT LOCAL COMMUNI- TIES AND PROVIDE COOPERATION WITH PRIVATE INDUSTRY AND STATE AND LOCAL GOVERNMENTS?		Resource management activities such as road and trail construction, timber sales, recreation site development and grazing use add to local economies by providing both jobs and goods and services. Specific human resource programs like the Youth Conservation Corps (YCC) and the Senior Citizen Employment Program, administered through the Department of Labor, provide jobs and benefit the local community. National Forest participation in these programs depends on the level of funding by the Department of Labor. No significant difference in enrollee years is expected between the alternatives budgeted for human resource programs except for Alternative E where no programs would be funded.				

TABLE S-2

Alternative Comparison (Average annual outputs - summary of all periods unless otherwise noted)

Activity	Unit of Measure	1983 Production	A	B	Alternatives C	D	E
VEGETATION							
Area Treated	Thousand Acres	6.9	17 7	20 0	11 2	16.3	5 2
RECREATION							
Developed Capacity (Excluding Downhill Skiing)	Thousand Visitor Days <u>1/</u>	1214	1928	1533	1928	1532	997
Developed Use Campgrounds and Picnic Areas Only	Thousand Visitor Days	595	1240	1018	1240	1018	600
Downhill Ski Areas	Thousand Visitor Days	147	762	762	764	762	387
Dispersed Use	Thousand Visitor Days	2450	4700	4400	4700	4400	3700
Off-Road Motorized Use <u>2/</u>	Thousand Visitor Days	103	202	184	202	184	146
Semiprimitive Nonmotorized & Primitive Area	Thousand Acres	688	743	716	826	605	633
Semiprimitive Motorized Area	Thousand Acres	550	495	523	413	605	578
Roaded Natural and Rural Area	Thousand Acres	1486	1486	1486	1486	1514	1514
VISUAL QUALITY OBJECTIVES							
Preservation, Retention, Partial Retention	Thousand Acres	2246	1144	1285	1283	1178	1221
Modification, Maximum Modification	Thousand Acres	506	1608	1467	1469	1574	1531
<u>1/</u> Recreation Visitor Day = 12 hours of recreation for one person or one hour of recreation for 12 persons or any combination thereof							
<u>2/</u> Off-road motorized use figures are also included in dispersed recreation, they are not additive							

TABLE S-2 Continued

Alternative Comparison (Average annual outputs - summary of all periods unless otherwise noted)

Activity	Unit of Measure	1983 Production	A	B	Alternatives C	D	E
WILDERNESS							
Wilderness Use <u>3/</u>	Thousand Visitor Days	242	706	669	825	387	387
Additional Wilderness	Thousand Acres	N/A	120	86	206	0	0
WILDLIFE AND FISH							
Improved Habitat	Thousand Acres	3 2	9 5	4 0	6 1	5 6	1 0
Big Game Winter Range Habitat	Thousand Deer	11.9	14 9	13 9	14.2	13.0	12 9
Capability	Thousand Elk	3 0	3.7	3.5	3.6	3 3	3 2
Fish Habitat Improvement	Structure	40	60	40	54	24	10
Big Game Hunting <u>4/</u>	Thousand Visitor Days	47	72	62	67	60	60
Small Game Hunting <u>4/</u>	Thousand Visitor Days	17	25	22	23	21	21
Fishing	Thousand Visitor Days	157	245	238	242	226	221
Non-game Use <u>4/</u>	Thousand Visitor Days	64	100	90	97	83	83
RANGE							
Livestock Grazing	Thousand Animal Unit Months <u>5/</u>	40	49	46	44	56	25
Pike & San Isabel National Forests							
Cimarron & Comanche National Grasslands	Thousand Animal Unit Months <u>5/</u>	160	178	176	176	179	70

3/ Includes entire Mt Evans, Lost Creek, Mt Massive, Holy Cross & Collegiate Wildernesses and recommended Wilderness Study Areas and Further Planning Area

4/ Wildlife and fishing use figures are also included in dispersed recreation, they are not additive

5/ Animal Unit Month = the amount of forage consumed by one mature cow or its equivalent in a one-month period.

TABLE S-2 Continued

Alternative Comparison (Average annual outputs - summary of all periods unless otherwise noted)

Activity	Unit of Measure	1983 Production	A	B	Alternatives C	D	E
TIMBER							
Allowable Sale Quantity <u>6/</u>	Million Cubic Feet	7	11	13	10	19	9
	Million Board Feet	23	37	43	36	68	34
Long-Term Sustained Yield	Million Board Feet						
Area Treated <u>7/</u> Intermediate	Thousand Acres	1 5	2 2	4 0	1 5	1.4	0 3
Clearcut	Thousand Acres	2	1 9	2 0	3 2	7 4	3 9
Shelterwood	Thousand Acres	3 9	9 1	10 3	1 4	4 7	0 3
Selection	Thousand Acres	6	1 5	0.0	3 1	1 1	0 0
Reforestation <u>8/</u>	Acres	450	680	520	560	720	360
Timber Stand Improvement	Acres	400	2180	3220	1540	1340	340
WATER							
Water Yield	Million Acre-Feet	1.278	1 278	1 278	1 278	1 280	1 278
Water Meeting Quality Goals	Million Acre-Feet	1 130	1.140	1 140	1 141	1 142	1 141
MINERALS LEASING							
Total Pike & San Isabel NFs No Lease	Thousand Acres	N/A	254 4	225 6	354 4	8 9	8 9
Lease without surface occupancy	Thousand Acres	N/A	19 6	19 6	19 6	19 6	19 6
Lease	Thousand Acres	N/A	2,342 3	2,371 0	2,251 5	2,587 7	2,587 7

6/ Sales in this summary pertain to harvests from suitable forest lands only and are included in the Allowable Sale Quantity (ASQ). In addition to volumes shown above, an unspecified amount of wood from trees less than 7 inches in diameter, topwood less than 6 inches in diameter, and trees from catastrophic events such as wildfire and windthrows will be harvested but are not part of the ASQ. A small amount of wood will be harvested from unsuitable lands that are also not included in the ASQ. This additional amount is estimated to be approximately 30 percent of the figures shown above.

7/ Area treated through timber management is also included in vegetation area treated, they are not additive.

8/ Reforestation figures include site preparation for natural regeneration.

TABLE S-2 Continued

Alternative Comparison (Average annual outputs - summary of all periods unless otherwise noted)

Activity	Unit of Measure	1983 Production	A	B	Alternatives C	D	E
FACILITIES - ROADS							
Arterial/Collector/ Local Construction/ Reconstruction	Miles	16 5	32 0	23 6	29 8	22 8	6 2
TRAILS							
Trails Constructed/ Reconstructed	Miles	8 0	20 0	16 0	53 2	16 0	0
PROTECTION							
Fuel Treatment	Thousand Acres	1 5	3 0	1 5	4 3	3 0	1 5

TABLE S-3

SUMMARY OF SIGNIFICANT EFFECTS

WATER

Alternative A produces the lowest water yield increase with the average annual increase of only 745 acre-feet. Alternative D produces the highest increase with an average annual yield of 2568 acre-feet. Alternative E is the next highest at 1177 acre-feet. Alternative B is slightly higher than A with an increase of 875 acre-feet annually.

RANGE

Long-term grazing capacity would increase significantly in all alternatives except Alternative E primarily due to investments for range improvement on the National Grasslands (See Range in Chapter III) Range outputs on National Forest lands increase under all alternatives except Alternative E due to improved management and reduced tree cover as a result of timber harvest.

TRANSPORTATION

All alternatives increase the total miles of local and arterial/collector roads. Alternative A requires the most road construction because of the number of acres accessed for vegetation treatment. Alternatives D, C and B require fewer miles of road construction, respectively and Alternative E requires the fewest miles of road construction. Road and travel management consider the needs for public access and management of other resources. Recreation Opportunity Spectrum (ROS) classes are maintained. Economically efficient road maintenance and closures consider impacts on other resources when increased public access is provided.

ECONOMICS

The average annual budget requirements for Alternatives A, C and D are expected to be 0.3 to 0.7 million dollars higher than current projected budget levels. Alternative E is expected to be 3.4 million dollars less than current budget levels. Alternative D returns the highest dollar amount to the U.S. Treasury and local counties, and has the fourth highest present net worth. Alternative C has the highest PNV with Alternative A second.

TIMBER

All alternatives would improve distribution of age classes in the short-term in varying degrees through vegetation management to enhance other resources. Alternative A enhances wildlife diversity, helps resolve insect and disease problems, and increases water yield. Alternative D provides a variety of timber products, increases water yield, and helps

resolve insect and disease problems. Alternative C provides for timber demand and concentrates on wilderness, and enhancement of fish and wildlife resources. Alternative E. provides less of a variety of timber products than any other alternative.

WILDLIFE
AND FISH

Alternative A best improves wildlife habitat overall, especially habitat diversity in high priority areas, habitat in nonforested areas, and fish habitats. Alternative C would greatly improve habitat diversity and nonforested habitats. Alternatives B and D would moderately improve habitat conditions, and Alternative E would not maintain habitat conditions. Long-term beneficial effects on management indicator species would occur under Alternatives A and C.

VISUAL
RESOURCES

Road and facilities construction and clearcutting would have short-term adverse effects on visual quality. All alternatives would produce a long-term beneficial change in visual quality.

SOILS

All alternatives will have the potential for short term adverse effects on the soil during the application of the ground disturbing practices. However, mitigation measures for all resource management practices will insure that soil loss remains within acceptable soil loss tolerance levels. Long-term productivity will be maintained for all alternatives.

SOCIAL

All alternatives except Alternative E, will have a positive effect on employment and incomes on communities within the Planning Unit. Alternative C is expected to produce the greatest number of jobs and generate the most income locally. Alternative A is second.

MINERALS

Alternative A provides the most access for mineral activity in both short and long-term. All alternatives provide for mitigating measures for resource management activities having potential for adverse environmental effects in both short and long-terms. Recommendations are made on the suitability of oil, gas and geothermal leasing activities on all National Forest System lands, except Wilderness and recommended Wilderness Study Areas.

LANDS

Alternative C includes 180 miles of property boundary location per year and would eliminate the backlog. All other alternatives include 50 miles of property boundary location per year which is nec-

essary to protect adjacent private lands and Forest lands from trespass, resolve trespass problems and meet other resource activity needs. Alternatives A, B and D would provide for low - moderate levels of land acquisition for both short and long-terms. Alternative C provides for an intensive land acquisition program in the first 10 year period. Alternative E would provide no land acquisition.

INSECT AND DISEASE

All Alternatives provide for vegetation treatment for reduction of insect and disease problems in the short and long-terms, with Alternatives A, C, and D providing the greatest number of treated acres.

RECREATION

Alternatives A, B, C, and D would provide for moderate increases in dispersed recreation use capacity, and gradual to significant increases in trail system improvement in both short and long-terms. Alternatives B and D would maintain current levels of developed recreation use capacity, C would have the highest increase in the level of developed recreation use capacity, and E would decrease levels of developed recreation use capacity through the closing of selected sites.

WILDERNESS

Alternatives A, B, and C recommend portions of the Buffalo Peaks, Spanish Peaks, Greenhorn Mountain and Sangre de Cristo Wilderness Study Areas as suitable for inclusion in the National Wilderness Preservation System. Alternative C recommends suitability for all 316,820 acres of the Wilderness Study Areas and all of Lost Creek Further Planning Area, as suitable for inclusion in the National Wilderness Preservation System. Alternative B recommends 216,700 acres of the Sangre de Cristo Wilderness Study Area as suitable for inclusion in the National Wilderness Preservation System. Alternative A recommends 187,169 acres of the Sangre de Cristo Wilderness Study Area, 36,060 acres of the Buffalo Peaks Wilderness Study Area, and 22,300 acres of the Greenhorn Mountain Wilderness Study Area as suitable for a total of 245,529 acres. In Alternatives D and E, no Wilderness Study Areas are recommended as suitable.

CONSULTATION WITH OTHERS BETWEEN THE DRAFT AND FINAL ENVIRONMENTAL IMPACT STATEMENTS

Following publication of the Draft Environmental Impact Statement and Proposed Forest Plan in September 1982, public involvement activities included: open houses and meetings with organizations and citizen groups; newspaper articles in local newspapers; formal hearings on Wilderness Study Areas; members of the Forest staff made personal con-

tacts to inform members of the public about the Plan; and copies of the documents were mailed to people who had expressed an interest in Forest planning. Comments on a wide variety of subjects covered in the Plan and Draft EIS were received in both letters and hearing testimony. Over 1,058 formal comments were received. Detailed comments and Forest Service responses are in Chapter VI of this document. These comments were the source for many of the changes made between the Draft and Final EIS.

TABLE OF CONTENTS

PIKE AND SAN ISABEL NATIONAL FORESTS
 LAND AND RESOURCE MANAGEMENT PLAN
 FINAL ENVIRONMENTAL IMPACT STATEMENT

TABLE OF CONTENTS

	<u>Page</u>
<u>VOLUME I</u>	
Abstract -----	1
SUMMARY OF FINAL ENVIRONMENTAL IMPACT STATEMENT	2
I. PURPOSE AND NEED -----	I-1
Overview -----	I-1
Vicinity of the Forest -----	I-10
Scope of Issues to be Addressed -----	I-10
Issue Identification Prior to Draft Environmental Impact Statement -----	I-10
Issue Identification Following the Draft Environmental Impact Statement ----	I-16
Changes Between the Draft and Final EIS ---	I-17
II. ALTERNATIVES INCLUDING THE PROPOSED ACTION -----	II-1
Overview -----	II-1
Criteria Used to Develop Alternatives -----	II-1
Consideration that Remained Constant in All Alternatives -----	II-5
Economic Efficiency -----	II-10
Benchmark Analysis -----	II-11
Alternatives Considered and Eliminated from Detailed Study -----	II-19
Departures From The Base Timber Sale Schedule -----	II-19
Unconstrained Mineral Leasing Alternative -----	II-21
Alternatives Considered in Detail -----	II-21
Alternative A (Proposed Action) -----	II-27
Alternative B (Current Program - No Action)	II-29
Alternative C (RPA Program) -----	II-31
Alternative D (Market Opportunities) -----	II-33
Alternative E (Reduced Budget) -----	II-34

TABLE OF CONTENTS
(Continued)

	<u>Page</u>
Comparison of Alternatives and Environmental Consequences -----	II-36
Comparison of Alternatives Through Ranking By PNV -----	II-59
 III. AFFECTED ENVIRONMENT -----	 III-1
Overview -----	III-1
Physical and Biological Setting -----	III-1
Geology -----	III-2
Climate -----	III-3
Vegetation -----	III-4
Social Setting -----	III-15
Social Resource Units -----	III-16
Human Resource Units -----	III-19
Economic Setting -----	III-40
Resource Elements -----	III-53
 Recreation -----	 III-54
Special Recreation Areas -----	III-66
Wilderness -----	III-68
Fish and Wildlife -----	III-78
Habitat Diversity -----	III-84
Threatened and Endangered Species -----	III-89
Range -----	III-92
Timber -----	III-95
Fuelwood -----	III-103
Water -----	III-104
Minerals -----	III-107
Human and Community Development -----	III-114
 Support Elements -----	 III-116
Lands -----	III-116
Soils -----	III-117
Facilities -----	III-120
Travel Management -----	III-122
Protection -----	III-123
State and Private Forestry -----	III-126
 IV. ENVIRONMENTAL CONSEQUENCES -----	 IV-1
Overview -----	IV-1
Summary of Changes Since the Draft EIS -----	IV-2
 Direct and Indirect Environmental Effects -----	 IV-3
Vegetation -----	IV-3
Recreation -----	IV-12

TABLE OF CONTENTS
(Continued)

	<u>Page</u>
Visual Resources -----	IV-29
Wilderness -----	IV-29
Suitability Evaluations -----	IV-33
Fish and Wildlife -----	IV-43
Range -----	IV-51
Timber -----	IV-56
Water -----	IV-64
Minerals -----	IV-68
Human and Community Development -----	IV-74
Lands -----	IV-75
Soils -----	IV-75
Facilities -----	IV-80
Protection -----	IV-83
Interrelationships Between Program Elements -----	IV-85
Social Effects -----	IV-86
Social Effects of Alternatives by Human Resource Unit -----	IV-86
Effects on Minorities and Women -----	IV-87
Economic Effects -----	IV-87
Cost Efficiency Analysis -----	IV-87
Resource Values -----	IV-92
Present Net Value Trade-Off Analysis -----	IV-94
Budget Estimates and Returns to the Treasury ----	IV-97
Employment, Population and Income -----	IV-99
Payments to Counties -----	IV-104
 Possible Conflicts -----	 IV-109
 Resources Planning Act (RPA) Program Objectives -----	 IV-109
Objectives of Other Federal, State, County, and Local Governments -----	IV-111
Energy Requirements -----	IV-113
Irreversible and Irretrievable Commitment of Resources- Adverse Environmental Effects that Cannot be Avoided --	IV-115
Short-Term Uses of the Human Environment and the Maintenance of Long-Term Productivity -----	IV-117
 Natural or Depletable Resource Requirements and Conservation Potential of Alternatives -----	 IV-118
Urban Quality, Historic and Cultural Resources; the Design of the Built Environment -----	IV-119
Community Stability -----	IV-119
Historical and Cultural Resources -----	IV-119
The Design of the Built Environment -----	IV-120
 V. LIST OF PREPARERS -----	 V-1

TABLE OF CONTENTS
(Continued)

	<u>Page</u>
VI. CONSULTATION WITH OTHERS, AND LIST OF AGENCIES, ORGANIZATIONS, AND INDIVIDUALS TO WHOM COPIES OF THE STATEMENT ARE SENT -----	VI-1
Overview -----	VI-1
Consultation with Others Between the Draft and Final EIS -----	VI-1
Content Analysis -----	VI-6
Public Comments on the Draft EIS and Forest Service Response -----	VI-19
Public Comments on the Draft EIS and Proposed Plan and Forest Service Response -----	VI-41
Comments From The Public -----	VI-42
1. Alternatives -----	VI-42
2. Economics -----	VI-45
3. Planning Process -----	VI-51
4. Fire -----	VI-66
5. Range -----	VI-67
6. Minerals -----	VI-71
7. Recreation -----	VI-79
8. Research Natural Areas -----	VI-82
9. Timber -----	VI-84
10. Transportation -----	VI-105
11. Water -----	VI-110
12. Wildlife -----	VI-117
13. Law Enforcement -----	VI-131
14. General -----	VI-132
15. Sangre de Cristo Wilderness Study Area	VI-137
16. Greenhorn Wilderness Study Area -----	VI-146
17. Spanish Peaks Wilderness Study Area --	VI-148
18. Buffalo Peaks Wilderness Study Area --	VI-154
19. Lost Creek Further Planning Area -----	VI-161
20. Wilderness Study Areas (General) -----	VI-163
21. Existing Wilderness -----	VI-170
22. Soils -----	VI-172
23. Quail Mountain -----	VI-174
24. Visuals -----	VI-176
25. Cultural Resources -----	VI-177
Comments from Federal, State, and Local Agencies, and Elected Officials -----	VI-178
List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent -----	VI-263

TABLE OF CONTENTS
(Continued)

	<u>Page</u>
VII. INDEX -----	VII-1
 <u>VOLUME II</u>	
VIII. APPENDICES	
A. References -----	A-1
B. Glossary -----	B-1
C. Wilderness Study and Further Planning Area Reports -----	C-1
Greenhorn Mountain Wilderness Study Area-	C-3
Buffalo Peaks Wilderness Study Area -----	C-54
Spanish Peaks Wilderness Study Area-----	C-109
Sangre de Cristo Wilderness Study Area---	C-165
Lost Creek Further Planning Area -----	C-340
D. Resource Allocation Model and Constraint Analysis -----	D-1
E. Benchmark Levels -----	E-1
F. Wild and Scenic River Eligibility Report for Badger Creek, Cimarron River and a Section of the South Platte River -----	F-1
G. Management Area Prescription Changes Reflected on Forest Plan Map -----	G-1
H. Status of Grazing Allotments on Pike and San Isabel National Forests -----	H-1
I. Downhill Skiing Supply and Demand Projections and the Allocation of Potential New Ski Areas	I-1
J. Management Area Prescriptions 8A and 8D ----	J-1
K. Present Net Value Trade-Off Analysis -----	K-1

PURPOSE AND NEED

CHAPTER I
PURPOSE AND NEED

OVERVIEW

This Final Environmental Impact Statement discloses a proposed course of action, as well as alternatives to that proposed action, for managing the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands. It also describes the environment to be affected and the potential environmental consequences of implementing the proposed action and each alternative. Preparation of an environmental impact statement is required by the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations found in Title 40, Code of Federal Regulations, Part 1500 (40 CFR 1500), and the implementing regulations of the National Forest Management Act (NFMA) in 36 CFR 219 (1982). The EIS is prepared in the format established in 40 CFR 1502.10, of the CEQ regulations.

A notice of intent to prepare an environmental impact statement for the Pike and San Isabel National Forests Plan was published in the Federal Register on May 10, 1979. A revised notice of intent was published on November 14, 1980. The draft EIS was filed with the Environmental Protection Agency (EPA) and distributed to individuals, organizations and agencies on September 2, 1982. A notice of availability of the draft EIS was published in the Federal Register on September 24, 1982. The comment period closed on December 15, 1982.

The proposed action is described in a document titled "Pike and San Isabel National Forest Land and Resource Management Plan" (Forest Plan). For purposes of NEPA disclosure, this final EIS and the Forest Plan are treated as combined documents (40 CFR 1506.4).

The Pike and San Isabel National Forests administrative unit contains 2,751,736 acres of National Forest System land. Included are 1,107,946 acres of the Pike National Forest; 1,116,743 acres of the San Isabel National Forest; 418,870 acres of the Comanche National Grassland; and 108,177 acres of the Cimarron National Grassland. In addition, the Pike National Forest administers 440 acres of Fountain Creek Land Utilization Project lands in Teller County. These lands do not have National Forest status and are identified for disposal.

The Record of Decision issued with this Environmental Impact Statement will make a recommendation on wilderness suitability on 4,910 acres of U.S. Department of the Interior, Bureau of Land Management (BLM) lands contiguous to the western boundary of the Sangre de Cristo Wilderness Study

Area The four BLM Wilderness Study Areas are Black Canyon, South Piney Creek, Papa Keal and Zapata Creek. Details of this study are summarized in Appendix C.

The Colorado Wilderness Act, Public Law 96-560 of December 22, 1980, directed the Secretary of Agriculture to review and within three years after the date of enactment, to report to the President and Congress his recommendations on the suitability or unsuitability of the Buffalo Peaks, Spanish Peaks, Greenhorn Mountain and Sangre de Cristo Wilderness Study Areas in Colorado for inclusion in the National Wilderness Preservation System. These studies are being completed as part of the Land Management Planning process.

The RARE II (Second Roadless Area Review and Evaluation) study recommended part of the Lost Creek area for wilderness and allocated part to further planning. The 1980 Colorado Wilderness Act established all but 20,723 acres of the Further Planning Area as wilderness. Congress left this part of the Further Planning Area to be administratively evaluated for wilderness suitability in the Forest planning process.

Preparation of the Forest Land and Resource Management Plan (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). The regulations implementing NFMA, found in 36 CFR 219 and cited throughout this Environmental Impact Statement (EIS), specify that a Forest Plan will be accompanied by an EIS. The EIS will conform to the requirements of the National Environmental Policy Act of 1969 (NEPA) and the implementing regulations found in 40 CFR 1500.

Forest planning occurs within the overall framework of both national and regional planning as structured by the laws and implementing regulations cited above. Through the national RPA Program, the Regional Guide establishes management standards and guidelines, attempts to resolve regionally significant issues and concerns, and assigns outputs and activities (RPA targets) to the Forests within the Region. The question of achieving assigned RPA targets and resolving local-area issues and concerns is addressed in the Forest Plan. The purpose of the Forest Plan is to assure multiple use and protection of Forest resources; compliance with regulations, and consideration of local, regional, and national issues.

The Forest Plan is to guide management of the Pike and San Isabel National Forests through the year 2030. It will replace all previous resource management plans prepared for the Forest. The overall goal of the Plan is to provide direction for achieving a healthy, vigorous forest environment capable of supporting a wide range of natural processes and human activities. Vegetation treatment is the major tool the Forest Service

has at its disposal to achieve this goal. The proposed action and alternatives to it developed in this document satisfy this goal in different ways. The Plan will ordinarily be revised on a 10-year cycle or at least every 15 years, as specified in 36 CFR 210.10(g).

The Regional Forester will use the Final EIS in making a decision under NFMA as to the approval of the Forest Plan as per 36 CFR 219.10(c). This decision will be documented in a Record of Decision (ROD) which will be issued with this Final Environmental Impact Statement and the Forest Plan.

The Record of Decision which approves the Pike and San Isabel National Forests Plan will recommend the suitability or unsuitability for inclusion in the National Wilderness Preservation System of the Sangre de Cristo, Buffalo Peaks, Spanish Peaks and Greenhorn Mountain Wilderness Study Areas. The Lost Creek Further Planning Area is not suitable for inclusion into the National Wilderness Preservation System. The recommendation will include that portion of the Sangre de Cristo Wilderness Study area which is within the boundaries of the Rio Grande National Forest and the four parcels of U.S. Department of the Interior, Bureau of Land Management lands adjacent to the Sangre de Cristo Study Area.

Legislative Final EIS's will be prepared for each Wilderness Study Area based on information and analysis disclosed in this EIS for the Pike and San Isabel National Forests Plan and from an analysis of the records of the public hearings which were held on October 19 through 21, 1982. A Legislative Final EIS will be prepared for the Lost Creek Further Planning Area if all or part of the area is found suitable for wilderness designation based on information and analysis disclosed in this FEIS. The closing of the comment period for the hearing record coincided with the date established for the proposed Plan and draft EIS, December 15, 1982. Chapter VI of this EIS documents the consultation and public comment.

The Legislative Final EIS's with the Regional Forester's recommendations will receive further review and possible modification in the offices of the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States. After the President transmits the Administration's final recommendations to Congress, the Legislative Final EIS's will be filed with the Environmental Protection Agency and distributed to the public. Final decisions on wilderness designation for Wilderness Study Areas have been reserved by Congress. The wilderness characteristics of the areas will be protected until Congress acts.

Also, because of the need for uniform management direction on designated wildernesses which are on more than one Forest, this

Also, because of the need for uniform management direction on designated wildernesses which are on more than one Forest, this EIS develops alternatives and discloses the effects of alternatives for management direction of the Mount Evans Wilderness. Alternatives for management direction for the Holy Cross and Collegiate Peaks Wildernesses is provided in the Forest Plan and FEIS prepared by the White River National Forest.

Name	Net Acres	National Forest Administrative Unit
Collegiate Peaks Wilderness	81,450	Pike & San Isabel NF's
	78,450	White River NF
	<u>159,900</u>	
Holy Cross Wilderness	9,020	Pike & San Isabel NF's
	116,980	White River NF
	<u>126,000</u>	
Mount Evans Wilderness	34,950	Pike & San Isabel NF's
	40,274	Arapaho & Roosevelt NF's
	<u>75,224</u>	

This EIS is not a decision document. It is a document disclosing the environmental consequences of implementing the proposed action and the alternatives to that action which were considered in developing the Land and Resource Management Plan for the Forest. The Forest Service decision relates only to lands administered by the Forest Service and is documented in the Record of Decision which accompanies the Plan.

The purpose of the Plan is to develop a strategy to guide management of the Forest for the next 50 years and to provide direction for achieving a healthy, vigorous Forest environment capable of supporting a wide range of natural processes and human activities. Vegetation treatment is the major tool the Forest Service has at its disposal to achieve a healthy Forest. To accomplish the long range management program, the Forest Plan:

- establishes the management direction and associated long-range goals and objectives for the Forest for the next 50 years;
- specifies the standards and guidelines, the approximate timing and location of the practices necessary to achieve that direction;
- establishes the monitoring and evaluation requirements needed to insure that the direction is carried out and to determine how well outputs and effects were predicted; and
- makes a recommendation on the suitability for wilderness designation on four Congressionally designated Wilderness Study Areas (Buffalo Peaks, Greenhorn Mountain, Spanish Peaks and Sangre de Cristo) and one Administratively designated Further Planning Area (Lost Creek).

As soon as practicable after the Plan is approved, the Forest Supervisor will insure that, subject to valid existing rights, all outstanding and future permits and other occupancy and use documents which affect National Forest System lands are consistent with the Plan. The management direction contained in the Forest Plan is used in analyzing proposals by prospective Forest users. All permits, contracts, and other instruments for occupancy and use of the National Forest System lands covered by this Plan must be consistent with the Management Requirements in both the Forest and Management Area Direction Sections. This is required by 16 USC 1604(i) and 36 CFR 219.10(e).

Subsequent administrative activities affecting National Forest System lands, including budget proposals, shall be based on the Plan. The Forest Supervisor may change proposed implementation schedules to reflect differences between proposed annual budgets and actual funds received. Schedule changes resulting from a reduced budget will be considered an amendment to the Forest Plan. These changes shall not be considered a significant amendment, and will not require the preparation of an environmental impact statement unless the changes significantly alter the long-term relationship between levels of multiple-use goods and services projected under planned budget proposals as compared to those projected under actual appropriations.

Implementation of this management direction is the key to translating the goals, objectives, and management requirements stated in the Forest Plan into on-the-ground results. The Forest Plan is implemented through the program development, budgeting, and annual work planning processes. These processes supplement the Forest Plan and make the annual adjustments and changes needed to reflect current priorities within the overall management direction contained in the Plan.

The Forest Plan guides development of multi-year implementation programs for each Ranger District. The Plan's goals, objectives, and management requirements are translated into these multi-year program budget proposals which specifically identify the activities and expenditures necessary to achieve the direction provided by the Forest Plan. These implementation programs form the basis for the Forest's annual program budget.

Upon approval of the final budget appropriation for the Forest, the annual program of work is finalized and implemented on the ground. The annual work plan provides the detail to the program budget proposals necessary to guide the land managers and their staffs in responding to the direction of the Forest Plan. The activity files in the data base and the Program Accounting and Management Attainment Reporting System provide information for monitoring the accomplishment of the annual Forest program.

The Final EIS prepared for the Forest Plan will be used in preparing future environmental documents through tiering in

accordance with 40 CFR 1502.20 and 1508.28. Tiering means that environmental documents prepared for projects arising from the Plan will refer to analysis contained in the EIS, Forest Plan, and associated documents rather than repeat information. Site-specific detail will be included in the environmental analysis for project-level decisions. Environmental documents for specific projects will therefore be shorter and concentrate on issues unique to the project.

The management direction (Chapter III of the Plan) is composed of two major parts: Forest Direction and Management Area Direction. Management direction responds to public issues, management concerns, and opportunities within the availability, suitability, and capability of the land and resources.

Forest Direction consists of goals, objectives, and management requirements. The goals and objectives provide broad overall direction regarding the type and amount of goods and services that the Forest will provide. The management requirements contained in the Forest Direction section sets the minimum conditions that must be maintained while achieving the Plan's goals and objectives.

Management Area Direction consists of Management Area Prescriptions applicable to specific management areas shown on the Forest Plan map. The Management Area Prescriptions contain management requirements specifying which activities will be implemented to achieve the goals and objectives. Management requirements contained in individual Management Area Prescriptions are applied to the specific areas shown on the management area map in the back of the Forest Plan.

The planning process specified in the implementing NFMA regulations was followed in developing the Forest Plan alternatives. The planning process uses an interdisciplinary approach in developing the alternatives (36 CFR 219.6). The steps or planning actions described in the regulations (36 CFR 219.5(b)-(k)) and used in this Forest planning process are:

1. Identification of issues, concerns and opportunities,
2. Development of planning criteria;
3. Inventory data and information collection;
4. Analysis of the management situation;
5. Formulation of alternatives;
6. Estimated effects of alternatives;
7. Evaluation of alternatives;
8. Selection of the proposed action (or proposed Forest Plan);
9. Implementation of the Forest Plan; and
10. Monitoring and evaluation of the Forest Plan

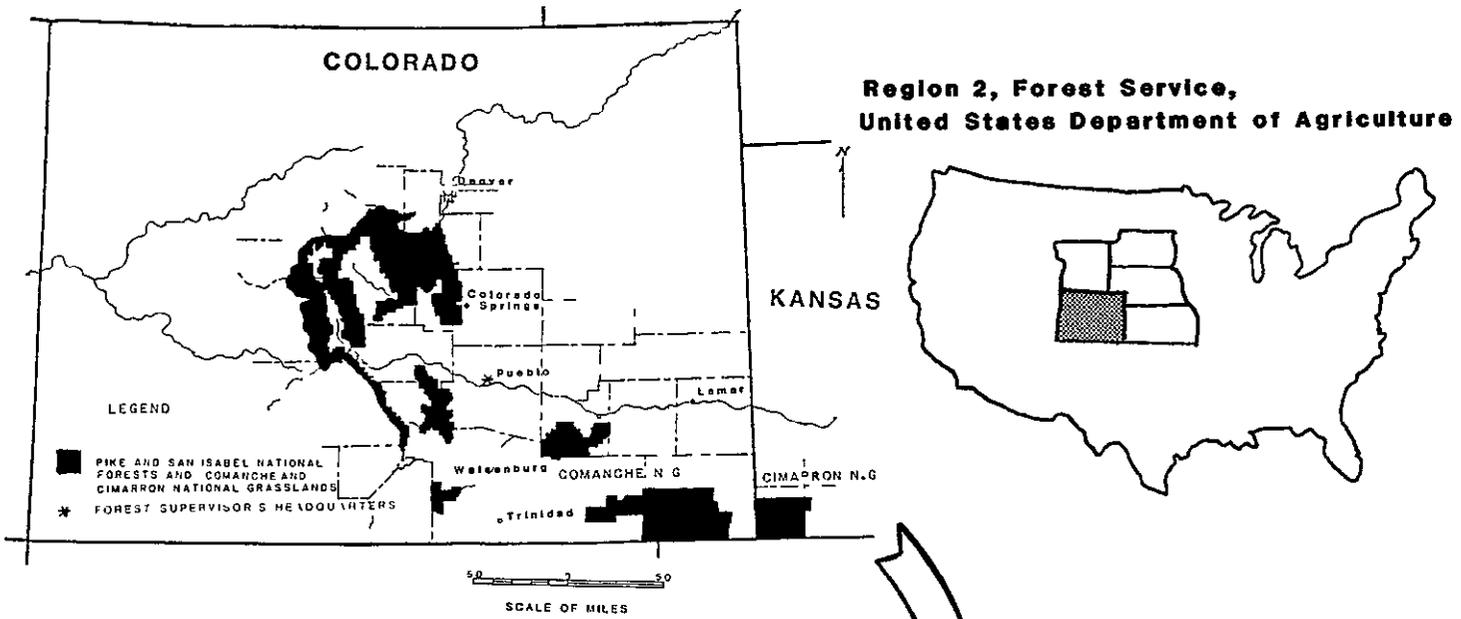
All of the documents that describe the Forest's planning process are available for inspection during regular business hours at the Pike and San Isabel National Forest's Supervisor's Office, 1920 Valley Drive, Pueblo, Colorado. These documents, known as planning records, contain the detailed information used in developing the Forest Plan. These planning records are incorporated by reference and are referred to throughout these documents as a part of this EIS and Forest Plan.

The environmental consequences of the proposed action and alternatives on lands and activities administered by the Pike and San Isabel National Forests, as well as other Federal, State, and local agencies are disclosed in this EIS. Other Federal, State, and local agencies have assisted in disclosure of environmental consequences and development of alternatives to the proposed action. Agencies which cooperated in the preparation of this document are listed in Chapter VI, Consultation with Others, and List of Agencies, Organizations and Individuals to whom copies of the statement are sent.

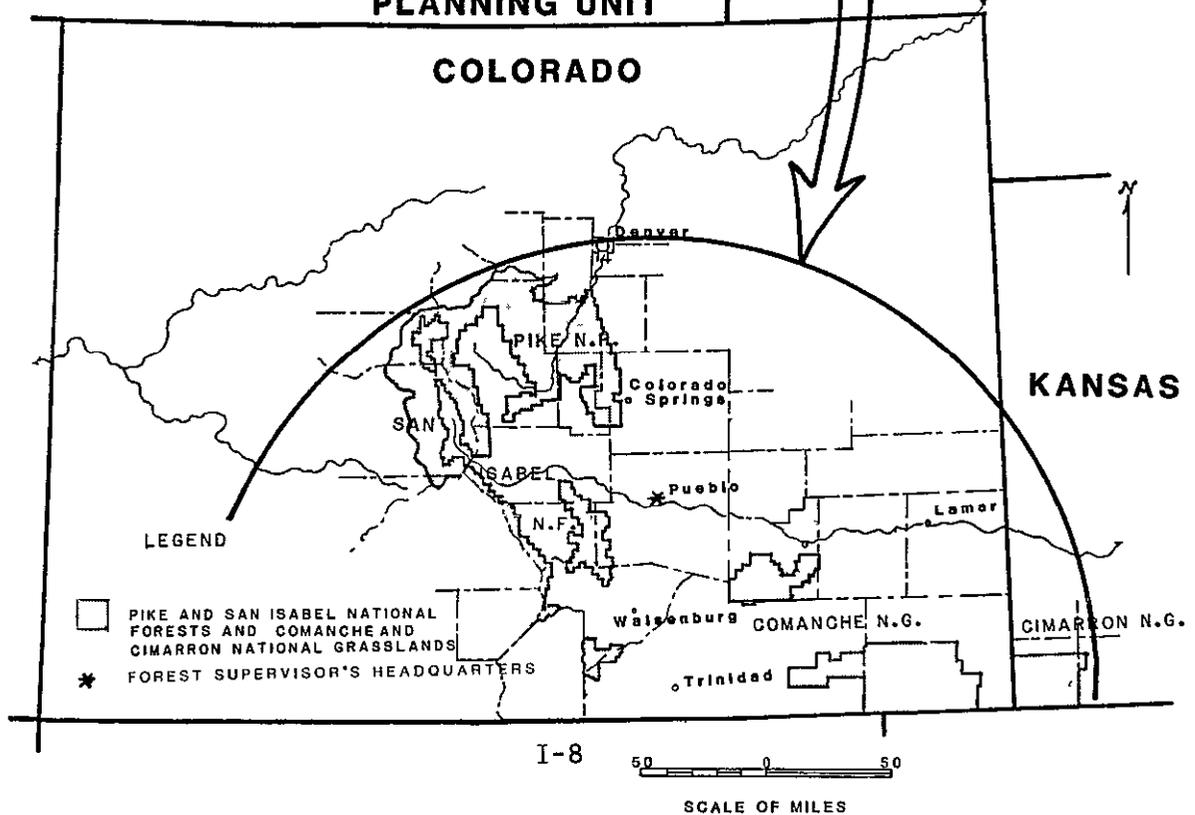
Appendix A of this EIS contains a list of references consulted in preparing the Forest Plan and EIS. These references are incorporated by reference and are available for review at the Forest Supervisor's Office, Pueblo, Colorado. Appendix B is a glossary of terms used in this document and the Forest Plan. The reader may find it useful to refer to the glossary.

VICINITY MAP

FIGURE I-1



GENERAL LOCATION MAP PLANNING UNIT



VICINITY OF THE FOREST

The Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands are located in central and southeastern Colorado, and southwestern Kansas. (Figure I-1) There are 2,643,559 acres in Colorado and 108,177 acres in Kansas, totalling 2,751,736 acres of National Forest System land. All the acreage in Kansas is National Grassland; 418,870 acres of the Colorado portion is National Grassland and the remainder is National Forest. National Forest System lands are intermingled with and adjacent to other public and privately-owned land.

The Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands lie in parts of eighteen counties; sixteen in Colorado (Baca, Chaffee, Clear Creek, Custer, Douglas, El Paso, Fremont, Huerfano, Jefferson, Lake, Las Animas, Otero, Park, Pueblo, Saguache, and Teller), and two in Kansas (Morton and Stevens).

The Pike and San Isabel National Forest consists of eight Ranger Districts located in Canon City, Colorado Springs, Fairplay, Lakewood, Leadville, Salida, and Springfield, Colorado, and Elkhart, Kansas. The Cimarron National Grassland is administered by the District Ranger in Elkhart, Kansas. The Comanche National Grassland is administered by the District Ranger in Springfield, Colorado.

SCOPE OF ISSUES TO BE ADDRESSED

ISSUE IDENTIFICATION PRIOR TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Plan addresses public issues and management concerns. In the initial phase of the planning process, issues and concerns were identified through a review of past public involvement efforts.

A list of Forest-wide public issues and management concerns regarding Forest management was developed from this review and from comments solicited at public meetings, from written responses to news media articles, from written responses to the Forest's Issues and Concerns Statement, from written comments received from Citizen Involvement Groups, and from the Forest's Management Team. (Please see Chapter V for identification of this Management Team.) When the review was completed, Federal, State, and local agencies and the public were asked to validate existing issues and define any new issues. These public issues and management concerns established the scope of the EIS (40 CFR 1501.7 and 1508.25). These issues and concerns are the topics the FEIS and Plan will address.

The Draft EIS for the Plan was filed with the Environmental Protection Agency and distributed to the public, organizations and agencies on September 2, 1982, for review and comment. The comment period on the Proposed Plan and Draft EIS closed December 15, 1982. The Final EIS and Plan have been changed to respond to public comment, new or improved data, opposing views, and additional analysis. The reader is encouraged to review Chapter VI of the Final EIS. Chapter VI documents consultation with the public; Federal, State and local governments; industry; organizations; and legislators. The section CHANGES BETWEEN DRAFT AND FINAL EIS in this chapter summarizes changes between the Draft and Final EIS.

Various factors are involved in planning for management of the Forest in order to resolve issues and concerns. One important factor is the ability to produce goods and services within the context of a limited land base and limited financial resources. Another factor is the ability to meet the demands of various publics, while simultaneously maintaining protection of soil and water. Often, identified issues and concerns are in opposition to one another.

Public issues and management concerns were grouped according to similar subject. From these groupings, fifteen planning questions were developed to represent the major public issues and management concerns that the Forest Plan would be directed to resolve. How each planning question is addressed by the Forest Plan also determines the manner in which the issues and concerns are addressed. A detailed discussion of the process and the specific public issues and management concerns relating to each planning question is contained in the planning records and can be found in the Planning Action 1 document (Issues, Concerns and Opportunities), and the Planning Action 2 document (Planning Criteria) which are available for review in the Forest Supervisor's Office in Pueblo. The levels of goods and services and effects that were made and used to determine how well the planning questions were answered are discussed in Chapter II, Alternatives Including the Proposed Action, and in Chapter IV, Environmental Consequences.

Public comment on the draft EIS and Proposed Forest Plan did not identify any new issues or concerns, however, ten of the fifteen planning questions (I, II, III, IV, V, VIIb, VIIIb, IXa, X and XI) were clarified or expanded to better address the issues and concerns identified.

Planning Question I: What should be emphasized in the management and utilization of the range resource and how much forage should be allocated to livestock use on the Pike and San Isabel National Forests and Grasslands?

Issues and concerns related to range resource production and utilization exist throughout the Forest in varying degrees of intensity. Grazing has long been one of the significant resource uses on the Forest, particularly on the National Grasslands. Range utilization in the grassland areas provides a major portion of the economic base of the local communities, both directly and indirectly.

The public comments between the Draft and Final EIS related to this planning question were focused on the issues and concerns involving grazing and were directed mostly toward conflicts with other uses, such as recreation, and toward the unacceptable impacts of overgrazing in certain areas along with its effects on soil, water, and riparian areas. Comments were also received indicating the need for National Forest System land for livestock grazing.

Planning Question II: How can the Pike and San Isabel National Forests supply the variety of timber products desired by the public while insuring that timber harvest activities enhance other resource values?

Public comments between the Draft and Final EIS focused on the amount and location of timber harvesting on the Forest. Harvest methods, such as clearcutting, are also an issue. Other issues and concerns relate to economic efficiency, the effects of timber cutting on local communities, conflicts with other uses, the type of products cut, and the impacts that timber harvesting and associated road construction may have on other resource values.

Management concerns include proper management and harvesting of the Forest's timber resources to provide a healthy Forest and to enhance and protect esthetics, wildlife habitat, recreation opportunities, watershed values, and the soil resource.

Planning Question III: How should the Pike and San Isabel National Forests be managed to respond to increasing demands for water yield, storage, transmission uses, high quality water and protection of the soil resource?

Public comments between the Draft and Final EIS which related to this planning question are directed to the need for more water, higher quality water, or correction of unacceptable impacts occurring from such uses as recreation, grazing, mining, and road construction.

Other water related comments were concerned with availability of water, reduction of soil erosion and the need to rehabilitate existing erosion problem areas, State and Federal water laws and rights, proposed water development projects, administration of laws, and water storage and transmission facilities.

Planning Question IV: How should wilderness on the Pike and San Isabel National Forests be managed to maintain a high quality wilderness recreation experience under the National Wilderness Preservation System?

This planning question was further defined to address the type of wilderness management needed to maintain a quality wilderness recreation experience. The issues center around conflicts between wilderness use and mineral exploration and between different types of wilderness users.

Planning Question IVa: Should additions to the National Wilderness Preservation or Wild and Scenic River Systems be recommended for certain areas on the Pike and San Isabel National Forests?

This planning question pertains to the suitability for inclusion in the National Wilderness Preservation system of several areas which have been identified for possible wilderness designation. The Colorado Wilderness Act of 1980, (P.L. 96-560) designated four areas of the Pike and San Isabel National Forests as Wilderness Study Areas (Buffalo Peaks, Greenhorn Mountain, Spanish Peaks, and Sangre de Cristo). During the Forest planning process these areas were evaluated for suitability or unsuitability for inclusion in the National Wilderness Preservation System as directed by Congress under Section 105.(a) of the 1964 Wilderness Act. One Further Planning Area (Lost Creek) was administratively identified in RARE II. During the Forest planning process this area was also evaluated for all uses including the suitability or unsuitability for inclusion in the National Wilderness Preservation System. (See Appendix C.)

Public comment between the Draft and Final EIS related to both sides of this issue with some desiring more wilderness designation and others desiring less or at least no increase in the current amount of designated wilderness on the Forest.

Detailed studies for determining the suitability or unsuitability of the South Platte River section for inclusion in the National Wild and Scenic Rivers System were not conducted as a part of this planning effort. Preliminary studies were made and are displayed in Appendix F of this EIS.

Planning Question V: What can be done to maintain or improve wildlife and fish populations by management of their habitats and how can riparian (wetlands) area management be emphasized on the Pike and San Isabel National Forests?

Commentors expressed a concern that the Forest needs to increase its activities in wildlife habitat management, treat deer and elk separately and provide protection for riparian area.

Other issues and concerns emphasized a need for protection and improvement of fish and wildlife habitats through consideration of and coordination with all resource management activities.

Planning Question VI: How should the Pike and San Isabel National Forests provide accessibility of National Forest System lands for mineral activities, and at the same time minimize the adverse impacts of mining activities on other resources?

The majority of the public comments received emphasized the need for production of minerals on Forest lands, not only to meet public demand for minerals, but also to provide employment.

Several commentors to the Draft EIS and Proposed Plan felt that energy and mineral resources did not receive adequate consideration during the planning process prior to issuance of these documents. These commentors focused on the issue related to providing guidelines for making decisions favorable for leasing. Other commentors felt there were no provisions for conflict resolution between minerals exploration/development activities and wilderness and other resource values.

Planning Question VIIa: How can resource management programs and administration be improved through land exchange, land and rights-of-way acquisition, land line location and other functions?

Issues range from more to less access routes into National Forest lands, more land exchanges, boundary locations and marking, and land uses. Some commentors felt that land adjustments, especially acquisition of some privately owned inholdings are necessary for public access and management of Forest resources.

Planning Question VIIb: How should the need for utility lines, electronic sites and other transmission facilities be integrated into the administration of the National Forests and can the Plan accommodate the needs of future development?

Issues and concerns emphasized a need for these facilities but that they should be allowed only with strict regulations concerning visual and other resource impacts created by these utility rights-of-way. Due to public comment between the Draft

and Final EIS, this planning question was expanded to include a concern that existing and planned utility corridors may not be capable of meeting the requirements of all new developments.

Planning Question VIIla: What is the role of the Pike and San Isabel National Forests and the Cimarron and Comanche National Grasslands in managing insects and diseases?

The majority of the issues relating to insect and disease management are of high public concern. This includes management's concerns that if large areas of the forest are left unprotected from insect and disease, vegetation communities could be damaged severely.

Planning Question VIIlb: How should the Forest Service carry out fire protection and management including what suppression methods are appropriate within wilderness?

This includes public issues and management concerns of how natural forces as well as human caused wildfire can be a threat to the Forest and Grasslands, particularly during periods of drought. Public comment between the Draft and Final EIS which related to this planning question includes concerns about the importance of fire management on the Forest, adequate fire protection for adjacent private and other government lands, and provision in the Plan that would allow motorized access to suppress wildfire in wilderness.

Planning Question IXa: What range and quantity of developed and dispersed recreation opportunities and activities should the Pike and San Isabel National Forests provide?

Due to public comment between the Draft and Final EIS, this planning question was expanded to specifically address both developed and dispersed recreation opportunities. This includes major public issues and management concerns relating to control of vehicle use by road and trail management, more or less recreation developments, more privately operated campgrounds within the National Forest System, conflicts between non-motorized recreation use and other uses of the Forest.

Planning Question IXb: How should the cultural resources of the Pike and San Isabel National Forests be managed?

Most issues and concerns expressed a desire that the Forest needs to accelerate efforts to identify (inventory), assess the significance of, protect, and develop suitable methods of preservation of cultural resources.

Planning Question X: What considerations should be made in providing facilities, including transportation, systems for off-road vehicles and trails for motorized use to meet public and resource management needs on the Pike and San Isabel National Forests?

Due to public comment between the Draft and Final EIS, this planning question was expanded to place emphasis on evaluating motorized use. Other issue facets pertaining to facilities include construction, maintenance and improvement, compatibility with other resources, cost and energy efficiency, reduce or increase facilities, adequate access, and consideration for handicapped users.

Planning Question XI: What kinds of human and community development programs and activities will benefit local communities, and provide cooperation with private industry and state and local governments?

Due to public, other agency and local government comments between the Draft and Final EIS, this planning question was expanded to include those who could be affected by Forest planning decisions.

This includes major public issues and management concerns of how Forest Planning decisions will affect and be affected by the needs and plans of individuals, communities, industry, and governments influenced by the Plan. Issues include employment, availability of fuelwood, recreation facilities for the handicapped, protection and management, public education, and complementing and assisting local economies and dependent industries.

ISSUE IDENTIFICATION FOLLOWING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Following release of the Draft Environmental Impact Statement and Forest Plan, over 1,000 public comments were received that formed the basis for changes in the final documents. These comments served to clarify public issues and management concerns already identified in Planning Action 1 documents. They further identified major areas of agreement or disagreement with the proposed action and focused attention on a particular set of public issues which tend to be more "volatile" than others. Certainly the number of comments on a particular issue does not necessarily indicate greater importance, although it may indicate the need for additional analysis or reconsideration of proposed activities.

Topics addressed by public comments on the Proposed Forest Plan and Draft EIS are listed below. Many topics were represented by comments both in favor of and in disagreement with particular statements or proposed activities related to that topic. Major topics include:

-wilderness preservation;

- opposition to oil and gas leasing in wilderness;
- excessive timber harvest especially in Lake County; and
- wildlife and fish habitat quality.

Other topics include:

- development of Quail Mountain Ski Area;
- economic concerns over reduced budgets and campground closures; and
- increased water quantity from timber harvest.

Some commentators expressed concern that Denver Water Board proposals (for water projects) are not addressed as issues in the Forest planning process. The Denver Water Board's Two Forks proposal on the South Platte River for water collection and storage for the metropolitan Denver area is an example. Singular issues of this nature are addressed through the National Environmental Policy Act (NEPA) analysis process. This includes public, other Federal and State agency and local government participation at the earliest opportunity for scoping of issues and concerns about the proposal and continues throughout the entire planning process for the proposal. Environmental and project analysis is documented in either an Environmental Assessment (EA) or through Environmental Impact Statement (EIS) process.

CHANGES BETWEEN THE DRAFT AND FINAL EIS

Following publication of the Draft Environmental Impact Statement and Proposed Forest Plan in September 1982, public involvement activities included: open houses and meetings with organizations and citizen groups; newspaper articles in local newspapers; formal hearings on Wilderness Study Areas; members of the Forest staff made personal contacts to inform members of the public about the Plan; and copies of the documents were mailed to people who had expressed an interest in Forest planning. Comments on a wide variety of subjects covered in the Plan and Draft EIS were received in both letters and hearing testimony. Over 1,058 formal comments were received. Detailed comments and Forest Service responses are in Chapter VI of this document. These comments were the source for many of the changes made between the Draft and Final EIS.

A number of people had a variety of concerns and questions caused by the brevity of Chapters III and IV of the draft EIS and the management direction section of the Proposed Plan. These sections of the documents have been expanded to provide additional information and to clarify the analysis.

Changes between the Draft and Final EIS fell into seven areas: format, changes in implementing regulations for the National Forest Management Act, completion of the Rocky Mountain Regional Guide, management area direction, management area prescriptions (see the Management Area map), content changes in the document and issues to be addressed in the Final EIS. Although the changes will be apparent to someone reading both this document and the DEIS, they are highlighted below.

FORMAT

Minor changes in format have been made to enhance readability and understanding. The arrangement of some of the material has changed for clarification purposes.

NFMA IMPLEMENTING REGULATIONS

During preparation of the Draft documents the 1979 NFMA implementing regulations were revised. The revised regulations became effective in November 1982.

The Pike and San Isabel National Forest Plan has been prepared in conformance with the 1982 regulations.

REGIONAL GUIDE

The 1982 regulations changed the name of the Regional Plan to Regional Guide. The proposed Rocky Mountain Regional Plan referenced in the Draft EIS is now referred to as the Rocky Mountain Regional Guide. The Regional Guide and Final EIS were filed with the Environmental Protection Agency on June 1, 1983.

MANAGEMENT AREA DIRECTION

Management Area Prescriptions in the Draft EIS were developed to direct specific management activities on similar land types as well as achieve desired management objectives. Following publication of draft documents, the need to develop uniform prescriptions across the Region became apparent. Uniform prescriptions were designed to facilitate management as well as public understanding by highlighting the similarities and differences between Forests through consistent use of terminology. Uniform prescriptions were developed based on common goals and objectives for similar land types. These were then adapted by individual Forests to address unique situations at that level.

This Final EIS and accompanying Forest Plan are expressed in terms of these uniform prescriptions, as modified, to address the local situation.

Chapter III of the Plan includes additional management prescriptions and some refinements in the prescriptions as presented in the Proposed Plan. These changes reflect both the need for uniformity within the Rocky Mountain Region and most importantly they reflect the need to clarify or highlight management unique to the local situation.

Management prescriptions included in the Forest Plan that were not displayed in the Proposed Plan are:

- 1D - Utility Corridors;
- 4D - Aspen Management;
- 7D - Wood-fiber Production and Utilization for Products Other Than Sawtimber
- 9A - Riparian Area Management;
- 10C - Special Interest Areas; and
- 10E - Municipal Water Supply Watersheds.

Management requirements for these management areas are displayed in Chapter III of the Forest Plan.

Some land use allocations have been adjusted. In some cases the adjustments are in response to public comments (i.e., removal of the water production Management Area at higher elevations around Leadville) and in other cases the changes in Management Area designation were initiated to facilitate Plan implementation and better serve overall Plan goals. Appendix G displays all Management Area changes and the reasons for the changes.

Some formal land classifications have changed since release of the Proposed Forest Plan and Draft Environmental Impact Statement. The Fremont Experimental Forest (Pikes Peak District, Pike National Forest) was disestablished by the Chief of the Forest Service on September 6, 1983, and control was returned to the National Forest System. Lost Creek and Abyss Lake Scenic Areas were declassified on February 8, 1984, by the Regional Forester under authority of 36 CFR 294.1. Management of these two areas is now dictated by the Wilderness Act of 1964 and the Colorado Wilderness Act of 1980; the two areas are allocated to wilderness prescriptions.

Management Area 1B (Provides for existing and potential winter sports sites) has been eliminated. This Management Area Prescription has been replaced with two Management Area Prescriptions that better provide the specific management direction and emphasis intended for existing and potential winter sports areas. Management Area 1B-1 provides for existing winter sports sites. Management Area 1B-2 provides management direction and emphasis for potential winter sports sites. These two Management Area Prescriptions are displayed in Chapter III of the Forest Plan.

CONTENT CHANGES

Several changes were made in the content of the Forest Plan and EIS documents. The changes are the result of public comments, reflect new data, and identified the need to add resource-specific information for clarification of management's concerns.

On December 31, 1983, wilderness was withdrawn from mineral entry and leasing except where valid mineral rights existed prior to January 1, 1984. Lands not recommended for wilderness designation will be managed as non-classified lands.

Some commentators disagreed with data or analysis displayed in the Draft EIS. These are considered opposing views under the NEPA regulations. Opposing views have been incorporated throughout the Final EIS. The responsible official will consider these opposing views when making a final decision. Opposing views resulting from public review and comment on the DEIS that have been added to the Final EIS include:

- current management should be continued.
- alternative C strikes a better balance between timber supply and demand and has more wilderness recommended.
- Plan emphasizes timber and new roads--this is wrong; emphasis should be on recreation.
- standards and guidelines and general direction are too general to provide adequate guidance to the land manager.
- winter range habitat for deer and elk should not be treated as single entities, they are different.
- allow motorized access to fight fires in wilderness.
- need more grazing in our public lands to balance the plight of ranchers whose land is overgrazed by wildlife.
- criteria are subjective and spell out only the justification for prohibiting leasing and give no guidelines for making decisions favorable for mineral leasing.
- areas identified as having energy and mineral potential should influence other resource decisions.
- there should be more planning for nonmotorized recreation because of increased demand.
- no new ski area sites should be considered until existing areas have expanded to capacity.

- oppose development at Quail Mountain.
- support development at Quail Mountain.
- open more areas to motorized use.
- allow off-road vehicles in more areas.
- too much motorized area is available now.
- Timpas Research Natural Area does not represent Kuchlers K-65 (Grama-Buffer Buffalo Grass) well.
- clearcutting, new roads, and ski areas will adversely effect wildlife and permit adverse human impacts.
- timber harvest levels are too high.
- timber harvest levels are too low.
- timber stands should be managed in uneven-aged stands.
- more roads, more management and more water impoundments are needed to improve the quality of life.

The significant changes in content made in the EIS and Plan centered on relatively few subjects. These changes are highlighted in the following major categories:

Land Ownership Adjustments and Acreage Recalculation

Net gain in land acreage for the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands since release of the Proposed Forest Plan and Draft Environmental Impact Statement is 7,337 acres. The majority of these lands, 6,906 acres, were acquired by transfer of administrative jurisdiction of lands at Twin Lakes on the Leadville District, San Isabel National Forest. Administrative jurisdiction of these lands was transferred from the Department of the Interior, Bureau of Reclamation, to the Department of Agriculture, Forest Service. The order transferring jurisdiction became effective upon publication in the Federal Register on December 13, 1983 (Fed. Reg., Vol. 48, No. 240).

The remaining gain in net land acreage of 431 acres has been through various land adjustment activities such as purchases, exchanges and resurvey of National Forest and National Grassland boundaries.

Acreage for Lost Creek Further Planning Area was recalculated. It was found to be 20,723 acres; 2,277 acres less than the acreage displayed in the DEIS.

FORPLAN Update

Because of recent technological advances in FORPLAN analysis techniques, the Forest updated and reran the FORPLAN benchmarks and alternatives. When doing this, the opportunity was available to improve and update the Forest planning data base through the use of the Resource Information System (RIS) District data bases. The RIS data base was combined with the planning data base which was used to develop the DEIS and Proposed Plan.

Major enhancements were made in the previous FORPLAN data set. For example, timing and treatment options were added for all tree species. Forage and recreation yield tables were improved through the use of age values (older tree stands are more valuable for recreation purposes because of their attractiveness, diversity and screening ability; conversely, a younger tree stand is more valuable when computing range values because more forage grows under the younger stand). Additionally, timber prices, forage and recreation values were changed to reflect more current information. Constraints limiting management on slopes over 40 percent were removed.

Also, cubic foot to board foot conversion factors were corrected from approximately 5:1 to approximately 3.3:1. This means that a greater number of acres must be entered to produce the volume of timber estimated to meet demand which was shown in the DEIS and Proposed Plan. This change is reflected in all tables through the documents which address acres treated.

Additional or more detailed information and documentation on FORPLAN is available from the Forest Supervisor's Office in Pueblo.

Economic Analysis

In the FEIS, Alternative C moved ahead of Alternative A in Present Net Value (PNV). This is a result of several factors that changed during preparation of the Final Forest Plan. In Alternative A, specific acreage constraints were used, by type, to create better vegetation diversity. This increased diversity conforms to the goals of Alternative A providing better wildlife habitat diversity, fiber production and visual resources. Creating this diversity required managing lower valued species without an equal reduction in cost, and therefore, a lower PNV. In the DEIS, Alternative A did not use specific acreage constraints, only economic efficiency was considered. (See FEIS, Chapter II for a more detailed discussion.)

Dispersed recreation values, timber values and costs were also changed between the DEIS and the FEIS. Constant 1978 dollars were assumed in the FEIS while real price increases were used in the DEIS.

Timber Management and Cutting Methods

There has been general misunderstanding of timber management's role in meeting Forest-wide goals and objectives in the management of other resources. The reasons for using different cutting methods or regeneration techniques was also not understood. The final documents contain an explanation of the role of vegetation treatment and the silvicultural measures necessary in achieving and maintaining healthy forest conditions. There is also a discussion of how this can be done through a combination of both "commercial" timber harvests and "non-commercial" methods of treatment. The importance of vegetation and its relationship to other resources on the Forest has been highlighted. Alternatives in Chapter II have vegetation treatment goals. Chapter III displays current vegetation conditions and what will happen to the vegetation with and without treatment. Chapter IV displays how vegetation treatment contributes to a healthy Forest. Vegetation treatment contributions to other resources are displayed in Chapter IV. Some goals were reworded and new goals added to clarify management direction.

Timber Management and Wildlife

There was a concern that an increased timber program would be detrimental to wildlife.

Commentors felt clearcutting, construction of new roads and their use, and the increased harvest levels will adversely affect wildlife. Chapters III and IV of the EIS have been expanded to provide a more detailed discussion of wildlife habitat requirements as well as the consequences of vegetation treatments on these habitats.

Wilderness Act of 1964

The Wilderness Act of 1964 (P.L. 88-577) provided that all components of the National Wilderness Preservation System would be withdrawn from mineral entry and leasing, subject to valid existing rights, on December 31, 1983. This change addresses, in part, public concerns about mineral activity in designated wilderness. Additionally, it is reflected in the alternative descriptions, in the discussion of impacts of mineral activity in wilderness, and in the mineral discussions in Chapters III and IV.

Oil and Gas Leasing

This has become an issue, in part, because of the presentation in the Draft EIS. People were not generally aware that laws and regulations make all but a very few acres of National Forest System land available for oil and gas leasing. It appeared to people that the Forest Service was suddenly planning to lease

most of the National Forest. In fact, the planning process included oil and gas leasing in the overall analysis of resources and uses to determine where this activity is in conflict with other resources and where other resources may be in conflict with potential oil and gas leasing activities. Analysis has shown that potential conflicts that cannot be mitigated through specific management practices occur on a low percentage of National Forest System lands. The Plan simply discloses that a high percentage of lands are available for oil and gas leasing based on potential environmental effects. The Plan does not recommend that any of these lands be leased. It does establish criteria for case-by-case use in recommending oil and gas leasing availability. The Forests' recommendation to BLM for leasing or not leasing is based on the results of site specific analysis and the criteria.

Since December 31, 1983, provisions of the 1964 Wilderness Act require designated wilderness to be withdrawn from mineral entry and leasing except where prior valid mineral rights exist.

Wilderness Study Areas

A number of people were concerned with the proposed addition of Wilderness Study Areas as wilderness. Some of the reasons given for not wanting additional wilderness were:

- existence of private lands.
- unpatented mining properties.
- potential for minerals.
- future ski areas.
- inability to fight fires effectively.
- no need for additional wilderness.
- potential loss of multiple use values.
- may need power transmission lines through these areas.

Some commentators and groups submitted wilderness proposals to be considered in alternative analysis. Atlantic Richfield Company proposed to modify the Sangre de Cristo Wilderness Study Area boundary. Their proposal included lands which total somewhat less than the Congressional Wilderness Study Area. They provided information to the Forest Supervisor and the Region's proprietary minerals information officer in support of their proposal. This information was reviewed as part of the deliberations regarding the Sangre de Cristo Wilderness Study Area suitability recommendation.

Many other commentors expressed concerns that not enough Wilderness Study Area acreage was being recommended as suitable for inclusion in the National Wilderness Preservation System. Commentors felt that Forest Service reasons for an unsuitable recommendation for the Buffalo Peaks Wilderness Study Area were not justified. Because of the public concern expressed and after reanalysis of the area, 36,000 acres of the Buffalo Peaks Wilderness Study Area has been recommended suitable for wilderness.

The Colorado Open Space Council (Denver, Colorado) devoted a significant amount of time and effort in preparing a wilderness proposal for the Sangre de Cristo Wilderness Study Area. Their proposal which expanded the Study Area was considered, however, it was not evaluated in detail because the Forest Service does not have authority to study an alternative outside of the current Wilderness Study Area boundary identified in the Colorado Wilderness Act of December 22, 1980, Public Law 96-560. Section 105(a) in the Act is specific in identifying the areas to be studied as those lands depicted on the June 1980 maps.

Section 107 in the Act has clear direction that the RARE II review and evaluation has been completed. As a result, there will be no additional National Forest System lands in the State of Colorado studied for the purpose of determining their suitability for inclusion in the National Wilderness Preservation System unless authorized by Congress. This refers to lands not currently designated as a Further Planning Area or Wilderness Study Area under the Act.

Two additional alternatives were added for the Lost Creek Further Planning Area to meet NEPA requirements as well as in response to comments received during the public comment period for the Proposed Forest Plan and DEIS. These alternatives were developed and considered to provide an opportunity to examine for selection: an alternative that would include the entire Lost Creek Further Planning Area (20,723 acres) for inclusion in the National Wilderness Preservation System; and, an alternative that proposed the Lost Creek Further Planning Area for wilderness designation with a boundary modification. The boundary modification would encompass 10,561 acres of the eastern part of the FPA that is proposed as suitable for wilderness designation. These alternatives are described in the Lost Creek FPA report, Appendix C. All of the Lost Creek Further Planning Area is recommended as suitable for wilderness in Alternative C of this FEIS.

Descriptions of the alternatives considered in the WSA and FPA reports have been expanded. Management Area Prescriptions allocated to these areas are more fully described. This provides a better understanding of how these areas will be managed under all alternatives. The additional discussion of the alternatives ties alternative management strategy for the WSA's and FPA directly to the Forest Plan alternative.

The Management Area Prescriptions assigned to the WSA's and FPA in the different alternatives and the effects of those prescriptions are discussed in detail in Chapter IV of the WSA and FPA reports. Recommendations for wilderness designation have also been revised in these reports, primarily in response to comment received at public hearings held on the Wilderness Study Areas and to comments received during the public comment period on the Proposed Forest Plan and DEIS.

The reader is encouraged to review Appendix C of this Final EIS. This appendix contains reports on the Sangre de Cristo, Buffalo Peaks, Spanish Peaks and Greenhorn Mountain Wilderness Study Areas and the Lost Creek Further Planning Area. The purpose of these reports is to display the analysis used to develop a recommendation on the suitability or unsuitability of the WSA's for inclusion in the National Wilderness Preservation System, and consideration of the areas for all uses including wilderness within the Forest Land and Resource Management planning process. These reports also disclose the expected environmental consequences of implementing the alternatives described in the reports

Quail Mountain Potential Winter Sports Site

This area has become a major issue in the Twin Lakes area with people divided both for and against development.

Those opposed to any Quail Mountain development cited the following as support for their position:

- development would be detrimental to elk herds in the area;
- not enough water for snow making;
- area lacks adequate and dependable snowfall;
- would destroy historical and other cultural resources; and
- the scenic and natural beauty of the Twin Lakes area would be degraded by commercial development of a ski area.

Those expressing support for development cited the following:

- clearing for ski runs should provide additional forage for elk herds;
- development can be accomplished with care to share the beauty of the area with more people;
- provide needed employment;

- broaden the tax base for Lake County; and
- enhance year-round recreation activities.

Forest Service policy in providing development opportunity for winter sports sites (downhill skiing) is to maintain the opportunity for expansion or new construction by the private sector to meet public needs. Current management emphasizes providing for expansion of existing developed ski areas. The Forest Service in the Rocky Mountain Region does not actively encourage new development, but responds to proponent interest on a case-by-case basis. Quail Mountain has been allocated to Management Area 1B-2 which provides management direction and emphasis for potential winter sports sites.

The Plan (Alternative A) displays the priority for development of the Quail Mountain site as Priority 2 (as shown in the Rocky Mountain Regional Guide). Regional Guide direction schedules allocated winter sports sites for development based on a priority system. Priority 1 sites will be scheduled for consideration before any allocated Priority 2 sites. Expansion of existing ski areas and areas served by existing resort and support facilities are considered first.

The Forest Plan provides for development of inventoried winter sports sites in Regional Priority Level 1. The Rocky Mountain Regional Guide defines Priority 1 sites as including the following:

- a) Those sites that have already been committed to project planning (sites for which there is an agreement to study development).
- b) Existing permitted areas with potential for expansion (either within or adjoining the permitted area).
- c) Proposals for new sites rated good that are served by existing ski areas or resort communities and that have an adequate road system, as well as either adequate air or rail service to accommodate expected use.

Expansion would be allowed for existing areas (Geneva Basin, Pikes Peak, Cooper Hill, Cuchara Valley Resort, Conquistador and Monarch), to their capacity.

Applications for development of proposed winter sports sites will be considered in accordance with Regional Guide standards and guidelines for scheduling development of allocated winter sports sites. In response to concerns expressed by commentators on the Proposed Forest Plan and DEIS the following guidelines will be followed. Preference will be given to Priority 1 sites in scheduling proposed developments of allocated winter sports

sites. Use trend projections based on actual use at existing areas will be used for determining when applications will be considered.

Another issue involved in scheduling consideration of development applications is overall regional ski area capacity. A goal of the Regional Guide for the Rocky Mountain Region, through 1990, is to provide an increase of no more than 132,000 skiers-at-one-time (SAOT) for a Regional total of 229,370 SAOT.

All applications will be considered in accordance with the National Environmental Policy Act.

Timber Management in Lake County

Many people were concerned that planned timber harvest in Lake County was too high and would increase water yields in streams already carrying too much water. There was also concern by residents of the area that the planned cutting for increased water yields in the higher elevations would detract from recreation and esthetic qualities, adversely affecting the recreation and tourist industry in Lake County. The timber harvest program in Lake County has been substantially reduced. In addition, in the Final Plan and EIS, the 9B Management Areas, which emphasize water yield increase, adjacent to the Holy Cross Wilderness have been changed to 2B Management Areas which emphasize roaded natural recreation.

ALTERNATIVES

INCLUDING

THE PROPOSED ACTION

CHAPTER II

ALTERNATIVES INCLUDING THE PROPOSED ACTION

OVERVIEW

This Chapter discusses the alternatives explored in the planning process. It describes and compares the alternatives analyzed in the Forest planning process, including the Proposed Action. The section, Criteria Used to Develop Alternatives, explains the regulations and requirements in both the National Environmental Policy Act (NEPA) and the National Forest Management Act (NFMA) governing development of alternatives. The section also discusses considerations that remained constant in all alternatives and the role of economics in alternative formulation. The section, Benchmark Analysis, describes the benchmark levels and their quantitative analysis. This is used to define the decision space used in formulating alternatives.

The section, Alternatives Considered and Eliminated from Detailed Study, describes the alternatives that were considered in the planning process and eliminated from detailed study, and gives reasons for their elimination. The section, Alternatives Considered in Detail, describes the range of alternatives considered reasonable for detailed analysis. This includes the Proposed Action. The alternatives are summarized with emphasis, land use allocations, and the expected future condition of the Forest.

This chapter concludes with a Comparison of Alternatives and Environmental Consequences, which displays the anticipated effects of implementing the alternatives considered in detail, a Summary of How Planning Questions Are Addressed By Alternative, and a Comparison of Alternatives through Ranking by Present Net Value (PNV).

CRITERIA USED TO DEVELOP ALTERNATIVES

National Environmental Policy Act (NEPA) regulations (40 CFR 1502.14) require rigorous exploration and objective evaluation of all reasonable alternatives to the Proposed Action, including a no action alternative, as well as alternatives not within the jurisdiction of the agency. The NEPA regulations also require the identification and discussion of alternatives eliminated from detailed study.

In the Forest Service planning process, each alternative is a particular combination of management prescriptions which covers all acres on a National Forest and which relates to an overall philosophy of management. Each combination establishes a different management emphasis, for example, an emphasis on wildlife habitat improvement and water yield. Many combinations of prescriptions are possible in formulating a reasonable range of alternatives for the Forest Plan.

The National Forest Management Act (NFMA) regulations, [36 CFR 219.12(f)] establish criteria for guiding the development of alternatives. These criteria are.

- Each alternative will be capable of being achieved
- A no action alternative will be formulated that is the most likely condition expected to exist in the future if current management direction would continue unchanged.
- Each alternative will provide for the orderly elimination of backlogs of needed treatment for the restoration of renewable resources as necessary to achieve the multiple use objectives of that alternative.
- Each identified major public issue and management concern will be addressed in one or more alternatives. Public issues and concerns and resource management opportunities have been combined and are expressed as Planning Questions in this document.
- Each alternative will represent to the extent practicable the most cost efficient combination of management practices examined that can meet the objectives established in the alternative.

The NFMA regulations, [36 CFR 219.12(f)(9)], also require that each alternative state:

- The condition and uses that will result from long-term application of the alternative.
- The goods and services to be produced, and the timing and flow of these resource outputs, together with associated costs and benefits.
- Resource management standards and guidelines.
- The purposes of the management direction proposed.

In order to comply with NEPA regulations for rigorous examination of alternatives and the NFMA criteria for alternatives listed above, each alternative was developed step-by-step, using information derived from the NFMA planning process.

In addition to the alternatives developed through the NFMA planning process, other alternatives were considered in response to NEPA requirements. These included alternatives that are realistically beyond the jurisdiction of the Forest Service. They are discussed in the section entitled Alternatives Considered and Eliminated from Detailed Study.

Federal agencies are required to include and discuss appropriate measures to mitigate adverse environmental impacts (40 CFR 1502.14 and 16).

"Mitigation includes the following possibilities for dealing with adverse environmental impacts:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments." (40 CFR 1508.20)

Chapter III, Management Direction, of the Forest Plan contains goals, objectives and management requirements necessary to achieve these goals and objectives. Management requirements are presented in two sections. The first section contains Forest direction which details overall management requirements that must be followed during implementation of the Plan. The second section includes management prescriptions detailing the management requirements for specific land areas of the Forest called management areas. The management requirements listed in Forest Direction are applied in addition to the management requirements for individual management areas. On any given land, both Forest Direction and one management prescription are being followed. Individual management areas are identified on the management area map attached to the Forest Plan. The alternatives presented in this Final EIS were formulated using different combinations of management areas and associated management requirements. Mitigation measures were incorporated into the management requirements. The management requirements set the baseline conditions that must be maintained throughout the Forest in achieving the goals and objectives of the Forest Plan. They establish the environmental quality requirements, renewable and depletable resource use standards, and mitigating measures that apply to all areas of the Forest.

After the Draft Environmental Impact Statement for the Pike and San Isabel National Forests Land and Resource Management Plan was completed, the Rocky Mountain Region formulated some uniform management prescriptions for management areas to be applied throughout the Region. This was done to insure a degree of uni-

formity among Forests in dealing with similar land types, public issues and management concerns, and resource management emphasis. They also serve to facilitate management and public understanding by high-lighting similarities or differences among Forests through consistent use of terminology, format and prescription numbering. Each individual Forest modified the uniform prescriptions as needed to address unique situations at the Forest Level.

This Final EIS and accompanying Forest Plan use the uniform prescriptions, as modified, to address the local situation.

The Formulation of Alternatives (Planning Action 5) is the culmination of Planning Actions 1 through 4 of the NFMA planning process. A summary of steps used on the Pike and San Isabel National Forests to complete Planning Actions 1 through 5 is described below.

- Step 1 Major public issues were identified through public involvement and coordination with other local, State and Federal agencies. Management concerns were also identified through an internal analysis.
- Step 2 Public issues and management concerns were consolidated into a set of general planning questions which would guide subsequent steps.
- Step 3 Multiple use management prescriptions, representing sets of compatible management practices, were designed to answer planning questions in an economically efficient manner.
- Step 4 Data was collected, assembled, and stored in the Forest resource data base.
- Step 5 Potential locations for applying the management prescriptions were identified through site-specific capability and suitability analysis.
- Step 6 Potential production levels, which reflect the environmental response of the land to management prescriptions, were estimated for each resource through benchmark analysis. Benchmark levels defined the range within which alternatives could be developed.
- Step 7 Potential demand and supply levels were estimated for the various resources. Indications of the need to change management direction as well as opportunities to change future emphasis were identified.

- Step 8 A broad range of possible alternatives were developed. These alternatives address the needed changes in management direction. Each alternative reflected a unique set of objectives for resource management which responds to planning questions differently.
- Step 9 A linear program model (FORPLAN, see Appendices D and E) was used to help estimate the goods and services that could actually be produced by each alternative. The model is a mathematical process that determines the most cost-efficient mix of prescriptions which achieves a desired goal. The model schedules outputs and costs over time. The FORPLAN model was run to determine the allocation of prescriptions and scheduling of outputs which would satisfy the objective for each alternative in an economically efficient manner.
- Step 10 Following the FORPLAN analysis, the resulting solutions were transferred to maps by Forest personnel. During this process, the feasibility of the FORPLAN solution was tested. In some instances, the FORPLAN solution might call for harvesting a small and isolated portion of an analysis area which would not result in a viable timber sale. In other cases, it became apparent that management conflicts, such as timber harvest in highly erodible watersheds, made the solution undesirable. To resolve these problems, constraints were added to the FORPLAN model and it was rerun.
- Step 11 The results of the constrained FORPLAN solutions were again spatially allocated by Forest personnel to test for feasibility.
- Step 12 Steps 9 through 11 were repeated as necessary to arrive at an acceptable set of alternatives which produces the desired outputs and meets the established direction.

A variety of alternatives was considered in the planning effort, including those considered and eliminated from further study, and those considered in detail. There were five alternatives considered in detail in this Final EIS. Those alternatives eliminated from detailed study were carried through the above steps until it became clear that the alternative was not appropriate for detailed study.

CONSIDERATIONS THAT REMAINED CONSTANT IN ALL ALTERNATIVES

Several types of past and proposed land use and allocation decisions remained constant in all the alternatives formulated and considered in detail. They are discussed below. In addition, a discussion of the criteria used to make wilderness suitability determinations in each of the alternatives considered in detail also follows.

Mineral Withdrawals

Withdrawals from mineral entry under the 1872 Mining Law refers to the segregation of Federal lands from prospecting, location, entry, or purchase of minerals under the mining laws of the United States. *Withdrawals from mineral leasing under the 1920 Leasing Act* refers to the segregation of Federal lands from mineral leasing under the mineral leasing laws of the United States.

There are 354,734 acres of National Forest System lands that are withdrawn from mineral activities on the Pike and San Isabel National Forests. Of this total, 266,278 acres are withdrawn from all mining activities under both the Mineral Leasing Act of 1920 and the Mining Law of 1872 and the Wilderness Act. Section 4 (d) of the 1964 Act states in part, "no patent within wilderness areas designated by this Act shall issue after December 31, 1983, except for the valid claims existing on or before December 31, 1983" and "subject to valid rights then existing, effective January 1, 1984, the minerals in lands designated by this Act as wilderness areas are withdrawn from all forms of appropriation under the mining laws pertaining to mineral leasing and all amendments thereto."

There are 229 Forest Service withdrawals within the Pike and San Isabel National Forests that have segregated areas of Federal land from settlement, sale, location, mineral entry, or leasing under some of the public land laws. Withdrawals are requested by the Forest Service and/or other agencies for the purpose of limiting activities under public land laws in order to maintain other resource values in the area, or reserving the area for a particular public purpose or program.

As required by the Federal Land Policy and Management Act of 1976 (43 USC 1701), the review of the existing 229 Forest Service withdrawals on the Pike and San Isabel National Forests will be accomplished as follows: 10 in 1984, 41 in 1985, 43 in 1986-1987, and 59 in 1988-1989. Areas withdrawn by other agencies are scheduled for review by 1991. Formal withdrawal reviews do not include congressionally designated watersheds or wildernesses. Withdrawn areas were given the same consideration on each alternative. Table II-1 shows areas withdrawn from mineral entry.

Table II-1. AREAS WITHDRAWN FROM MINERAL ENTRY

AREA	AUTHORITY	ACRES	REMARKS
Administrative Sites	Act of 6/4/1894 EO 10355	1,743	
Air Force Academy	EO 10355	8,858	
Recreation Sites	"	40,217	Picnic, campgrounds, ski areas, overlooks, organization camps, scenic zones, geo- logical areas
Research Natural Areas (Executive Order 010355)	"	1,000	Hurricane Canyon, Saddle Mountain
Experimental Forest	"	14,812	Manitou
Bureau of Reclamation	Act of 6/17/02	16,457	Forest-wide
Watershed Agreements	Act of 2/27/13	9,505 4,722	City of Colo. Springs City of Manitou
Wilderness	PL 88-577 PL 96-560	257,420	By the Wilderness Act of 1964 and the Colorado Wilderness Act of 1980.
TOTAL		<u>354,734</u>	

WITHDRAWN FROM MINERAL LEASING

Collegiate Peaks Wilderness	PL 88-577 PL 96-560	81,450	acres
Holy Cross Wilderness		9,020	acres
Lost Creek Wilderness		106,000	acres
Mt. Evans Wilderness		34,950	acres
Mt. Massive Wilderness		<u>26,000</u> 257,420	acres acres
Air Force Academy		<u>8,858</u>	acres
TOTAL		266,278	acres

Resource management requirements applicable to mineral activities on unclassified National Forest System lands are contained in the Forest Direction section in Chapter III of the Forest Plan. Mineral Stipulations for mineral leasing for lands under jurisdiction of the U.S. Department of Agriculture are displayed in Appendix F of the Forest Plan. Site specific stipulations for mitigation will be assigned when operating plans or lease applications are received. Additional discussion of minerals, areas withdrawn from mineral entry and leasing, and mineral occurrences is contained in Chapters III and IV of this FEIS. These mineral withdrawals were determined to be appropriate at this time and were considered as constants for each alternative considered in detail.

Special Areas

Approximately 392,784 acres of the Pike and San Isabel National Forests (figure includes the Arapaho National Forest portion of the Mt. Evans Wilderness) are subject to special laws, regulations, executive orders and public land orders. These areas have specific management requirements and restrictions which limit the kind and extent of resource management activities that can be carried out within their boundaries.

These land use allocations include:

- Wilderness
- Research Experimental Forest
- Research Natural Areas
- Scenic Areas
- National Natural Landmarks
- National Historic Landmarks
- National Recreation Trails
- National Fish Hatcheries
- U.S. Air Force Academy
- Wilderness Study Areas

A review of these land use allocations in the Forest planning process determined them to be appropriate; consequently, they are carried forward into the Forest Plan and were considered constant in all alternatives considered in detail. Abyss Lake and Lost Creek Scenic Areas were included in lands designated by Congress in the Mt. Evans and Lost Creek Wildernesses. Wilderness designation will preserve the outstanding scenic attractiveness of these areas, so dual designation as scenic areas is not necessary. These Scenic Areas have been declassified. The Fremont Experimental Forest was disestablished and these lands have been returned to the National Forest System for the full range of multiple use management activities.

Additional information regarding special recreation areas is contained in Chapter III of this EIS and in Planning Action 4, Analysis of the Management Situation. This document is available for review at any Pike and San Isabel National Forests' office.

Wild and Scenic River Segments

Three inventoried Wild and Scenic River Segments were analyzed during the planning process. The analysis determined each segment's eligibility for further suitability determination and recommendation for inclusion into the National Wild and Scenic River System. A more detailed explanation of this eligibility evaluation is contained in Appendix F. The results of the eligibility analysis are:

<u>River Segment</u>	<u>Eligible for Suitability Analysis</u>
Portions of the South Platte River	Yes
Portions of the Cimarron River	No
Portions of Badger Creek	No

This determination was constant for all alternatives considered in detail.

Eligibility criteria and the determination for each inventoried river segment are:

	<u>South Platte</u>	<u>Badger</u>	<u>Cimarron</u>
Free flowing natural condition	Yes	Yes	No (Only 20 days/yr)
Long enough to provide a meaningful experience	Yes	No	Yes
Sufficient volume of water	Yes	No	No
Outstandingly remarkable and pleasing to the eye	Yes	No	No
High quality water or potentially restorable to this condition	Yes	Yes	Yes

The suitability analysis for portions of the South Platte River will be carried out after completion of the Forest Plan. The potential Wild and Scenic River segment has been identified on all

alternative maps and a management corridor delineated. Management prescriptions assigned to areas including this corridor are compatible with its management as a Wild and Scenic River. Management direction for this corridor contained in the Forest Direction section of the Forest Plan will guide its management until a legislative proposal is made by the Forest Service and Congress acts on the proposal. If the Wild and Scenic River segment is not designated by Congress, the management requirements for each management area that the corridor passes through will be implemented within the corridor.

ECONOMIC EFFICIENCY

In formulating alternatives, NFMA regulations [219.12(f)(9)] require that each alternative must represent to the extent practicable the most cost-efficient way of accomplishing the goals that were established for it. This involves the use of economic analysis at several stages of the process. The first stage incorporating economic concepts was in formulating prescriptions. These comprise the building blocks of alternatives composed of specific management practices to be applied on specific vegetation areas. The sets of management practices to be included in each prescription were formulated by resource specialists working in an interdisciplinary mode. Consideration was given to those practices that would best accomplish the stated objectives of the prescription. Where more than one practice was available, the most cost-efficient one was selected.

Economic analysis played an important role in selecting the mix of management prescriptions to be applied in each alternative. This was initially accomplished through the FORPLAN Model, which was run under the objective function of maximizing present net value. Given that two prescriptions would both be able to satisfy the pertinent constraints, the most cost efficient prescription would be applied.

Once FORPLAN produced a tentative allocation of prescriptions, members of the management team mapped it into a manageable Forest configuration. Once again, economic efficiency was a major criterion, especially as it relates to access, transportation system design, and administrative costs.

Once prescriptions were allocated, those outputs and costs associated with the alternative, but not included in the FORPLAN model, were estimated. These costs and outputs were aggregated with those generated by FORPLAN and analyzed to determine the overall economic efficiency of each alternative. Two economic parameters, present net value (PNV) and a benefit cost ratio (B/C) were calculated for each alternative. (See Table II-8). These two parameters are indices of economic efficiency.

Present net value represents the total discounted benefits of an alternative less its total discounted cost. That alternative with the greatest PNV is the most efficient from an economic perspective. The difference in PNV's between alternatives represents the opportunity cost associated with imposing different allocations of prescriptions to the Forest which result in different levels of outputs and costs.

Benefit cost ratios were computed by dividing the total incremental discounted benefits by the total incremental discounted cost for each alternative. A B/C greater than 1 (one) indicates that benefits associated with an alternative exceed its cost.

The present net value (PNV) of an alternative represents its economic efficiency in terms of those benefits and costs which may be monetarily valued. This economic parameter disregards those intangible effects which cannot be assigned monetary values. A more comprehensive measure of the worth of an alternative is its net public benefit (NPB). Net public benefits encompass both the tangible and intangible benefits and costs of an alternative. In addition to the monetary values associated with resources such as timber and grazing, qualitative considerations such as visual quality, wildlife habitat diversity and community stability are considered. Additionally, conditions which ultimately have economic dimensions such as fuel reduction and soil erosion are also subjectively incorporated in this parameter. Alternatives also impact the ability of local communities to experience economic growth and may contribute to decreasing unemployment in certain situations. Since net public benefits consider all tangible and intangible factors as well as monetary benefits and cost, it most closely measures the desirability of implementing an alternative.

The goals of each alternative are reflected in the mix of tangible and intangible benefits and costs it produces. This mix represents the net public benefits of each alternative. In order to produce some of these benefits, constraints are imposed. The constraints placed on each alternative are reported in Appendix D. These constraints represent opportunity costs if they negatively impact the PNV of an alternative.

However, these constraints were applied in order that intangible benefits might be produced, or that intangible costs could be avoided. The opportunity costs associated with these constraints, in turn, represent part of the cost of attaining the public benefits of the alternatives.

BENCHMARK ANALYSIS

Benchmark analyses were done to derive reference points against which Forest alternatives could be compared, and to define the range within which feasible alternatives could be constructed. Benchmark levels are the results of a systematic, objective analysis, oriented toward defining the range of outputs and expenditures which represent the decision space. Table II-2 displays the range of average annual outputs and expenditures for

all benchmarks used in formulating alternatives.

Since benchmarks were not constrained by policy, they provide a basis for identifying the opportunity cost associated with policy constraints.

Table E-1, Appendix E displays the cost efficiency and levels of resource outputs from the various benchmarks.

Table II-2 Range of Average Annual Outputs And Expenditures for All Benchmarks Used in Formulating Alternatives.

OUTPUTS	Lower Bound <u>1/</u>		Upper Bound <u>2/</u>	
	Period I	50 Years	Period I	50 Years
Timber (MMBF)	0	0	113.6	113.2
(MMCF)	0	0	35.9	42.1
Range (MAUM)	0	0	240.0	259.0
Recreation				
Dispersed (MRVD)	2280	5276	8073	8868
Developed (MRVD)	0	0	2570	3814
Winter Sports (MRVD)	0	0	816	3878
Wilderness (MRVD)	188	375	685	685
Wildlife (Thousand Acres Treated)	0	0	100	100
Water Yield Increase (MAF)	0	0	4.8	4.0
Expenditures (MM\$) <u>3/</u>	0.7	1.0	20.7	17.3

1/ Lower Bounds defined by minimum level benchmark.

2/ Upper Bounds defined by respective maximum resource benchmark.

3/ Lower Bounds - Minimum Level Benchmark: Upper Bound - Maximum Timber Benchmark

Dollar values used in the economic analysis are based on a "willingness to pay" for those resources, which may differ from the price actually charged. RPA values and values calculated for use in the Rocky Mountain Regional Guide and Forest Plans were assigned to most outputs. The values for timber were based on actual data from timber sale reports (also "willingness to pay").

Prices were calculated for each of the major species categories on the Forest. Table II-3 displays the base year values used and their sources.

Minimum Level (Benchmark #1)

The purpose of the minimum level benchmark is to estimate naturally occurring outputs and costs of maintaining the Forest as a part of the National Forest System, so controllable outputs and discretionary costs can be identified.

Identification of the unavoidable costs and incidental benefits provide a baseline for analysis from which incremental outputs, benefits and costs may be identified and distinguished both within and between alternatives.

Minimum level is a Forest-wide management strategy that would meet only the following statutory requirements: administration of unavoidable non-discretionary land uses, prevention of impairment of the productivity of the land and protection of the life, health, and safety of incidental users. The sum of these activities defines the long-term fixed costs of public ownership.

This benchmark provides a base for comparing the incremental costs and benefits of those alternatives considered in detail. This insures that the economic parameters used in evaluating alternatives are the result of a true incremental analysis in which uncontrollable benefits and costs are not a factor. This benchmark also defines the lower bounds for the production of all resources tracked in the Forest planning process for all alternatives considered in detail.

TABLE II-3 Resource output values used in PNV analysis
(1978 First Quarter Dollars)

<u>SOURCE</u>	<u>RESOURCE</u>	<u>OUTPUT MEASURE</u>	<u>VALUE</u>
	<u>RANGE</u>		
RPA	Forage	AUM	10.50
	<u>RECREATION</u>		
Forest	Dispersed Rec includes wildlife/ fish/nature study	RVD	5.00
RPA	Developed Rec	RVD	3.00
RPA	Wilderness	RVD	8.00
RPA	Winter Sports	RVD	3.00
	<u>TIMBER</u>		
R-2	Aspen	MBF	21.50
	Aspen	MCF	82.00
R-2	Douglas-fir	MBF	19.00
	Douglas-fir	MCF	53.00
R-2	Lodgepole Pine	MBF	22.00
	Lodgepole Pine	MCF	82.00
R-2	Ponderosa pine	MBF	19.00
	Ponderosa pine	MCF	53.00
R-2	Spruce/fir	MBF	21.00
	Spruce/fir	MCF	73.00
	<u>WATER</u>		
R-2	Water Yield	Acre Foot	19.70
	<u>WILDLIFE</u>		
Forest	Habitat Improvement	Acre	186.00

Additionally, the 50 year average annual expenditures of this benchmark (represented by undiscounted budget cost) of \$1.0MM defines the lower bound of expenditures considered in detail.

The minimum level benchmark is conceivably implementable by applying minimum level management to all areas of the Forest.

Maximum Present Net Value - Market Outputs (Benchmark #2)

This benchmark level derives from management direction which would maximize the present net value of only those outputs having an established market price. On this Forest, those outputs include timber, livestock and developed recreation (including commercial winter sports development). All of the Wilderness Study Areas and the Further Planning Area on the Forest were allocated to non-wilderness status.

The land allocation associated with this benchmark is capable of being implemented; meets the requirements of existing laws and regulations for wilderness, wildlife and water quality; and will not impair the long-term productivity of the land. Policy type constraints, such as nondeclining flow of timber products, specific rotation lengths, and old growth retention guidelines, were not applied, nor were budget constraints. Two timber land guides were used. The first was to insure an inventory at the end of the planning horizon capable of producing at long term sustained yield capacity. The second guaranteed the period's harvest to be within 25% of the previous period. Demand cut off points were employed to insure that the volume of all resources produced on the Forest would only be valued up to the point of projected demand. For example, in the first period, projected demand is 600 thousand animal unit months (MAUM). Any forage volume produced on the Forest in excess of 600 MAUM is considered in excess of demand and would not be valued.

This benchmark provided the conceptual basis for the Formulation of Alternative D, which stresses the production of resources with market values and unlike Benchmark #2, conforms to policies such as nondeclining flow, harvesting at the culmination of the mean annual increment and limiting clearcut size to 40 acres.

Maximum Present Net Value Market and Nonmarket Outputs (Benchmark #3)

This benchmark level derives from the set of management direction which would maximize the present net value of all outputs having an assigned monetary value. These outputs include timber, developed and dispersed recreation, wilderness use, range, water, wildlife and fish. All Wilderness Study Areas and the Further Planning Area were allocated to wilderness in this benchmark since this allocation contributes to maximization of PNV due to values associated with wilderness use.

The land allocation for this benchmark is capable of being implemented, meets the requirements of existing laws and regulations for wilderness, wildlife and water quality and will not impair the long-term productivity of the land. Policy-type use constraints, such as nondeclining flow, specific rotation lengths, and old-growth retention guidelines, were not applied; nor were budget constraints. The same constraints in terms of demand cut off points, first period harvest floor and sequential upper and lower bounds which were employed in the formulation of Benchmark #2 were also employed in this benchmark.

The primary value of this benchmark is to aid in identifying the opportunity cost associated with imposing policy and management constraints in the alternatives considered in detail. By comparing the present net value of any alternative to the present net value of this benchmark, the opportunity cost resulting from the constraints on each alternative can be determined.

This benchmark provided the conceptual basis for formulating Alternative A which provides for the production of both resources with market values and those without market values and which, unlike Benchmark #3, conforms to policies such as nondeclining flow, harvesting at the culmination of the mean annual increment and limiting clearcut size to 40 acres.

Maximum Timber Level (Benchmark #4)

This benchmark derives from the set of management direction which would maximize the production of timber subject to laws and regulations for wilderness, wildlife and water quality and without impairing the productivity of the land. A single resource emphasis is used to determine the actual biological potential of the Forest to produce timber. The resulting schedule of timber flows over time is the maximum that could be produced in the first decade subject to at most, a 25 percent variation per decade thereafter. A second step of the analysis involved holding this maximum level of timber volume constant for 24 decades and determining the most cost effective set of prescriptions that could be used to achieve it. Cost effectiveness was assured by setting timber outputs as right-hand-side constraints and rerunning the FORPLAN model with the objective of minimizing cost.

Policy-type constraints, such as nondeclining flow, specific rotation lengths, and old growth retention guides, were not imposed in this benchmark analysis; nor were budget or output constraints. Equivalent clearcut acre constraints were imposed to insure that soil productivity and water quality were not impaired. All land area classified as capable and available for timber production was identified as suitable for this purpose in this analysis.

The 50-year average annual timber output, of 133 MMBF from this benchmark defines the upper bound of timber production for all alternatives considered in detail.

Maximum Range Level (Benchmark #5)

This benchmark derives from the set of management direction which would maximize the production of livestock forage subject to laws and regulations for wilderness, wildlife and water quality and without impairing the productivity of the land. A single resource emphasis is used to determine the actual biological potential of the Forest to produce livestock forage. The resulting schedule of forage levels over time is the maximum total amount that could be produced in the first five decades. Timber was not allowed to vary more than 25 percent from the previous decade's harvest. Otherwise, no output or budget constraints were imposed, nor were policy-type constraints such as nondeclining flow, specific rotation lengths, or old-growth retention guidelines. A second step of the analysis involved holding these maximum levels of livestock forage constant for five decades and determining the most cost effective set of prescriptions that could be used to achieve it. This was accomplished by setting AUM production levels as right-hand-side constraints and rerunning FORPLAN with a minimum cost objective function. All land area classified as capable and available for livestock production was identified as suitable for this purpose in this analysis.

The 50-year average annual output of 259 MAUM's from this benchmark defines the upper bound of livestock grazing for all alternatives considered in detail.

Maximum Dispersed Recreation (Benchmark #6)

This benchmark provides for the maximization of dispersed recreation on the Forest. The current capacity of the Forest for dispersed recreation is 8073 MRVD's per year and increases to 9033 MRVD's by 2030.

The 50-year average annual output, in terms of dispersed recreation capacity, of 8868 MRVD's, defines the upper bound of dispersed recreation capacity for all alternatives considered in detail.

Maximum Developed Recreation (Benchmark #7)

This benchmark provides for the maximization of developed recreation on the Forest. This benchmark was incorporated in Alternative C up to the demand cutoff level.

The 50-year average annual output, in terms of developed recreation capacity of 3,814 MRVD's, defines the upper bound of developed recreation capacity for all alternatives considered in detail.

Maximum Winter Sports Level (Benchmark #8)

The maximum level of winter sports development allocates all of the inventoried winter sports sites on the Forest for development. This benchmark was incorporated in Alternative C.

The 50-year average annual output, in terms of downhill skiing capacity of MRVD's, defines the upper bound of downhill skiing capacity for all alternatives considered in detail.

Maximum Wilderness Level (Benchmark #9)

The maximum wilderness level is also reflected in Benchmark #3; all of the Wilderness Study Areas and the Further Planning Area on the Forest are identified as suitable for wilderness designation. The wilderness allocation of this benchmark was incorporated in Alternative C.

The wilderness capacity of 685 MRVD's defines the upper bound of wilderness recreation capacity for all alternatives considered in detail.

Maximum Wildlife Habitat Improvement (Benchmark #10)

Maximum wildlife habitat improvements, in terms of treating winter range and improving diversity, were also attained in Benchmark #3. The winter range allocation in this benchmark was incorporated in Alternatives A and C.

The 50-year average annual treatment of 12,500 acres of wildlife habitat defines the upper bound for all alternatives considered in detail.

Maximum Water Yield Level (Benchmark #11)

This benchmark derives from the set of management direction which would maximize the production of water.

The land allocation associated with this benchmark is capable of being implemented; meets the requirements of existing laws and regulations for wilderness, wildlife and water quality and will not impair the long-term productivity of the land. Policy-type constraints, such as nondeclining flow, specific rotation lengths, and old growth retention guidelines, were not applied, nor were budget or output constraints. One exception to this is that timber harvest was permitted to fluctuate up or down to a level no more than 25 percent of the harvest in the previous decade.

The 50-year average annual output of 4,000 MAF defines the upper bound of water yield for all alternatives considered in detail.

Definition of Decision Space

During formulation of alternatives the benchmarks were used to identify the maximum and minimum levels of outputs and expenditures within which alternatives considered in detail must fall to be feasible and implementable. These maximum and minimum levels of outputs and expenditures define the decision space within which the

attributes of an alternative must be located. Table II-2 shows the lower and upper bounds of the decision space.

ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED STUDY

This section discusses two alternatives considered but subsequently eliminated from further study. These were an alternative which departs from the base timber sale schedule, and an unconstrained minerals leasing alternative, which assumes all areas addressed in this EIS are available for leasing.

DEPARTURES FROM THE BASE TIMBER SALE SCHEDULE

Normally, planning alternatives utilize a base sale schedule where the timber harvest in a given period is equal to or greater than the harvest level in any previous period. This concept is referred to as "nondeclining flow" because the supply of timber products never declines during the planning horizon.

Departures are defined as alternatives which deviate from non-declining flow by scheduling a decline in timber volume at some point in the future. Often, future declines must occur to counterbalance a significant harvest increase scheduled in an early planning period.

Regulations addressing alternative formulation and analysis (36 CFR 219.16) direct departure alternatives be evaluated when one of the following conditions exist:

1. No other alternative provides a sale schedule that achieves the assigned RPA goals.
2. Losses from forest insects and diseases can be significantly reduced, or the forest age-class distribution improved by deviating from the base sale schedule.
3. Implementation of a proposed base sale schedule would cause substantial adverse impact on a community in the Forest's economic area.
4. There is reasonable expectation that overall multiple use goals could be better achieved with a departure alternative than with a typical base sale schedule.

In addition to the conditions stated above, the revised RPA statement of policy specifies that alternatives shall attain 90 percent of the average annual growth rate at the long-term sustained yield capacity (LTSYC).

The preferred alternative achieves a growth rate of 9,485,700 cubic feet (from suitable lands) in the year 2030. This represents 75

percent of the growth rate associated with the LTSYC (12,644,400 cubic feet annually from the same suitable lands). The basic reason for this growth disparity is the age-class distribution in 2030; approximately 50 percent of the forested stands are 120 years old or older.

Departure alternatives were considered in determining the maximum timber output alternative. Departure schemes were also considered in the maximum present net value benchmark alternatives, and for the preferred alternative. These departures (from base sale schedules) were not considered as alternatives to be evaluated in detail for the following reasons.

- Departure alternatives were not considered economically practical from the standpoint of present and future anticipated demands for wood fiber in the planning area, and extremely high roading requirements to access the timber lands. It was estimated that the benefits associated with departure schemes would not justify the costs considering the calculated present net value of the alternatives considered in detail. Should conditions change significantly in the future, departure from the base harvest schedule will be given additional consideration. At this time, however, no further consideration was deemed appropriate.
- Present productivity of much of the suitable timber land on the Forests is well below the sustained yield potential because it has not been in a managed condition for decades.
- In order to bring the growth rate of suitable timber land to 90 percent of the long-term sustained yield by the year 2030, it is estimated that over 75 percent of the existing sawtimber and poletimber stands would have to be regenerated (harvested) by that date. Since 81 percent of the Forest is currently in the sawtimber and poletimber size classes (suitable acres only), the environmental consequences of harvesting that much area in 50 years were considered prohibited to detailed analysis of such a departure.
- This scenario holds true for all alternatives due to the existing age class distribution of the suitable timber land.
- Departure alternatives may be biologically and physically feasible, but were not considered acceptable because of the adverse impacts they would have on other resources. Examples are: wildlife habitat diversity would be adversely affected; there would be unacceptable impacts to visual quality; and potential soil loss and stream sediment loading would be substantially increased.

UNCONSTRAINED MINERAL LEASING ALTERNATIVE

This alternative was not considered further between the Draft EIS and Final EIS. It was no longer a viable alternative considering the December 31, 1983 date for no leasing within wilderness requirement contained in the 1964 Wilderness Act.

The unlimited mineral leasing alternative assumes application of the availability criteria would result in a recommendation that all areas addressed in this EIS are available for leasing. Under this alternative the following acreages would be open to a full range of exploration and development activities.

Wilderness	257,420 Acres
Wilderness Study Areas	317,000 Acres
Other Special Areas	99,000 Acres
Unclassified Lands	2,201,000 Acres
Total	2,874,420 Acres

Implementation of this alternative would have the following effects:

In designated wilderness, all acres would be made available for exploration and development activities.

In Wilderness Study Areas, all acres would be available for leasing.

Mineral exploration and development would be detrimental or destructive to the values on an additional 99,000 acres of "Other Special Areas" which would be available for mineral leasing. This alternative would require revocation of existing withdrawals on these special areas.

This alternative was eliminated from further study because it represents a response to only one issue, mineral leasing, and because implementing the alternative would violate several laws, including the Minerals Leasing Act of 1920, the Wilderness Act of 1964, and the Colorado Wilderness Act of 1980. These Acts require protection, reclamation, and/or restoration of lands disturbed by mineral activities; implementation of this alternative would not allow the required protection measures to be applied to the lands identified above. Since December 31, 1983 provisions of the 1964 Wilderness Act require designated wilderness to be withdrawn from mineral entry and leasing except where prior valid mineral rights exist.

ALTERNATIVES CONSIDERED IN DETAIL

Each of the alternatives described in this section meets the requirements of the NFMA regulations. Each alternative is achievable. Output levels are below maximum supply potentials, yet

satisfy the management direction for all resources. Each alternative includes mitigating measures described in the Management Requirements in Chapter III of the Forest Plan. The outputs and effects of alternatives are estimated assuming the mitigation contained in Chapter III of the Plan.

NFMA regulations require that alternatives address public issues and management concerns. To insure this, alternatives were formulated so that each addressed, in various ways, the planning questions identified in Chapter I. Planning questions were directly linked to public issues and management concerns early in the planning process. Public issues and management concerns identified during the planning process were incorporated into existing planning questions if appropriate; some of the fifteen planning questions were revised or expanded following analysis of comments received on the Proposed Forest Plan and Draft EIS.

Projected demands for goods and services were incorporated into the formulation of alternatives by insuring that goods and services produced in any alternative were valued only up to the consumptive trend levels. In some situations, due to joint production functions, excess quantities of some products are produced, but these were not valued in the cost-efficiency analysis of that alternative. From a supply standpoint, each alternative was formulated by attempting to first recognize how management of the Forest relates to production of the same resources by other governmental and private entities. The need to change management direction to correct shortfalls in local or Regional supply, as well as maintaining the opportunity to do so, were important considerations in the formulation of each alternative.

In many cases, constraints were imposed upon the FORPLAN linear programming model to accomplish the factors described above (see Appendix D, EIS). In fact, varying the constraints within FORPLAN provided the main source of variability between alternatives. By imposing a unique set of constraints on the model, FORPLAN was used to meet the requirements of the NFMA regulations for coordination of outdoor recreation, range, timber, water, wildlife and fish and wilderness resources. To achieve such multiple use coordination, each alternative provided for an integrated mix of resource products rather than a combination that maximizes some goods and services to the exclusion of others.

Integration was achieved by insuring that each alternative meets certain basic requirements, such as minimum acceptable habitat diversity and water quality. Some of these requirements were applied as constraints in the linear program model. Others appear as Management Requirements in Chapter III of the Forest Plan.

Associated with each alternative is a schedule of resource outputs over time. Outputs were projected for five 10-year periods from 1984 through 2033. Timber harvest was examined for an additional

24 decades to insure non-declining yield of wood fiber production, as required by NFMA, 36 CFR 219.16(a)(1).

Each of the five alternatives described in this section was developed and analyzed through the NFMA planning process outlined in Chapter I. The Forest Plan is Alternative A.

The differences between the various alternatives considered in detail is a function of both the level of goods and services produced and application of prescriptions on the land. Two alternatives may have similar outputs, but are significantly different in terms of which prescriptions have been applied to a specific parcel of land. Conversely, two alternatives may be similar in allocation, but the timing of management activities may be such that the outputs produced during a particular decade are significantly different. For this reason, it is important to consider both aspects of the alternatives as comparisons are made.

The five alternatives considered in detail were developed using different goals and strategies for responding to the planning questions. The discussion of the expected future condition for each alternative estimates the extent to which the Forest goals will be achieved and how the planning questions are addressed. The goals used to define these alternatives were developed in response to various public issues and management concerns as well as appropriate laws, regulations, and policies.

The key element for achieving the goals of these alternatives is a healthy forest. Vegetation treatment levels differ by alternative due to the alternatives' emphasis. Vegetation treatment is a management technique in administering the multiple use resources of the National Forest to attain the overall goal of a healthy, vigorous forest. It is used to adjust existing plant communities to best meet the vegetation needs and resource goals and objectives. Vegetation treatment is accomplished without impairment of land productivity and is guided by the Management Requirements displayed in the Plan. Through commercial and noncommercial treatment activities, vegetation treatment is directed towards the following:

- Providing additional recreation opportunities;
- Providing public service through utility corridors and electronic sites;
- Increasing opportunities for significant cultural resource discovery;
- Improving visual quality;
- Improving big game winter range;

- Increasing wildlife habitat diversity;
- Improving range conditions;
- Providing wood fiber;
- Increasing tree growth and vigor;
- Increasing water yield without impairing water quality;
- Increasing the Forest's resistance to insect and disease infestations;
- Reducing unwanted fuel accumulations;
- Returning revenue to the U.S. Treasury;
- Maintaining industries dependent on the supply of National Forest System resources.

This Final EIS discusses need and rationale for using vegetation treatment. Vegetation treatment is one of the most practical and efficient methods available to achieve goals. Most aspen stands on the Forest were generated by past fires. Most stands are over 80 years old. Their beginning coincides with the fire prevention and control activities established by the Forest Service in 1905.

Most aspen stands will not regenerate themselves. They will be replaced by pine or spruce unless cut, burned or otherwise treated. Aspen is an extremely important species to wildlife and contributes to the visual quality of mountain scenery. Without treatment or wildfire, most aspen stands will not regenerate. Detailed consequences of not managing Forest vegetation are presented in Chapter IV.

When vast acreages of forest cover are uniformly mature, wildlife diversity is generally limited to species dependent on mature forests. Burning, cutting or other vegetation treatment activities will increase vegetation diversity which will provide wildlife habitat diversity. Treatment also reduces the amount of unwanted fuels. Mature and overmature forests are more susceptible to epidemic insect attack. The attack can spread over large areas creating undesirable effects similar to large burns or clearcuts. When age, size class and species diversity is enhanced, the risk of widespread epidemic is reduced.

Water yield increases also depend on forest resource management. Other outputs and effects as diverse as maintaining visual quality and firewood availability are closely related to the amount of vegetation treated.

Vegetation treatment can require road construction. Roads take land out of production and impact soil and water resources. However, Management Requirements in the Plan, Chapter III, insure impacts are short-term in all alternatives and are within acceptable limits. An environmental analysis occurs before road construction. Considerations are given to the physical and biological land characteristics as well as the goals of the management area in determining how and where to construct the road. These characteristics include slope, soil erodibility, vegetation cover, wildlife and fisheries protection, stream proximity and visual resource protection. Road use by people, rather than the actual road itself, causes greater impacts on the environment and on other resource uses and activities. Effective travel management provides resource protection and a safe, environmentally sound and efficient transportation system.

Travel management directs use of existing and future roads in all alternatives. In some areas, no roads will be built. In others, roads will be built, but their use will be restricted. In other instances, roads will remain open to public use.

As an example, road construction can open up a previously unroaded area. Road use in this area can impact wildlife seclusion and semiprimitive nonmotorized recreation opportunities. Travel management may restrict or close roads leading to, or in, the area based on the goals of the management areas through which the road passes. This road closure or restriction can restore wildlife seclusion, continue semiprimitive nonmotorized recreation opportunities but with improved nonmotorized access to the area, improve access for other resource activities, prevent unacceptable resource damage and reduce maintenance costs.

Public understanding of management area and travel management goals is necessary for public acceptance of area and road closures or restrictions. Additional discussion of travel management is displayed in Chapter III under the "Facilities" section.

Most new roads planned for construction for each alternative are local roads closed to public motorized traffic.

Differences in the alternatives in management of areas of existing wilderness or suitable Wilderness Study Areas reflect differences in the wilderness management appropriate to and compatible with the goals of the alternative, and do not necessarily reflect the capability of the area to provide a certain wilderness experience.

Area allocations to management prescriptions for each alternative are displayed in Table II-4.

TABLE II-4

ACRES BY MANAGEMENT AREA FOR EACH ALTERNATIVE

Management Area Prescription	Emphasis	ALTERNATIVES				
		Proposed Action A	B	C	D	E
1A	Developed Recreation Sites	1,575	1,279	1,699	1,279	1,063
1B-1	Winter Sports Sites	6,120	6,120	6,120	6,120	6,120
1B-2	Potential Winter Sports Development Sites	5,680	5,680	5,680	5,680	5,680
1C	Administrative Sites	361	361	361	361	361
1D	Utility Corridors	5,761	5,761	5,761	5,761	5,761
2A	Semiprimitive Motorized Recreation Opportunities (Rio Grande NF)	192,552 (5,188)	225,519 (0)	207,023 (0)	222,617 (0)	218,833 (0)
2B	Rural and Roaded Natural Recreation Opportunities	405,928	494,917	499,784	454,769	448,735
3A	Semiprimitive Nonmotorized Recreation Opportunities (Rio Grande NF)	121,765 (0)	144,464 (0)	66,613 (0)	176,521 (80,980)	228,771 (80,980)
4B	Wildlife Habitat for Management Indicator Species (Rio Grande NF)	263,260 (0)	217,700 (0)	138,788 (0)	184,950 (30,226)	197,446 (30,226)
4D	Aspen Management	43,690	0	0	0	0
5B	Big Game Winter Range	261,583	264,255	229,478	237,143	250,553
6B	Livestock Grazing (Rio Grande NF)	670,637 (0)	787,409 (0)	790,242 (0)	850,440 (16,538)	818,759 (16,538)
7A	Wood Fiber Production and Utilization - Sawlogs (Rio Grande NF)	150,372 (0)	188,365 (0)	242,117 (0)	243,022 (147)	234,169 (147)
7D	Wood Fiber Production and Utilization - for Products other than Sawtimber	92,651	0	0	0	0
8A	Pristine Wilderness Opportunities (Recommended - Rio Grande NF)	0 (5,866)	0 (5,866)	0 (5,866)	0 (0)	0 (0)
8B	Primitive Wilderness Opportunities Existing - Pike & San Isabel NF (Existing - Arapaho NF) Recommended - Pike & San Isabel NF (Recommended - Rio Grande NF)	178,762 (36,186) 105,738 (17,561)	145,220 (36,186) 35,368 (17,491)	138,702 (36,186) 54,578 (17,491)	96,750 (36,186) 0 (0)	17,712 (36,186) 0 (0)
8C	Semiprimitive Wilderness Opportunities Existing - Pike & San Isabel NF (Existing - Arapaho NF) Recommended - Pike & San Isabel NF (Recommended - Rio Grande NF)	79,545 (4,088) 14,279 (101,938)	112,200 (4,088) 50,632 (107,196)	118,718 (4,088) 150,965 (107,196)	158,702 (4,088) 0 (0)	239,708 (4,088) 0 (0)
8D	Limited Areas of High Density Day Use Existing Pike & San Isabel NF (Recommended - Rio Grande NF)	0 (147)	0 (147)	0 (147)	968 (0)	0 (0)
9A	Riparian Area Management	27,790	27,790	27,790	27,790	27,790
9B	Increased Water Yield Pike & San Isabel NF (Rio Grande NF)	69,829 (0)	38,726 (0)	67,317 (0)	78,863 (2,809)	50,275 (2,809)
10A	Research Natural Areas	1,354	0	0	0	0
10B	Experimental Forests	18,608	0	0	0	0
10C	Special Interest Areas	8,320	0	0	0	0
10E	Municipal Watersheds and Municipal Water Supply Watersheds	56,576	0	0	0	0
	Pike & San Isabel NF (Total)	2,751,736	2,751,736	2,751,736	2,751,736	2,751,736
	Rio Grande NF (Total)	(130,700)	(130,700)	(130,700)	(130,700)	(130,700)
	Arapaho NF (Total)	(40,274)	(40,274)	(40,274)	(40,274)	(40,274)

The five alternatives considered in detail recommend either wilderness suitability or unsuitability status for all or part of the four Wilderness Study Areas on the Forest. The Sangre de Cristo Wilderness Study Area is actually composed of three areas, one administered by this National Forest, a part administered by the Rio Grande National Forest and a part (the Black Canyon, South Piney Creek, Papa Keal and Zapata Creek Wilderness Study Areas) administered by the Bureau of Land Management. Wilderness suitability recommendations for the entire WSA include both the Forest Service and the Bureau of Land Management portions.

In the following description of expected future conditions for each alternative, the standard of comparison for increases and decreases in outputs and activities is the present situation on the Pike and San Isabel National Forests and the Comanche and Cimarron National Grasslands. Chapter IV further describes the expected future condition and environmental consequences resulting from the Proposed Action and Alternatives to it. Each alternative description relates primarily to the first 10 year period of the Plan.

ALTERNATIVE A (PROPOSED ACTION)

Alternative A emphasizes income producing goods and services and provides strong consideration to the need for wilderness. Wildlife habitat would be improved, water yield would increase, and recreation opportunities would be improved. In addition, livestock grazing and timber sale volume increase primarily because of using vegetation treatment as a tool to increase water yield, improve wildlife habitat, create vegetation diversity, and treat insect and disease problems.

This alternative recommends 187,169 acres of the Sangre de Cristo Wilderness Study Area (61,657 acres of the San Isabel and 125,512 acres of the Rio Grande National Forest), 36,060 acres of the Buffalo Peaks Wilderness Study Area, and 22,300 acres of the Greenhorn Mountain Wilderness Study Area for a total of 245,529 acres as suitable for wilderness designation. It recommends 71,291 acres of Wilderness Study Areas as unsuitable for wilderness, including Buffalo Peaks (20,890 acres), Spanish Peaks (19,570 acres), and 30,831 acres of the Sangre de Cristo Wilderness Study Area. The Lost Creek Further Planning Area (20,723 acres) is unsuitable for wilderness.

Expected Future Condition

Vegetation Management would be directed toward improving wildlife habitat, increasing water yield, improving visual quality in recreation areas, improving range condition, providing wood fiber, and increasing the Forest's resistance to insect and disease epidemics. Priority is placed on improving the age and size distribution of vegetation and resolving existing insect and

disease problems. The average annual level of vegetation treatment would affect about 11,000 acres. This is .40 percent of the total Forest area and .44 percent of the area outside wilderness.

See Table II-6 for predicted production levels. No existing campgrounds are scheduled to be eliminated. Privately owned campgrounds near or on the Forest could be developed to provide more capacity. Six new trailhead facilities will be developed. Approximately 20 miles of trails will be constructed or reconstructed annually. (See Chapter IV, Table IV-28).

Alternative A allocates the Burning Bear and Quail Mountain winter sports sites for consideration for future ski area development. These are Regional Priority 2 sites which will be considered only after Priority 1 areas are fully developed or the State of Colorado and affected counties notify the Forest Supervisor of their desire to participate in the Joint Review Process and to initiate and underwrite necessary studies. In this case, the Forest Service would coordinate development of the study (studies to be performed and/or underwritten by State of Colorado and affected counties).

A site-specific environmental analysis will be conducted in cooperation with local and State agencies prior to permitting ski area development.

About twelve additional miles of road per year are constructed or reconstructed than under current management. Approximately 75 percent of these new roads will be closed to public motorized travel, which combined with the existing roads, means about 25 percent of the total mileage on the road system will generally be closed to public motorized travel. The capacity for primitive and semiprimitive recreation is slightly increased, and easily meets the demands for these uses. Emphasis on developed recreation site capacity meets 80 percent of projected developed recreation use demand. The remaining unmet demand is assumed to be provided by either the private sector or other Federal, State or local entities.

Cultural resources are identified and protected in accordance with laws and regulations.

Areas adjacent to major travel corridors and use areas are managed to meet visual quality objectives for such areas. Evidence of management activities are visible in other areas, but most are visually acceptable.

Opportunities to view scenic areas or points of interest are provided through turn-outs and scenic view areas. Vegetation treatment will be applied using visual resource management guidelines to maintain a variety of vegetation sizes and species composition. A highly diverse mixture of vegetation types results in a more scenic forest.

Existing wildernesses are managed to provide high quality wilderness experience with minimum restrictions on visitor numbers and activities except to disperse use and protect the resource.

Wilderness Study Areas are managed to provide protection for their wilderness characteristics and to allow Congress to act on their designation.

Overall fish and wildlife habitat conditions improve over time. Horizontal and vertical vegetation diversity are improved as additional areas receive vegetation treatment.

Range condition is generally satisfactory overall. Livestock grazing for all types of livestock increases.

Wood resource outputs meet the anticipated demands of local industry. Timber cutting is one of the more effective means of achieving many other management goals and objectives. Fuelwood will be provided from commercial sales, timber stand improvement activities, fuel treatment programs and areas treated for prevention and control of insect and disease damage.

Water yield is increased due primarily to commercial timber harvest operations, located and designed to increase water yield. Water quality is maintained at acceptable levels.

Minerals exploration and development is carried out in areas not withdrawn from mineral entry or leasing. Protection of surface resources and environmental quality is assured in accordance with laws and regulations.

ALTERNATIVE B (CURRENT PROGRAM - NO ACTION)

This alternative continues current management direction using goals and objectives from existing plans. This is the required "no action" alternative that provides a basis for comparison with other alternatives. Moderate levels of commodity and noncommodity outputs would result from the implementation of this alternative. This alternative identifies 216,700 acres of the Sangre de Cristo Wilderness Study Area as suitable for wilderness, (86,000 acres on the San Isabel and 130,700 acres on the Rio Grande National Forest). Slight boundary adjustments are proposed from the original study area boundary to eliminate conflicts with other uses, specifically private land inholdings, and motorized recreation uses on the San Isabel National Forest. The boundary adjustments proposed total 1,300 acres. It also identifies 98,820 acres of Wilderness Study Areas as unsuitable for wilderness. Unsuitable areas are: Buffalo Peaks (56,950 acres), Spanish Peaks (19,570 acres), and Greenhorn Mountain (22,300 acres). The Lost Creek Further Planning Area (20,723 acres) is identified as unsuitable for wilderness. These areas are managed for primitive, non-wilderness recreation.

To date the Forest Service has not recommended issuance of any mineral leases on lands designated by Congress as wilderness or Wilderness Study Area which would allow occupancy and disturbance of the surface. Since December 31, 1983 provisions of the 1964 Wilderness Act require designated wilderness to be withdrawn from mineral entry and leasing except where prior valid mineral rights exist. For analysis purposes in this No Action alternative it is assumed that the Forest Service will recommend against mineral leasing and that the Bureau of Land Management not issue any leases for these lands.

Expected Future Condition

Vegetation management would emphasize improving wildlife habitat and range condition in addition to increasing water yield in some cases. There would also be an increase above historic levels in the production of wood fiber. The average annual area of vegetation treatment would affect about 11,000 acres. This is .4 percent of the total Forest or .44 percent of the area outside wilderness.

See Table II-6 for predicted production levels. No existing campgrounds are scheduled to be eliminated nor are any new campgrounds planned. Six new trailhead facilities will be developed.

Ski area development proposals are limited to Regional Priority Level 1 sites. Priority 2 sites will be protected. A site specific environmental analysis will be conducted in cooperation with local and State agencies prior to permitting ski area development.

Some dispersed semiprimitive recreation opportunities will be foreclosed by development for other resources such as timber harvest and road construction. The roads needed to access timber result in increased road-oriented recreation. There is sufficient capacity to meet demand for dispersed recreation. There is only a moderate emphasis on trail construction and reconstruction, resulting in approximately 12 miles of trails affected annually.

Cultural resources are identified and protected in accordance with laws and regulations.

Heavily traveled routes and use areas have landscapes that are in a natural, visually acceptable condition. Management activities and their modifications will be evident throughout the Forest. Activities such as aspen regeneration will maintain vegetation diversity.

Existing wilderness is managed to provide high quality wilderness experiences with minimum restrictions on visitor numbers and activities except those needed to disperse use and protect the resource.

Wilderness Study Areas are managed to protect their wilderness characteristics until Congress acts on their designation.

Wildlife habitat conditions are very similar to present day conditions. Fish habitat conditions are moderately improved. Vegetation diversity is improved through vegetation treatment.

Range condition is generally satisfactory in most areas with a stable to slightly upward trend.

Wood resource products meet industry and private needs.

Water yield is increased slightly due primarily to timber cutting. Water quality is slightly improved.

Approximately 70 percent of new roads will be closed to public motorized travel, which combined with the existing roads, means about 25 percent of the total mileage on the road system will generally be closed to public motorized travel.

The availability of road access makes mineral related activities less expensive. Protection of surface resources and environmental quality is assured in accordance with laws and regulations.

ALTERNATIVE C (RPA PROGRAM)

This alternative is highly responsive to the 1980 RPA Program assigned to the Forest. Specific objectives of this alternative are to attain all 1980 RPA targets in the most cost efficient manner. This emphasis would be achieved by managing all resources at assigned levels while still meeting Forest Management Requirements for protecting resources.

This alternative recommends wilderness suitability for 316,820 acres of the Buffalo Peaks, Spanish Peaks, Greenhorn Mountain, and Sangre de Cristo Wilderness Study Areas. A 1,300 acre boundary adjustment is recommended on the San Isabel portion of the Sangre de Cristo Wilderness Study Area to avoid conflicts with motorized recreation use and private land holdings. All of the Lost Creek Further Planning Area (20,723 acres) is identified as suitable for inclusion in the National Wilderness Preservation System.

Expected Future Condition

The vegetation management program in this alternative would be primarily oriented toward increasing water yield, improving wildlife habitat and livestock range and providing wood fiber. The average annual level of vegetation treatment would affect about 9,000 acres. This is .33 percent of the total Forest or .36 percent of the area outside wilderness.

See Table II-6 for predicted production levels. No existing campgrounds are scheduled to be eliminated and no new campgrounds are planned. Six new trailhead facilities will be developed.

Ski area development proposals are limited to Regional Priority Level 1 sites. Priority 2 sites will be protected. A site specific environmental analysis will be conducted in cooperation with local and State agencies prior to permitting ski area development.

There is an increase in road-oriented recreation opportunities in certain areas due to additional timber access roads, and total road miles maintained across the Forest increases. New trailheads built will enhance primitive and semiprimitive recreation experience opportunities. Approximately 46 miles of trails would be constructed or reconstructed annually. This is more than double the amount of trail work in any other alternative.

Cultural resources are identified and protected in accordance with laws and regulations.

Major travel routes and use areas have landscapes in natural, visually acceptable condition. Some opportunities to view points of interest and unique features are provided. Management activities and visual modification are evident throughout the Forest. Activities such as aspen regeneration will maintain vegetation diversity.

Existing wildernesses are managed to provide high quality wilderness experiences with minimum restrictions on visitory numbers and activities except those needed to disperse use and protect the resource. Wilderness Study Areas and the Lost Creek Further Planning Area are managed to maintain and protect their wilderness characteristics. Including the Lost Creek Further Planning Area and the four Wilderness Study Areas within the National Wilderness Preservation System would not prevent the Forest from meeting supply targets tentatively assigned by the Regional Guide.

Carrying capacity of wildlife habitats is increased; however, additional human uses may preclude the effective utilization of some habitats. Fish habitat improvements are applied at a moderately high rate. Habitat diversity is improved as a result of additional areas being placed under vegetation treatment.

Range conditions are satisfactory in most areas with a slightly upward trend. Livestock grazing is increased.

Annual wood resource products are high compared to current levels.

Water yield is increased due to timber harvests which are located and designed to increase water yield. Water quality is maintained at acceptable levels throughout the five-decade period.

Minerals exploration and development is carried out in areas not withdrawn from mineral entry or leasing. Protection of surface resources and environmental quality is assured in accordance with laws and regulations.

ALTERNATIVE D (MARKET OPPORTUNITIES)

This alternative emphasizes a high level of commodity outputs. Noncommodity outputs would be produced at lower levels. Current management direction would be followed for recreation, wildlife and watershed management. Wood products, livestock production and minerals development would be emphasized. In this alternative, none of the Wilderness Study Areas or Further Planning Area are recommended as suitable for inclusion in the National Wilderness Preservation System.

Emphasis is focused on production of goods and services that have the potential to produce income to the U.S. Treasury. These include timber, range and developed recreation.

Expected Future Condition

The vegetation management program will be directed toward increasing water yield, increasing wood fiber production, and improving range condition. The average annual level of vegetation treatment would affect 16,000 acres. This is .64 percent of the total Forest or .6 percent of the area outside designated wilderness. See Table II-6 for actual outputs. No new campgrounds are planned and none are scheduled for closure. Six new trailhead facilities will be developed. Twelve miles of trails will be constructed or reconstructed.

Ski area development proposals are limited to Regional Priority Level 1 sites. Priority 2 sites will be protected. A site specific environmental analysis will be conducted in cooperation with local and State agencies prior to permitting ski area development.

About seven additional miles of road per year are constructed than under current management. Approximately 75 percent of these new roads will be closed to public motorized travel. Combined with the existing roads, this means about 25 percent of the total mileage on the road system will generally be closed to public motorized travel.

Additional road mileage is constructed for access to market resources, and therefore, additional semiprimitive roaded natural and rural motorized acres are available for road-oriented dispersed recreation. This increased capacity will meet the demands for less primitive forms of dispersed recreation.

Cultural resources are identified and protected in accordance with existing laws and regulations.

The areas adjacent to major travel corridors are maintained in natural conditions, although distant areas viewed from these corridors reveal the management activities taking place. Landscape alterations are visible throughout the Pike and San Isabel National Forests except in wilderness.

Range condition is generally satisfactory and relatively stable, except in high activity areas such as timber sales and heavily used recreation areas. Grazing of livestock continues at current levels.

Wood resource outputs are available in amounts to meet the maximum projected needs of industry in balance with other commodities such as livestock production and developed recreation. Fuelwood for commercial and private needs are met.

Water yield is increased due to relatively heavy timber cutting. Some clearcuts are located and designed to specifically increase water yield.

Short-term water quality is reduced due to increased sediment yields, but is at levels acceptable under State standards.

Mineral exploration and development is facilitated by increased access. Surface resources and environmental quality are protected, in accordance with laws and regulations.

Wildlife habitats show improved carrying capacity and diversity. However, extensive human use may preclude effective utilization of many of the improved habitats. Fish habitat improvement would be low.

Wildernesses are managed to provide high quality wilderness experiences with minimum restrictions on visitor numbers and activities except to disperse use and protect the resource. Wilderness Study Areas are managed to maintain and protect their wilderness characteristics.

ALTERNATIVE E (REDUCED BUDGET)

This alternative has a lower level of commodity outputs under the philosophy of reduced administrative regulations and a reduction in budget levels. The budget for this alternative is approximately 25 percent below the 1982 level. Noncommodity outputs would be produced at an acceptable, but reduced, level. In this alternative, none of the Wilderness Study Areas or Further Planning Area are recommended as suitable for inclusion in the National Wilderness Preservation System.

Expected Future Condition

The vegetation treatment program will be primarily directed toward

production of wood fiber under the budget constraint. Wildlife habitat levels would be low and water yield would not increase. The average overall level of vegetation treatment would affect 3,500 acres which is the lowest of all alternatives. This is .1 percent of the total Forest or .14 percent of the area outside wilderness.

See Table II-6 for actual outputs. Twenty-eight campgrounds will be closed. Demand will exceed capacity by the year 1987 and will seriously exceed capacity by the year 1990.

Fewer roads are constructed in this alternative than any other. Road-oriented dispersed recreation capacities are increased by the construction of additional road mileage. Some roads are closed to public use with the result that semiprimitive nonmotorized opportunities are increased. There is no construction of trails or trailheads.

Ski area development proposals are limited to Regional Priority 1 sites. Priority 2 sites will be protected. A site specific environmental analysis will be conducted in cooperation with local and State agencies prior to permitting ski area development.

Cultural resources are identified and protected in accordance with laws and regulations.

Major travel routes and use areas are maintained in a visually acceptable condition. Areas viewed from travel corridors and use areas display evidence of some modification. Secondary travel routes and use areas show evidence of management activities that can be seen in all viewing zones. Throughout the Forest, activities such as aspen regeneration will maintain vegetation diversity.

Existing wildernesses are managed to provide high quality wilderness experiences with minimum restrictions on visitor numbers and activities except to disperse use and protect the resource. Wilderness Study Areas are managed to maintain and protect their wilderness characteristics.

Wildlife habitats show decreased capacity and diversity. In addition, because of additional human activity and reduced administrative controls, habitat quality decreases over time. There would be a decrease in fish habitat quality. Vegetation diversity would decrease due to limited vegetation treatment.

Range condition is generally satisfactory with gradual improvement. Livestock grazing decreases significantly.

Wood resource outputs are low through the first period, but meet the needs of currently open mills. After period three, outputs do not meet anticipated demand. Fuelwood for commercial and private needs are met.

Water yield is slightly increased due to relatively low amounts of commercial timber cutting. Water quality is maintained at acceptable levels or is slightly improved.

Mineral exploration and development occurs in areas not withdrawn from mineral entry or leasing. Protection of surface resources and environmental quality is assured in accordance with laws and regulations.

COMPARISON OF ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

The National Environmental Policy Act (40 CFR 1502.14) requires a comparison of alternatives to provide a clear basis for choice among options. This section includes summaries of environmental effects that are developed in more detail in Chapter IV, Environmental Consequences.

Table II-5 displays comparison of alternatives by planning question over the next 50 years. The outputs and effects listed underneath each planning question are those determined to be the most appropriate for measuring the extent to which the planning questions have been resolved by each alternative.

Table II-6 provides a comparison by alternative of selected average annual outputs by 10 year intervals of the 50 year planning period.

Table II-7 displays by alternative the distribution of lands available and suitable for timber production.

Figure II-1 displays the base sales schedule by alternative for 25 decades. The base sales schedule was developed to insure that the quantity of timber planned for sale and harvest for any future decade will be equal to or greater than the planned sale and harvest for the preceding decade, and that the planned sale and harvest for any decade is not greater than the long-term sustained yield capacity of the Forest.

Table II-8 summarizes and displays the cost-efficiency analysis of each alternative considered in detail using two discount rates; four percent and seven and one-eighth percent. All alternatives are compared to Benchmarks #1 and #3. The summary comparison displays discounted costs, discounted benefits, and incremental economic parameters associated with each alternative. These parameters are "incremental" in that costs and benefits of minimum level management have been subtracted out prior to calculation of the parameter.

Table II-9 displays a maximum present net value trade-off analysis, comparing all alternatives to Benchmarks #2 and #3 using two discount rates; four percent and seven and one-eighth percent.

Table II-10 displays population, employment and income impacts by alternative. This economic impact analysis uses data from 1983 for comparison.

Table II-11 displays acres allocated to wilderness for existing Wilderness, Wilderness Study Area and Further Planning Area by alternative.

Table II-12 displays average annual budget, returns to the Treasury, and estimated receipt shares to counties by alternative.

For a more detailed discussion of the effects of alternatives, see Chapter IV, Environmental Consequences.

[The content of this section is extremely faint and illegible, appearing to be a large table or figure with multiple columns and rows of data.]

Table II-5 COMPARISON OF ALTERNATIVES BY PLANNING QUESTIONS

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION)	(NO ACTION)	(RPA)			
		ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	
I WHAT SHOULD BE EMPHASIZED IN THE MANAGEMENT AND UTILIZATION OF THE RANGE RESOURCE AND HOW MUCH FORAGE SHOULD BE ALLOCATED TO LIVESTOCK USE ON THE PIKE AND SAN ISABEL NATIONAL FORESTS AND GRASSLANDS?	Livestock grazing (MAUM)	More lands will be managed under intensive grazing practices providing for a greater amount of structural improvements such as water development, range improvement treatments such as reseeding, prescribed burning and rangeland pitting; and grazing system applications such as deferred rotation Current grazing use is 205 MAUM's	Livestock grazing outputs increase to 213 MAUM's	Livestock grazing outputs increase to 208 MAUM's	Livestock grazing outputs decrease to 203 MAUM's	Livestock grazing outputs increase to 214 MAUM's	Livestock grazing outputs decrease to 86 MAUM's
(MAUM = 1000 Animal Unit Months)							
II HOW CAN THE PIKE AND SAN ISABEL NATIONAL FORESTS SUPPLY THE VARIETY OF TIMBER PRODUCTS DESIRED BY THE PUBLIC WHILE INSURING THAT TIMBER HARVEST ACTIVITIES ENHANCE OTHER RESOURCE VALUES?	Acres of vegetation treatment (annual)	Improving the stand age class distribution will create a healthier, more vigorous growing forest that will be less susceptible to insect and disease infestations while benefiting wildlife Timber harvest practices are designed in the Plan's management requirements to increase water yield and improve wildlife habitat diversity, maintain visual quality and meet the predicted demands for wood fiber	Enhances wildlife diversity, addresses insect and disease problems, increases wildlife, browse and water yields	Increases result in water yield and treatment of insect and disease problems. Slight decrease in wildlife habitat diversity	Enhances wildlife values Moderate improvements of insect and disease problems and water yields	Concentrates on most productive forest lands Moderate increase in water yield.	Enhances resources values such as wildlife diversity, water yield and visual quality
	Volume of timber products (MMBF)*	This alternative would produce 26 MMBF of commercial sawtimber	This alternative would produce 29 MMBF of commercial sawtimber	This alternative would produce 35 MMBF of commercial sawtimber	This alternative would produce 67 MMBF of commercial sawtimber	This alternative would produce 11 MMBF of commercial sawtimber	

* Sales in this summary pertain to harvests from suitable forest lands only and are included in the Allowable Sale Quantity (ASQ) In addition to volumes shown above, an unspecified amount of wood from trees less than 7 inches in diameter, topwood less than 6 inches in diameter, and trees from catastrophic events such as wildfire and windthrows will be harvested but are not part of the ASQ A small amount of wood will be harvested from unsuitable lands that are also not included in the ASQ This additional amount is estimated to be approximately 30 percent of the figures shown above

Table II-5 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
Planning Question II continued						
		Long-term sustained yield potential would be 43 MMBF per year (reflects acres being managed for wood fiber production)	Long-term sustained yield potential would be 44 MMBF per year (reflects acres being managed for wood fiber production)	Long-term sustained yield potential would be 37 MMBF per year (reflects acres being managed for wood fiber production)	Long-term sustained yield potential would be 75 MMBF per year (reflects acres being managed for wood fiber production).	Long-term sustained yield potential would be 40 MMBF per year (reflects acres being managed for wood fiber production)
		Commercial vegetation treatment would occur on 10,240 acres	Commercial vegetation treatment would occur on 11,930 acres	Commercial vegetation treatment would occur on 8,200 acres.	Commercial vegetation treatment would occur on 15,550 acres	Commercial vegetation treatment would occur on 3,380 acres
		Timber stand improvement and reforestation would occur on 1,800 acres	Timber stand improvement and reforestation would occur on 1,000 acres	Timber stand improvement and reforestation would occur on 900 acres.	Timber stand improvement and reforestation would occur on 1,500 acres.	Timber stand improvement and reforestation would occur on 400 acres.
<hr/>						
III	HOW SHOULD THE PIKE & SAN ISABEL NATIONAL FORESTS BE MANAGED TO RESPOND TO INCREASING DEMANDS FOR WATER YIELD, STORAGE, TRANSMISSION USES, HIGH QUALITY WATER AND PROTECTION OF THE SOIL RESOURCE?	<p>Modifying vegetation and snowpack conditions will result in changes in timing and yield of runoff. Structural snowpack controls (snowfences) and vegetation management (size, location and shape of harvest units) will increase runoff by reducing the amount of moisture lost to evaporation, transpiration and sublimation.</p> <p>Water yield increases are slight in all alternatives. Increased yields are primarily accomplished through commercial timber operations and represent a cost efficient response to vegetation treatment. All alternatives maintain water quality at acceptable levels and provide for special land use allocation for impoundments and transmission facilities.</p>				
	Water yield	Fifth decade average annual yield = 1277 M acre-feet	Fifth decade average annual yield = 1277 M acre-feet.	Fifth decade average annual yield = 1278 M acre-feet	Fifth decade average annual yield = 1279 M acre-feet	Fifth decade average annual yield = 1277 M acre-feet
	Soil & water improvement	Treats 1200 ac/yr for soil and water improvement.	Treats 575 ac/yr for soil and water improvement.	Treats 1000 ac/yr for soil and water improvement	Treats 1000 ac/yr for soil and water improvement	Treats 575 ac/yr for soil and water improvement

Table II-5 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
IV HOW SHOULD WILDERNESS ON THE PIKE & SAN ISABEL NATIONAL FORESTS BE MANAGED TO MAINTAIN A HIGH QUALITY WILDERNESS RECREATION EXPERIENCE UNDER THE NATIONAL WILDERNESS PRESERVATION SYSTEM?	Acre allocation to provide wilderness experience	Of the total area in existing and suitable wilderness, 70% is assigned to emphasize primitive wilderness experiences and 30% is assigned to emphasize semi-primitive wilderness experiences.	Of the total area in existing and suitable wilderness, 53% is assigned to emphasize primitive wilderness experiences and 47% is assigned to emphasize semi-primitive wilderness experiences	Of the total area in existing and suitable wilderness, 44% is assigned to emphasize primitive wilderness experiences and 56% is assigned to emphasize semi-primitive wilderness experiences	Of the total area in existing and suitable wilderness, 38% is assigned to emphasize primitive wilderness experiences and 62% is assigned to emphasize semi-primitive wilderness experiences	Of the total area in existing and suitable wilderness, 7% is assigned to emphasize primitive wilderness experiences and 93% is assigned to emphasize semi-primitive wilderness experiences
IVa SHOULD ADDITIONS TO THE NATIONAL WILDERNESS PRESERVATION OR WILD AND SCENIC RIVER SYSTEMS BE RECOMMENDED FOR CERTAIN DESIGNATED AREAS ON THE PIKE & SAN ISABEL NATIONAL FORESTS?	Eligibility of inventoried Wild and Scenic River candidates	South Platte River-Yes Badger Creek-No Cimarron River-No	South Platte River-Yes Badger Creek-No Cimarron River-No	South Platte River-Yes Badger Creek-No Cimarron River-No	South Platte River-Yes Badger Creek-No Cimarron River-No	South Platte River-Yes Badger Creek-No Cimarron River-No
	Suitability of Wilderness Study Areas	Buffalo Peaks-Yes (36,060 ac) Spanish Peaks-No Greenhorn Mtn.-Yes; *Sangre de Cristo-Yes (187,169 ac) 1/	Buffalo Peaks-No Spanish Peaks-No Greenhorn Mtn -No, *Sangre de Cristo-Yes (216,700 ac)	Buffalo Peaks-Yes Spanish Peaks-Yes Greenhorn Mtn -Yes, *Sangre de Cristo-Yes (216,700 ac)	Buffalo Peaks-No Spanish Peaks-No Greenhorn Mtn.-No, Sangre de Cristo-No	Buffalo Peaks-No Spanish Peaks-No Greenhorn Mtn.-No, Sangre de Cristo-No
	Suitability of RARE II Further Planning Area	Lost Creek-No	Lost Creek-No	Lost Creek-Yes	Lost Creek-No	Lost Creek-No

07-II

Table II-5 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
1/ When a recommendation as to the suitability or unsuitability for wilderness is made for the Sangre de Cristo Wilderness Study Area, it also includes the same recommendation for the adjacent Black Canyon, South Piney Creek, Papa Keal and Zapata Creek contiguous Wilderness Study Areas administered by the Bureau of Land Management.		<p>*Suitable with boundary adjustments as follows Alternative A - 5,188 acre adjustment on Rio Grande NF and 25,643 acre adjustment on San Isaoel NF Alternatives B and C - 1,300 acre adjustment on the San Isabel NF</p> <p>Wilderness Study Area suitability recommendations made in the Record of Decision in this planning effort will not take effect until Congress acts on them. These areas will be managed to protect their wilderness characteristics until such time as Congressional action takes place.</p>				
V WHAT CAN BE DONE TO MAINTAIN OR IMPROVE WILDLIFE AND FISH POPULATIONS BY MANAGEMENT OF THEIR HABITATS AND HOW CAN RIPARIAN (WETLANDS) AREA MANAGEMENT BE EMPHASIZED ON THE PIKE AND SAN ISABEL NATIONAL FORESTS?	Wildlife habitat improvement Acre/Year	7,400	3,500	6,500	6,400	800
	Structure/Year	83	50	63	50	45
	Fish habitat improvement Structure/Year	60	40	54	24	10
	Habitat Capability for Management Indicator Species (Rank)	1	3	2	5	4

II-41

Table II-5 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p>VI HOW SHOULD THE PIKE AND SAN ISABEL NATIONAL FORESTS PROVIDE ACCESSIBILITY OF NATIONAL FOREST SYSTEM LANDS FOR MINERAL ACTIVITIES AND AT THE SAME TIME MINIMIZE THE ADVERSE IMPACTS OF MINING ACTIVITIES ON OTHER RESOURCES?</p>		<p>National Forest System land is available for mineral exploration and development under all applicable laws and regulations in all alternatives. For leasable minerals, the BLM leases tracts of land for exploration and development by the mining industry. Saleable minerals are the only type of mineral commodity for which the Forest can directly affect the supply by selling materials to individuals and private industry. Management requirements for minerals in the Plan are based on statutory and regulatory direction for locatable, leaseable, and salable minerals. Management requirements in Chapter III of the Forest Plan provide surface resource protection and restoration requirements in all alternatives.</p> <p>Criteria have been established for making case-by-case availability recommendations for National Forest System lands for geophysical investigation, oil and gas leasing with surface occupancy, and oil and gas leasing without surface occupancy in this planning effort. Lands must be rehabilitated following activities associated with exploration and development. Specific mitigation direction, coordinated resource management requirements, and special stipulations are contained in the Forest Direction section of Chapter III and Appendix F in the Forest Plan.</p>				
<p>VIIa HOW CAN THE RESOURCE MANAGEMENT PROGRAMS & ADMINISTRATION ON THE PIKE & SAN ISABEL NATIONAL FORESTS BE IMPROVED THROUGH LAND EXCHANGE, LAND AND RIGHTS-OF-WAY ACQUISITION, AND LAND LINE LOCATION?</p>	Property boundary location	50 miles/year	50 miles/year	Eliminates the backlog of land line location by 2030 180 miles/year	50 miles/year	50 miles/year
	Land exchange	All alternatives provide for land exchange activities				
	Land acquisition	Moderate level	Low level	Very high level	Moderate level	None
	Rights-of-way acquisition	High level	Low level	Moderate level	Moderate level	Low level
		Rights-of-way acquisition is directly related to the level of resource management activity in an alternative				

Table II-5 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p>VIIb. HOW SHOULD THE NEED FOR UTILITY LINES, ELECTRONIC SITES AND OTHER TRANSMISSION FACILITIES BE INTEGRATED INTO THE ADMINISTRATION OF THE PIKE & SAN ISABEL NATIONAL FORESTS AND CAN THE PLAN ACCOMMODATE THE NEEDS OF FUTURE DEVELOPMENT?</p>		<p>The designation of new utility corridors will be studied on a case-by-case basis regardless of the alternative, but will be consistent with the plans and programs of other agencies. The Rocky Mountain Regional Guide establishes standards and guidelines to be used by the Forest in activities related to utility corridors. Expanding compatible uses in existing corridors is emphasized over new corridor development. The permitting and NEPA processes to be followed when authorizing use and occupancy are located in Forest Service Manuals. Management Area Prescription 1D provides for utility corridors in all alternatives. Management activities within these linear corridors strive to be compatible with the goals of the management area through which the corridors pass.</p> <p>Utility corridors have been identified on the Forest Plan map and on each of the Alternative Maps contained in the Final Environmental Impact Statement.</p>				
<p>VIIIa. WHAT IS THE ROLE OF THE PIKE & SAN ISABEL NATIONAL FORESTS AND THE CIMARRON AND COMANCHE NATIONAL GRASSLANDS IN MANAGING INSECTS AND DISEASES?</p>	<p>Acres of vegetation treated</p>	<p>Treats 10,240 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>	<p>Treats 11,930 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>	<p>Treats 8,200 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>	<p>Treats 15,550 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>	<p>Treats 3,380 acres through commercial timber harvest. Emphasizes treatment of problem areas.</p>

II-43

Table II-5 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
VIIIb HOW SHOULD THE FOREST SERVICE CARRY OUT FIRE PROTECTION AND MANAGEMENT INCLUDING WHAT SUPPRESSION METHODS ARE APPROPRIATE WITHIN WILDERNESS?	Acres of fuel treatment	3,000	1,500	3,900	3,000	1,500
<p>Management requirements for fire planning and suppression and for escaped fire suppression are contained in the management direction section of the Forest Plan (Chapter III).</p> <p>All alternatives provide for the same level of fire protection based upon the 1980 Fire Management Budget Analysis. Acres planned for fuel treatment in each alternative are correlated with the amount of fuels generated as the result of vegetation treatment.</p> <p>Wildfire within wilderness will be suppressed when adjacent private lands or other resource values on adjoining Forest land are threatened. Suppression methods can include motorized equipment when the need has been identified and the Forest Supervisor approves.</p>						
IXa WHAT RANGE AND QUANTITY OF DEVELOPED AND DISPERSED RECREATION OPPORTUNITIES AND ACTIVITIES SHOULD THE PIKE AND SAN ISABEL NATIONAL FORESTS PROVIDE?	Dispersed recreation use capacity (MMRVD)	Provides for 3.4 million Recreation Visitor Days (MMRVD's)	Provides for 3.2 million Recreation Visitor Days (MMRVD's)	Provides for 3.4 million Recreation Visitor Days (MMRVD's)	Provides for 3.2 million Recreation Visitor Days (MMRVD's)	Provides for 2.8 million Recreation Visitor Days (MMRVD's)
	Miles of trail construction/reconstruction	Provides for 20 miles of trail construction and reconstruction annually	Provides for 12 miles of trail construction and reconstruction annually.	Provides for 46 miles of trail construction and reconstruction annually	Provides for 12 miles of trail construction and reconstruction annually	No trail construction or reconstruction would occur
	New trail-head construction	Six trailhead facilities would be constructed	Six trailhead facilities would be constructed	Six trailhead facilities would be constructed	Six trailhead facilities would be constructed	No new trail-head facilities would be constructed
	Developed recreation use capacity (PAOT)	Alternatives A, B, C and D provide for a developed recreation capacity of 12,135 persons at one time (PAOT) in 136 camp and picnic grounds. Alternative E would provide 10,643 PAOT's in 108 camp and picnic grounds.				

47-11

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION)	(NO ACTION)	(RPA)		
		ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
IXb HOW SHOULD CULTURAL RESOURCES OF THE PIKE & SAN ISABEL NATIONAL FORESTS BE MANAGED?		All alternatives provide for protection of cultural resources. Activities include working with State Historic Preservation Officers to evaluate identified cultural resources. Representative samples of unique cultural resources may be interpreted for public benefit. Cultural resource surveys and inventories will be completed prior to scheduling on-the-ground resource management activities that have the potential for damaging or destroying unidentified sites. Properties which are included or are eligible for inclusion in the National Register of Historic Places will be protected and preserved.				
		Management Area Prescriptions 10A and 10C provide for Research Natural Areas and Special Interest Areas in all alternatives.				
	Cultural Resource Surveys	Appropriate cultural resource surveys would provide the opportunity for recognition, preservation and development of cultural resources for public benefit.	This alternative provides for 1,680 acres of cultural resource surveys.	This alternative provides for 1,000 acres of cultural resource surveys.	This alternative provides for 1,320 acres of cultural resource surveys.	This alternative provides for 1,320 acres of cultural resource surveys.
	Potential adverse effects	This alternative treats the greatest number of acres in timber and other resource activities and so has the greatest potential to disturb cultural resources. However, since intensive surveys are made prior to resource development activity it conversely provides the best opportunity to identify and protect cultural resources. With a moderate increase in developed recreation, important sites are interpreted for public benefit. All significant sites are protected.	Provides moderate level of acres treated in timber and other resources and in turn has moderate potential for disturbance. Provision for developed recreation gives opportunity for a moderate level of interpretation. All significant sites are protected.	Provides moderate level of acres treated in timber and other resources with moderate potential for disturbance. Opportunity for interpretation is moderate outside wilderness and very low inside. Protection is moderate outside wilderness and poor inside.	Acres treated in various resources are high and have a high potential for disturbance of cultural resources. Opportunity to find and protect sites is good however. A moderate level of interpretation is provided.	Treats the fewest acres in various resource activities, however at the same time it provides the least opportunity to identify or interpret sites. With a reduced budget, the level of protection of sites is correspondingly lower.

Table II-5 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION)	(NO ACTION)	(RPA)	ALTERNATIVE	ALTERNATIVE
		ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
X WHAT CONSIDERATIONS SHOULD BE MADE IN PROVIDING FACILITIES, INCLUDING TRANSPORTATION SYSTEMS FOR OFF-ROAD VEHICLES AND TRAILS FOR MOTORIZED USE TO MEET PUBLIC AND RESOURCE MANAGEMENT NEEDS ON THE PIKE AND SAN ISABEL NATIONAL FORESTS AND GRASSLANDS?		Facilities are a support item directly related to the level of activity which they serve. Roads are provided for harvest and treatment of timber and other resource management. Trails provide opportunity for recreation activities. Road standards vary depending on the size of the areas being accessed and the resource use served.				
	Road Construction/Reconstruction					
	-Arterial and collector (Miles)	15	5	19	5	0
	-Local (Miles)	17	20	14	26	6
	Trail construction/reconstruction (Miles)	20.0	12.0	46.0	12.0	0
		Motorized use is permitted over large areas of the Forest Management requirements in Chapter III of the Plan specify motorized use for off-road vehicles and where trails are open to these uses				
	Motorized use permitted (thousands of acres)	680	669	655	708	680
	Motorized use prohibited (thousands of acres)	638	604	725	519	519
	Motorized use may be either permitted or prohibited (thousands of acres)	1,433	1,478	1,371	1,524	1,552
	Trails-off-road vehicles use permitted (Miles)	688	688	678	688	688
Trails-off-road vehicle use restricted	100	112	100	159	159	
Trails-off-road vehicle use administratively closed	90	100	88	100	100	

Table II-5 continued

PLANNING QUESTIONS	OUTPUT EFFECT TO BE MEASURED	(PROPOSED ACTION) ALTERNATIVE A	(NO ACTION) ALTERNATIVE B	(RPA) ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
XI. WHAT KINDS OF HUMAN AND COMMUNITY DEVEL- OPMENT PROGRAMS AND ACTIVITIES ON THE PIKE & SAN ISABEL NATIONAL FORESTS WILL BENEFIT LOCAL COMMUNI- TIES AND PROVIDE COOPERATION WITH PRIVATE INDUSTRY AND STATE AND LOCAL GOVERNMENTS?		Resource management activities such as road and trail construction, timber sales, recreation site development and grazing use add to local economies by providing both jobs and goods and services. Specific human resource programs like the Youth Conservation Corps (YCC) and the Senior Citizen Employment Program, administered through the Department of Labor, provide jobs and benefit the local community. National Forest participation in these programs depends on the level of funding by the Department of Labor. No significant difference in enrollee years is expected between the alternatives budgeted for human resource programs except for Alternative E where no programs would be funded.				

TABLE 11-6

Alternative Comparison (Average annual outputs - summary of all periods unless otherwise noted)

Activity	Unit of Measure	1983 Production	A	B	Alternatives C	D	E
VEGETATION							
Area Treated	Thousand Acres	6 9	17 7	20 0	11 2	16 3	5.2
RECREATION							
Developed Capacity (Excluding Downhill Skiing)	Thousand Visitor Days <u>1/</u>	1214	1928	1533	1928	1532	997
Developed Use Campgrounds and Picnic Areas Only	Thousand Visitor Days	595	1240	1018	1240	1018	600
Downhill Ski Areas	Thousand Visitor Days	147	762	762	764	762	387
Dispersed Use	Thousand Visitor Days	2450	4700	4400	4700	4400	3700
Off-Road Motorized Use <u>2/</u>	Thousand Visitor Days	103	202	184	202	184	146
Semiprimitive Nonmotorized & Primitive Area	Thousand Acres	688	743	716	826	605	633
Semiprimitive Motorized Area	Thousand Acres	550	495	523	413	605	578
Roaded Natural and Rural Area	Thousand Acres	1486	1486	1486	1486	1514	1514
VISUAL QUALITY OBJECTIVES							
Preservation, Retention, Partial Retention	Thousand Acres	2246	1144	1285	1283	1178	1221
Modification, Maximum Modification	Thousand Acres	506	1608	1467	1469	1574	1531

1/ Recreation Visitor Day = 12 hours of recreation for one person or one hour of recreation for 12 persons or any combination thereof

2/ Off-road motorized use figures are also included in dispersed recreation; they are not additive

TABLE II-6 Continued

Alternative Comparison (Average annual outputs - summary of all periods unless otherwise noted)

Activity	Unit of Measure	1983 Production	A	B	Alternatives C	D	E
WILDERNESS							
Wilderness Use <u>3/</u>	Thousand Visitor Days	242	706	669	825	387	387
Additional Wilderness	Thousand Acres	N/A	120	86	206	0	0
WILDLIFE AND FISH							
Improved Habitat	Thousand Acres	3.2	9.5	4 0	6.1	5 6	1.0
Big Game Winter Range Habitat	Thousand Deer	11 9	14 9	13 9	14.2	13.0	12.9
Capability	Thousand Elk	3.0	3 7	3 5	3.6	3 3	3 2
Fish Habitat Improvement	Structure	40	60	40	54	24	10
Big Game Hunting <u>4/</u>	Thousand Visitor Days	47	72	62	67	60	60
Small Game Hunting <u>4/</u>	Thousand Visitor Days	17	25	22	23	21	21
Fishing	Thousand Visitor Days	157	245	238	242	226	221
Non-game Use <u>4/</u>	Thousand Visitor Days	64	100	90	97	83	83
RANGE							
Livestock Grazing	Thousand Animal Unit Months <u>5/</u>	40	49	46	44	56	25
Pike & San Isabel National Forests							
Cimarron & Comanche National Grasslands	Thousand Animal Unit Months <u>5/</u>	160	178	176	176	179	70

3/ Includes entire Mt Evans, Lost Creek, Mt Massive, Holy Cross & Collegiate Wildernesses and recommended Wilderness Study Areas and Further Planning Area

4/ Wildlife and fishing use figures are also included in dispersed recreation, they are not additive

5/ Animal Unit Month = the amount of forage consumed by one mature cow or its equivalent in a one-month period.

TABLE II-6 Continued

Alternative Comparison (Average annual outputs - summary of all periods unless otherwise noted)

Activity	Unit of Measure	1983 Production	A	B	Alternatives C	D	E
TIMBER							
Allowable Sale Quantity <u>6/</u>	Million Cubic Feet	7	11	13	10	19	9
	Million Board Feet	23	37	43	36	68	34
Long-Term Sustained Yield	Million Board Feet						
Area Treated <u>7/</u> Intermediate	Thousand Acres	1.5	2 2	4 0	1 5	1 4	0 3
	Clearcut	2	1.9	2.0	3 2	7 4	3 9
Shelterwood	Thousand Acres	3 9	9 1	10.3	1.4	4 7	0.3
Selection	Thousand Acres	6	1.5	0 0	3 1	1 1	0 0
Reforestation <u>8/</u>	Acres	450	680	520	560	720	360
Timber Stand Improvement	Acres	400	2180	3220	1540	1340	340
WATER							
Water Yield	Million Acre-Feet	1 278	1.278	1.278	1.278	1 280	1 278
Water Meeting Quality Goals	Million Acre-Feet	1.130	1 140	1 140	1.141	1.142	1 141
MINERALS LEASING							
Total Pike & San Isabel NFs No Lease	Thousand Acres	N/A	254 4	225 6	354 4	8.9	8.9
	Lease without surface occupancy	Thousand Acres	N/A	19 6	19.6	19 6	19 6
Lease	Thousand Acres	N/A	2,342 3	2,371.0	2,251.5	2,587 7	2,587 7

6/ Sales in this summary pertain to harvests from suitable forest lands only and are included in the Allowable Sale Quantity (ASQ). In addition to volumes shown above, an unspecified amount of wood from trees less than 7 inches in diameter, topwood less than 6 inches in diameter, and trees from catastrophic events such as wildfire and windthrows will be harvested but are not part of the ASQ. A small amount of wood will be harvested from unsuitable lands that are also not included in the ASQ. This additional amount is estimated to be approximately 30 percent of the figures shown above.

7/ Area treated through timber management is also included in vegetation area treated, they are not additive.

8/ Reforestation figures include site preparation for natural regeneration.

TABLE II-6 Continued

Alternative Comparison (Average annual outputs - summary of all periods unless otherwise noted)

Activity	Unit of Measure	1983 Production	A	B	Alternatives C	D	E
FACILITIES - ROADS							
Arterial/Collector/ Local Construction/ Reconstruction	Miles	16.5	32.0	23.6	29.8	22.8	6.2
TRAILS							
Trails Constructed/ Reconstructed	Miles	8.0	20.0	16.0	53.2	16.0	0
PROTECTION							
Fuel Treatment	Thousand Acres	1.5	3.0	1.5	4.3	3.0	1.5

TABLE II-7

ALTERNATIVE DISTRIBUTION OF TENTATIVELY SUITABLE LAND

	<u>ALTERNATIVES</u>				
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Available & Tentatively Suitable Forest Land*	1,186,520	1,186,520	1,186,520	1,186,520	1,186,520
A Timber production incompatible with allocation	0	0	0	0	0
1. Endangered species habitat requirements	0	0	0	0	0
2. Primitive & Semiprimitive recreation	0	0	0	0	0
3. Wilderness proposal identified in alternative formulation	74,000	43,700	103,100	0	0
B. Economically not available					
1. Markets not available	0	0	0	0	0
2. Isolated tract	0	0	0	0	0
3. High road construction cost	0	0	0	0	0
4. High logging cost (Slope Class 40 70%)	272,972	280,772	246,672	298,372	298,372
C. Other (Explain)	0	0	0	0	0
D. Productive, available & suitable but surplus to timber production objectives in the particular alternative	257,998	267,678	372,268	53,108	425,108
Lands Suitable for Timber Production by Alternative	581,550	594,370	464,480	835,040	463,040

* These figures include productive forest land in congressionally designated Wilderness Study Areas and the administratively endorsed Further Planning Area (deferred lands).

FIGURE II-1
BASE SALES SCHEDULE FOR ALTERNATIVES CONSIDERED IN DETAIL

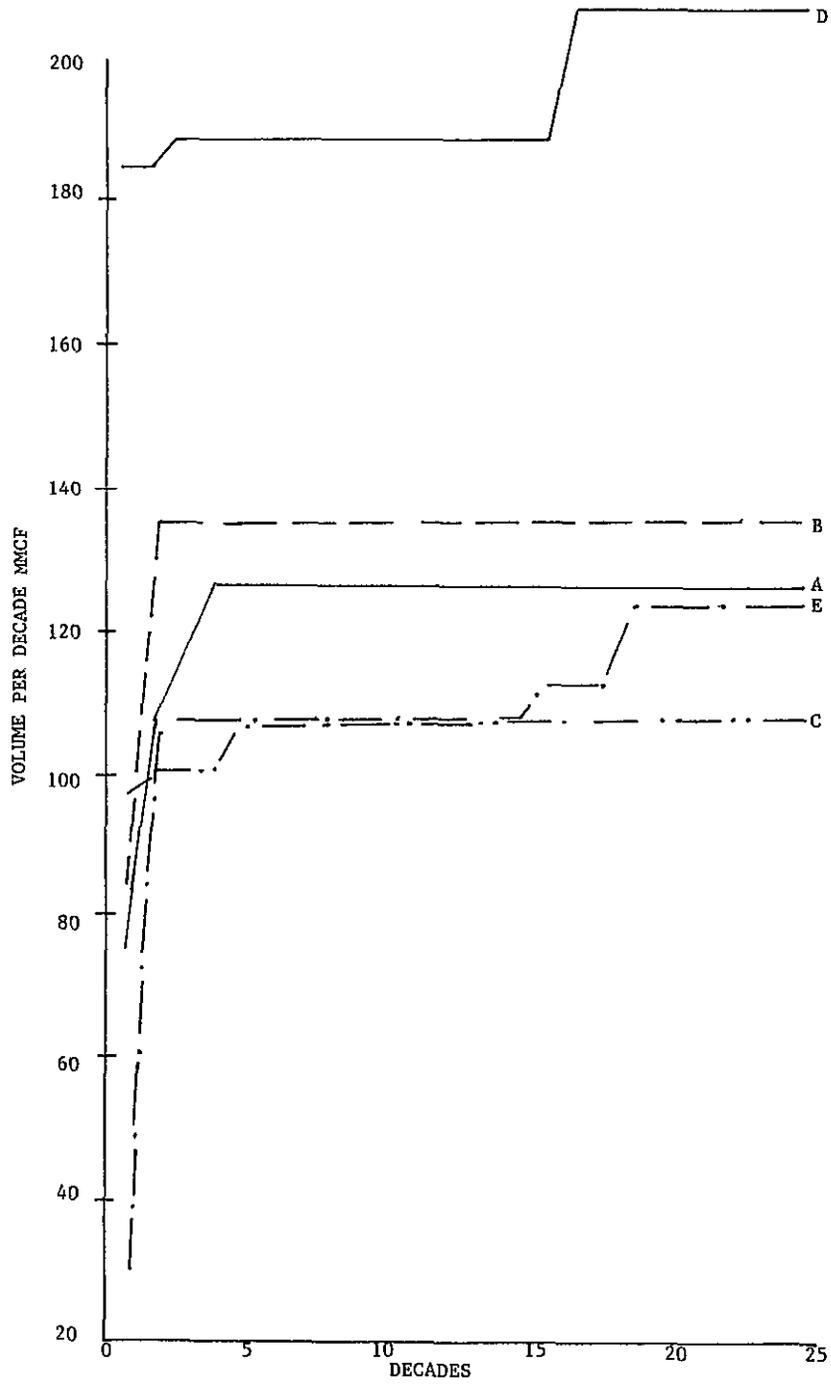


TABLE II-8 COST EFFICIENCY ANALYSIS SUMMARY
(First Quarter 1978 Constant Dollars)

All Periods - Discounted at 4% - Millions of Dollars

	BENCHMARKS		ALTERNATIVES				
	BM#1	1/ BM#3	A	B	C	D	E
Present Value Benefits, Incremental (PVB)	893 2	379 9	362 2	322 6	377 0	298 1	165 3
Assigned Values, Less Receipts	893 2	358.0	332 1	292 6	346 7	258 0	143 7
Federal Receipts	0	21 9	30 1	30 0	30 3	40.1	21 6
Present Value Costs, Incremental (PVC)	18 7	156 7	172 6	167 6	174 9	185 4	102 3
Forest Service							
Long-range Fixed Investment	18 7	0	0	0	0	0	0
Operational	0	15 4	11 5	10 3	16 0	11 7	2 8
General Administration	0	98 2	116 4	112.9	112 8	124 6	67 5
Non-Forest Service Cooperator Costs	0	26 5	29 3	28 4	29 5	31 0	17 8
	0	16 6	15 4	16 0	16 6	18 1	14 2
Present Net Value, Incremental (PNV)	874 5	223.2	189 6	155 0	202.1	112 7	63 0
Benefit-Cost Ratio, Incremental	47 8	2 4	2 1	1.9	2 2	1 6	1 6

All Periods - Discounted at 7-1/8% - Millions of Dollars

	BENCHMARKS		ALTERNATIVES				
	BM#1	1/ BM#3	A	B	C	D	E
Present Value Benefits, Incremental (PVB)	552 3	221 3	210 0	188 6	218 6	173.6	99 8
Assigned Values, Less Receipts	552 3	208 9	192 8	171 0	200 8	149 5	87 2
Federal Receipts	0	12 4	17 2	17 6	17 8	24 1	12 6
Present Value Costs, Incremental (PVC)	11.1	97 0	103.6	100 8	105 1	112 5	62 7
Forest Service							
Long-range Fixed Investment	11 1	0	0	0	0	0	0
Operational	0	9 7	6 5	6 0	9 1	6 5	1 9
General Administration	0	58 0	69 5	67 2	68 0	75 3	40 3
Non-Forest Service Cooperator Costs	0	15 8	15 0	14 6	15 4	16 4	8 4
	0	13 5	12 6	13 0	12 6	14 3	12 1
Present Net Value, Incremental (PNV)	541.2	124 3	106.4	87.8	113 5	61 1	37 1
Benefit-Cost Ratio, Incremental	49 9	2 3	2 0	1 9	2 1	1 5	1 6

1/ Benefits and costs are total, all others are incremental from BM#1

TABLE II-9 Present Net Value Trade-off Analysis - Summary All Periods 1/ (Millions of First Quarter 1978 Dollars, 4% Discount Rate)

	Benchmarks			Alternatives			
	#2	#3	C	A	B	D	E
Discounted Cost (PVC)	83.5	156.7	174.9	172.6	167.6	185.4	102.3
Discounted Benefits (PVB)	167.5	379.9	377.0	362.2	322.6	298.1	165.3
Present Net Value	84.0	223.2	202.1	189.6	155.0	112.7	63.0
difference in PNV (from BM#3)	-139.2		-21.1	-33.6	-68.2	-110.5	-160.2
difference in PVB (from BM#3)	-212.4		-2.9	-17.7	-57.3	-81.8	-214.6
difference in PVC (from BM#3)	-73.2		18.2	15.9	10.9	28.7	-54.4
Contributions Made to Total							
Discounted Benefits by							
Resource, Incremental							
Timber	14.3	12.5	13.9	13.1	13.8	11.1	10.9
Range	51.6	50.5	48.9	50.6	49.5	51.9	20.8
Developed Recreation	64.7	64.7	64.7	64.7	54.8	54.8	39.3
Dispersed Recreation	0	152.9	152.9	152.9	126.0	126.0	56.1
Winter Sports	36.9	36.9	36.9	36.9	36.9	36.9	22.1
Wilderness	0	55.6	55.6	40.1	40.1	15.3	15.3
Wildlife (Recreation	0	6.6	3.6	3.6	1.2	1.2	0.4
Related Activities)							
Water	0	0.2	0.5	0.3	0.3	0.9	0.4

1/ All Benefits and Costs are incremental from Benchmark #1

TABLE II-9 Continued

Present Net Value Trade-off Analysis - Summary All Periods 1/ (Millions of First Quarter 1978 Dollars, 7-1/8% Discount)

	Benchmarks		Alternatives				
	#2	#3	C	A	B	D	E
Discounted Cost (PVC)	49.2	97.0	105.1	103.6	100.8	112.5	62.7
Discounted Benefits (PVB)	95.3	221.3	218.6	210.0	188.6	173.6	99.8
Present Net Value (PNV)	46.1	124.3	113.5	106.4	87.8	61.1	37.1
difference in PNV (from BM#3)	-78.2		-10.8	-17.9	-36.5	-63.2	-87.2
difference in PVB (from BM#3)	-126.0		-2.7	-11.3	-32.7	-47.7	-121.5
difference in PVC (from BM#3)	-47.8		8.1	6.6	3.8	15.5	-34.3
Contributions Made to Total							
Discounted Benefits by							
Resource, Incremental							
Timber	8.9	7.9	8.5	8.0	8.5	6.9	6.9
Range	32.4	31.8	30.5	31.6	31.1	32.2	12.6
Developed Recreation	35.5	35.5	35.5	35.5	31.1	31.1	24.6
Dispersed Recreation	0	90.4	90.4	90.4	75.1	75.1	34.2
Winter Sports	18.5	18.5	18.5	18.5	18.5	18.5	12.5
Wilderness	0	32.7	32.7	23.5	23.5	8.6	8.6
Wildlife (Recreation Related Activities)	0	4.4	2.3	2.3	0.6	0.6	0.2
Water	0	0.1	0.2	0.2	0.2	0.6	0.2

1/ All Benefits and Costs are incremental from Benchmark #1

TABLE II-10 Economic Impact Analysis (Second Period - 1991-2000)

Pike and San Isabel National Forests Total

Forest Related Population, Employment and Income Impacts (Annual Figures)

	Population	Total Employment (No of Jobs)	Employment			Total Income (MM\$)	Personal Income (MM\$)	Property Income (MM\$)
			Agriculture	Logging/ Sawmill	Tourism <u>1/</u>			
Forest Related Impacts (1983 Base)	13008	6263	68	76	2373	84 14	49 40	34 74
Forest Related Incremental Increases by Alternative (1995 Index Year)								
A	9203	4431	32	36	2143	54 08	31 42	22 66
B	8844	4258	31	71	2082	51 85	30 09	21 76
C	9519	4583	40	38	2204	56 10	32 57	23 53
D	9004	4364	42	131	2085	53 96	31 21	22 75
E	4997	2406	6	47	1366	26 80	15 57	11 23

Population is based upon a population/employment ratio of 2.077 to 1 0 (9184 Colorado State-wide average, Colorado Department of Labor

1/ Tourism is an aggregation of Hotel and Lodging Places, Eating and Drinking Places, and the Amusement and Recreation Sector

TABLE II-11 Wilderness, Wilderness Study Area and Further Planning Area Allocation by Alternative

<u>AREA</u>	<u>ALTERNATIVE</u>				
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Existing Wilderness					
Pike & San Isabel	257,420	257,420	257,420	257,420	257,420
Arapaho/Roosevelt	40,274	40,274	40,274	40,274	40,274
Determined Suitable*					
Buffalo Peaks	36,060	0	56,900	0	0
Greenhorn Mtn.	22,300	0	22,300	0	0
Sangre de Cristo					
Pike & San Isabel	61,657	86,000	86,000	0	0
Rio Grande	125,512	130,700	130,700	0	0
Spanish Peaks	0	0	19,570	0	0
Lost Creek	0	0	20,723	0	0
Total Pike & San Isabel	377,437	343,420	453,220	257,420	257,420
Total Rio Grande	125,512	130,700	130,700	0	0
Total Arapaho/Roosevelt	40,274	40,274	40,274	40,274	40,274
Total All Forests	543,223	514,394	633,937	287,694	297,694

* Alternatives developed cover the entire Sangre de Cristo Wilderness Study Area which includes the Rio Grande National Forest portion.

TABLE II-12

Average Annual Budget by Alternative (1978 Dollars)

<u>Alternative</u>	<u>Period</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
A	6,340,000	7,610,000	9,100,000	10,500,000	12,190,000
B	6,220,000	7,480,000	9,050,000	9,560,000	10,960,000
C	6,960,000	7,460,000	8,560,000	10,300,000	11,800,000
D	7,260,000	8,150,000	9,000,000	10,450,000	12,160,000
E	4,030,000	4,880,000	5,440,000	5,920,000	6,520,000

Average Annual Returns to the Treasury by Alternative (1978 Dollars)

<u>Alternative</u>	<u>Period</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
A	912,000	1,424,000	1,692,000	1,897,000	2,076,000
B	955,000	1,484,000	1,677,000	1,835,000	1,991,000
C	1,034,000	1,412,000	1,614,000	1,788,000	1,993,000
D	1,510,000	1,841,000	2,069,000	2,234,000	2,388,000
E	645,000	1,157,000	1,206,000	1,248,000	1,288,000

Average Annual Estimated Receipt Shares to Counties (1978 Dollars)

<u>Alternative</u>	<u>Period</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
A	228,000	356,000	423,000	474,250	519,000
B	238,750	371,000	419,250	458,750	497,750
C	258,500	353,000	403,500	447,000	498,250
D	377,500	460,250	517,250	558,500	596,750
E	161,250	289,250	301,500	312,000	322,000

COMPARISON OF ALTERNATIVES THROUGH RANKING BY PNV

Table II-9 displays the PNV trade-offs between alternatives. It must be noted that this economic evaluation reflects all costs, but only the quantifiable benefits of resource outputs that can be valued. The unquantified benefits are reflected in the quality differences between alternatives including improved resource conditions, resource protection, public safety, concerns for public acceptance of resource management programs and future generations.

Two types of costs make up the total cost figures. The first type are those costs directly attributable to the level of outputs produced. In recreation related outputs these costs include facility construction and rehabilitation and the operation and

maintenance costs associated with producing and managing recreation visitor days (RVD's). In timber management outputs these costs include timber sale preparation and administration, road construction, timber stand improvement, reforestation, and treatment of fuels and residue following timber management activities.

The other category of costs includes those expenditures that are not directly related to the level of outputs produced. These costs are incurred from activities such as soil and water improvement practices and land acquisition for other than resource management needs.

As the reason for developing Benchmark #3 was to display the alternative that maximizes PNV for all priced goods and services, a comparison between BM #3 and the alternatives considered in detail in this planning effort will disclose the differences in total PNV among the alternatives resulting from various nonmonetary management objectives.

Using a 4 percent discount rate, Alternative C, the RPA alternative has the highest Present Net Value (PNV) of all alternatives (refer to Table II-9). This alternative will be compared to Benchmark #3. Following this comparison, Alternative C will serve as the basis for comparing Alternative A (the Forest Plan), which has the next highest PNV among the alternatives. Each alternative will be compared in turn, based upon its PNV rank.

Alternative C's PNV is \$21.1 million (MM) less than that of Benchmark #3. Alternative C has a lower level of discounted benefits (PNB) and a higher level of discounted costs (PVC). The difference in PVB is due to lower grazing use, wilderness use and wildlife habitat improvement treatments. The difference in PVC in Alternative C is due to the production of more wilderness outputs, a substantially larger land acquisition program, trail and road construction/reconstruction.

Alternative A, the proposed action, has a present net value approximately 12.5 million dollars less than Alternative C. This occurred because:

- a. Alternative C emphasizes wilderness management, which has very high benefits when compared with costs (a benefit/cost ratio of 21.62, indicating that \$21.62 of benefits are derived for each \$1.00 of cost).
- b. Alternative A provides a better balance of vegetation treatment by including 63 percent of all regeneration cutting (for the first 50 years) in Douglas-fir and ponderosa pine stands. In contrast, Alternative C includes only 25 percent of regeneration cutting in these types. Douglas-fir and ponderosa pine comprise 52 percent of the lands suitable for

timber production, but include the majority of area available for significant improvement of big game winter range and wildlife habitat diversity. They are less efficient economically than spruce/fir, lodgepole pine or aspen lands because their benefit/cost ratio is lower (0.95 versus 1.08 for aspen and lodgepole pine and 1.28 for spruce/fir) and they have lower inherent productivity. This means that less volume (per acre) is available when ponderosa pine or Douglas-fir lands are regenerated than is realized from spruce/fir, lodgepole pine or aspen regeneration. When combined with lower returns per unit of output (i.e., lower benefit/cost ratio). Alternative C did not provide for acceptable levels of Douglas-fir or ponderosa pine regeneration because it was not economically efficient to do so without the benefits of improved winter range and wildlife habitat being explicitly valued. Since these and certain other multiple use benefits could not be included in the allocation model directly, Alternative A had acreage constraints to provide a vegetation treatment program suitable for achieving these nonpriced resource objectives, even though a lower present net value was the expected consequence.

Alternative B, the current management alternative, has a PNV which is \$34.6 MM less than Alternative A. This is due to a lower level of developed and dispersed recreation as well as area treated for wildlife habitat. Since Alternative B modeled our current management, it was designed to treat the minimum areas by species. Further allocations were then made in the more economically efficient species; spruce/fir, lodgepole pine and aspen. This created a PVB increase in timber of \$0.7 MM.

Alternative D, the commodity emphasis alternative, has a PNV which is \$42.3 MM less than Alternative B. Its reduction in PVB of \$24.5 MM is due primarily to the strategy of maintaining current wilderness acres. Its increase in PVC is due to the large increase in timber volume with its associated costs. Since Alternative D allocated timber beyond demand, costs were accumulated up to allocation while benefits were valued only to demand. The net result of this is a reduction in PNV.

Alternative E, the reduced budget alternative, has a PNV which is \$49.7 MM less than Alternative D. The PVC is the lowest of all alternatives and is \$83.1 MM less than Alternative D. Its PVB is \$132.8 MM less than Alternative D, reflecting the relatively low levels of production of most resources and uses.

AFFECTED ENVIRONMENT

CHAPTER III

AFFECTED ENVIRONMENT

OVERVIEW

This chapter describes the environment of the area to be affected by the implementation of the proposed action and alternatives to it. The Physical and Biological Setting section describes the geology, topography, climate, animal and plant life existing on the Forest. The Social and Economic Setting sections describe the human, social and economic environment of the Pike and San Isabel National Forests and Cimarron and Comanche National Grasslands. The Resource Elements section provides a detailed review of current use, management and demand trends for the Forests' resources. Projections of supply and demand developed in the Analysis of the Management Situation (Planning Action 4) for resource outputs are included in Chapter II of the Forest Plan. The Support Elements section discusses activities needed to maintain and develop the resources.

Parts of this chapter have been revised and expanded in response to public comments on the Draft Environmental Impact Statement. Major changes are in discussions of vegetation, recreation, wilderness, timber, water and minerals. A more thorough discussion of vegetation has been added under the Physical and Biological Setting. This discussion portrays in one place, a Forest and Grasslands-wide picture of existing vegetation. The role of vegetation treatment is also explained in how management can be utilized to achieve a healthy Forest. Vegetation treatment has also been expanded in other discussions throughout the chapter where appropriate.

Minor format and editorial changes have been made to clarify the narrative and some numerical values have been corrected throughout the chapter and between the Plan and Environmental Impact Statement.

In addition to the Pike and San Isabel National Forest lands, this document also displays management alternatives for portions of the Rio Grande National Forest related to the Sangre de Cristo Wilderness Study Area. These areas total 130,700 acres. This document also covers 4,910 acres of Bureau of Land Management lands which are contiguous to the western boundary of the Sangre de Cristo Wilderness Study Area. These Wilderness Study Areas are Black Canyon, South Piney Creek, Papa Keal and Zapata Creek.

PHYSICAL AND BIOLOGICAL SETTING

The Pike and San Isabel National Forests are located in central

and southeastern Colorado, and southwestern Kansas. The Pike and San Isabel National Forests Administrative Unit contains 2,751,736 acres of National Forest System land, and includes 1,107,946 acres of the Pike National Forest; 1,116,743 acres of the San Isabel National Forest; 418,870 acres of the Comanche National Grasslands; and 108,177 acres of the Cimarron National Grasslands.

Geology

The planning area lies in two physiographic provinces, the Great Plains Physiographic Province on the east which includes the Comanche and Cimarron National Grasslands, and the Rocky Mountains Physiographic Province on the west which includes the Pike and San Isabel National Forests, the BLM lands, and those parts of the Rio Grande and Arapaho National Forests.

The Cimarron National Grassland lies within the southern High Plains section of the Great Plains Physiographic Province. The High Plains consist of nearly level plains with intermittent streams of which the Cimarron River is the largest. Elevations range from 3,150 feet to 3,700 feet. The area is composed of upland plains and rolling, hilly, sandy land generally split by the Cimarron River. The upland plains are comparatively flat and featureless breaking to intermediate slopes along the River. The sandhills are sandy hilly land with sand dunes of varying ages ranging up to 20 feet in height.

The Comanche National Grassland lies within the High Plains, Raton, and Colorado Piedmont sections of the Great Plains Physiographic Province. Elevations range from 3,800 feet to 5,900 feet. The generally flat terrain with broad shallow depressions is broken by low lying sand hills in the southeastern part. The Colorado Piedmont has more diverse elevations than the High Plains section. The Raton section is characterized in the northwestern and southwestern parts of the Comanche National Grasslands by deep, steep walled canyons and mesa tops with elevations from 200 to 300 feet. The remainder of the area is generally flat with low rolling plains.

The Pike and San Isabel National Forests are within the Rocky Mountains Physiographic Province. Numerous mountain ranges of varying elevations are interspersed with broad gentle valleys, steep-sided V shaped canyons and some U shaped glaciated valleys. Elevations are from 5,000 feet where the mountains rise from the plains to 14,433 feet at Mt. Elbert, Colorado's highest point. The Continental Divide forms much of the western border of the Pike and San Isabel National Forests.

Two major river systems, the South Platte River to the north, and the Arkansas River to the south originate on and drain the mountainous part of the Forest.

The Front Range, the easternmost range of the Rocky Mountains, is the longest continuous uplift in Colorado, extending from Canon City northward to the Wyoming border. The eastern slope is characterized by broad dissected benchlike erosional surfaces that descend in steps to the plains. At the eastern edge of the Front Range, Pikes Peak and Rampart Range, composed of pink, coarse grained, Precambrian granite, rise steeply above the plains to a general elevation of 9,000 feet reaching upward to the 14,110 foot summit of Pikes Peak. Thick layers of sediments deposited in intermountain basins before the mountains of the Front Range were thrust up, are evident in the Florissant Fossil Beds, Manitou Park, and South Park to the west. Several major mountain ranges zig-zag throughout this portion of the planning area. The Platte River, Kenosha, and Tarryall Mountain Ranges rise to 11,000 and 12,000 foot elevations dividing the area west of the South Platte River.

The Wet Mountains are the easternmost range of the Rockies south of Canon City. The Sangre de Cristo Mountain Range is visible from many parts of southeastern Colorado as a jagged, saw-toothed, snowcrested ridge on the western skyline. It extends about 150 miles from the Arkansas River near Salida southward into New Mexico. South of the Sangre de Cristo Range is a group of prominent peaks known as the Culebra Range. To the east of the Sangre de Cristo and Culebra Ranges are the Spanish Peaks, a pair of dormant Cenozoic volcanoes, now deeply eroded. The Park Range, bordering the western side of South Park is a long north-south ridge extending from the Wyoming border into central Colorado with a structure similar to the Front Range. The Mosquito Range which adjoins the Park Range on the south, separates South Park from the Upper Arkansas Valley and includes several peaks, all over 14,000 feet in elevation. Buffalo Peaks, two highly eroded volcanic mountains are near the south end of the Mosquito Range. Bordering the Arkansas River Valley on the west, the Sawatch Range includes Colorado's highest mountain, Mt. Elbert (14,433 feet). This Range, highest in the state, is 100 miles long and 40 miles wide. The Sawatch and Mosquito Ranges are separated topographically by the deep valley of the Arkansas River.

Climate

The planning area covers a broad range of elevations from 14,433 feet at Mt. Elbert to 3,150 feet where the Cimarron River leaves the Cimarron National Grassland in southwest Kansas. This wide elevation range accounts in part, for extreme differences in climate. Average growing season extends from about 170 days in the lower Arkansas Valley to about 82 days in the Leadville area. Average mean temperatures range from 52 degrees to 37 degrees for those respective areas.

The high mountains of the Continental Divide dominate and control year long precipitation patterns. Moist air flowing from the west rises over the Rocky Mountains and in the process loses much of its moisture to the western slope. Although higher elevations of forest land receive over 30 inches of precipitation per year, other areas such as the South Park or Upper Arkansas Valley areas lying in the "Rain Shadow" of the mountains receive only 10 inches or less per year. Average snowfall ranges from 125 inches at Leadville to about 24 inches or less in the eastern part of the planning area. Numerous summer thunderstorms account for a high incidence of lightning caused fires. High winds, occurring usually in the spring and early summer across the plains, contributed to the dust bowl conditions of the 1930's and are still considered a threat when accompanied by drought, high temperatures and the absence of cover vegetation.

Vegetation

Vegetation contributes to Forest character more than most landscape features. Its form, color and texture are easily discernible to the human eye. Society perceives it to have beauty and utility.

Plant life varies by elevational range and climate. Temperature and precipitation extremes are encountered through the elevation zones from the prairie to the high peaks. Moving upward through the zones, the National Grasslands are characterized by short grass prairie with plains grasses, sandsage and yucca. Cottonwood grows in the major stream bottoms. The National Forests begin at the foothills with pinyon pine and shrubs and continue up through the montane zone with aspen, ponderosa pine and Douglas-fir forests. In the upper montane zone, aspen, lodgepole pine and spruce/fir forests are encountered. At higher elevation, the sub-alpine fir are found. Above timberline, from about 11,500 feet to the highest peaks, the alpine zone occurs.

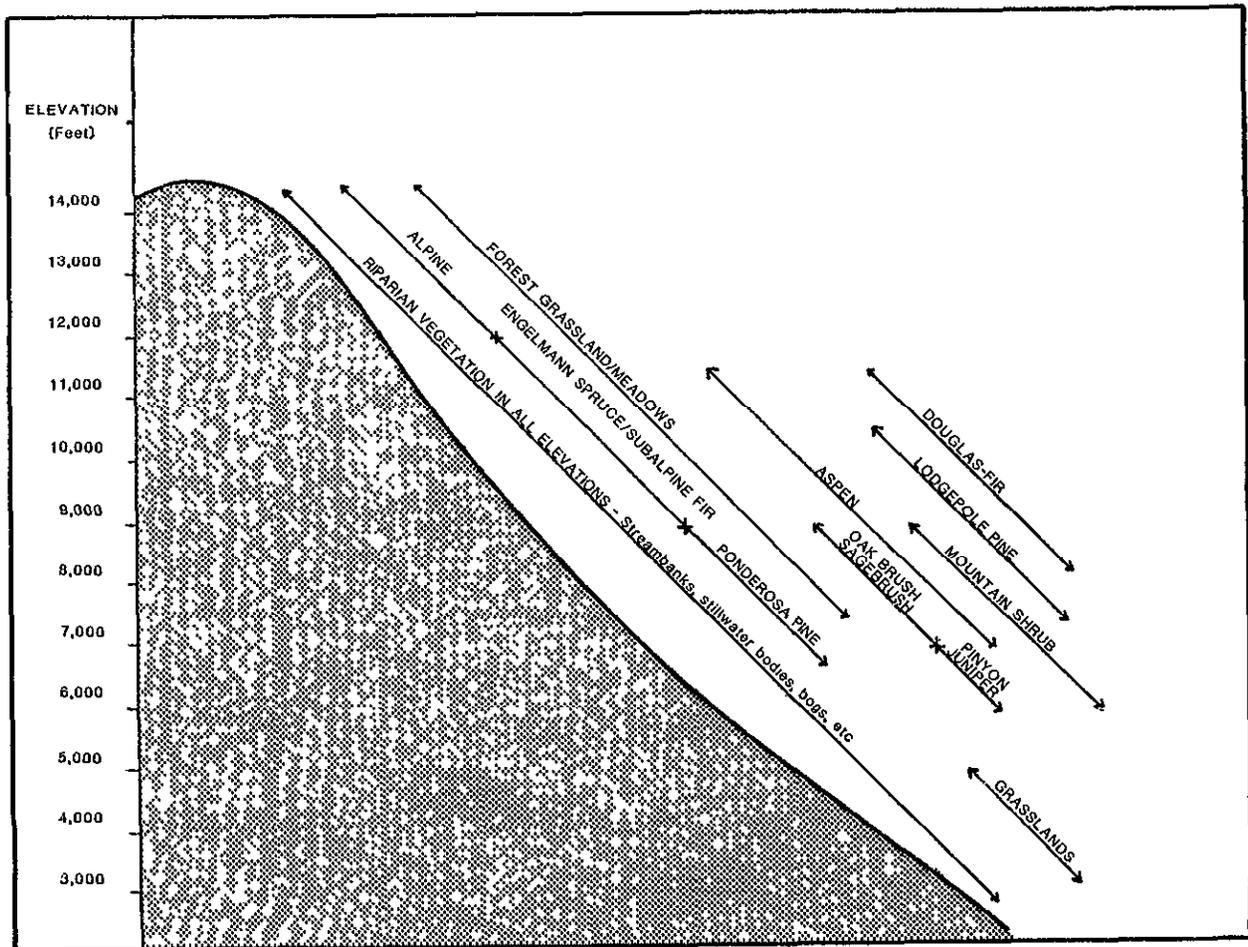
Vegetation is a dynamic resource as it changes over time. The way it will change is based on factors that effect vegetation and the site on which it is growing. The Forest Reserves were established prior to 1900. Since that time, Forest managers have largely controlled the natural factors that effect vegetation and growing conditions.

Forest managers control these conditions to provide and maintain a healthy, vigorous environment, capable of producing a range of outputs and conditions. There are consequences associated with not managing vegetation on the forest. These consequences are discussed throughout Chapter IV.

Hundreds of individual plant species occur within five major vegetative zones on the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands which may be classified into less than a dozen vegetation types. Each type lends a unique character to the landscape and has an associated utility to society. Forest management is linked to vegetation treatment because vegetation influences other resource elements.

The following display shows general elevational ranges for the major vegetation communities on the Forests and National Grasslands.

Figure III-1 General Elevation Range for Grasslands and Forest Vegetation.



Major Vegetation Zones

Grasslands (Comanche and Cimarron National Grasslands)

The Comanche and Cimarron National Grasslands occupy an elevational range from 3,150 to 5,900 feet. The flat topography of the grasslands with its broad, shallow depressions is broken by low lying sand hills in the southeastern part. Other parts of the grasslands have deep (up to 300 feet), steep walled canyons and mesa tops where the erosional effects of wind and water have carved these landscape features.

Tertiary and Quaternary sediments consisting of deposits of limestone, shale, sandstone, sands and gravels underlie the Grasslands. These deposits consist of marine and nonmarine beds. Most of the soils have developed from sediments deposited during the Pleistocene and recent epochs. The parent materials are mainly loess, eolian sand, recent alluvium, and old alluvium of the Pleistocene or Late Pliocene epochs.

The Grasslands have a growing season of about 170 days, with warm summers and often times cold winters. Humidity is low; precipitation averages between 10 to 17 inches annually.

Predominant vegetation is grass and forbs with trees and shrubs restricted mostly to the larger drainage bottoms. These consist primarily of cottonwood and willows.

Lower Montane

The lower montane forests occupy an elevation range of 6,000 to 7,500 feet. This zone occurs on the lower to mid-foothills, plateaus, and canyon sides within the Forests. Soils vary considerably in depth and texture but have formed predominantly in materials weathered from sedimentary rock.

This zone has a growing season of 60 to 80 days, with warm summers and cold winters. Humidity is normally low; precipitation averages 13 to 15 inches annually.

Predominant vegetation is sagebrush, Gambel oak, ponderosa pine and Douglas-fir, with associated grasses and shrubs on the lower elevations and canyon sideslopes. Lodgepole pine and aspen occur in the upper portions of the zone.

Upper Montane

The upper montane forest is found from 7,500 to 10,000 feet. It occupies the upper foothills, canyon sideslopes and lower mountain slopes of the Forest. The soils vary considerably in depth and texture as in the lower montane. Soils have formed in materials weathered mainly from metamorphic and sedimentary rocks. At the higher elevations of the zone, igneous and metamorphic parent materials are found.

The length of the growing season ranges between 45 and 60 days. The zone is slightly cooler and more humid than the lower elevations. Precipitation averages from 15 to 20 inches annually.

The major forest species are Lodgepole pine and aspen. Englemann spruce and subalpine fir occur in the upper portions of this zone and ponderosa pine, Douglas-fir, sagebrush and Gambel oak in the lower.

Subalpine

The subalpine forest occurs at elevations of 10,000 to 12,000 feet. This zone occupies the upper mountain slopes and mountain canyon sideslopes of the Pike and San Isabel National Forests.

Geology of the zone is typified by igneous, metamorphic and volcanic rocks with some sedimentary rocks. Soils in this zone generally have more rock and stone fragments on the surface and within the soil profile. They are generally younger and less developed. Wet meadows and bogs occur frequently.

The climate is characterized by cool summers and cold winters. The length of the growing season is 40 to 45 days. Average annual precipitation is between 20 and 30 inches.

The principle vegetation types are sedge-grass meadows with Engelmann spruce, subalpine-fir and aspen dominating in the forested areas. In many areas in this zone, lodgepole pine is also an important component.

Alpine

The alpine forest is found at elevations above 11,500 feet. Most of the zone has undergone extensive glaciation and is characterized by rugged alpine landforms. The geology within this zone is predominantly igneous and metamorphic, with occasional sedimentary rocks.

This zone contains large areas of exposed rock. The soils contain large amounts of rock fragments and are well drained on the steeper areas. Depressions and bowls contain some poorly drained soils and often standing water throughout the summer months.

This zone has short cool summers and long cold winters. Snow cover typically lasts from September to July. Strong winds, variable moisture and a growing season of 40 days or less create a harsh environment for vegetation. Average annual precipitation is usually over 30 inches.

Vegetation on moist sites includes tufted hairgrass, sedges and willows; while on dry sites, fescues, sedges, bluegrasses and

numerous forbs are found. Timberline forms the lower boundary of this zone. Scattered krummholz of spruce or fir are found within this zone.

Vegetation types found in the major vegetation zones are as follows:

Alpine - Alpine vegetation grows above native tree elevation limits. It is characterized by grasses, grasslike plants, low shrubs, and poorly formed trees. Alpine provided a unique opportunity for scenic viewing particularly during the early summer when wildflowers are in bloom. The most important factor controlling the distribution and growth of alpine plants is available soil moisture. Wildlife habitats provided by this type support elk, bighorn sheep and mountain goats. Ptarmigan and pika are unique to the type. Livestock, particularly sheep, graze the alpine in designated range allotments.

Treatments which modify alpine vegetation are infrequently applied. Due to a short growing season and harsh climatic conditions, alpine vegetation after disturbance is very slow to recover. Alpine vegetation will perpetuate itself unless there is severe ground disturbance.

Aspen - The aspen vegetation type occupies 6 percent of the Forest and typically occurs at lower elevations interspersed with grasslands, meadows, mountain brush, and other forest types. Aspen stands on the Forest are typically mature to overmature with high disease and mortality levels.

Aspen is important to recreation use. It is an important visual feature in the landscape character of the Rocky Mountains Physiographic Province. Aspen color and texture contribute to the character in many ways. These include edge contrast between aspen and conifer stands, aspen islands in large meadows, and massive textural blocks all occurring in the midground and background. In the foreground distance zone, aspen form and texture are important features. Color is a dominant element in all distance zones. Color contrasts with surrounding coniferous vegetation, nonforest areas, bare rock, water and sky. The color change between seasons attracts many forest visits year round.

Mountain grasslands and associated aspen stands furnish forage for a large segment of the livestock industry in Colorado. Many aspen sites support a luxuriant understory of forbs and grasses. These areas are important summer rangelands for both cattle and sheep.

The aspen ecosystem is important to wildlife. Deer and elk browse aspen under 6 feet in height. Taller aspen provides both thermal and hiding cover. Aspen sprouts above snowcover

are important to winter diet in some areas. The grass, forb and shrub understory provide a summer food source.

Aspen forests provide prime elk calving and deer fawning habitat. This is especially true on south slopes when water is within one-quarter mile.

More songbirds are normally observed in aspen forests than in coniferous forests. Aspen provides food, nest sites and cover for warblers, vireos, blue grouse, owls, thrushes, kinglets, and a variety of other birds. Small mammals such as shrews, moles and mice use aspen forests. Aspen under-story and leaf litter provides their food, cover and nest sites. Aspen along riparian zones is one of the basic foods for beaver.

Overmature aspen stands are sometimes decadent and provide cavities and insects for bird and mammal species. Aspen stands are often in close proximity to conifer stands that can provide cover during aspen regeneration.

Aspen management in transitory big game range helps support food and cover needs longer in the spring and fall. This takes pressure off summer and winter range and provides extra forage during mild winters.

Aspen is an early seral species which aggressively invades recently burned over or otherwise disturbed areas. Most aspen stands on the Forest were established following large fires and are now even-aged and mature or over-mature.

Aspen are prolific seed producers, however, the requirements for seedling survival are so limiting that aspen rarely regenerate from seed. The usual means by which aspen regenerate is suckering. Suckering is a form of asexual reproduction in which a number of stems are produced from a single root system to form a clone. Clones are genetically identical to the trees from which they originated. Trees within one clone are very homogeneous in such characteristics as rate of growth, form, vigor, resistance to disease, and time of leaf break and leaf fall.

Young aspens which develop from suckering are fast growing and are relatively short-lived. Like many pioneer species, aspen do best in full sunlight, and compete poorly with later successional species which are more tolerant of shade. On the Pike and San Isabel National Forests, mature aspen stands often have an understory of Engelmann spruce and subalpine fir. These conifers develop slowly beneath the semi-open canopy of the aspen overstory, eventually over-topping and displacing the aspen.

Another factor which contributes to the relatively short life span of aspen is their susceptibility to disease. Aspen is a host to over 250 species of fungi. It appears that the degree of infestation is related to age. Decay becomes serious in most trees over 100 years of age. Trunk cankers also cause considerable mortality.

Major disturbances, such as fire or clearcutting which quickly kill the above ground portion of an aspen stand, are usually followed by abundant suckering. Suckering is thought to be the result of a hormone imbalance in the root system. Hormones produced in the leaves are thought to suppress suckering from the root system. When the above ground portion of the tree is killed, the inhibiting hormone is no longer present, and suckering occurs. In deteriorating clones, the overstory dies slowly and is accompanied by concurrent deterioration of the root system. This concurrent deterioration maintains the hormonal balance and prevents suckering. As this condition progresses, the ability of the clone to regenerate by suckering declines.

Wildfire has historically been the primary disturbance initiating root suckering. Control of wildfire has permitted many aspen stands to become overmature with little success in regenerating. In the absence of disturbance, either natural or man-made, much of the aspen type will convert to conifer types in 100 to 200 years.

Resource values will suffer if aspen is not treated and allowed to convert to a conifer Forest. This will result in loss of wildlife habitat reductions in forage supplies, and adverse impacts on recreation settings associated with the aspen types.

Douglas-fir - Douglas-fir occupies about 16 percent of the Forest. It typically occurs on steep, north-facing slopes at lower elevations and is frequently the only conifer vegetation in a large area. On south-facing slopes, Douglas-fir occurs sparsely on rocky ridges, steep hillsides and canyon slopes.

Douglas-fir is a long-lived species which is valued for wildlife habitat diversity, scenic quality and cover on big game winter range. Douglas-fir also contributes to watershed protection and is a desired commercial tree species. The Douglas-fir type has not been treated in the past resulting in mostly mature and overmature stands. Very little acreage of early successional stages of Douglas-fir are known to exist on the Forests.

Douglas-fir is a climax species that reproduces from seed. These stands will regenerate without any silvicultural treatment.

Currently the stands have a relatively uniform age structure. Natural succession will perpetuate the current uniform distribution.

Gambel Oak - Oak brush vegetation commonly occurs at lower elevations on the Forest. At its lower elevation range, it is frequently associated with pinyon-juniper trees. At its upper limit it is often interspersed with aspen, Douglas-fir or ponderosa pine.

The Gambel oak type provides watershed protection, retards snowmelt, provides browse for wildlife and domestic stock and is a popular firewood species. Gambel oak is capable of reaching tree size on some sites. This savannah type provides highly productive understory forage for wildlife and livestock. The mature trees provide cavities for small mammal dens and non-game bird nests. Food production for deer and turkey is highest on these sites.

Grasslands (Comanche and Cimarron National Grasslands) Vegetation consists primarily of short and mid-grasses. Cottonwood trees and willow are largely restricted to major stream bottoms. Juniper trees and shrubs occur in low lying areas and on slopes in areas of broken topography, such as canyons and draws. Shrubs consist of sand sagebrush, yucca, four-wing saltbrush, tumbling saltbrush, true mountain mahogany, rubber rabbit brush, wax current, clove current, boulder raspberry, small soapweed, skunkbush sumac, common hackberry, walkingstick cholla, Longs grape, winterfat and sacahuista.

Major mid-grasses are sideoats grama, galleta, and sand dropseed. Major short grasses are blue grama and buffalo grass. Other species include Indian ricegrass, crested wheatgrass, western wheatgrass, big, little and sand bluestem grass, sand love, New Mexico needle grass, akali sacaton, and three awn.

Forbs make up a portion of the vegetative cover. Some of the more common forbs are Russian thistle, Kochia, sunflower, poverty weed, night shade, evening star, snow-on-the-mountain, gourds, Devil's claw, croton, milkweed, and pig weed. Other species include asters, bush morning glory, daisies, penstemons, shooting star, evening primrose, and wooly verbena. Astragalus and delphinium are also found in favorable years.

Forage production ranges from 715 to 2050 pounds per acre per year across the Grasslands. Management is directed at increasing forage while providing protection for other resource values.

The National Grasslands provide a diverse scenic variety of landforms, natural and managed vegetation communities, and wildlife species seen nowhere else on the National Forest.

Forest Grasslands and Meadows - Forest grasslands and meadow vegetation types occur throughout the mountainous part of the Forest and are interspersed with other vegetation types. Most mountain grasslands support, or are capable of supporting, numerous kinds of perennial grasses and forbs. Herbage production on mountain grasslands occasionally exceeds 3,000 pounds per acre; however, yields of 1,000 to 2,000 pounds per acre are more common.

Many of these open parks may be the result of fire. The forage produced in the mountain grasslands and meadow vegetation types is available for both wildlife and domestic stock. The open nature of these vegetation types provides a great deal of scenic variety. Management is typically directed at increasing forage while maintaining visual quality.

Lodgepole pine - Lodgepole pine occurs on the Forest primarily in even-aged stands of fire origin. Lodgepole pine is typically a seral species which, in the long-term absence of major disturbance, will be replaced by more shade tolerant species--generally Engelmann spruce and subalpine fir. On some sites, however, where site conditions or lack of a seed source prevent the establishment of more shade tolerant species, lodgepole may form a virtual climax plant community. The type occupies about 18 percent of the Forest and provides scenic beauty, wildlife habitat, firewood and other wood products.

Lodgepole pine is an aggressive invader into disturbed sites. Existing stands will deteriorate in 200 to 300 years. As lodgepole pine matures and loses vigor, it becomes highly susceptible to attack by the mountain pine beetle. Under the right stand conditions, individual beetle infestations can multiply into an epidemic. The long-term solution to control pine beetle epidemics is to create a mosaic of age and size classes in lodgepole pine and to apply intermediate cultural treatments which promote vigorous, disease free trees.

Mistletoe also heavily infects large amounts of lodgepole pine on the Forest. Approximately 95 percent of lodgepole pine stands on the Forest are considered to be stagnated (extremely slow or stopped growth) and should be treated. Following disturbance, natural regeneration is often so prolific that the stand is overstocked and may become stagnated if it is not thinned. (Stagnation is a condition where competition between individual trees for light, water and available nutrients is so intense that growth slows severely or ceases entirely.)

If lodgepole pine is not treated the even-aged stands will become overmature and the mountain pine beetle infestation risk will increase. Large areas of beetle killed trees will become increasingly susceptible to wildfire. If serotinous cones are present the lodgepole pine type could be maintained. Without a seed source meadows or other seral vegetation types such as aspen could invade burned over areas.

Mountain Shrub - This vegetation type is dominated by one or more of the following species: current, bitterbrush, rabbitbrush, snowberry, and mountain mahogany. It is located in combination with other shrub types (sagebrush, blueberry, etc.) and some of the drier forest types. The primary value of the type is for wildlife habitat. It has particular importance when available for use as big game winter range.

Pinyon/Juniper - This vegetation type is a semi-arid woodland composed of pinyon pine and juniper. It occurs below the elevation limit of Gambel oak and generally occupies the lower elevations on the Forest.

The pinyon-juniper type occurs on the drier sites on the Forest and therefore is one of the least productive types. Vegetation is characterized by small size and low growth rates.

It provides forage for wildlife and livestock, adds scenic variety to the landscape, and furnishes products such as firewood, posts, and Christmas trees. It is important cover on big game winter range. Most of the type is estimated to be in the intermediate and late structural stages which reflects the lack of recent natural disturbance.

If left untreated pinyon-juniper will replace itself. If it replaces itself naturally the type will retain its current structural imbalance.

Riparian - Riparian vegetation occur in areas with high water tables. Plants frequently common in this ecosystem include willows, alder, cottonwood and sedges. These areas are typically located adjacent to streams and around springs, lakes or bogs. While small in total area, they represent delicate, very important habitat for wildlife and serve as sediment traps to help purify overland water runoff. Desirable forage production is high, and under proper management these areas are an important part of grazing allotments. The riparian type also provides visual diversity and timber management potential along most forest streams. Riparian is important for recreation such as campgrounds and fishing. Riparian is one of the more productive sites on the forest. It also has the most diverse age structure.

Sagebrush - This vegetation type occupies relatively dry sites on the Forest. It is important for big game winter range. It also provides a scenic desert-like landscape and significant forage for livestock. Most of the type is in intermediate and late structural stages. Management techniques used in this type are prescribed burning and mechanical or chemical treatment.

Sagebrush is an invader species that may eventually take over other sites. If left untreated the sagebrush type will perpetuate itself and expand.

Engelmann Spruce/Subalpine Fir - Engelmann spruce and subalpine fir occupies 14 percent of the Forest. This type occurs at higher elevations and represents the climax plant community on most of the sites it occupies. This type usually occupies moist sites. Spruce can grow to over 300 years and fir to 250 years. They generally occur in single age stands but occasionally occur in 2, 3, or multi-story stands. Its dense forest growth and layered appearance provides outstanding scenic views. It is also valued for wildlife habitat, watershed protection and production, and wood products.

There is currently a poor distribution of age classes or structural stages. This poor distribution is caused by low levels of management activity and by fire control. Fifty-six percent of the type is overmature. As the spruce and fir type matures, the trees become susceptible to insect and disease infestations. Subalpine fir is infected first, followed by spruce. A better balance of structural stages is needed to enhance forest health and vigor.

There was an extensive spruce bark beetle epidemic during the period 1939 to 1952. It affected the old growth spruce and fir stands on the Forest at that time. Many of the dead trees are still standing.

The spruce/fir type reproduces by seed. It will reproduce itself naturally if not treated. The reproduction will retain the same age class distribution as currently exists. If a natural disturbance occurs, such as a major fire, the site will probably revert to aspen or lodgepole pine type.

Ponderosa pine - This vegetation type occupies 14 percent of the Forest. Ponderosa pine generally grows in pure stands, but can be associated with aspen, Douglas-fir, pinyon-juniper and oakbrush. Ponderosa pine reproduces by seed. Natural regeneration requires the combination of a good seed crop, ample moisture the spring following seed fall to assure germination and seedling survival and favorable seedbed conditions. These three conditions coincide rather infrequently.

Historically, low-intensity wildfires burned through ponderosa pine stands at frequent intervals. These fires had little effect on established trees. Thick bark makes ponderosa pine fire resistant. However, these fires prevented the buildup of heavy duff accumulations and kept competing vegetation in check, thus maintaining seedbed conditions favorable to ponderosa pine. Fire suppression over the past several decades has resulted in a buildup of organic litter, making seedbed conditions less favorable for ponderosa pine. Currently the type is mature to overmature, open grown and poorly stocked. There are some uneven aged stands which are the result of past cutting activity.

Ponderosa pine is important for timber production, livestock grazing, and wildlife habitat.

Ponderosa pine is considered a climax species on many of the sites on which it occurs, particularly near the center of its elevational range. Major disturbances, such as high-intensity fires, heavy logging, or widespread mortality from insect or disease infestations may cause ponderosa pine sites to revert to more seral stages such as aspen, oakbrush or grass. The mountain pine beetle is currently at epidemic levels in some localized areas, but the rate of spread appears to generally be decreasing.

SOCIAL SETTING

The area of direct social influence lies in parts of eighteen counties, sixteen in Colorado (Baca, Chaffee, Clear Creek, Custer, Douglas, El Paso, Fremont, Huerfano, Jefferson, Lake, Las Animas, Otero, Park, Pueblo, Saguache, and Teller), and two in Kansas (Morton and Stevens). The Forest consists of 2,643,559 acres in Colorado and 108,177 acres in Kansas, totalling 2,751,736 acres of National Forest System land. All the acreage in Kansas is National Grassland; 418,870 acres of the Colorado portion are National Grassland, and the remainder is National Forest.

The Forest is adjacent to the Denver Standard Metropolitan Statistical Area (SMSA) which includes seven counties (Adams, Arapaho, Boulder, Denver, Douglas, Gilpin, and Jefferson). The Denver SMSA is considered to be a major area of influence for the management of the Pike and San Isabel National Forests. The population in the Denver SMSA creates a large portion of the recreational uses that occur on the Forest, particularly along the Front Range.

SOCIAL RESOURCE UNITS

Social Resource Units (SRU's) were delineated and used as a framework for assessing the social and cultural relationships that people have with the land environment. Social Resource Units were defined by natural topographic boundaries such as mountain valleys and river basins, and by cultural lifestyles and settlement patterns.

The Forest area lies within three Social Resource Units: Front Range, Arkansas, and Southern Plains. (Figures III-2 and III-3)

The Front Range Social Resource Unit (SRU I) consists of the Colorado Front Range. The Front Range can be described as a strip roughly 40 miles wide that stretches from Ft. Collins in the north, through Greeley, Boulder, Denver, and Colorado Springs to Pueblo in the south. The majority of SRU I to the west consists of mountains with intermittent lowlands, and plains to the eastern boundary.

The population boom occurring along the Front Range Urban Corridor has had significant impacts upon the nearby Forest lands. The Denver metropolitan area is the hub for the state and the Rocky Mountain Great Plains region and is rapidly becoming a national technological commercial center. The diversity of jobs and opportunities linked with favorable climatic conditions make the urban centers of Denver and Colorado Springs high immigration areas. Urban sprawl has extended its residential influence far into many of the mountain communities. Winter sports, real estate development, and supporting businesses orient their operations to a national market which increased the demand for recreational uses of National Forest System land.

The Arkansas Social Resource Unit (SRU J) begins in the west at the headwaters of the Arkansas River above Leadville, at Tennessee Pass. It follows the Arkansas River south and east to the eastern boundary of Pueblo County. Also included in the Arkansas SRU are the South Park valley area which lies south of Kenosha Pass and east of the Arkansas River, and the Spanish Peaks Region.

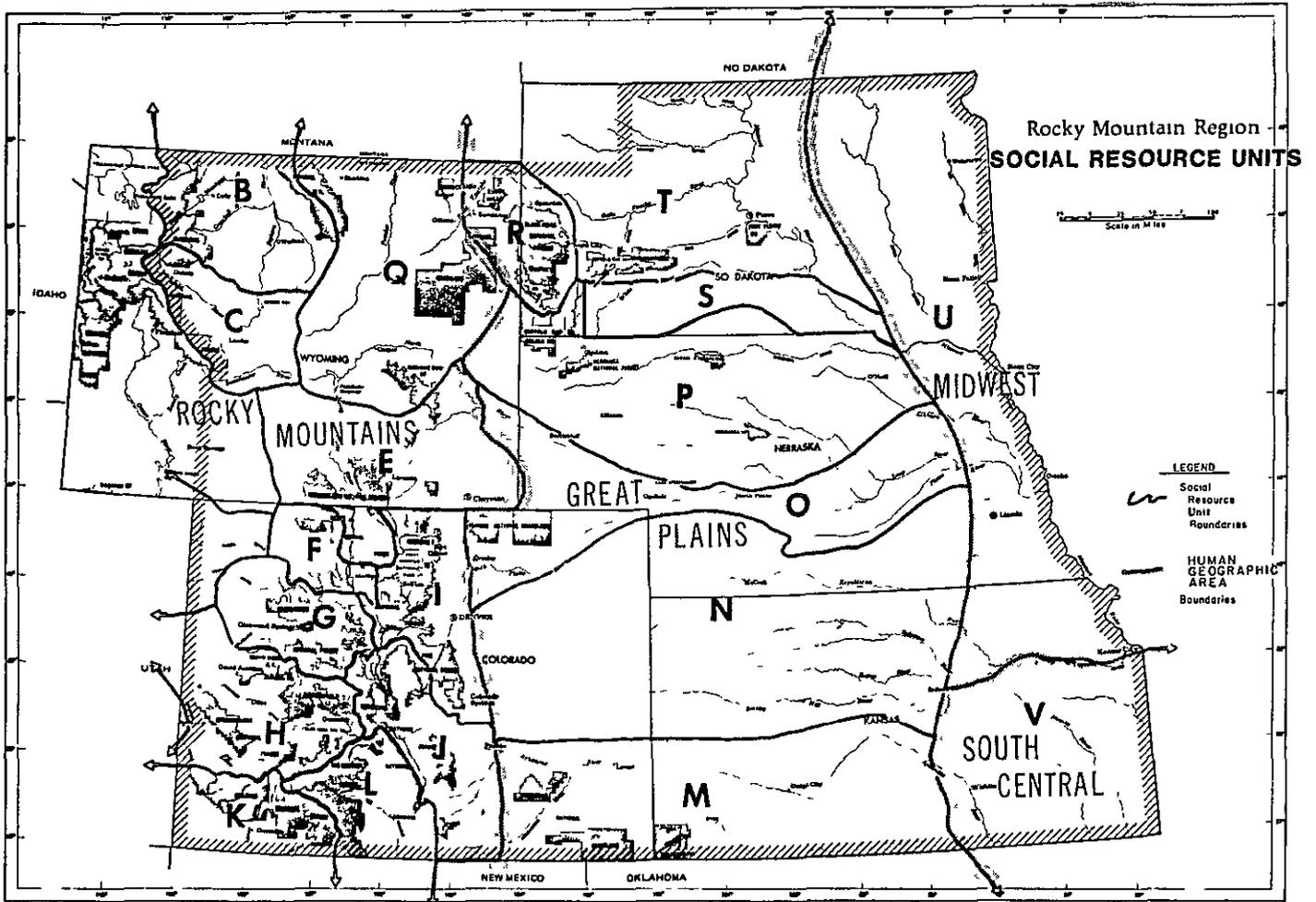
The northern Arkansas Valley between Leadville and Salida, and the South Park Valley are surrounded by National Forest System lands. Lake County as well as nearby counties are totally dependent upon mineral activities as an economic base. Manufacturing and service related economies are a major part of the Unit in the middle Arkansas Valley. Government is considered the area's largest employer with more than 22 percent of the civilian labor force employed by local, state or Federal agencies.

South Park is dependent on construction and service related jobs to support the local population. Many people commute outside the SRU to the Denver metropolitan and Colorado Springs areas for employment. The Spanish Peaks region is dependent on agricultural and mining activities as well as service and government related employment. Tourism is important throughout the SRU and provides direct and indirect employment for the area. Esthetics are of major importance because of their value in attracting tourists to the SRU.

The Southern Plains SRU (SRU M) consists of the Comanche and Cimarron National Grasslands located in southeastern Colorado and southwestern Kansas, respectively.

Since 1953, the National Grasslands have been administered by the USDA, Forest Service and are presently known as the Cimarron and Comanche National Grasslands. The Cimarron National Grassland is the largest block of public land in the State of Kansas.

FIGURE III-2
 Social Resource Units for the Rocky Mountain Region



The Grasslands portion of the SRU is primarily dependent on intensive agriculture and ranching and relies extensively on National Grasslands for grazing of livestock. Cattle production is one of the principal industries in the SRU and provides a significant portion of the economic base. The oil and gas industry plays an important role in the use of the Grasslands and provides large quantities of energy fuels for the Nation. The Grasslands have become important wildlife habitats, that have generated large amounts of hunting related revenue for the area's economy. Manufacturing, service, and government related activities are major contributors to the total employment and economy of the area.

HUMAN RESOURCE UNITS

The Pike and San Isabel National Forests delineated areas called Human Resource Units (HRU) to assess geographically the social variables related to the different aspects of Forest resources and management. A Human Resource Unit is defined as a geographic area of land that is characterized by particular patterns of cultural lifestyles, economic conditions, and topography. This concept was used to characterize the unique relationships residents of an area have with one another and with the land on and near National Forests and Grasslands. Social variables include both economic and cultural values. From the HRU's, the dependency of the local communities on Forest and Grassland natural resources was determined. Public issues and management concerns were identified within specific geographic areas of land. The Forest Plan addresses public issues and management concerns related to Forest management.

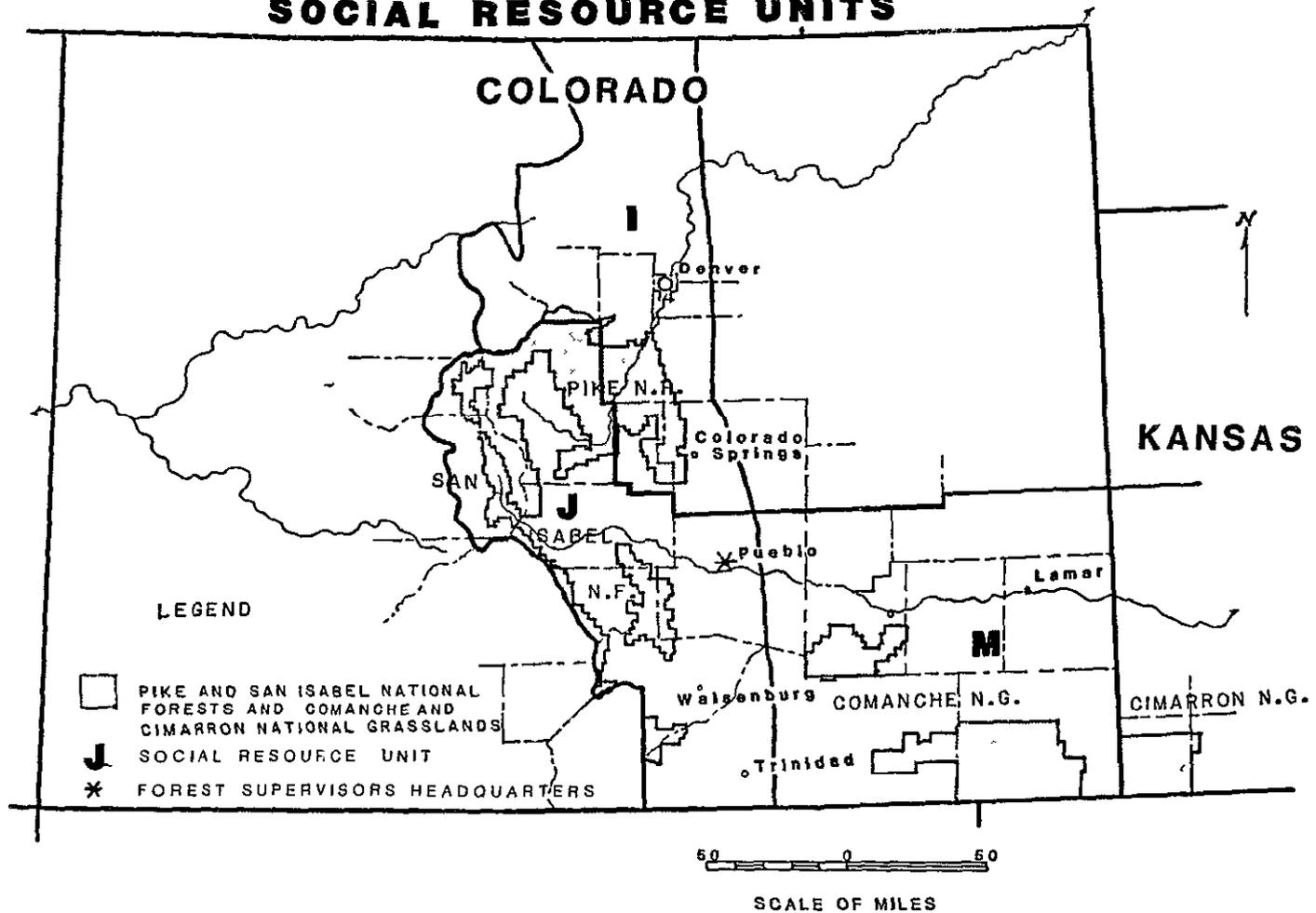
Racial composition within Human Resource Units, and geographic locations of minorities, is available in the planning record (Planning Action 4, Analysis of the Management Situation). This document is available for review in the Forest Supervisor's Office, Pueblo.

The Forest is comprised of nine Human Resource Units (Leadville, Salida, South Park, South Platte, Pikes Peak, Sangre de Cristo-Wet Mountains, Spanish Peaks, Comanche, and Cimarron) falling within three Social Resource Units (Front Range, Arkansas, and Southern Plains). See Figure III-4.

<u>Social Resource Unit</u>	<u>Human Resource Unit</u>	<u>County</u>
I (Front Range)	Pikes Peak #5 South Platte #4	El Paso; Teller Douglas; Jefferson
J (Arkansas)	Leadville #1 South Park #3 Salida #2 Sangre de Cristo and Wet Mountains #6 Spanish Peaks #7	Lake Park Chaffee Custer; Fremont and Pueblo Huerfano; part of Las Animas
M (Southern Plains)	Comanche #8 Cimarron #9	Baca; Otero; part of Las Animas Morton; part of Steven, KS

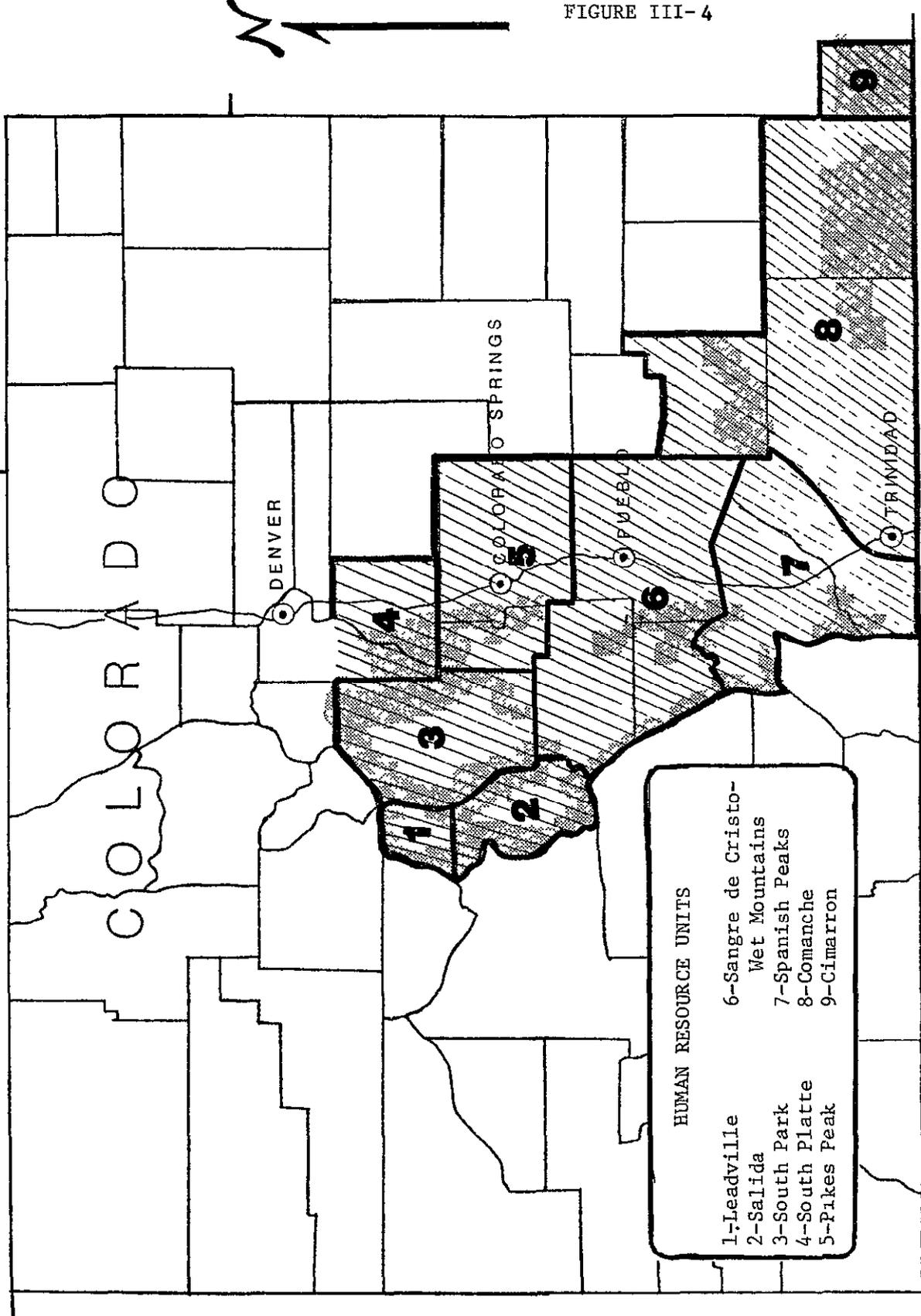
FIGURE III-3

GENERAL LOCATION MAP SOCIAL RESOURCE UNITS



Pike & San Isabel National Forests Comanche & Cimarron National Grasslands

HUMAN RESOURCE UNITS



- HUMAN RESOURCE UNITS
- 1-Leadville
 - 2-Salida
 - 3-South Park
 - 4-South Platte
 - 5-Pikes Peak
 - 6-Sangre de Cristo-Wet Mountains
 - 7-Spanish Peaks
 - 8-Comanche
 - 9-Cimarron

LOCATION MAP

FIGURE III-4

LEADVILLE HUMAN RESOURCE UNIT #1: This Human Resource Unit is comprised of Lake County which occupies a central position in the State of Colorado. Counties bordering Lake County are Pitkin to the west, Eagle to the north, Summit to the northeast, Park to the east, and Chaffee to the south. Lake County consists of 242.6 thousand acres of which 64.5 percent is National Forest System land. Leadville is the major city in Lake County.

Settlement

The settlement of the Leadville Human Resource Unit is tied to the history of its minerals. Mining activities opened the area for development by white settlers. Related activities and other business industries developed shortly after mineral discoveries. The cost of living in the area is high as a result of mineral activities and resultant high wages. Elderly and retired families tend to move out because of the high cost of living.

Lifestyle

Mining and related activities dominate the employment in the HRU. Trades, services and government also provide a significant portion of the total employment.

Communities depend on National Forest System land for a variety of resources. The local employment and economic base stems from mining and related activities. Mining in Lake County is on the increase. Nearby Forest areas are used for numerous outdoor activities. Active and inactive mine sites on National Forest System land are of educational and scenic value to tourists and residents. Fuelwood is in great demand because of rising fuel prices. Forest lands provide a diversity of esthetics that attract a wide range of interests. The Forest Service provides a few permanent and seasonal job opportunities annually.

Dispersed recreation occurring on the Forest, particularly hiking, mountain climbing, hunting, fishing, camping and picnicking, is increasing. Turquoise Lake Recreation Area is located on the Forest approximately four miles west of Leadville. Facilities for handicapped individuals are available at the Turquoise Lake and Twin Lakes Recreation Areas.

Social Organization

Adequate support services, including medical, educational, law enforcement, and firefighting facilities, are available in Lake County. Communication networks comprised of various interest groups, local newspaper, and government provide an ongoing means for communications. Lake County residents have developed a cohesive community stability based on minerals related employment.

Attitudes, Beliefs, Values

Esthetics are important to the residents in Lake County. Residents depend on mining related employment, either directly or indirectly. Recreation is one of the major activities taking place in the HRU and dispersed recreation occurring on the Forest is increasing. Several households depend on fuelwood from the Forest as a primary source of heat. Local businesses look upon Forest Service-related activities and tourism as a supplement to the economic base.

Land Use

Mining and related activities prevail within Lake County. Urbanization and expansion of the City of Leadville is occurring slowly. Other areas in the county which show signs of an urbanizing nature are the subdivisions, mobile home parks, and recreation areas scattered throughout the HRU. Along the Arkansas River, irrigated agriculture and pasture are the predominant land uses. Livestock activity consists mainly of cattle and sheep raising. At higher elevations in the woodland and alpine areas, some lumbering and grazing takes place, but recreation is the predominant use. The areas around Twin Lakes and Turquoise Lake Reservoirs are major recreation areas. Water storage for the Fryingpan-Arkansas Project and water-based recreation are the primary uses.

Population and Employment

Historically, mineral production and related industries have been and still are the prime factors in the labor market in Lake County. Mining accounts for 35 percent of the total employment. Trade, services, and government provide the majority of the remaining nonagricultural employment. In March 1981, the unemployment rate in Lake County was 7.4 percent. Per capita income increased from \$3,231 in 1970 to \$5,374 in 1977. The total population of the Leadville Human Resource Unit increased about 24 percent between 1960 and 1980. Population and employment are expected to increase significantly by 2010 because of increased mineral production in the area. However, the area's high cost-of-living may have some effect on the population growth rate. Increased mineral production in Lake County would also have positive effects on employment in nearby human resource units.

SALIDA HUMAN RESOURCE UNIT #2: This Human Resource Unit is comprised of the majority of Chaffee County which lies near the central part of the State of Colorado. Chaffee County's western boundary is formed by the Sawatch Mountains, which include the Continental Divide, and its eastern boundary is formed by the Park Range. Chaffee County consists of 664.3 thousand acres of which 68.1 percent is National Forest System land. Salida and Buena Vista are the two major cities in Chaffee County.

Settlement

Settlement of the Salida Human Resource Unit had its beginning as a result of mineral discoveries. This was immediately followed by ranching and crop farming. Tourism has generated small businesses and a variety of service enterprises. The scenic beauty and other desirable amenities within Chaffee County have attracted elderly population into the area.

Lifestyle

Service, government, trades, and mining provide the majority of the work routine in the HRU.

Communities depend on the Forest for a variety of resources. Nearby Forest areas provide numerous opportunities in outdoor recreation. Fuelwood collection is increasing because of the rising cost of natural gas and other fuels. The agricultural industry relies on government lands for grazing of domestic livestock. Several small sawlog and commercial fuelwood operators depend on Forest timber products for their livelihood. Mineral production provides necessary minerals and employment. The scenic beauty of the area attracts a large number of tourists annually and generates a major portion of the area's economic base.

Recreation is a major activity occurring within this HRU. Recreation activities contribute significantly to the employment and economic base of the area. Dispersed recreation on Forest land, particularly hiking, mountain climbing, hunting, fishing, camping, and picnicking, is increasing. Monarch Ski Area provides winter sports activities. Ghost towns, mines, and museums add to the diversity of recreational opportunities available to tourists and residents.

Social Organization

The infrastructure in Chaffee County provides adequate support service facilities including medical, educational, fire and law enforcement facilities. Communication networks comprised of various interest groups, local newspaper, and government provide a continuous line of communications. The HRU appears to possess a cohesive community stability based on mineral and tourism related activities. Most of the residents share a common interest in the land environment and its esthetic qualities.

Attitudes, Beliefs, Values

The natural beauty of the Forest and mountain valley environment attract a large number of tourists annually. Because of the resort nature of the County, the visual qualities of the mountain environment are viewed with significant economic as well as personal concern. The esthetics of the area are recognized as important recreation values that need to be maintained to attract tourists both in and out of state to help the economy year-round. Generally, the residents feel that mining activities are important for employment and energy but should be allowed only with appropriate controls.

Land Use

In the relatively flat river plains and adjoining low terraces, settlement and subsequent urbanization has followed the traditional development patterns. Major communities, subdivision activity, irrigated farming, and ranching occur in these areas because of accessible water and productive soils. Above the bottoms and alluvial plains are the high terraces and Forest lands where grazing, recreational activity, and some lumbering occur. The area is mineralized and has experienced mining activity. Recreation is the primary use of the high mountain areas. Privately-owned land is for the most part on the west side of the Arkansas River and along the tributaries of the Arkansas.

Population and Employment

The recreation industry occurring in the area is a major contributor to the labor market in the HRU. Service, government, and trade are the major employment sectors. In March 1981, the unemployment rate in Chaffee County was 7.2 percent. Mining and agricultural activities also contribute significantly to the labor market and economic base. Per capita income increased from \$3,391 in 1970 to \$4,909 in 1977. The total population of the Salida Human Resource Unit increased about 59 percent between 1960 and 1980. It is estimated that the population will continue to increase because of increased employment opportunities in mineral and recreation developments, and immigration of elderly people into the area.

SOUTH PARK HUMAN RESOURCE UNIT #3: This Human Resource Unit is comprised of the majority of Park County which lies almost exactly in the center of the State of Colorado. Park County includes the beautiful mountain rimmed meadow known as South Park. It is bounded on the north by Clear Creek County, the south by Fremont County, the east by Jefferson and Teller Counties, and the west by Chaffee, Lake and Summit Counties. Its western boundary is at the summit of the Park Range, which

at some places forms the Continental Divide. Park County consists of 1.3 million acres of which 46.7 percent is National Forest System land. Fairplay and Lake George are the major communities in Park County.

Settlement

Originally, Indians and explorers passed through the area. Mineral discoveries, primarily gold, caused the settlement of the area. Mill construction, railroad construction, and associated services developed shortly after gold discoveries provided employment. Agriculture, including hay production and cattle and sheep grazing, was an important economic factor to early settlers. After the decline of mining activities, the population decreased. Many ranchers and farmers felt the adverse effects from loss of agricultural water rights because of residential developments and increased domestic water use.

Employment activity in the HRU is characterized by seasonal fluctuation because of tourism, recreation, and construction industries.

Lifestyle

Services, trades, government and agriculture comprise significant contributions to the work routines. Communities depend on nearby Forest areas for summer and winter recreational activities. Fuelwood collection is increasing because of the high cost of fossil fuels. The agricultural industry depends on government lands for livestock grazing. Local residents depend on employment derived directly from the government or indirectly through mining, timber, construction, and other Forest resource related activities. Several small commercial sawlog and fuelwood operators depend on Forest timber products as a livelihood. Water derived from the Forest is a necessary commodity for all users. The visual qualities of the area attract a large number of tourists annually. Tourism generates a major contribution to the local economy.

Forest land provides numerous recreational opportunities including mountain climbing, gold panning, hunting, fishing, picnicking, and camping. Inactive mine sites and museums add to the diversity of recreational opportunities available to the residents and tourists. Nearby ski areas include Breckenridge and Geneva Basin.

Social Organization

Educational, medical, fire, and law enforcement facilities are well represented throughout the HRU. Communication networks found in the area consist of various local interest groups, newspaper, and government which provide a continuous line of communication. The communities located within the HRU appear to share a cohesive stability inasmuch as is possible because of

the distance from each other. Generally, Park County's stability stems from tourism, mining, and government related employment. The high unemployment occurring within the HRU is responsible for an unstable work routine. Some Park County residents commute outside their area for employment in other areas including the Denver and Colorado Springs SMSA's.

Attitudes, Beliefs, Values

The esthetics of the area are recognized as important economic and recreational values that need to be maintained to support the economic stability of the HRU. Residents of the area are concerned about fuelwood availability for future needs. Generally, residents feel that mineral development should be allowed to provide employment and energy needs, but should occur only with appropriate controls. The environmental qualities of the HRU including water, visuals, and wildlife are important to the HRU.

Land Use

About nine percent of the land in Park County has been subdivided and plotted for residential and commercial land use. Present land use patterns include forest, alpine, agricultural, grazing, residential, subdivision, commercial, industrial, mining, and recreational land. The majority of forested and alpine land is managed by the Pike and San Isabel National Forests. Land uses on government-owned lands include year-round recreational activities, wildlife management, watershed management, mining, timber harvesting, and grazing operations.

Population and Employment

The largest number of jobs occur in services, retail trade, agriculture, government, and mining. In March 1981, the unemployment rate in Park County was 6.0 percent. A large number of residents from the Platte Canyon area commute to the Denver metropolitan area for employment. The sale of land and water is contributing to the decline of the agricultural industry. Per capita income increased from \$3,259 in 1970 to \$4,128 in 1977. The total population of the South Park Human Resource Unit increased about 193 percent between 1960 and 1980. It is estimated that the population will continue to increase because of residential development in the Platte Canyon area, near the Denver metropolitan area and immigration of elderly into the area.

SOUTH PLATTE HUMAN RESOURCE UNIT #4: This Human Resource Unit is comprised of Douglas and Teller Counties which lie in the north-central part of the State of Colorado and are a part of the Denver SMSA. The Platte River and its South Fork form the western boundary of Douglas County. The city of Denver forms a

part of Jefferson County's eastern boundary. Both counties total 1.04 million acres of which 23 percent is National Forest System land. Major communities in the HRU include Castle Rock, Englewood, Sedalia, Littleton, Evergreen, Morrison, and Golden.

Settlement

Settlement of the area started as a result of the "Rush for the Rockies," after gold was discovered. The industrial growth of the Denver metropolitan area quickly followed with the establishment of smelters, railroads, and various other businesses necessary to serve the booming mineral activities located elsewhere in Colorado. Many prospectors failed to find a bonanza and turned to the agricultural prospects of the area. The installation of major military, manufacturing, and medical facilities have created a large influx of population since the early 1900's. The Denver metropolitan area is a regional center for numerous federal agencies. Because of the favorable climatic conditions and visual qualities, the area is experiencing an influx of retired people from other states. The establishment of bedroom communities away from the major city area is increasing because people want to be removed from the crowded Denver metro area, except for employment.

Lifestyle

Work routines revolve around several employment sectors existing within the HRU. Manufacturing, trade, and services dominate the labor market. The Denver SMSA is a regional center and headquarters for several federal agencies which provide a significant percentage of the total employment in the area.

Communities depend on the Forest for fuelwood which is currently a primary source of heat energy for many families. An important function of the Forest is for recreation for residents and tourists. A number of winter and summer sports activities occur extensively on Forest land. The agricultural industry depends on government lands for livestock grazing. Employment is generated directly and indirectly through mining, timber production, recreational activities, and other Forest resource related activities. Water yield is an important use of National Forest System land in the area. The visual qualities of the area are important because of their value in attracting tourists.

National Forest System land offers a wide variety of outdoor recreation to residents and visitors. Eighty percent of the area's recreation users are from the adjacent Denver metropolitan area, with 50 percent of the use occurring on weekends. Dispersed recreational use, including camping, backpacking, motorcycling, skiing, picnicking, hunting, and fishing, is increasing. Ski areas located within a short distance from the HRU are Arapahoe East, Monarch, Vail, Breckenridge, Copper

Mountain, A-Basin, Snowmass, Winter Park, Keystone and Geneva Basin. Inactive mine sites, old towns, and museums provide educational and historical values. The scenic beauty of the area offers unlimited opportunities for viewing and photography.

Social Organization

There is a concentration of specialized medical and educational facilities available within the Denver SMSA. Other support services including fire and law enforcement are also well represented throughout the HRU. The small communities within the HRU appear to possess a stable and cohesive community atmosphere. The Denver SMSA which is adjacent to and also a part of the HRU creates significant impacts on the Forest, and subsequently on the small communities located outside the metropolitan area. Fuelwood cutters and heavy impacts from recreationists often create trespass and law enforcement problems for private landowners within the HRU adjacent to Forest lands. Employment stability, however, can be attributed to the various employment sectors located in the Denver SMSA.

Attitudes, Beliefs, Values

Environmental, conservation, and other interest groups within the HRU are concerned about the management of the natural resources existing in the area. Esthetics, water and other environmental qualities are considered to be of major importance to the residents. Citizens share a dependency upon the Forest for natural resource products and also a concern that proper controls be used in the management of the Forest.

Land Use

Douglas County is primarily a farming and livestock grazing area. Dry and irrigated farming is still done extensively in some parts of the county. The farmland base in Jefferson County is slowly decreasing. Farmland areas are being used for construction of roadways, single and multi-family housing units, industrial, and commercial purposes. Depletion of farmland in the HRU is expected to continue due to the population growth and expansion of the Denver SMSA. National Forest System land is used extensively for recreational purposes. Mining activities occupy a small percentage of land in the HRU.

Population and Employment

The Denver metropolitan area is a regional center for numerous federal agencies. Military installation, manufacturing, and medical facilities also contribute significantly to the local labor market and employment sectors. The largest number of jobs occur in manufacturing, trade, services, government, and construction. In March 1981, the unemployment rate in the Denver

metropolitan area was 3.4 percent. Per capita income increased from \$4,270 in 1970 to \$7,091 in 1977. The total population of the South Platte Human Resource Unit increased about 200 percent between 1960 and 1980. It is estimated that the population of the Unit will continue to increase rapidly for a number of reasons including increased job opportunities and retirement related immigration. The favorable climatic conditions coupled with other desirable amenities found in the Unit are generating an influx of population of all ages.

PIKES PEAK HUMAN RESOURCE UNIT #5: This Human Resource Unit is comprised of the majority of El Paso and Teller Counties. El Paso County lies in the east-central part of Colorado and is a sort of open door or "pass" between the Great Plains region of eastern Colorado and the mountain region beyond. Teller County lies in the central part of the state directly west of Colorado Springs with Pikes Peak lying near its eastern boundary. Both counties total 1.7 million acres of which 13 percent is National Forest System land. Major communities include the Colorado Springs metropolitan area, Woodland Park, and Cripple Creek.

Settlement

Settlement of the area started immediately following gold discoveries in Cripple Creek. Agriculture and cattle raising were important to the growth of Colorado Springs. Many people were attracted to the area because of its values as an outstanding health resort. Several sanatoriums were established for the treatment of tuberculosis and other chronic ailments. The establishment of military installations, including Fort Carson, Peterson Air Force Base, and the Air Force Academy, resulted in extensive population growth. The favorable climatic conditions and visual qualities have generated extensive retirement related growth. Woodland Park has become a favorite tourist spot.

Lifestyle

Work routines are dominated by the government and military employment sectors. The labor force in the area is predominantly white collar. Trade, services, and manufacturing contribute a significant portion of the total employment in the HRU.

Communities depend on and utilize the Forest for summer and winter recreational activities. Fuelwood has become a primary source of heat energy for many households and is in great demand because of the rising cost of fossil fuels. An important use of Forest land is for watershed management. The watershed function of the Forest will be of increasing importance as the population of the Pikes Peak Region continues to expand. Employment is generated directly and indirectly through mining, timber production, recreational activities, and other Forest resource

related activities. Government lands provide livestock grazing for the agricultural industry. The visual and environmental qualities of the Forest area are of economic and personal concern because of the tourism they generate.

Recreation is an important industry for the Pikes Peak Region. The Forest provides numerous recreational opportunities in winter and summer sports activities for tourists and residents. Facilities for the handicapped have been established within the Rampart Reservoir Complex. Dispersed recreation use in the HRU is increasing. Cripple Creek and Victor provide educational and historical values with their wealth of old mines, homes, and museums. Pikes Peak provides opportunities for skiing, scenic viewing and photography.

Social Organization

Specialized medical, including military units, and educational facilities are available within the Colorado Springs Metropolitan Area. Fire and law enforcement activities are conducted by the city, county and state governments. The majority of the communities appear to possess a rather stable and cohesive way of life, although outside influences impact the area on a continuing basis. Population migration from other areas create additional subdivision and impacts to available educational and other infrastructure entities. Unemployment in the area often causes some instability because of the seasonal fluctuating nature of some employment sectors.

Attitudes, Beliefs, Values

The residents of the Pikes Peak HRU share similar concerns regarding the use and conservation of natural resources. Generally, it is emphasized that management should have strict controls on timber harvesting, recreational uses, water uses, and other resource related activities occurring on the Forest. It is felt that minerals should be made available to provide employment and mineral needs but should be allowed only with strict control. The public is concerned with insect and disease problems. Currently, existing law enforcement is both a public issue and a management concern because of large number of problems resulting from off-road vehicle use, game poaching, littering, vandalism, theft and illegal cutting of timber. The esthetics and environmental qualities are recognized as important recreational and economical values that need to be protected and maintained because of the tourist nature of the HRU.

Land Use

The Front Range urban corridor is the primary focus for urban land use in the Pikes Peak HRU. Colorado Springs is the principal axis of urban development within this corridor and is the

site of the major financial, education, and population- serving institutions within the region. Several military installations are also based in the Colorado Springs area. An important use of the Forest in Teller County is for water production. The watershed function of the Forest will be of increasing importance as the population of the HRU continues to increase. National Forest System land is used extensively for recreational purposes. Other uses of Forest lands are for timber production, grazing and mining.

Population and Employment

Military installations including the U.S. Air Force Academy and Fort Carson contribute significantly to the labor market of the Unit. The largest number of jobs occur in military, government, trades, and services. In March 1981, the unemployment rate in the Pikes Peak HRU was 4.3 percent. Per capita income increased from \$3,560 in 1970 to \$4,824 in 1977. The total population of the Unit increased about 117 percent between 1960 and 1980. It is estimated that the population will continue to increase rapidly.

SANGRE DE CRISTO - WET MOUNTAIN HUMAN RESOURCE UNIT #6: This Human Resource Unit is comprised of Custer, Fremont, and Pueblo Counties which lie in the south-central part of the State of Colorado. The Sangre de Cristo Range forms the western boundary of Custer County and part of Fremont's. Pueblo County includes a portion of the Arkansas Valley. The counties total 3.01 million acres of which 10 percent is National Forest System land. Major communities in the HRU include Pueblo, Canon City, and Westcliffe.

Settlement

Mineral exploration and discoveries created a steady influx of settlers into the region. Pueblo County became a "melting pot" as many thousands of people of various ethnic backgrounds settled in what is now Pueblo. The establishment of the steel mill, smelters, railroads, and Pueblo Ordnance Depot attracted many people into the area. Many settlers came to cultivate the rich and fertile lands along river valleys and bottom lands. Thousands of cattle were brought into the lush grazing areas found in the Unit. Favorable climatic conditions and the scenic environment generate an influx of retired people from other states.

Lifestyle

Services, manufacturing, government, and trades provide the major portion of the work routine that exist in the HRU. Tourist related enterprises comprise a large segment of the small businesses.

Communities depend on nearby National Forest System land for summer and winter recreational activities. Fuelwood collection is increasing because of its use as a primary source of heat energy by many households. The agricultural industry depends on Federal lands for livestock grazing. Water derived from the Forest is a necessary commodity for all users. Employment is generated directly and indirectly through mining, timber production, recreational activities, tourism, and resource related activities. The HRU provides a diversity of esthetics that attract a wide range of interests, and tourism attracted by the scenic quality of the Forest enhances the economy of the local communities.

Forest land offers numerous recreational opportunities for both summer and winter sports. Dispersed recreation occurring on Forest lands, particularly hiking, mountain climbing, camping, and picnicking, is increasing. Nearby ski areas include Monarch, Vail, Breckenridge, Cooper Hill, Conquistador, and Pikes Peak. Abandoned mines and old towns add to the diversity of recreation opportunities in the area. Unlimited opportunities exist for scenic viewing and photography.

Social Organization

Medical, educational, fire, and law enforcement facilities are available at various locations within each county of the HRU. Additional specialized medical facilities are located in nearby areas such as Colorado Springs and Denver. Communication networks comprised of various interest groups, local newspapers, radio and television, and governments provide a continuous line of communication. A stable and cohesive community atmosphere appears to exist throughout the HRU. Generally, the residents have formed cohesive communities within each county but share mutual needs with other counties such as employment and recreation areas. Custer and Pueblo Counties have been experiencing instability in employment and population levels.

Attitudes, Beliefs, Values

The residents throughout the HRU are concerned about the Forest environment and natural resource management. Some opposition has been voiced regarding unrestricted off-road vehicle use, timber harvesting, mining and energy exploration, and other activities that would have a potential to cause environmental degradation. The visual and other environmental qualities are valued because of personal as well as economic concerns. Generally, residents want to see enforcement of a viable program of land management, conservation practices, and the preservation of natural resources on the Forest.

Land Use

Agricultural land in the HRU consists of 1.8 million acres in farms. Crop production that occurs throughout the HRU includes wheat and other grains, sugar beets, potatoes, and a variety of fruits and vegetables. Livestock grazing is intensive in some parts of the HRU. Mining activities occupy a small percentage of land. Forest lands are also used intensively for recreational purposes. Fuelwood collection and timber harvesting also occur on National Forest System lands. Pueblo County is the most heavily urbanized and industrialized county of the HRU.

Population and Employment

The region is dominated by primary metal industries, most notably in the Pueblo area. Manufacturing comprises a large segment of the economic base and employment in the area. The largest number of jobs occur in services, manufacturing, government, and trade. In March 1981, the unemployment rate in the area was 6.3 percent. Per capita income increased from \$2,523 in 1970 to \$4,662 in 1977. Total population of the Sangre de Cristo-Wet Mountain Human Resource Unit increased by 11 percent between 1960 and 1980. It is estimated that population will increase only slightly by 2010.

SPANISH PEAKS HUMAN RESOURCE UNIT #7: This Human Resource Unit is comprised of Huerfano County and part of Las Animas County. Huerfano County lies in the south-central part of the state. Its western boundary is formed by the Sangre de Cristo and Culebra Mountain Ranges. Las Animas County lies in the southeastern part of the state. Its southern boundary is formed by the State of New Mexico. Both counties total 4.07 million acres of which 5 percent is National Forest System land. Major communities in the Unit include Walsenburg, La Veta, and Trinidad.

Settlement

Fur trapping and buffalo hunting first attracted people into the area. Later, coal mining, stock raising, agriculture, and the railroad brought many settlers. Huge Spanish land grants played an important part in the historical settlement of Huerfano County, especially in its agricultural development. Large ranches supplied cultivated crops and red meat to Denver and other regions. The coal industry declined shortly after the development of gas and oil for energy fuels. As a result, the major coal mines in the area were closed which created high unemployment and migration to other areas. Immigration of elderly population into HRU has occurred within the last few years. The tourist trade has been steadily growing and is of economic importance to the communities.

Lifestyle

Work routines in the HRU are dominated by the service, trades, government and agricultural labor sectors. Tourism generates a large portion of the local employment but is usually a fluctuating seasonal type of employment.

Communities depend on the Forest for winter and summer recreational activities. Fuelwood collection is increasing because of its use as a primary source of heat by many households. The agricultural industry depends on government lands for grazing of cattle. Water is an important commodity for all uses. Residents benefit from employment generated directly and indirectly through mining, timber production, tree transplants, recreational activities, tourism, and other resource related activities. The esthetic and geologic qualities of the region attracts many visitors annually which generates a major portion of the economic base for the HRU.

Forest land offers a wide variety of recreational opportunities within the Unit for summer and winter activities. Dispersed recreation occurring on Forest land is increasing. Nearby ski areas, include Conquistador, Cuchara Valley and Monarch. The Spanish Peaks offer opportunities for educational purposes and scenic viewing.

Social Organization

Support services such as medical, education, fire, and law enforcement facilities are well represented throughout the HRU. Communication networks comprised of various local interest groups, news media, and government entities provide an ongoing means of communication. Local community atmospheres appear to indicate a cohesive type of community; however, high unemployment has created an unstable population within the last 10-15 years.

Attitudes, Beliefs, Values

The residents of the area are concerned with the surrounding environment and natural resources. Esthetics and other environmental qualities of the HRU are valued highly because of personal and economic values. Generally, residents are not opposed to Forest resource management activities, including mining. However, it is felt that strict controls on all Forest activities should be imposed to protect against potential environmental quality degradations.

Land Use

Agricultural land in the HRU consists of approximately 1.4 million acres of land in farming. Field crop production undertaken on both irrigated and dry lands includes wheat and other

grains, potatoes, sugar beets, and a variety of fruits and vegetables. Livestock activity includes raising and feeding of livestock. Mining activities occupy a small percentage of land in the HRU. National Forest System lands are used intensively for recreational purposes year-round. Some grazing and fuelwood collection also occurs on Forest lands.

Population and Employment

The greatest number of jobs occur in services, trade, government, and agriculture. In March 1981, the unemployment rate in the area was 5.2 percent. Per capita income increased from \$2,392 in 1970 to \$4,355 in 1977. Total population of the Spanish Peaks Human Resource Unit decreased significantly by 23 percent between 1960 and 1980, with the greatest decrease occurring in Las Animas County. Population decreases occurred shortly after the decline of the coal production in Huerfano and Las Animas Counties. It is estimated that the Unit population will continue to decrease by 2010, with major decreases occurring in Las Animas County. Huerfano County population will increase only slightly because of an influx of elderly population into the area.

COMANCHE HUMAN RESOURCE UNIT #8: This Human Resource Unit is comprised of Baca County, part of Las Animas County, and Otero County. Baca County lies in the extreme southeast corner of Colorado, is bounded on the east by Kansas, and on the south by New Mexico and Oklahoma. Las Animas County lies in the southeastern part of Colorado. Its southern boundary is formed by New Mexico and part of its western boundary is formed by the Culebra Mountains. The counties total 5.5 million acres of which 8 percent is National Forest System land. Major communities in the HRU include Springfield, La Junta, and Rocky Ford.

Settlement

All of the area south of the Arkansas River was once in Spanish possession and became a U.S. Territory in 1846. Cattlemen brought large herds of cattle and other livestock. Homesteading brought a large influx of people during the 1880's. Farming and over-grazing of land combined with dry climatic conditions resulted in the years of the "Dust Bowl". This caused nearly 600 families to leave the area. To relieve the distressed condition of the agricultural people and those depending on their products, the Federal government initiated a variety of agricultural programs which currently provide an economic base on which the area survives. Population, size and density, as well as settlement patterns, changed to respond to the increasing knowledge of the peculiarities of the semi-arid habitat.

Lifestyle

The HRU is primarily an agriculturally-oriented area because of the vast areas of National Grassland used for livestock grazing. Agricultural activities provide a large portion of the area's economic base. Other significant employment sectors include services, trades, and government.

One of the greatest natural resources in the Unit is the range land. The local and regional economies in southeast Colorado are largely dependent on livestock and agricultural industries. The Comanche Grassland currently produces approximately 102,000 animal unit months of forage annually. The Grassland is a favorite area for hunting of small and big game, waterfowl, and upland game birds. Wildlife from southeast Colorado contributes about \$1,000,000 annually from hunting and wildlife related activities. Dispersed recreational opportunities are also available within the Unit. Educational opportunities in history and archeology exist at Picture Canyon and other archeological sites. The total annual estimated income from mineral and energy related activities on the Grassland is about \$225,000.

Present recreational activities on the Grassland consist mainly of hunting upland game birds, deer and antelope, artifacts, and rattlesnakes; visiting old homestead sites; and spring and fall picnicking.

Social Organization

The infrastructure of each of the counties in the HRU provide adequate support service including medical, educational, fire and law enforcement facilities throughout the HRU. Communication networks consist of various local interest groups, particularly agriculturally-oriented, news media, and government entities. The majority of the communities appear to share a mutual cohesiveness within respective counties based primarily on the agricultural qualities. Generally speaking, employment has been rather stable but population decreases have been noticed in Las Animas County.

Attitudes, Beliefs, Values

The primary concern of the HRU is the conservation and protection of the rangeland qualities possessed by the National Grasslands. The HRU has a semi-arid climate and, consequently, water is a scarce commodity throughout the HRU.

Land Use

A wide variety of natural resources, including the lands, minerals, vegetation cover, water, wildlife, and climate, have enabled the Comanche HRU to develop a diversified economy.

Agriculture is practiced on a commercial scale on nearly all parts of the HRU. Fruits and vegetables are produced abundantly along the lower Arkansas River and other areas. Baca County accounts for 41.5 percent of the total agricultural land of the HRU, and Las Animas County accounts for 39.6 percent. Crops include corn, sugar beets, alfalfa, hay, small grains, fruits and vegetables. Several kinds of livestock enterprises are associated with farm and ranch operations in the HRU. Cow-calf operations are the principal livestock enterprises. One hundred percent of the Comanche National Grassland is rangeland, and all of the area is currently being grazed. In 1978, there were 7,800 head of cattle grazed on the Grassland and 79,000 head of cattle grazed on private land in Baca County. Mining activities occupy a small percentage of the land within the HRU. The Grassland area is extensively used by hunters. Recreational activities consists mainly of upland game hunting, deer and antelope hunting, artifact hunting, rattlesnake hunting, visiting old homestead sites and spring and fall picnicking.

Population and Employment

Agricultural activities provide a large portion of the economic base for the Unit. The greatest number of jobs occur in agriculture, trade, services, and government. In March 1981, the unemployment rate was 4.4 percent. Per capita income increased \$2,853 in 1970 to \$4,386 in 1977. Total population of the Comanche Human Resource Unit decreased by 9 percent between 1960 and 1980. It is estimated that the population of the Unit will increase by 2010, with increases occurring in Baca and Otero Counties. However, Las Animas County will continue to decrease in population.

CIMARRON HUMAN RESOURCE UNIT #9: This Human Resource Unit is comprised of Morton County and a small portion of Stevens County, Kansas. Morton County is located in the southwestern part of Kansas and is bordered on the south by Oklahoma and on the west by Colorado. Stevens County is located immediately east of Morton County. Morton County totals .4 million acres of which 24 percent is National Forest System land. There are 920 acres of National Forest System land in Stevens County. The major community in the HRU is Elkhart.

Settlement

Settlement of the Unit started about 1870 with cattlemen moving into the area. Originally, the Santa Fe Trail furnished transportation into the area which was later followed by the railroad. Homesteading was popular in the 1880's, but declined shortly thereafter because of dry climatic conditions. Ranching operations were the trend until the 1920's. Overfarming and grazing, coupled with the dry climatic conditions of the early 1930's, resulted in the "Dust Bowl". Many families abandoned

their homesteads and returned to the east. In 1935, national attention was focused on the erosion problems. Congress purchased much of the land and placed it under management by the Soil Conservation Service, then transferred it to the Forest Service.

Lifestyle

Agricultural related industries, combined with oil and gas production industries are the dominant employment sectors of the HRU. Services, trades, and government also provide a significant percentage of the total employment in the HRU.

Forage is the principal resource of the Cimarron National Grassland and has considerable influence on the local economy. There are 120 permittees that depend on the range during summer months. The Grassland provides land occupancies which include easements, powerlines, oil and gas pipelines, processing plants, and wildlife developments. Oil and gas development has been a significant economic factor providing local employment and an energy resource for the Nation. Oil and gas is being produced from 23 oil and gas fields on Federal lands within the HRU. The Grassland provides recreational opportunities including hunting and picnicking. Hunting of waterfowl, upland game birds, and small game are popular and create additional revenue for the Unit. Educational opportunities in history and archeology are available because of the Santa Fe Trail and Indian artifacts found in the area.

Social Organization

Support services available within the HRU include medical, educational, fire, and law enforcement facilities. Communication networks consist primarily of agriculturally-oriented publics, news media, and government. Communities share a cohesive environment because population and employment have been stable.

Attitudes, Beliefs, Values

Residents in this HRU are concerned with conservation, preservation, and management of the National Grassland because of the dependency that agriculture and oil and gas industries have on it. Employment generated from the use of the Cimarron National Grassland as a result of grazing is of major importance to the residents of the HRU.

Land Use

In 1974, there were 225 farms in the HRU consisting of 447,232 acres. Average size of farms were 1,988 acres. The agriculture of Morton County is based on the production of wheat and grain

sorghum as cash crops. This county is one of the leading producers of grain sorghum in the State of Kansas. Cattle are the principal livestock raised in the county. The number of beef cattle in the county varies according to the local supply of feed. During fall and spring, many beef cattle are brought into the county when wheat, sorghum stubble, and native grass pasture are available. Only a few sheep are raised in this county. The oil and gas industry plays an important role in the use of the land in the HRU. Helium and natural gas are produced at several local facilities. The grasslands are used extensively for hunting. The HRU derives approximately 14.0 percent of its annual recreational visits from hunters. Several other types of recreation occur on the HRU including fishing and picnicking.

Population and Employment

The greatest number of jobs occur in agriculture, services, oil and gas development, and trade. In March 1981, the unemployment rate in Morton County was 1.3 percent. Per capita income was \$6,000 in 1977. Total population of the Cimarron Human Resource Unit increased by 2 percent between 1960 and 1980. It is estimated that the population of the HRU will increase only slightly by 2010. Table III-2 shows per capita personal income.

ECONOMIC SETTING

The Forest and rangelands, and associated water areas, are important sources of basic raw materials for local, regional, and national economies. This land base also plays a vital role in the social and cultural life of the populations in or near the planning area. In addition to supplying materials such as timber, minerals, and forage for domestic livestock, the lands also provide wilderness, a wide range of recreational activities, water, wildlife, and fish.

Population

The area of influence includes several large metropolitan population centers in the Colorado Front Range Urban Corridor and many small communities in the mountain and plains sections of the planning area. Table III-1 displays past, present and projected population. The population of the area increased significantly from 1960 to 1980; however, four counties (Baca, Huerfano, Las Animas, and Otero) experienced minor decreases in population. The major population increases occurred along the Front Range, specifically in El Paso and Jefferson Counties. It is estimated that the population of the area will reach 1.7 million by 2010 with 72.6 percent residing in El Paso and Jefferson Counties.

TABLE III-1
PAST, PRESENT AND PROJECTED POPULATION

<u>COUNTY</u>	<u>1960</u>	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>
Baca	6,310	5,674	5,419	7,500	7,700	8,000
Chaffee	8,298	10,162	13,227	15,700	19,600	23,500
Custer	1,305	1,074	1,528	1,500	1,500	1,500
Douglas	4,816	8,407	25,153	67,700	113,600	159,600
El Paso	143,742	235,972	309,424	357,100	431,900	506,600
Fremont	20,196	21,942	28,676	31,000	37,800	45,700
Huerfano	7,867	6,681	6,440	6,600	6,700	6,800
Jefferson	127,520	233,031	371,741	482,300	606,400	743,500
Lake	7,101	8,282	8,830	12,800	16,800	20,800
Las Animas	19,983	15,744	14,897	14,600	13,900	13,300
Otero	24,128	23,523	22,567	24,000	24,600	27,200
Park	1,822	2,185	5,333	5,700	6,500	7,300
Pueblo	118,707	118,238	125,972	124,700	125,700	135,200
Teller	2,495	3,316	8,034	11,700	15,400	19,100
Morton, KS	3,317	3,442	3,400	3,450	3,500	3,550
TOTAL	497,607	697,673	950,641	1,166,350	1,431,600	1,721,650

The favorable climate and esthetically pleasing environment of the planning area continue to attract people into the area. The establishment of bedroom communities away from major metropolitan areas is increasing. There is also an influx of retired people from other states seeking the low cost-of-living amenities still available in some communities.

Employment and Income

Per capita personal income has been gradually increasing during the past few years primarily due to inflationary factors. High and low increases may also have been influenced by such factors as employment rates and changes in population with higher or lower income brackets. In 1977, per capita income ranged from \$4,033 in Las Animas County to \$7,235 in Jefferson County. Generally, there have been significant increases in the per capita personal income throughout the planning area. Table III-2 displays per capita personal income.

TABLE III-2
PER CAPITA PERSONAL INCOME

<u>County</u>	<u>1970</u>	<u>1973</u>	<u>1977</u>	<u>Percent Increase from 1970-1977</u>
Baca	3,038	4,054	4,874	60.4
Chaffee	3,391	3,883	4,909	44.8
Custer	2,445	3,403	4,215	72.4
Douglas	4,270	5,272	6,947	62.7
El Paso	3,791	4,547	5,240	38.2
Fremont	2,849	3,578	4,509	58.3
Huerfano	2,207	2,920	4,677	111.9
Jefferson	4,269	5,382	7,235	69.5
Lake	3,231	4,087	5,374	66.3
Las Animas	2,576	3,234	4,033	56.6
Otero	2,944	3,943	4,252	44.4
Park	3,259	4,140	4,128	26.7
Pueblo	3,276	4,395	5,261	60.6
Teller	3,368	4,022	4,408	30.9
Morton, KS	-	-	6,000	-

Source: Colorado Division of Planning, Demographic Section; & Division of Employment, Kansas.

Overall, trade, services, and government are the three largest industrial sectors in the planning area. Manufacturing comprises a significant portion of the economic base and employment in the planning area, particularly in the Colorado Springs, Pueblo, and Denver SMSA's (Standard Metropolitan Statistical Areas).

Labor market information figures for March 1981 indicated a five percent unemployment rate for the planning area excluding the Denver SMSA which encountered a 3.4 percent unemployment rate during the same period as compared to 3.8 percent for the state. The total labor force for March 1981 was 227,110 for the planning area, excluding the Denver SMSA which had a labor force of 865,008 during the same period. Unemployment rates for counties within the area ranged from 1.3 percent in Morton County, Kansas to 7.4 percent in Lake County, Colorado. Lake and Chaffee Counties had the highest unemployment rates in the area with 7.4 and 7.2 percent, respectively. (Source: Colorado Division of Employment and Training, March 1981.)

The 18 county region that makes up the planning area has been divided into 3 distinct Economic Impact Areas (EIA) for analysis purposes. They are:

<u>Economic Impact Area</u>	<u>Human Resource Unit</u>	<u>County</u>
Trinidad-Lamar	Spanish Peaks Comanche	Huerfano Las Animas, Baca, Otero, Crowley, Kiowa, Bent, Prowers
	Cimarron	Morton, Stevens, KS
South Park	Leadville	Lake
	Salida	Chaffee
	South Park	Park
	Sangre de Cristo- Wet Mountain	Custer Fremont
Colorado Springs	Sangre de Cristo- Wet Mountain	Pueblo El Paso
	Pikes Peak	Teller

These EIA's are displayed in Figure III-5. Tables III-3, III-4 and III-5 show past, present and projected population in the Forests' Economic Impact Areas. The economic impact analysis carried out in this planning effort focuses on potential economic effects of concern in the Human Resource Units. Social and Human Resource Units were used to assess potential social impacts. The resulting social and economic analysis builds on these and can be found in Chapter IV.

Complement and Assist Local Economy

In addition to specific human resource programs utilized, essentially all of the activities performed by the Pike and San Isabel National Forests contribute local employment and income, and also contribute in some measure to the support and economic health of Forest based communities. Forest and Grassland resources utilized to complement local economies include:

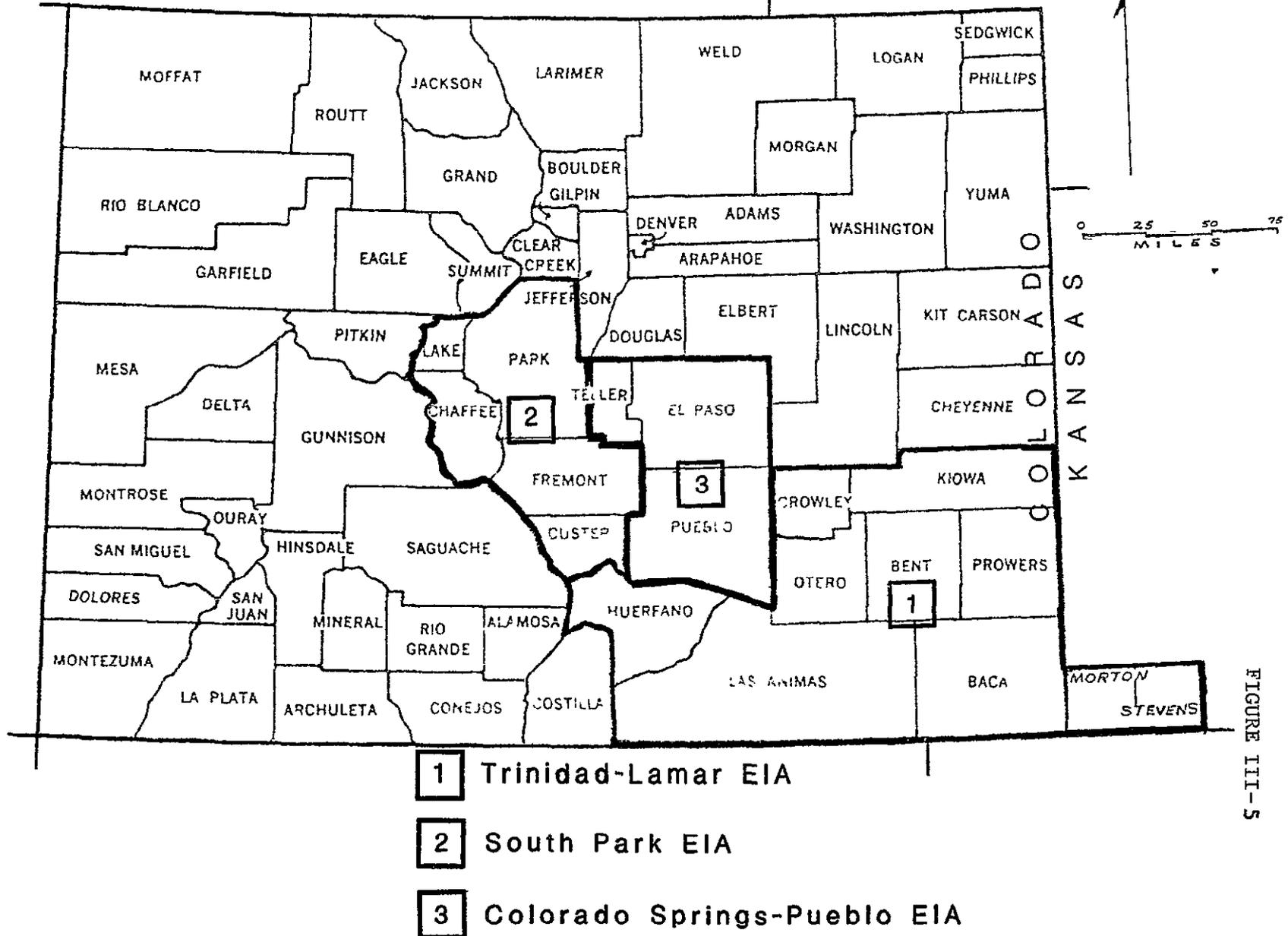
- grazing of rangeland by domestic livestock
- enhanced wildlife habitat and Forest esthetics to induce and attract tourists
- timber sales
- special use permits such as recreational outfitter guides, electronic sites, etc.
- mineral development

Purchase of supplies, equipment and services from local suppliers is carried out to the extent possible.

Colorado has entered a period of rapid population and economic growth. Growth rates exceeding the national average are likely to continue well into the next century. The majority of the state's growth has been from new residents moving into the Front Range area. The 13 counties of the Front Range already contain most of Colorado's population. With few exceptions, population settlement has been caused by the natural resources and amenities available within Colorado. In general, the most rapid growth in the planning area will occur in the Front Range area, specifically in the Colorado Springs, Pueblo EIA. The major population concentrations will be much as they are now in the South Park and Trinidad-Lamar EIA's.

ECONOMIC IMPACT AREAS (EIA)

Pike & San Isabel National Forests



III-45

FIGURE III-5

The geographic distribution of the population has a strong influence on demands for renewable resources, and particularly those that must be produced and consumed at the same place. Changes in population have had an important effect on the demand for outdoor recreation, wildlife, fish, timber, forage, and water. They have also influenced the size of the labor force, a major determinant of the level of economic activity and related material use. The population explosion has resulted in several problems such as deterioration of air quality, energy scarcity, inflation, and changing economic bases.

The population of the planning area increased by 36.3 percent between 1970 and 1980. Major increases occurred along the Front Range area, specifically in the Colorado Springs-Pueblo EIA. The Trinidad-Lamar EIA experienced minor decreases in population. Out-migration of population has been occurring since the 1950's as a result of high unemployment.

According to the 1970 Census, population density per square mile for the planning area was 29.9 as compared to 21.3 for Colorado. By 1980, population density had increased to 40.8 persons per square mile as compared to 27.8 for the state.

The age distribution of the population is a significant factor in estimating demands for many renewable resource products, especially for outdoor recreation. The median age in the planning area in 1970 was approximately 29.4 years compared to 26.2 years for the state. The Bureau of Census projects a substantial increase in the number and proportion of people in the middle age classes, the classes that have the highest income levels and the largest demands for goods and services. Of the total population residing in the planning area in 1977, 9.9 percent were elderly. (Elderly population includes all persons 62 years of age and over.) Major increases of elderly population have occurred in all EIA's.

TABLE III-3
TRINIDAD-LAMAR ECONOMIC IMPACT AREA
(Past, Present and Projected Population)

<u>COUNTY</u>	<u>1960</u>	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>
Huerfano	7,867	6,681	6,440	6,600	6,700	6,800
Las Animas	19,983	15,744	14,897	14,600	13,900	13,300
Baca	6,310	5,674	5,419	7,500	7,700	8,000
Otero	24,128	23,523	22,567	24,000	24,600	27,200
Morton, KS	3,317	3,442	3,400	3,450	3,500	3,550
TOTAL	61,605	55,064	52,723	56,150	56,400	58,850

TABLE III-4
SOUTH PARK ECONOMIC IMPACT AREA
(Past, Present and Projected Population)

COUNTY	1960	1970	1980	1990	2000	2010
Chaffee	8,298	10,162	13,227	15,700	19,600	23,500
Custer	1,305	1,074	1,528	1,500	1,500	1,500
Lake	7,101	8,282	8,830	12,800	16,800	20,800
Park	1,822	2,185	5,333	5,700	6,500	7,300
Fremont	20,196	21,942	28,676	31,000	37,800	45,700
TOTAL	38,722	43,645	57,594	66,700	82,200	98,800

TABLE III-5
COLORADO SPRINGS-PUEBLO ECONOMIC IMPACT AREA
(Past, Present and Projected Population)

COUNTY	1960	1970	1980	1990	2000	2010
El Paso	143,742	235,972	309,424	357,100	431,900	506,600
Pueblo	118,707	118,238	125,972	124,700	125,700	135,200
Teller	2,495	3,316	8,034	11,700	15,400	19,100
TOTAL	264,944	357,526	443,430	493,500	573,000	660,900

SOURCE: 1960, 1970, and 1980 Census; Colorado Population Reports, population estimates and projections Series CP25, #79(A)-3, August 1979.

Significant employment sectors for the Economic Impact Areas are displayed in Tables III-6, III-7 and III-8.

Trade, services, and government are the three largest industrial sectors in the planning area. Manufacturing comprises a significant portion of the economic base and employment, particularly in the Colorado Springs-Pueblo EIA.

Employment by industrial sectors varies in importance by EIA. Mineral activities comprise significant portions of the total employment for the South Park EIA, and are of lesser importance to the others.

Agricultural industries create a substantial percentage of the total employment in the Trinidad-Lamar EIA. Ranching and other agricultural activities in other areas are still a basic source of employment and income for some families. It is, however, slowly diminishing because of inflationary factors and lack of sufficient water resources.

Military installations contribute a large segment of the total government employment in the Colorado Springs-Pueblo EIA. Commuters from several nearby communities travel to Colorado Springs or Denver for employment. The civilian labor force increased approximately 50.4 percent during the period 1970-1980 in relation to the population increases that have occurred. Indications are that the civilian labor force will continue to increase in relation to anticipated population increases.

TABLE III-6
 COLORADO SPRINGS-PUEBLO ECONOMIC IMPACT AREA
 (Significant Employment Sectors - 1977)*

Total Labor Force	120,204
Total Employed	114,194
Percent Unemployment	5.0%
<u>Employment Sectors</u>	<u>Number Employed</u>
Manufacturing	16,024
Retail and Wholesale Trade	24,299
Services	35,695

TABLE III-7
 SOUTH PARK ECONOMIC IMPACT AREA
 (Significant Employment Sectors - 1977)*

Total Labor Force	12,266
Total Employed	11,530
Percent Unemployment	6.0%
<u>Employment Sectors</u>	<u>Number Employed</u>
Mining	2,101
Wholesale and Retail Trade	2,735
Services	3,481

TABLE III-8
 TRINIDAD-LAMAR ECONOMIC IMPACT AREA
 (Significant Employment Sectors - 1977)*

Total Labor Force	20,636
Total Employed	19,728
Percent Unemployment	4.4%
<u>Employment Sectors</u>	<u>Number Employed</u>
Agriculture	2,418
Retail and Wholesale Trade	3,840
Services	5,438

*Base year 1977 data used for the Input-Output model, IMPLAN System, 1984.

Tables III-9, III-10 and III-11 display per capita personal income for the Economic Impact Areas.

Per capita personal income has been gradually increasing during the past few years primarily due to inflationary factors. High and low increases may also have been influenced by such factors as employment rates and changes in population with higher or lower income brackets. In 1977, per capita income ranged from \$4,033 in the Trinidad-Lamar EIA to \$7,235 in the Colorado Springs-Pueblo EIA. Generally, there have been significant increases in the per capita personal income throughout the planning area.

TABLE III-9
SOUTH PARK ECONOMIC IMPACT AREA
(Per Capita Personal Income)

COUNTY	1970	1973	1977	Percent Increase	
				1970	1977
Chaffee	\$3,391	\$3,883	\$4,909		44.8
Custer	2,445	3,403	4,215		72.4
Fremont	2,849	3,578	4,509		58.3
Lake	3,231	4,087	5,374		66.3
Park	3,259	4,140	4,128		26.7

Total income for South Park EIA in 1977 was \$218,820,900. Of this amount, \$135,227,300 was personal income and \$83,593,700 was property income.

TABLE III-10
COLORADO SPRINGS-PUEBLO ECONOMIC IMPACT AREA
(Per Capita Personal Income)

COUNTY	1970	1973	1977	Percent Increase	
				1970	1977
El Paso	\$3,791	\$4,547	\$5,240		38.2
Pueblo	3,276	4,395	5,261		60.6
Teller	3,368	4,022	4,408		30.9

Total income for Colorado Springs-Pueblo EIA in 1977 was \$2,251,531,300. Of this amount, \$1,444,148,800 was personal income and \$807,382,500 was property income.

TABLE III-11
 TRINIDAD-LAMAR ECONOMIC IMPACT AREA
 (Per Capita Personal Income)

COUNTY	1970	1973	1977	Percent Increase	
				1970	1977
Baca	\$3,038	\$4,054	\$4,874		60.4
Huerfano	2,207	2,920	4,677		111.9
Las Animas	2,576	3,234	4,033		56.6
Otero	2,944	3,943	4,252		44.4
Morton	-	-	6,000		-
Stevens	-	-	-		-

Total income for the Trinidad-Lamar EIA in 1977 was \$404,847,700. Of this amount, \$187,234,000 was personal income and \$217,613,700 was property income.

SOURCE: Colorado Division of Planning, Demographic Section; and Division of Employment, Kansas.

Year-round homes increased by 17 percent between 1977 and 1980. Significant increases have occurred in the Colorado Springs-Pueblo and South Park EIA.

Expenditures and Returns

The Fiscal Year 1981 Pike and San Isabel National Forest appropriated budget was \$7,101,000 and is displayed in Table III-12. A major amount of the fiscal year budget was expended for timber and recreation activities and resulting road and trail construction and maintenance. The following table provides a general breakdown of the budgeted items:

TABLE III-12
FISCAL YEAR 1981 BUDGET (1981 dollars)

<u>ITEM</u>	<u>DOLLARS</u>
Road and Trail Construction and Maintenance	\$1,033,000
Recreation	1,874,000
Timber Sales, Inventories and Plans, Silvicultural Exam and Prescriptions, Insect and Disease Control, Salvage Sales	735,000
Range	425,000
Wildlife	266,000
Reforestation, Timber Stand Improvement, KV, Brush Disposal	735,000
Soil, Water and Air Management, Land and Water Conservation Fund	138,000
Fire Management	629,000
Administrative Improvements and Working Capital Fund	643,000
Miscellaneous (special uses, minerals, land classifica- tion, land adjustments, land line location, maintenance of improvements, law enforcement, cooperative work)	<u>623,000</u>
TOTAL	\$7,101,000

In addition to the \$7,101,000 budget, \$380,000 of National Grassland grazing receipts was invested in conservation and management practices to improve and maintain Grassland productivity. While these expenditures were not allocated and included in the FY81 budget, they do represent a cost of doing business. Other additional funds include \$83,000 from the Bureau of Reclamation for construction and revegetation of Twin Lakes and \$587,000 for the Young Adult Conservation Corps (YACC) program. The total funds expended on the Pike and San Isabel National Forests in FY81 was \$8,151,000.

In fiscal year 1981, the Pike and San Isabel National Forests generated receipts from the two National Forests and two National Grasslands. Table III-13 provides a breakdown of where the receipts originated on the Pike and San Isabel National Forests. By law, 25 percent of the revenues collected by the USDA Forest Service must be returned to the states to be used for schools and roads in the counties where the National Forest System lands are located. The payments to counties from Forest receipts are displayed in Table III-14.

TABLE III-13
 FY 1981 RECEIPTS (1981 dollars)

Item	Pike National Forest	San Isabel National Forest	Comanche National Grassland	Cimarron National Grassland	Total
Timber	40,926.79	51,564.19			92,490.98
Grazing	42,053.14	29,161.32	8,229.21	17,280.93	96,724.60
Land Uses	11,381.37	11,003.07	6,527.40	5,305.07	34,216.91
Recreation	61,445.80	51,644.16			113,089.96
Power	2,757.85	1,701.24		247.50	4,706.59
Minerals	154.50	180.00	106,449.50	206,532.81	313,316.81
Rec. Admission & User Fees	72,513.84	111,524.42			184,038.26
Knutson-Vandenberg Act Funds	47,198.00	25,688.09			72,886.09
Timber Purchaser Road Credit	<u>12,352.02</u>	<u>2,572.00</u>			<u>14,924.02</u>
TOTAL	\$290,783.31	\$285,038.49	\$121,206.11	\$229,366.31	\$926,394.22

TABLE III-14
 PAYMENTS TO COUNTIES FROM FOREST RECEIPTS (1981 dollars)

<u>National Forests</u>		<u>National Grasslands</u>	
Chaffee	\$ 29,017.20	Otero	\$11,037.78
Douglas	9,293.22	Las Animas	3,601.04
El Paso	6,614.06	Baca	14,036.18
Fremont	6,418.83	Morton County (Kansas)	55,213.90
Huerfano	8,990.35	Stevens County (Kansas)	473.60
Jefferson	7,111.82		
Lake	10,035.79		
Las Animas	1,423.24		
Park	44,339.98		
Pueblo	2,111.84		
Teller	8,242.26		
Custer	10,518.37		
Saguache	90,931.05 <u>1/</u>		
Clear Creek	49,278.32 <u>2/</u>		

- 1/ Includes receipts from both San Isabel and Rio Grande National Forests.
 2/ Includes receipts from both Pike and Arapaho National Forests.

RESOURCE ELEMENTS

The Forest's capacity to provide goods, services and use opportunities is directly related to the management of its resources and the activities which support those resources. The following is an overview of those elements on the Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands.

As an ecological system, the National Forests and National Grasslands are described in this document in terms of their resource elements and support activities. The Forest's capacity to provide outputs, goods, and services is directly related to its ability to manage these resources and support activities. The following is an overview of resources and supporting activities involved in the management of the Forest. They are the same elements used in developing the National Renewable Resources Program and Assessment as required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA).

The following discussion portrays the management situation as it relates to various resource elements. Although resource elements are discussed individually, management of the Forest occurs on an integrated resource basis. Management activities affect a variety of resources, and decisions are made only after considering the entire set of ramifications involved. Similarly, single management activities are actually designed to serve a variety of resource objectives. For example, treating lodgepole pine stands with small clearcuts to increase water yield will also provide additional wildlife habitat and a source of wood for various purposes. Water developments are designed to serve the needs of certain wildlife species as well as domestic livestock. Roads are located to efficiently transport logs from the timber sale area to the mill. These same roads are also designed to provide access for hunting, firewood gathering, and recreation.

Other inter-relationships are more separated chronologically. For example, treating trees to improve successional stages of vegetation can provide an immediate benefit of fiber and will improve wildlife habitat and visual quality over the long run. Improved diversity leads to a gradual increase in populations of certain animal species, which in turn increases recreation opportunities for viewing, photographing, and hunting these animals. This series of events may take several years to come to fruition, yet it may be entirely the result of a single management activity.

Therefore, resources that are discussed individually below are really part of a very complex system with numerous interactions.

They are described individually only to emphasize important aspects of the current situation in an organized framework. These elements must be conceptually combined to understand the overall current situation on the Forest.

RECREATION

Recreation is the major use of the Forest with six ski areas, 192 developed public sites and nearly two million acres outside of wilderness for dispersed recreation. Dispersed recreation is use outside of wilderness that does not occur in a developed site such as a campground, picnic ground, or ski area. The Forest-wide supply and use is summarized in Table III-16. The relative prominence of the leading recreation activities on the Forest in descending order are: auto driving and viewing the scenery (about 30 percent of use in RVD's by activity); camping (24 percent); hiking and mountain climbing (11 percent); and motorcycle use (7 percent). Fishing, winter sports, picnicking, hunting and horseback riding are also important uses.

Forest planning for recreation opportunities uses the Recreation Opportunity Spectrum (ROS) as described in the ROS Users Guide (USFS, 1981). ROS provides a framework for defining the types of outdoor recreation available on the Forest. A description of ROS is found in Appendix B Glossary. The relationship of the Forests' present ROS class composition and use is shown in Table III-15.

TABLE III-15

Recreation Opportunity Spectrum Class Composition and Use		
Class	Percent of Forest	Percent Use on Forest
Urban (U)	1	1
Rural (R)	1	8
Roaded Natural (RN)	53	75
Semiprimitive Motorized (SMP)	20	6
Semiprimitive Nonmotorized (SPN)	22	9
Primitive (P)	3	1

TABLE III-16

Forest-wide Supply and Use Data 1/ - Existing Situation

Supply	Number of Sites/Areas	Number Acres (Net)	Percent of Forest Acres	Theoretical Capacity (Annual RVD's) <u>2/</u>
PIKE AND SAN ISABEL NATIONAL FORESTS (Includes National Grasslands)	282	2,751,736	100%	13,453,750
Ski Areas	6	2,800 <u>3/</u>	0.1%	900,750
Public and Private Developed Sites (Other than Ski Areas)	276	3,900	0.1%	2,285,000
Dispersed Areas (Other than Wilderness)	NA	2,380,773	82.8%	9,187,000
Wilderness	5	257,420	9.4%	685,000
Wilderness Study Areas & Further Planning Area	5	206,843	7.6%	396,000
Use	Annual RVD's <u>4/</u>	Percent Total Use	RVD's Per Acre	
PIKE AND SAN ISABEL NATIONAL FORESTS (All Sites and Areas)	3,829,700	100%	-	
Ski Areas <u>5/</u>	161,500	4%	57.7	
Public and Private Developed Sites (Other than Ski Areas)	1,000,900	26%	256.6	
Dispersed Use (Other than Wilderness)	2,347,300	61%	1.06	
Wilderness	241,500	7%	1.17	
Wilderness Study Areas & Further Planning Area	78,500	2%	.38	

1/ From RIM2/ Annual RVD capacity may vary considerably from year to year because of weather conditions. Operating capacity for each category is considered to be 40% of theoretical capacity and 30% at ski areas. See narratives.3/ Permitted Acres (rounded to nearest 100 acres).4/ Recreation use on the Pike and San Isabel National Forests can vary up or down by as much as 10% because of weather conditions. Reported use represents an adjusted average of most recent years.5/ Average year based on Colorado Ski Country and RIM.

Approximately 84 percent of the recreation use on the Pike and San Isabel National Forests occurs within the Roaded Natural, Rural, and Urban ROS classes. Almost 100 percent of all developed recreation sites, including ski areas, occur within these classes and account for the resultant intensive use.

The remaining 16 percent of recreation use occurs within the primitive and semiprimitive ROS classes. Table III-17 illustrates the relationship between existing ROS class and type of use.

TABLE III-17

Percent Use by ROS Class and Type of Use

Type of Use	ROS Class						Total
	P	SPN	SPM	RN	R	U	
Developed	-	-	1%	23%	6	-	30%
Dispersed (excluding Wilderness)	-	4%	5%	52%	2	1	64%
Wilderness	1%	5%	-	-	-	-	6%

Historically, recreation use on the Pike and San Isabel National Forests fluctuates dramatically. The addition of recreation complexes at Turquoise and Twin Lakes; the sensitivity of use to weather conditions (e.g., lack of snow decreases winter use or heavy snowfalls shorten summer use seasons); the addition of Wilderness, and other factors make historic use trends and future use projections difficult to derive. Therefore, use projections for developed (excluding ski areas) and dispersed recreation are based on local, state, and national population projections related to Forest user origin.

Recreation Facilities for Handicapped (Physically Disabled, Elderly, Blind)

As the number of the planning area's outdoor recreationists continues to grow, a proportionate ratio of elderly and handicapped Forest users will also grow. It is estimated that between 5 and 10 percent of the population is handicapped (FSM 2331, R2 Supplement #53, 8/73). These citizens are increasingly using outdoor recreation opportunities and facilities. The handicapped wish to be included in the mainstream of life, without an inordinate amount of special or segregated facilities and programs.

Several public issues were identified concerning the special needs of the handicapped as they relate to recreational opportunities on the Forest. Generally, it is felt that handicapped individuals have been excluded in the overall planning and designing of transportation and recreational facilities. Some public opinion indicates that there should be adequate roads, trails, and recreation facilities for the physically disabled, elderly and blind individuals. Recreation management should consider the special needs of the handicapped. As called for in the Architectural Barriers Act (P.L. 90-480 as amended), an appropriate number of facilities must be made available to special populations. The Pike and San Isabel National Forests recognize the need to provide appropriate facilities for the special populations located within or near the planning area.

There has been little use of the braille trails by handicapped individuals. It is not known why, but it is assumed that distance from communities and lack of transportation may be factors that deter usage. Camp and picnic ground facilities receive somewhat greater use than the braille trails.

The planning area provides recreation sites and facilities designed to include handicapped persons in the mainstream of life. The Forest Service goal is to provide sites and facilities appropriate for use by the special populations located in or visiting the planning area. The primary need is to eliminate architectural barriers in existing sites which prevent their use or enjoyment of the recreation attractions by handicapped individuals. Site development for the handicapped will be in locations where gradients and surfacing on trails and designed facilities will safely accommodate wheelchairs, crutches, walkers and similar devices. Parking areas, toilet facilities, camp and picnic facilities and access and circulation patterns will be designed to reflect the needs of the handicapped in a minimum of 10 percent of all facilities at these sites.

Dispersed Recreation (Other than Wilderness)

Current Use and Management. Approximately 64 percent of all recreation use of the Pike and San Isabel National Forests is attributed to dispersed recreation activities outside of Wilderness. Motorized touring ^{1/} (on and off roads) is the leading dispersed recreation activity on the Forest. The

^{1/} Includes autos, 4x4's, motorbikes, and snowmobiles.

high prominence of this activity can be attributed to the highly scenic visual resources on the Forests associated with travel routes. Camping and hiking are the next most prominent activities, followed by fishing, hunting, viewing scenery, and other activities.

Around 80 percent of all use occurring outside of developed sites and Wildernesses occurs on or near roads. The area being used by these recreators represents approximately 35 percent of the total Forest. The remaining 20 percent of the dispersed use outside of wilderness is occurring on approximately 35 percent of the Forests.

Off-road vehicle (ORV) use does not represent a major percentage of total recreation use on the Pike and San Isabel National Forests. Because of the rugged terrain and availability of challenging primitive roads, most users of motorbikes and 4x4's limit use to designated routes. Motorbikes are the major "off-road" vehicle users on the Forests. Total ORV use on the Forest is approximately 325,000 RVD, or about eight percent of the total use on the Forests. Operational dispersed recreation capacity is limited because of inadequate parking at trailheads for summer and winter users. The Forests do not have funds to provide plowing at these facilities and cooperative efforts with the State, counties, and others are needed to provide winter access.

Much of the Forests' primitive and semiprimitive nonmotorized recreation use occurs within Wilderness and Wilderness Study Areas. This occurs because these areas possess outstanding recreational, scenic, and geological attributes, including most of the lakes and most of the highest (over 14,000 foot) mountain peaks.

A major factor influencing the use of Forest resources for dispersed recreation are the Travel Management Plans. Motorized recreation use on the Forest is currently managed according to the 1980 and 1981 Pike and San Isabel National Forests Travel Maps. Presently, 25 percent of the Forests are open to unrestricted motorized use, 19 percent is closed (wilderness, ski areas, wildlife, and other closures), and 56 percent of the Forests are open with restrictions on motorized use. Information on miles of roads and trails in the Forests is found in the Facilities section.

Several trails on the Pike and San Isabel National Forests have been identified for special recognition. The Barr and Devil's Head Trails are part of the National Recreation Trail System. About 170 miles of the Colorado Trail, (Denver to Durango) cross the Forests. The Continental Divide National Scenic Trail (CDNST) corridor, identified in Regional Guide (USFS, Region 2), has primary and alternative routes in the South Platte, South

Park, Leadville and Salida Districts The Rampart motorcycle trail system, southwest of Denver, has over 100 miles of trails especially designed and administered for motorcycle use.

Demand Trends. Table III-18 shows average annual dispersed recreation use. Based on current dispersed recreation use estimates, user origin, and projections for local, state and national populations, dispersed recreation use trends are projected to increase by approximately 49 percent to over 3,620 MRVD's by 1990. Long-range projected use estimates are for 3,990 MRVD's by 2000, and 6,130 MRVD's by 2030.

Dispersed recreation use estimates on state, private, and other agency administered lands are not readily available. Big game hunting, snowmobiling, boating (rafting), and fishing are the predominate activities.

According to the 1981 Colorado Outdoor Recreation Plan, the provision of recreation public land resource base in southeastern Colorado (Regions 3, 4, 6, 7 and 13) is as follows: USDA Forest Service, 73 percent; Bureau of Land Management, 18 percent; other federal, state, city/county and private, 9 percent. Only 9 percent of the recreational water resource base is being provided by the National Forests, with 71 percent provided by state agencies. The Plan recommends better coordination between federal, state, and local governments and the private sector to achieve better continuity in the provision of open space and developed recreation opportunities. High priorities are hiking, camping, picnicking, fishing and 4x4 use, and development of areas capable of accommodating intensive use.

Current dispersed recreation capacity on the Pike and San Isabel National Forests was estimated using procedures based in FSH 1909.12 and the ROS User Guide. People-at-One-Time (PAOT) capacity for undeveloped non-wilderness areas in each ROS class was determined and applied in the following formula:

$$\text{Annual RVD Capacity} = \frac{\text{PAOT} \times \text{MS} \times \text{PU} \times \text{LOS}}{12}$$

where:

PAOT = People at one time capable of occupying acres in a given ROS class.

MS = Managed Season - 200 days was used.

PU = Pattern of Use - an adjustment factor for accessibility and weekend vs. weekday use (.1 in Primitive to .4 for Roaded Natural)

LOS = Length of Stay - assumed average of eight hours was used.

12 = The constant for 12 hours/RVD.

Following these computations, a maximum capacity of 22,950 MRVD's annually was reached. Assuming 40 percent of the acres are usable (based on slopes, soils, and vegetation), the current practical maximum capacity for dispersed recreation (excluding wilderness) is 9,187 MRVD's annually. These average annual dispersed recreation use figures are displayed in Table III-18. Supply will decrease slightly during the period 1986-1990 because some lands are expected to be classified as wilderness during that period and the use will be reported as wilderness use. Supply will increase slightly throughout the subsequent decades because of planned road improvements which will result in converting some lands to the more intensively used ROS classes.

TABLE III-18
AVERAGE ANNUAL
DISPERSED RECREATION USE ^{1/}
(MRVD)

	1983	1981- 1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Demand Trend	2425	3181	3620	3990	4661	5350	6130
Supply Potential	-	9187	8800	8888	8977	9067	9156

^{1/} Includes fishing and hunting but excludes wilderness.

Developed Recreation (Other than Ski Areas)

Current Use and Management. Table III-19 displays current use at developed sites. The Pike and San Isabel National Forests currently manages 193 developed sites, including campgrounds, picnic grounds, boat ramps, and observation sites. Downhill skiing developments are discussed separately in the following section. Most sites typically open in late May to early June and remain open through hunting season which ends in November. The annual theoretical capacity for these sites is approximately 3,182 MRVD's for campgrounds and 1,330 MRVD's at other developed sites, totaling 4,512 MRVD's annual theoretical capacity as managed by the Forests. Current practical capacity (40 percent of theoretical capacity) is 1,805 MRVD's for Forest Service operated facilities. ^{1/}

There are currently 72 fee sites (family and group campgrounds) being managed by the Forests during the heavy use season. The fee sites have an annual theoretical capacity of 2,700 MRVD's during the fee season and are the only developed sites being managed at the full service level. Collections from these sites in 1983 was nearly \$270,000.

Eighty three developed recreation sites on the Forests are being utilized or operated by private individuals or organizations under special use permits. These sites include organization camps, group recreation residence sites, and isolated recreation residence sites. These sites provide an annual theoretical capacity of 1,200 MRVD's and an estimated practical capacity of 480 MRVD's.

In a typical year, over one million RVD's in public developed recreation (this excludes ski area use) is reported on the Pike and San Isabel National Forests. About 30 percent of this use is attributed to use at sites owned or administered by private owners or other agencies. The developed recreation use (excluding ski areas) on the Forests by ROS class is as follows: rural, 12 percent; roaded natural, 85 percent, and semiprimitive motorized, 3 percent.

TABLE III-19
DEVELOPED SITES 1984
 (Forest Service Operated)

<u>District</u>	<u>Campground</u>		<u>1/</u>	<u>Picnic</u>		<u>Other</u>		<u>Total</u>	
	<u>Sites</u>	<u>PAOT</u>		<u>Sites</u>	<u>PAOT</u>	<u>Sites</u>	<u>PAOT</u>	<u>Sites</u>	<u>PAOT</u>
Leadville	13	2455		4	285	18	1352	35	4092
Salida	13	1365		2	195	10	585	25	2145
San Carlos	12	1265		4	440	7	670	23	2375
Pikes Peak	13	1470		3	440	13	833	29	2743
South Park	21	1585		8	385	5	660	34	2630
South Platte	25	1900		10	285	9	915	44	3100
Comanche	0	0		1	35	1	80	2	115
Cimarron	0	0		1	30	0	0	1	30
Total	97	10040		33	2095	63	5095	193	17230

1/ PAOT is the persons-at-one-time capacity which is equal to 5 persons per family unit for camp and picnic grounds. Other sites vary.

Demand Trends. Demand trends for developed recreation are based on projected population growth. Table III-20 displays average annual developed recreation use.

TABLE III-20
AVERAGE ANNUAL
DEVELOPED RECREATION USE
(MRVD)

	1983	1981- 1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Demand Trend all Types of sites	989	989	1510	2013	2163	2338	2713
Demand Trend for Camping & picnicking sites	595	595	631	848	1140	1532	2059

Winter Sports (Ski Areas)

Current Use and Management. The six winter sports sites on the Pike and San Isabel National Forests are displayed in Table III-21. They are Ski Cooper, Monarch, Pikes Peak, Conquistador, Cuchara Valley Resort, and Geneva Basin. In 1983-84, they provided about 146,700 visitor days use. All sites are operating basically as day use areas rather than destination resort type areas.

TABLE III-21
WINTER SPORTS AREAS

Areas	(SAOT) <u>1/</u> Capacity	<u>2/</u> Visits	<u>3/</u> RVD	Maximum Theoretical Capacity <u>4/</u>
				RVD
Ski Cooper	2500	46,132	23,066	187,500
Monarch	3000	140,327	70,163	237,000
Pikes Peak	1250	4,948	2,474	93,750
Geneva Basin	1200	24,287	12,143	90,000
Cuchara Valley Resort	1300	33,500	16,750	97,500
Conquistador	<u>2600</u>	<u>44,196</u>	<u>22,098</u>	<u>195,000</u>
Total	11,850	293,390	146,695	900,750

1/ Capacity in Skiers at One Time (SAOT)

2/ Visits are from 1983-84 lift ticket sales

3/ A recreation visitor day (RVD) equals one visitor for 12 hours. The average length of stay at the ski areas is considered to be 6 hours or 0.5 RVD.

4/ Theoretical capacity presumes a maximum SAOT at 7 days per week and a 150 day season, except that a 160 day season was used for Monarch.

Currently, Monarch, Cuchara Valley Resort and Conquistador are open seven days a week on a regular basis. The other three are open for shorter weeks.

Demand Trends. Downhill skiing demand has been rapidly increasing. For example, skiing use has increased from 27,200 RVD's in 1967 to 146,700 RVD's in 1984.

A detailed discussion of supply and demand projections are contained in Part I of Appendix I. A summary of average annual downhill skiing use projections is presented in Table III-22.

TABLE III-22
AVERAGE ANNUAL
DOWNHILL SKIING USE
(MRVD)

	1981- 1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
Demand						
Trend	147	219	481	904	1305	1754
Supply						
Potential	270	330	474	997	1100	1150

Cultural Resources

Current Use and Management. The planning area occupies a significant place in both the history and prehistory of central and southeast Colorado as well as southwest Kansas.

Relatively little is known of prehistoric occupancy in the mountain areas. Use is considered to have been predominantly seasonal transitory hunting and food gathering.

Most known occupancy sites are near major drainage courses, water sources and along travel routes. Use on the plains was much the same with nomadic hunting and food gathering the major activities. Some cultivation of crops is believed to have been practiced to a limited extent.

Historic use began with the early exploratory expeditions. Through the 1840's hunting and trapping were common, followed by mineral prospecting through the 1860's. Agricultural settlements began about that time. The major mining activity began in the 1880's and continued through the early 1900's. Mining camps and towns were established early in that period. On the plains, major settlement and agricultural development began after the turn of the century.

Important artifacts and sites have been recognized through the National Register program. In the Forest eight sites have been included in the National Register of Historic Places and seven others considered eligible. Fifty additional sites have been identified and are pending determination of eligibility.

An overview of cultural resources has only recently been completed for the central high plains including the Pike and San Isabel National Forests and Cimarron and Comanche National Grasslands. Known sites have been compiled and listed. Evaluation of potential for the National Register will take several years.

Prior to any disturbing activity, the affected area is intensively surveyed to identify cultural resources. Cultural resources are then evaluated to determine their significance. Significant sites are appropriately protected or salvaged to preserve the cultural, scientific or educational value. Selected sites may be interpreted or enhanced for recreation and educational purposes. Approximately 122,500 acres have been intensively surveyed to date.

A sensitivity rating system was developed for the Forests to show the likelihood of occurrence of significant cultural resources. Approximately 30% of the Forests and Grasslands is estimated to contain some areas of high potential. Intensive management of resources in those areas would be more likely to require increased mitigating measures.

Demand Trends. Demand for the preservation of cultural resources is expressed in laws and regulations requiring their identification and protection. Mineral exploration, the development of energy-related minerals, road and trail construction, timber sales, developed recreation construction, and transmission line construction will increase, creating a greater demand for the cultural surveys required for these projects. Evaluation of sites by consultants or academic institutions is likely to increase and eventually to complete the inventory of all sites on the Forest. The thrust of future cultural resource management will be to complete an inventory of the Forests.

Visual Resources

Current Use and Management. The visual and esthetic qualities of the planning area are considered to be a valuable resource because of their ability to attract large numbers of tourists into the area. Tourism provides a significant portion of the economic base for the entire planning area. The importance of tourism varies within the HRU's. Some areas depend heavily on tourism as a major source of economic activity whereas others look to tourism only as a supplement.