

# CHAPTER V

## MONITORING AND EVALUATION

### INTRODUCTION

In the preceding chapters of the Revision, the Forest Service identified general management direction in terms of goals and objectives and commitments to carry out that direction. Monitoring and evaluation provides an opportunity for the agency to demonstrate how it is complying with the standards and guidelines, and whether or not the standards and guidelines are performing in the predicted manner. In essence, it answers the question, "Are we doing what we said we would do?", and "Are the assumptions on which we based decisions and allocations correct?"

A monitoring and evaluation plan is required by Forest Service planning regulations, which stipulate a report will be issued at the midpoint of the planning cycle. The Forest will issue a monitoring report annually to demonstrate progress toward meeting goals and objectives, and to identify as early as possible any needed changes to the Revised Forest Plan.

### RELATIONSHIP TO OTHER MONITORING ACTIVITIES

This plan shows how the Forest will monitor compliance with, and performance of, standards and guidelines and assumptions in the Revision. The monitoring activities listed in this plan are only a part of a larger range of monitoring activities which take place on the Forest.

Monitoring requirements are often determined in planning and analysis which support specific projects (known as the NEPA process). Though these monitoring activities are conducted independently of Revision monitoring, there will often be an overlap between the two in that project monitoring can give some indication of how Revision standards and guidelines are working, or accomplishment of Revision goals and objectives. Monitoring of randomly-selected projects for compliance with Revision standards and guides is also conducted.

The Forest conducts some monitoring which is required by law or regulation and which may not necessarily demonstrate how the Revision is working. An example of this type of monitoring is regeneration surveys which are done in timber harvest units. Additionally, some contract administration provides information on how Revision goals and objectives are being met, and provides information on compliance with standards and guides.

The research branch of the Forest Service conducts a wide range of trials and experiments to determine the causes of resource problems, or to improve resource management. The results of these scientifically-rigorous experiments are documented in research technical reports and serve to validate current goals, objectives, standards and guidelines, or to recommend changes to them. This type of monitoring is crucial to the Forest's adaptive management approach.

Collectively, all of the above-mentioned efforts, and other day-to-day work not discussed here, comprises a large body of monitoring work of which Revision monitoring is an important part. While not all of the items monitored by these other efforts are expressly listed in the Revision Monitoring Plan, they often overlap and are closely related.

### TYPES OF MONITORING

Three types of monitoring can assess performance of the Revision. The three types of monitoring are implementation, effectiveness and validation.

Implementation monitoring answers the question, "Are projects and activities being implemented in compliance with the standards and guidelines?" Implementation monitoring forms the basis for the other types of monitoring, since those cannot be conducted unless projects and activities comply with Revision standards and guidelines. Thus this monitoring type may be the most important of the three types, and needs to be conducted most often.

Effectiveness monitoring answers the question, "Is implementation of the standards and guidelines giving us the results we expected?" Effectiveness monitoring often means quantitatively assessing the effects of management actions. Since this may require quite a bit of data, effectiveness monitoring is generally conducted on a limited basis and deals with sensitive areas and activities that pose higher risks of adverse effects on Forest resources, or addresses items of high public interest. Once the question of whether effects are as expected is answered, then implementation monitoring is sufficient.

Validation monitoring answers the questions, "Are these results what we really want? Are there better ways to meet the Revision goals and objectives?" Validation monitoring is usually conducted when there is reason to question basic assumptions or coefficients, such as when these are not reasonably supported by existing research. Validation monitoring focuses on items of strong public interest, agency concern, diversity of opinion, or that have the potential to be unduly lax or restrictive. This type of monitoring may require a partnership with the Research branch and long-term investigations. Once an item is validated, as with effectiveness monitoring, then implementation monitoring is sufficient.

#### ITEMS TO BE MONITORED

To maximize the efficiency of the overall monitoring effort, the Forest has focused on certain critical items, identified partners, and will measure as many items as possible with the least number of indicators. The items selected for Revision monitoring met these important criteria, among others:

- critical planning assumptions
- activities with the greatest risk to resources
- most potentially constraining on outputs

The items are listed in brief in the accompanying Monitoring Item Summary, and in greater detail in the individual Monitoring Item Descriptions on the following pages.

#### MONITORING AND THE BUDGET

The monitoring program outlined here is the optimal level, assuming the Revision is fully funded. It is unlikely that annual budgets will fully fund the monitoring effort shown here. Priorities for the annual monitoring effort will be based on annual budgets and program direction, and on the priority of the item, in descending order, from Forest Priority Group 1 to Forest Priority Group 3.

In order to maximize efficiency and promote cooperation, the Forest will seek to develop monitoring partnerships with federal and state agencies and other entities as appropriate, to further shared goals and carry out agency responsibilities.

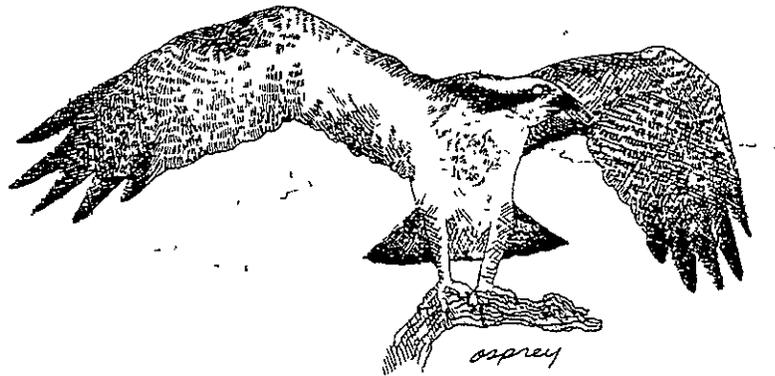
The cost of annually monitoring the items in Priority Groups 1, 2 and 3 is as follows:

Priority Group	Cost for Entire Group
<b>1 (27 items):</b>	<b>between \$283,525 and \$285,525;</b>
<b>2 (6 items):</b>	<b>between \$76,690 and \$86,690;</b>
<b>3 (12 items):</b>	<b>between \$100,800 and \$115,300;</b>
<b>Total Program Cost (45 items):</b>	<b>between \$461,015 and \$487,515.</b>

## MONITORING ITEM SUMMARY

Monitoring Item	Forest Priority Group	Page
<b>PHYSICAL ELEMENTS</b>		
Air Quality		
Long-term Visual Range in Class I and II Airsheds	3	V-6
Soils		
Hydrologic Disturbance in Watersheds	2	V-7
Woody Residue Needs for Soil and Wildlife ✓	1	V-7
Detrimental Soil Disturbance	2	V-9
Fine Organic Matter Retention	3	V-9
<b>BIOLOGICAL ELEMENTS</b>		
Fisheries, Water and Riparian Resources		
Improvement of WQL Streams ✓	1	V-11
Application of BMPs	3	V-11
Native Cutthroat Trout Habitat Features ✓	1	V-12
Vegetation		
Timber Volume Removed From Unsuitable and Suitable-Unscheduled Lands	1	V-13
Pest Increase in Managed Stands	1	V-14
Ute Ladies'-Tresses Populations	1	V-14
Vegetation Structure, Composition and Distribution of Sagebrush/Grassland Habitats ✓	3	V-15
Wildlife ✓		
Cavity Nesters	1	V-16
Standing Dead Tree Habitat	3	V-17
Grizzly Bear Population	1	V-18
Grizzly Bear Habitat Improvement	1	V-19
Bald Eagle Nesting Population	1	V-20
Gray Wolf Population	1	V-21
Peregrine Falcon Nesting Population	1	V-22
Furbearer Population Trends	1	V-23
Goshawk Population Trends	1	V-24
Forest Owl Population	1	V-25
Trumpeter Swan Nesting Population	1	V-26
Spotted Frog Population	1	V-27
Common Loon Population	1	V-28
Harlequin Duck Population	1	V-29
Elk Vulnerability and Elk Habitat Effectiveness	1	V-30
Red Squirrel Population	1	V-31
<b>FOREST USE AND OCCUPATION</b>		
Forest Users		
User Satisfaction	2	V-32
Forest Operation		
Budget	1	V-33

Recreation		
Seasonal Trail Use Impacts to Soil and Vegetation	2	V-33
Recreation/Wildlife Conflicts	2	V-34
Dispersed Campsite Soil Displacement	3	V-35
Jedediah Smith Wilderness LAC	3	V-35
Roads and Trails Access		
Authorized Use Level	2	V-39
Road Closure Effectiveness	1	V-39
Achievement of Road Density Standards	1	V-41
PRODUCTION OF COMMODITY RESOURCES		
Range		
Streambank Disturbance/Stubble Height/ Channel Stability	1	V-42
Riparian Forage Utilization Within Key Areas	1	V-42
Upland Forage Utilization Within Key Areas	3	V-43
Riparian and Upland Long-Term Trend in Benchmarks	3	V-44
Timber		
Changes to Land Suitability	1	V-44
Maximum Created Opening Size	3	V-45
Security Cover Retention	3	V-46
Large Forested Block Retention	3	V-46



## HOW THE MONITORING INFORMATION WILL BE USED

The results of annual monitoring activities will be evaluated to either verify the propriety of current actions, standards and guidelines, or to determine the need to change them. This evaluation will be assembled into an annual report and made available to Forest stakeholders.

Based on the information in the annual report the Forest will identify any changes needed to actions, standards or guidelines. Depending on the magnitude of the change required the Forest may choose to amend the Revised Plan through either the minor (nonsignificant) or major (significant) amendment processes. If the changes needed are of such a large magnitude that it is not feasible to amend the Plan, a Revision may be called for. Through the constant updating of direction due to yearly monitoring or advances in knowledge the Forest will strive to minimize the need to revise the Plan.

The monitoring item descriptions contain certain information in a standard format, which is briefly explained below:

**Monitoring Item** - The subject of the monitoring. This can often be tied back to a particular standard or guideline in the Revised Plan.

**Type of Monitoring** - Implementation, Effectiveness or Validation. The item may address more than one type of monitoring, such as effectiveness and validation.

**Priority** - The relative importance assigned to the item by the Forest leadership team, with one being highest priority and three the lowest.

**Where Applies** - Shows areas of the Forest where the monitoring would be conducted.

**Indicator** - Describes the parameter(s) that will be used to show compliance or change. For example, trails meeting acceptable standards could be measured in miles, areas meeting standards for down woody residue might be measured in acres, and so on.

**Method** - Explains how the monitoring will be conducted. For example, line transects could be used to monitor vegetation conditions, user surveys could be used to monitor recreation use and experience, and so on. If partnerships can be developed for doing the monitoring, that might be explained here.

**Expected Precision and Reliability**

- **Precision** - Shows how correct the monitoring result can be expected to be. For methods which allow scientifically replicable measurements these may be expressed in terms of how closely the estimate approaches the average of a cluster of sample values. For methods which are less scientifically rigorous precision may be expressed in terms of high, medium (or moderate) and low.

- **Reliability** - Measures the confidence which may be placed in the correctness of the estimate. Reliability may be expressed in terms of high, medium (or moderate) and low.

**Tolerance or Variability Indicating Action** - Explains the point at which management review or corrective action will be taken.

**Frequency of Monitoring** - Shows how often the monitoring will be conducted.

**Lead Responsibility** - Designates Forest personnel accountable for conducting the monitoring.

**Estimated Annual Cost** - Gives an estimate of the yearly cost to the Forest to conduct the monitoring.

MONITORING AND EVALUATION STRATEGY  
Monitoring Item Description

**PHYSICAL ELEMENTS**

**Air Quality**

**Monitoring Item - Long-term Visual Range in Class I and Class II Airsheds**

Type of Monitoring - Implementation The standards have not been quantified so there is also a need to establish a baseline

Priority - Forest Priority Group 3

Where Applies - Monitoring should be conducted in designated wilderness on the Forest, and other nonwilderness areas upwind from and adjacent to Class I airsheds and Class II wilderness airsheds managed by other entities

Indicator - *Visibility in miles*

Method - The following methods will be used

1 Mounted, timed-exposure camera(s) established at fixed photopoint(s) The exposures should be evaluated periodically by density-monitoring devices in addition to ocular means

2 Aerosol particle evaluation, to supplement information gathered by photographic means on days not meeting visual standards These devices gather and evaluate information at the site only, not at remote locations on the visual evaluation track, and can help determine the particulate components of air not meeting standards to help discover the cause

There appears to be ample opportunity for partnerships in this effort Other federal agencies such as the Environmental Protection Agency, the U S Fish and Wildlife Service, and the National Park Service are already engaged in efforts of this type The adjacent national parks, especially Grand Teton National Park, have been conducting some of this type of monitoring for some time, most recently in conjunction with their own prescribed burning activities which have increased since the 1988 Yellowstone fires Within the Forest Service, the Bridger-Teton National Forest has conducted air quality monitoring for years in connection with oil and gas development activities The Rocky Mountain Regional Office and Rocky Mountain Research Station both have shown interest in, and have expertise in, air quality monitoring

Expected Precision and Reliability

- Precision - High
- Reliability - High

Tolerance or Variability Indicating Action - Reference standards

Frequency of Monitoring - This will depend on local activities Initially the frequency should be higher, until a baseline is established, perhaps at intervals of two to three times a week After ambient conditions are determined, frequency could be relaxed and targeted toward times when conditions exceed naturally-occurring ambient conditions, or the Forest is planning and conducting activities which threaten to exceed standards

Lead Responsibility - The Forest fire management group

Estimated Annual Cost

Installation of camera	\$2,000 per unit, or \$200/year
Annual operation and evaluation cost	\$1,500 per unit
Installation of aerosol monitoring unit	\$5,000 per unit, or \$500/year
Annual operation and evaluation cost	\$1,500 per unit

TOTAL COST \$3,700/year

**Soils**

**Monitoring Item - Hydrologic Disturbance in Watersheds**

Type of Monitoring - Implementation, Validation Designed to measure implementation of the standard and verify its applicability

Priority - Forest Priority Group 2

Where Applies - Watersheds 10, 11 and 12 (currently at or above the 30 percent level), and watersheds 13 and 25 (which are approaching the 30 percent level)

Indicator - Bank instability (natural versus management-induced) along representative stream reaches within the above-mentioned watersheds

Method - Rosgen stream-typing and Intermountain Region streambank stability ratings

Expected Precision and Reliability

- Precision - Moderate
- Reliability - Moderate

Tolerance or Variability Indicating Action - Determine if bank instability is occurring within the watersheds currently exceeding the 30 percent guideline Determine the sufficiency of the 30 percent guideline

Frequency of Monitoring - Annually, until the 30 percent figure is validated or changed by appropriate study

Lead Responsibility - The forest soil scientist will coordinate an integrated effort by watershed specialists and aquatic scientists

Estimated Annual Cost - \$4,500

**Monitoring Item - Woody Residue Needs for Soil and Wildlife** ✓

Type of Monitoring - Effectiveness/Validation

Priority - Forest Priority Group 1

Where Applies - Subsection, Watershed, Stand (~25 acres), Site

Indicator -

1 Size class, length, composition class to meet standards

1 logs of > 7" diameter @ small end and > 20' length

2 number of logs per acre consisting of logs in appropriate decomposition classes as shown in the Forestwide S&Gs for soil and wildlife

2 Acre/acres (patch) dependent upon analysis approach, and area size, species or life form (such as cavity-nesters) of interest

3 Distribution/condition/availability

1 stand

2 subwatershed or watershed

3 landscape (incl species type and sere(s))

4 subsection

4 Follow requirements for woody residue and dead and down material in the Forestwide S&Gs

Method - Sampling in project or analysis areas by subsection by watershed/subwatershed, by type, elevation, and soil productivity class (integrated resource inventory)

Also, follow procedures such as those outlined within "Guidelines for Sampling Some Physical Conditions of Surface Soils", by Steve Howes, John Hazard, and J Michael Geist, Pacific Northwest Region, July 1983 (R6-RWM-146-1983) Sampling would be on line transects

Role of partners will depend on the availability of funds and relation of partner skills to task needs

Expected Precision and Reliability

- Precision - Variable by type but generally high

- Reliability - High

Tolerance or Variability Indicating Action - Changes in management will be necessary when

A Baseline studies (inventory) refine dead/down needs in varied forest types for species needs,

B Monitoring of projects and comparison of results among treated areas demonstrate that current guidelines are in need of change

Measures and need for change in both (A) and (B) should be determined through evaluations of site, stand and landscape conditions coupled with baseline forestwide (systematic) species inventories and improved knowledge of regional life history characteristics and requirements for various species of wildlife that use dead and down logs

Frequency of Monitoring - (Soils) Prior to and following project analyses for each subsection Analyses and evaluations should include site, stand and landscape conditions For soils, monitoring would be conducted annually, until an adequate determination can be made for ground-disturbing resource management practices

Lead Responsibility - (Soils) Monitoring teams including soils, vegetation and wildlife/ecology specialists

Estimated Annual Cost - Will vary by the number of projects anticipated and planned to affect the distribution and abundance of dead and down material. Per analysis and project costs will vary, but will likely range from \$2,000 to \$4,000, depending on size of analysis area and levels of previous and expected disturbance. Costs do not include baseline inventories nor NEPA preparation.

**Monitoring Item - Detrimental Soil Disturbance**

Type of Monitoring - Implementation and Effectiveness

Priority - Forest Priority Group 2

Where Applies - Forestwide (select representative sites where various land treatments have occurred)

Indicator - At least 85 percent of the total area within an activity area must have soil in satisfactory condition, or, no more than 15 percent of an activity area may have detrimentally-disturbed soil. Detrimentally-disturbed soil is soil that has been displaced, compacted, puddled, or severely burned.

Method - Follow procedures such as those outlined in "Guidelines for Sampling Some Physical Conditions of Surface Soils", by Steve Howes, John Hazard, and J. Michael Geist, Pacific Northwest Region, July 1983 (R6-RWM-146-1983). Sampling would be done on line transects.

Expected Precision and Reliability

- Precision - Moderately high
- Reliability - Moderately high

Tolerance or Variability Indicating Action - For those resource practices consistently exceeding the 15 percent threshold, determine if techniques can be improved or another method found. Evaluate areas with greater than 15 percent soil disturbance for rehabilitation opportunities.

Frequency of Monitoring - Annually, until an adequate determination can be made for various resource practices that are ground-disturbing.

Lead Responsibility - Forest or District soil scientist

Estimated Annual Cost - \$5,000

**Monitoring Item - Fine Organic Matter Retention**

Type of Monitoring - Implementation and Effectiveness

Priority - Forest Priority Group 3

Where Applies - Forestwide (select representative sites, or habitat types, where various land treatments have occurred)

Indicator - At least 50 percent (evenly distributed) of the total area within an activity area must retain its fine organic matter (duff layer plus materials less than 3-inches in diameter) within forested ecosystems,

provide for a minimum of 65 percent ground cover (plants, litter and rock - greater than 3/4-inch in diameter) on rangeland ecosystems, or, in both ecosystems, an equivalent percentage if the site cannot naturally attain the minimum percentages mentioned above

Method - Follow procedures such as those outlined within "Guidelines for Sampling Some Physical Conditions of Surface Soils" by Steve Howes, John Hazard, and J Michael Geist, Pacific Northwest Region, July 1983, (R6-RWM-146-1983) Sampling would consist of line transects and 1/10th acre plots

Expected Precision and Reliability

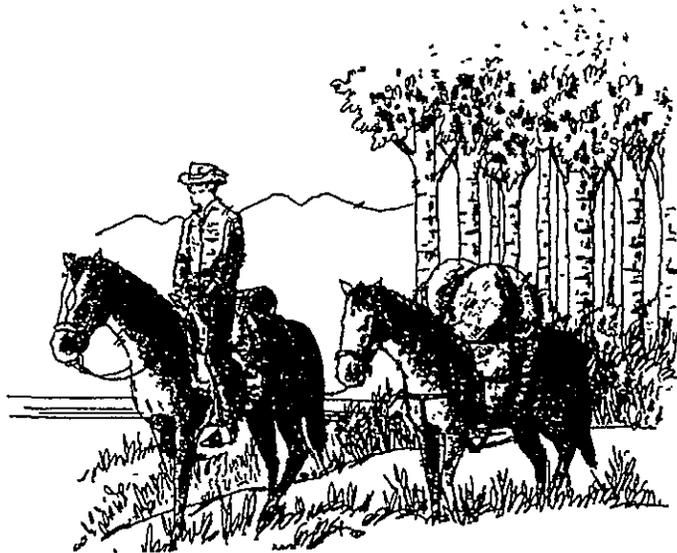
- Precision - Moderately high to high
- Reliability - Moderately high to high

Tolerance or Variability Indicating Action - For those resource practices consistently exceeding the threshold, determine if techniques can be improved or another method found Evaluate areas exceeding the standard for rehabilitation opportunities

Frequency of Monitoring - Annually, until an adequate determination can be made for various ground-disturbing resource management practices

Lead Responsibility - Forest or District soil scientist

Estimated Annual Cost - \$1,000



## BIOLOGICAL ELEMENTS

### Fisheries, Water and Riparian Resources

#### Monitoring Item - Improvement of Water Quality Limited Streams

Type of Monitoring - Validation This monitoring should answer the question, Is water quality in these streams at the point where they can be delisted?

Priority - Forest Priority Group 1

Where Applies - First on streams listed as Water Quality Limited, and then, if necessary, monitoring will be extended to their tributaries and watersheds This item will follow updates to the State WQL lists

Indicator - Depends on the reason for listing, e g , on streams listed for nutrient concerns, nitrate + nitrite and orthophosphate are used as indicators If monitoring of streams for the specific compound or component turns up concerns, monitoring would be extended to find the source of the concern

Method - Approved protocols for the constituent of concern Procedures include those used by Idaho DWR - Division of Environmental Quality (BURP Methods), methods approved for the State of Wyoming, the U S Geological Survey, or in publications such as "Monitoring Protocols to Evaluate Water Quality Effects of Grazing Management on Western Rangeland Streams" by Stephen Bauer and Timothy Burton, October 1993 (EPA 910/R-93-017) Methods will change as water quality standards and assessment procedures change

Expected Precision and Reliability

- Precision - Depends on the parameter/constituent being measured (e g , nutrients may be in mg/l, but sediment measurements vary widely)
- Reliability - if conditions remain constant, should be able to reproduce Some constituents, though, vary with streamflow There are some things that are difficult to reproduce when dealing with a fluid medium

Tolerance or Variability Indicating Action - When it can be reliably determined that water quality standards are being violated, or that the stream cannot be removed from the WQL list because of deteriorated conditions

Frequency of Monitoring - Depends on the constituent being monitored Generally, one can expect to have to visit sites several times during the summer

Lead Responsibility - Forest hydrologist

Estimated Annual Cost - Monitoring all WQL streams has an estimated annual cost of approximately \$15,000 This would include a full-time person to do the monitoring at the GS-5 level

#### Monitoring Item - Application of Best Management Practices (BMPs)

Type of Monitoring - Implementation and Effectiveness Measures whether BMPs related to maintaining and improving water quality are being applied

Priority - Forest Priority Group 3

Where Applies - Project areas where BMP's are applied (such as timber sale areas, new roads, etc )

Indicator - Variable, depending upon the BMP which was applied

Method - For implementation monitoring, reviews would be conducted of projects by teams including the project planner, administrator, and interested specialists For effectiveness monitoring, water quality, soil characteristics (such as erosion), and fish habitat would be monitored for selected projects

Expected Precision and Reliability

- Precision - Variable, depending on the project and the impacts being measured
- Reliability - Results should be reasonably reproducible, unless conditions change between monitoring times

Tolerance or Variability Indicating Action - If BMP's are not being applied in situations which call for their use, a review would be conducted to determine the reasons If instream beneficial uses may be put at risk, or if unacceptable soil degradation is occurring, a review would be conducted to determine the reasons

Frequency of Monitoring -

Implementation monitoring: Once after projects are finished

Effectiveness monitoring Variable Water quality monitoring might be conducted several times per year Monitoring for changes in soils, fish habitat or channel condition may be conducted once per year

Lead Responsibility - Soil scientist, fisheries biologist, hydrologist

Estimated Annual Cost - Average cost would be between \$2,000 and \$10,000 per year, depending on what is being monitored

### **Monitoring Item - Native Cutthroat Trout Habitat Features** ✓

Type of Monitoring - Validation Test the following critical planning assumptions 1) the "expected values" for water temperature and width/depth ratio, for a given Rosgen stream type, represent good habitat conditions for native cutthroat trout at the watershed scale, and 2) these conditions are attainable

Priority - Forest Priority Group 1 Monitoring needed to meet a Forest Plan objective Relates to many Forest Plan goals and provides a basis by which several guidelines were developed Monitoring needed to validate the "expected values" for water temperature and width/depth ratio because they are not strongly supported by site specific research There is strong public interest and agency concern over fisheries guidelines which may be unduly restrictive or lax

Where Applies - Within Native Trout Watersheds (17 identified at present)

Indicator - Number of Native Trout watersheds in which correlations have been completed

Method - Protocol to be determined

Phase 1 Within all Native Trout Watersheds, assess the population status of native cutthroat trout populations as to presence/absence, relative abundance, presence of other salmonid species, and

level of hybridization Survey techniques will employ snorkeling and electro-fishing

Phase 2 Where populations of native cutthroat trout exist, measure and record values for all of the six habitat features, including Rosgen stream type

Phase 3 Compare, at the watershed scale, the recorded values for water temperature and width/depth ratio to the "expected values "

#### Expected Precision and Reliability

- Precision - To be determined
- Reliability - At least 80 percent

#### Tolerance or Variability Indicating Action

Water temperature 1) meet State water quality standards, and 2) two degrees C above values in the table needed to meet biological requirements for native cutthroat trout

Width/depth ratio a factor of one

Frequency of Monitoring - Survey one time

Lead Responsibility - Forest Fisheries Biologist

Estimated Annual Cost - Monitoring costs could be incurred over a 2-5 year period Total cost is \$71,000 (assuming no cost-share above existing partnerships)

Year 1 \$ 9,000 (lower Henry's Fork drainage)

Year 2 \$26,000 (Teton drainages)

Year 3 \$36,000 (South Fork drainages)

## Vegetation

### **Monitoring Item - Timber Volume Removed from Unsuitable and Suitable-Unscheduled (U/S-U) Lands**

Type of Monitoring - Implementation

Priority - Forest Priority Group 1

Where Applies - Applies to harvest on lands not calculated in the Allowable Sale Quantity (ASQ)

Indicator - Million Board Feet (MMBF) for the Revised Plan initial decade

Method - Review project-level NEPA analysis for identification of U/S-U lands proposed for vegetation manipulation by timber harvest District timber sale project personnel include summary of cutting units on U/S-U lands and volume to be harvested with the Gate 3 Appraisal package submitted to the Contracting Officer for contract preparation

#### Expected Precision and Reliability

- Precision - High

- Reliability - High

Tolerance or Variability Indicating Action - U/S-U harvested volume exceeding 20 MMBF before completion of the Revised Plan initial decade

Frequency of Monitoring - Annually

Lead Responsibility - Forest Timber Contracting Officer and District Timber Sale project personnel

Annual Estimated Cost - \$1,000

### **Monitoring Item - Pest Increase in Managed Stands**

Type of Monitoring - Effectiveness Detects increases in insect and disease attacks in vegetation polygons after management activities

Priority - Forest Priority Group 1 (required by regulation)

Where Applies - Forestwide where management activities have altered vegetation

Indicator - An increase in insect and/or disease activity as plotted on annual aerial survey maps

Method - Forest silviculturist will review the annual aerial survey maps issued by Forest Service Pest Management branch, paying special attention to any increased incidence of pest activity in recent activity areas

Expected Precision and Reliability

- Precision - Moderate to High
- Reliability - Moderate to High

Tolerance or Variability Indicating Action - Significant pest activity noted in or near recent activity areas in any given year, or low-level recurring pest activity noted over several years, will be cause for visiting the sites to determine whether the pest activity is occurring within recently-treated areas Further action will be taken as needed

Frequency of Monitoring - Annually

Lead Responsibility - Forest Silviculturist

Annual Estimated Cost - GS-12 @ \$200/day for three days per year = \$600

### **Monitoring Item - Ute Ladies'-Tresses Populations**

Type of Monitoring - Effectiveness/Validation Designed to assess the effectiveness of standards and guidelines for livestock grazing and other activities for protection of this plant and its habitat

Priority - Forest Priority Group 1

Where Applies - Applies in occupied habitat and habitat suitable for the occurrence of this plant

Indicators -

- 1) Population trend as indicated by population size, condition or structure, in permanently marked or unmarked areas
- 2) Documented habitat changes as indicated by parameters such as hydrology, riparian successional stages, presence or absence of noxious weeds, etc

Method - To measure population trends, the size and condition of populations will be quantitatively monitored in marked and unmarked areas. In marked areas a permanently marked grid system will be used. Unmarked areas will be monitored using methods such as belt transects, quadrats or well-defined unmarked areas.

Habitat changes will be mapped and documented. In known population areas human activities will be recorded which have been or may be defined as threats to the species and its habitat.

Expected Precision and Reliability

- Precision - Generally high
- Reliability - Generally high if methods are applied correctly and data interpreted appropriately

Tolerance or Variability Indicating Action - Ute ladies'-tresses populations fluctuate with respect to the number of individuals flowering from year to year. In general, a sustained downward trend in population numbers would indicate a need for action.

Frequency of Monitoring - At least once a year during flowering and seed-set periods (generally August and September)

Lead Responsibility - Native plant program manager. State fish and game departments and other agencies will be invited to become involved as much as possible.

Annual Estimated Cost - \$1,500

**Monitoring Item - Vegetation Structure, Composition, and Distribution of Sagebrush/Grassland Habitats**

Type of Monitoring - Implementation

Priority - Forest Priority Group 3

Where Applies - Watersheds and subwatersheds

Indicator - Big sagebrush (*Artemisia tridentata*) canopy cover age distribution across a subwatershed or watershed

Method - Ocular estimate or Line Intercept Method for Crown Canopy Cover, described in the Forest Service Handbook 2209 21, Ch 44 51

Expected Precision and Reliability

- Precision - High
- Reliability - Moderate

Tolerance or Variability Indicating Action - When sagebrush/grassland habitat conditions are not within Forestwide S&Gs (vegetation)

Frequency of Monitoring - As needed

Lead Responsibility - District Rangeland Management Specialist

Estimated Annual Cost

One GS-9 @ \$175 00/day for 35 days = \$6,125/year

**Wildlife** ✓

**Monitoring Item - Cavity Nesters**

*Thru V-31*

Type of Monitoring - Effectiveness and/or Validation Designed to measure population trends of primary cavity nesting species and relationships to habitat changes

Priority - Forest Priority Group 1

Where Applies - Monitoring emphasis will be in the 5 x x series management prescriptions which allow timber harvesting Other management prescriptions will be monitored on an as needed basis depending on human activities and natural events such as fires

Indicator -

Population trend Birds per transect and/or birds per point

Habitat changes Percent biological potential (snags per 100 forested acres) as identified in the Forestwide S&Gs and the 5 x x series management prescriptions

Method -

Population trend Point count surveys following methods which have been used in the Neotropical Migratory Landbird Monitoring Project in the Big Hole Mountains (Kliene 1996) A minimum of 24 transects, with 10 to 15 point count stations per transect, distributed within the 5 x x series management prescriptions Surveys should be done in March and April, prior to the start of incubation Don't use playback calls

Habitat changes Documentation of changes in percent biological potential (snags per 100 forested acres) Several data sources could be used which include the following stand exam surveys, permanent forest inventory plots, and a methodology recently developed at the University of Idaho using variable length and width transects

Expected Precision and Reliability

- Precision - Moderate to High
- Reliability - Moderate to High

Tolerance or Variability Indicating Action -

Population trend Population trends are expected to be variable from year to year and are affected by habitat changes, weather conditions, predation, etc A declining trend for at least four years in a row would be an indication for action

Habitat changes Percent biological potential below that specified for a management prescription

Frequency of Monitoring - Annually

Lead Responsibility - Targhee National Forest State Fish and Game Departments and other agencies will be involved as much as possible

Estimated Annual Cost -           \$3,800 (24 days at \$160/day/person)  
  3,960 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$8,600

### **Monitoring Item - Standing Dead Tree Habitat**

Type of Monitoring - Effectiveness/Validation Determines degree to which wildlife requirements are met by standing dead and replacement green trees

Priority - Forest Priority Group 3

Where Applies - Subsection, Watershed, Stand (~25 acres), Site

Indicators -

- A diameter
- B tree species
- C tree height
- D composition (dead tree hardness/class)
- E number and dispersion of dead standing and replacement trees (dispersion refers to the evenness and clumpiness of dead and green replacement trees)

Factors to be considered include but are not limited to

- A Forest inventories for species that use dead standing trees
- B Number of species, species group or life form (e.g. cavity nesters, forest raptors, songbirds, furbearers) with potential to occur according to species distribution and available habitat characteristics (Note Guidelines do not assume that requirements for one species meet the needs for another where overlap in size and placement characteristics exist)
- C Size of female home range and breeding area requirements with representative habitat characteristics for successful breeding and fledging of young according to species of interest or concern
- D Existing landscape, stand, and site conditions and characteristics within analysis and treatment areas as determined by inventories prior to project implementation
- E Distribution/condition/availability
  - 1 stand
  - 2 subwatershed or watershed
  - 3 landscape (incl species type and sere(s))
  - 4 subsection

F Distribution of natural opening sizes, shapes and structural characteristics of forest seres comparing natural disturbance types to human-induced

G Occurrence and distribution of forest types and effective conditions at landscape, stand and site relative to potential for species occurrence, distribution and reproduction

Method - Systematic sampling in project or analysis areas by subsection by watershed/subwatershed, forest type, elevation, and soil productivity class (IRI inventory) Role of partners will be systematic inventories of habitat conditions and species occurrences prior to and after vegetation treatments

Expected Precision and Reliability

- Precision - Variable by species and forest (condition, characteristics) type but generally high
- Reliability - High

Tolerance or Variability Indicating Action - Changes in management will be necessary as

A Baseline studies (inventory) refine or replace dead standing and green replacement trees in varied forest types and conditions for species needs,

B Monitoring of projects and comparison of results among treated areas demonstrate that current guidelines are in need of change

Measures and need for change in both (A) and (B) should be determined through evaluations of site, stand and landscape conditions coupled with baseline forestwide (systematic) species inventories and improved knowledge of regional life history characteristics and requirements for various species of wildlife that use dead standing and green replacement trees

Frequency of Monitoring - Prior to and following project analyses for each subsection Analyses and evaluations should include site, stand and landscape conditions

Lead Responsibility - Forest wildlife biologist

Estimated Annual Cost - Will vary by the number of projects anticipated and planned to affect the distribution and abundance of dead and down material Per analysis and project costs will vary, but will likely range from \$1500 to \$3000 depending on size of analysis area, levels of previous disturbance, and expected disturbance Costs do not include baseline inventories nor NEPA preparation

### **Monitoring Item - Grizzly Bear Population**

Type of Monitoring - Effectiveness and/or Validation Designed to measure grizzly bear population and relationship to habitat changes

Priority - Forest Priority Group 1

Where Applies - Grizzly Bear BMU's and Subunits

Indicator -

Population trend Population trends are developed for the entire Yellowstone recovery area, and are computed from several components of the grizzly bear population which include the following annual unduplicated sightings of females with cubs, distribution of females with cubs, total known mortality, total female mortality

Habitat changes Habitat changes are analyzed with the grizzly bear cumulative effects model (CEM), and include changes in vegetation (fires, timber harvesting, etc ), road and trail access (also called linear activities), developed sites such as campgrounds, resorts, etc (also called point activities), and dispersed recreation such as hunting, berry picking, etc (also called dispersed activities)

Method -

Population trend In cooperation with the USFWS and Interagency Study Team, report all verified sightings of grizzly bears (especially sows with cubs) and all verified mortalities

Habitat changes Within the BMU's and Subunits, Ranger Districts will annually update information on vegetation, linear features, point activities, and dispersed activities This information will be maintained in the GIS database in the Supervisor's Office.

Expected Precision and Reliability

- Precision - Moderate for population trends (it is difficult to observe bears and verify all reported sightings) High for habitat changes
- Reliability - Moderate for population trends (it is difficult to observe bears and verify all reported sightings) High for habitat changes

Tolerance or Variability Indicating Action - Failure to meet the recovery targets as outlined in the Grizzly Bear Recovery Plan (this applies to the entire GYA recovery zone) Failure to meet the Forest Plan S&Gs for the BMU/Subunits on the Targhee National Forest

Frequency of Monitoring - Annually

Lead Responsibility - Population trend monitoring has been lead by the Interagency Grizzly Bear Study Team and the USFWS, Ranger Districts and the Supervisor's Office provide verified sighting information to the Study Team and USFWS Habitat monitoring is done by the Ranger Districts and Supervisor's Office

Estimated Annual Cost - \$19,200 (120 days at \$160/day (30 days/RD & SO))  
8,550 (vehicle expense, equipment, etc )  
800 (record keeping/report writing)  
\$28,550

**Monitoring Item - Grizzly Bear Habitat Improvement**

Type of Monitoring - Implementation, Effectiveness Measures improvement in the quality of grizzly bear habitat on the Forest, and the contribution of the Forest to total grizzly bear habitat quality in the Greater Yellowstone Area

Priority - Forest Priority Group 1

Where Applies - Applies to all prescription areas within designated Bear Management Units (BMU's) on the Forest

Indicator - The primary indicators of trend in grizzly bear habitat are habitat effectiveness, habitat value, and bear displacement These three are described in detail in the documentation for the grizzly bear cumulative effects model (IGBC 1990)

In addition to the above, indicators will be used from the Interagency Grizzly Bear Committee Taskforce Report on Motorized Access Management (IGBC 1994)

Method - Each management unit of the Greater Yellowstone Area, including the Targhee National Forest, will annually submit data on changes in road and trail access, and vegetation, to the USDA-Forest Service Intermountain Regional Office. That office will compile the data, develop a data set fixed in time, and issue this in electronic digital form (CD-ROM). This data will then be forwarded to individual management units for on-site use and runs.

On the Targhee National Forest, individual ranger districts will track changes in road and trail access and vegetation. These will be submitted to the Forest GIS shop for assembly into a Forest data package.

Expected Precision and Reliability

- Precision - Very high
- Reliability - Results will be reproducible with the same data set

Tolerance or Variability Indicating Action - Refer to the item on achievement of road density standards

Frequency of Monitoring - Annually

Lead Responsibility - Forest wildlife biologist

Estimated Annual Cost - On each of the three ranger districts with grizzly bear habitat, one person (GS-9 wildlife biologist) will need two weeks to put together the input data required. On receipt of the CD-ROM data from the Regional Office, the Forest GIS shop will need one person (GS-7 tech) for one day to run the cumulative effects model on each of the seven subunits.

GS-9 biologist 3 districts, two weeks each @ \$150/day	\$4,500
GS-7 GIS technician 7 subunits, one day each @ \$110/day	\$ 770
TOTAL	\$5,270

### Monitoring Item - Bald Eagle Nesting Population

Type of Monitoring - Effectiveness and/or Validation Measures the nesting population of bald eagles and its relationship to habitat changes

Priority - Forest Priority Group 1

Where Applies - All bald eagle nesting territories

Indicator -

Population trends Occupancy and productivity of all bald eagle nesting territories

Habitat changes Changes in vegetation within nesting territories, changes in human activities within nesting territories

Method -

Population trends Standard monitoring of occupancy and productivity which has been done for more than a decade

Habitat changes Documentation and mapping of vegetation changes within nesting territories using the forest GIS database Documentation of changes in human activities within nesting territories, which may include recreation use (boating, floating, fishing, etc ), motorized access, construction activities, etc

Past monitoring has been a cooperative effort with the Idaho Department of Fish and Game, BLM, U S Fish and Wildlife Service, Forest Service, and some private individuals It is expected that this cooperation will continue in the future

#### Expected Precision and Reliability

- Precision - High for population trends and vegetation changes Moderate to high for human activities
- Reliability - High for population trends and vegetation changes Moderate to high for human activities

Tolerance or Variability Indicating Action - Failure of an adult pair to occupy a nesting territory more than two years in a row Data on productivity shows that spring weather has a great influence on productivity Therefore, reductions in productivity must indicate factors other than spring weather are responsible for reduced productivity

Frequency of Monitoring - Annually

Lead Responsibility - Coordinated by the Forest wildlife biologist

Estimated Annual Cost - \$16,000

#### **Monitoring Item - Gray Wolf Population**

Type of Monitoring - Effectiveness and/or Validation Designed to measure gray wolf population and relationship to habitat changes

Priority - Forest Priority Group 1

Where Applies - Forestwide

Indicator -

Population trend Number of wolf packs, reproduction, movements, and mortality are being monitored

Habitat changes Intrusive human disturbances within one mile around active den sites and rendezvous sites between April 1 and June 30, when there are five or fewer breeding pairs of wolves in each experimental population area Forestwide standards for livestock grazing and gray wolves

Method -

Population trend In cooperation with the USFWS and monitoring teams, report all verified sightings of gray wolves (especially evidence of packs)

Habitat changes Within one mile of active den sites and rendezvous sites, restrict intrusive human disturbances between April 1 and June 30, when there are five or fewer breeding pairs of

wolves in each experimental population area Increase monitoring of livestock allotments where wolf packs have established

Expected Precision and Reliability

- Precision - High
- Reliability - High

Tolerance or Variability Indicating Action - Failure to implement the Revision S&Gs for gray wolves

Frequency of Monitoring - Annually

Lead Responsibility - Habitat monitoring is done by the Ranger Districts and Supervisor's Office, and coordinated by the Forest biologist Population trend monitoring has been lead by the USFWS and wolf monitoring teams Ranger Districts and the Supervisor's Office provide verified sighting information to the USFWS

Estimated Annual Cost -           \$8,000 (50 days at \$160/day)  
  2,000 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$10,800

**Monitoring Item - Peregrine Falcon Nesting Population**

Type of Monitoring - Effectiveness and/or Validation Designed to measure the peregrine falcon nesting population and relationship to habitat changes

Priority - Forest Priority Group 1

Where Applies - All peregrine falcon nest sites and territories

Indicator -

Population trend Occupancy and productivity of all peregrine falcon nest sites and territories

Habitat changes The primary concern is human activity, such as rock climbing, at known nest sites In the past, use of pesticides which caused egg shell thinning was the primary concern Human activities and use of pesticides will be the main habitat changes monitored General habitat conditions and changes within the foraging area will also be monitored

Method -

Population trend Standard monitoring of occupancy and productivity which has been done for more than a decade

Habitat changes Periodic visits to nest sites to document changes in human activities If necessary, cameras could be established to document human activity at nest sites Documentation of the use of pesticides Documentation of general habitat changes through tracking of proposed project activities and GIS databases

Past monitoring has been a cooperative effort with the Idaho Department of Fish and Game, BLM, U S Fish and Wildlife Service, Forest Service, and some private individuals It is expected that this cooperation will continue in the future

## Expected Precision and Reliability

- Precision - High for population trends Moderate to high for human activities
- Reliability - High for population trends Moderate to high for human activities

Tolerance or Variability Indicating Action - Peregrine falcon nest sites may not be occupied or produce young every year Nest sites may also change over time A nest site not occupied for more than two consecutive years may indicate the need to assess needed management actions

Frequency of Monitoring - Annually

Lead Responsibility - Forest biologist

Estimated Annual Cost -           \$4,800 (30 days at \$160/day)  
  1,200 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$6,800

## Monitoring Item - Furbearer Population Trends

Type of Monitoring - Effectiveness and/or Validation Measures the population trends of marten, fisher, wolverine, and relationships to habitat changes

Priority - Forest Priority Group 1

Where Applies - Ecological subsections of the Forest

Indicator -

Population trend travel distance per encounter of tracks or other sign, (example 1 43 marten tracks or sign per mile)

Habitat changes documented changes in important habitat parameters such as forest seral stages, dead and downed woody debris, motorized access, etc

Method -

Population trend Winter track/sign surveys following procedures developed by Dr Steve Minta in the Western Yellowstone Forest Carnivore Project Briefly a minimum of three sampling units of four square miles in each ecological subsection, with 8 to 10 linear miles of snowmachine routes in each sampling unit Each sampling unit should be sampled 3 times during the winter period Specific protocol is documented in Western Yellowstone Forest Carnivore Project Study

Since wolverine and fisher are extremely rare, additional monitoring using the following techniques may be used

A Scent stations with cameras and/or track recording,

B Surveys of natal denning areas in boulder fields (for wolverine),

C All observations from reputable sources will be recorded and maintained in District and Forest databases

Habitat changes Documentation and mapping of changes in forest seral stages (timber harvest, fires, etc ) in the Forest GIS database Documentation of changes in motorized access (see road and trail access monitoring items) Loss of dead and downed woody debris due to firewood gathering, timber harvesting, etc

Expected Precision and Reliability

- Precision - Moderate to High
- Reliability - Moderate to High

Tolerance or Variability Indicating Action - Furbearer populations will fluctuate naturally due to a variety of factors such as weather, prey abundance, trapping pressure (martens), etc Populations are expected to change due to programmed management actions like timber harvesting, as predicted in the FEIS Therefore a sustained downward trend for at least four sampling winters which is greater than expected from programmed management actions will trigger management review

Frequency of Monitoring - At least half of the ecological subsections each winter

Lead Responsibility - Forest wildlife biologist State Fish and Game Departments and other agencies will be involved as much as possible

Estimated Annual Cost - \$18,000

**Monitoring Item - Goshawk Population Trends**

Type of Monitoring - Effectiveness and/or Validation Designed to measure population trends of goshawks and relationships to habitat changes

Priority - Forest Priority Group 1

Where Applies - Forestwide

Indicator -

Population trend adult occupancy of known goshawk nesting territories

Habitat changes documented changes in important habitat parameters identified in the Forestwide S&Gs within known goshawk nesting territories

Method -

Population trend Random sampling of adult occupancy at a minimum of 15 goshawk nesting territories each year Sampling can occur during April (no taped calls), and June 10-30 (using taped calls) More than one trip to each territory may be needed to accurately assess adult occupancy Alternate nest sites must be checked

In addition to random sampling, all verified observations of adult occupancy in territories will be recorded All new verified territories will be added to the forestwide database

Habitat changes Documentation and mapping of changes in habitat conditions identified in the Forestwide S&Gs within active and historic nest territories, using the forest GIS database

#### Expected Precision and Reliability

- Precision - Moderate to High
- Reliability - Moderate to High

Tolerance or Variability Indicating Action - Habitat changes which exceed the Forestwide goshawk S&Gs Goshawk territories are not always occupied every year. However, overtime, a stable population should revolve around some average occupancy rate. A sustained downward trend of adult occupancy for at least four years may indicate a need for action.

Frequency of Monitoring - Annually

Lead Responsibility - Targhee National Forest State Fish and Game Departments and other agencies will be involved as much as possible.

Estimated Annual Cost -           \$7,200 (1 person for 45 days at \$160/day)  
  4,550 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$12,550

#### **Monitoring Item - Forest Owl Population**

Type of Monitoring - Effectiveness and/or Validation Designed to measure population trends of boreal, great gray and flammulated owls, and relationships to habitat changes.

Priority - Forest Priority Group 1

Where Applies - Ecological subsections of the forest

Indicator -

Population trend Travel distance per encounter of calling adults (example 0.5 boreal owl or great gray owl encounters per ten miles)

Habitat changes Documented changes in important habitat parameters such as forest seral stages, dead and downed woody debris, etc , within active and historic nesting territories.

Method -

Population trend A minimum of ten miles of calling transects within each ecological subsection (70 miles total) conducted each year. Briefly Boreal owls can be surveyed from about February through April, great gray owls from March through May, and flammulated owls during May. Follow standard survey/calling protocol which has been used on the forest for owl surveys for the past several years. About four miles of transect can be done in one night by one team.

In addition to the survey routes, all verified observations of boreal, great gray, and flammulated owls during the nesting and brooding/rearing seasons will be recorded and maintained in a forest database.

Habitat changes Documentation and mapping of changes in forest seral stages (due to timber harvest, fires, etc ) within active and historic nest territories, using the forest GIS database. Loss of dead and downed woody debris due to firewood gathering, timber harvesting, etc.

Expected Precision and Reliability

- Precision - Moderate to High
- Reliability - Moderate to High

*Tolerance or Variability Indicating Action* - Forest owl populations will fluctuate naturally due to a variety of factors such as weather, prey abundance, etc. Forestwide S&Gs were developed to maintain suitable habitat conditions in known territories. Therefore a sustained downward trend for at least four sampling years which can be correlated with changes in habitat conditions due to vegetation management or natural events such as fire will trigger management review.

Frequency of Monitoring - Annually

Lead Responsibility - Forest biologist. State Fish and Game Departments and other agencies will be involved as much as possible.

Estimated Annual Cost -           \$5,760 (2 person teams/18 days at \$160/day/person)  
  4,520 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$11,080

**Monitoring Item - Trumpeter Swan Nesting Population**

Type of Monitoring - Effectiveness and/or Validation. Designed to measure nesting populations and relationship to habitat changes.

Priority - Forest Priority Group 1

Where Applies - Trumpeter swan nesting habitat, highest priority will be the ponds and lakes identified in the Forestwide S&Gs.

Indicator -

Population trend. Occupancy of suitable nesting habitat and productivity of swan pairs using suitable nesting habitat.

Habitat changes. Changes in riparian and aquatic habitat within or adjacent to suitable nesting habitat, changes in human activities within or adjacent to suitable nesting habitat.

Method -

Population trend. Standard monitoring of occupancy and productivity which has been done for more than a decade. Emphasis will be on those sites listed in the trumpeter swan Forestwide S&Gs.

Habitat changes. Documentation and mapping of riparian and aquatic vegetation changes at suitable nesting ponds and lakes. Documentation of changes in water depths. Documentation of changes in human activities at suitable nesting ponds and lakes, which may include recreations use, motorized access, livestock grazing, etc.

Expected Precision and Reliability

- Precision - High for population trends. Moderate to high for habitat changes.

- Reliability - High for population trends Moderate to high for habitat changes

Tolerance or Variability Indicating Action - From 1982 to 1996, the number of sites occupied by pairs has ranged from 7 to 17 Only one site has been occupied by a swan pair all 15 years, and only one site has been occupied by a swan pair 14 out of the 15 years Total young observed has ranged between 3 and 16 for the 15 years of data The recent work to move swans to new areas may have resulted in reduced pairs using suitable habitat on the forest We therefore expect a lot of variability between years However, a downward trend in the number of pairs and/or productivity for more than four years in a row would indicate that some management action may be necessary

Frequency of Monitoring - Annually

Lead Responsibility - Forest biologist Ranger Districts will gather data, in cooperation with the State Fish and Game Departments and the U S Fish and Wildlife Service (Red Rock Lakes National Wildlife Refuge)

Estimated Annual Cost -           \$3,200 (20 days at \$160/day)  
  1,000 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$5,000

### **Monitoring Item - Spotted Frog Population**

Type of Monitoring - Effectiveness and/or Validation Designed to measure populations of frogs and relationship to habitat changes

Priority - Forest Priority Group 1

Where Applies - Spotted frog habitat, which is riparian and wetland areas on the northern portions of the Forest

Indicator -

Population trend Occupancy at documented sites and relative abundance at those sites

Habitat changes Changes in riparian and aquatic habitat conditions within or adjacent to documented sites, changes in human activities within or adjacent to documented sites

Method -

Population trend The Forest and Idaho State University recently completed a survey of spotted frogs on the forest Sites with spotted frogs were documented, and a relative estimate of the frog population observed at each site was made Each year, random sampling of occupancy and relative abundance will be done at a minimum of 15 sites, using the same techniques and procedures as used by Idaho State University In addition to resurveying known sites, new sites with spotted frogs will be added to the data base, and included in the survey program

Habitat changes Spotted frog habitat is to be managed according to Rx 2 8 3 and Forestwide S&Gs for Fisheries, Water and Riparian Resources As spotted frog sites are surveyed each year, documentation will be done on the habitat conditions and adherence to the management direction Conditions will be compared with descriptions from the Idaho State University survey reports

#### Expected Precision and Reliability

- Precision - Moderate for population trends Moderate to high for habitat changes
- Reliability - Moderate for population trends Moderate to high for habitat changes

Tolerance or Variability Indicating Action - The survey results from Idaho State University indicate that spotted frog distribution and abundance is highly variable between years, and is strongly influenced by moisture and water We expect survey results to be variable A consistent decline in the relative abundance of frogs at a majority of the survey sites, and a downward trend in riparian habitat conditions, would indicate that some management action may be necessary

Frequency of Monitoring - Annually

Lead Responsibility - Forest biologist will coordinate work by district personnel Other agencies and institutions will be involved as much as possible

Estimated Annual Cost -           \$4,000 (25 days at \$160/day)  
  1,000 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$5,800

#### Monitoring Item - Common Loon Population

Type of Monitoring - Effectiveness and/or Validation Designed to measure populations of common loons and relationship to habitat changes

Priority - Forest Priority Group 1

Where Applies - Suitable common loon nesting and brood rearing habitat identified in Process Paper D Additional sites may be added when new information documents that new sites are suitable

Indicator -

Population trend Occupancy at documented sites and productivity of breeding pairs at those sites

Habitat changes Changes in riparian and aquatic habitat conditions within or adjacent to documented sites, changes in human activities within or adjacent to documented sites

Method -

Population trend Annually document the presence of common loons at the sites listed in Process Paper D Several visits should be made to each site during the nesting and brood rearing seasons to document the presence of young

Habitat changes Common loon habitat is to be managed according to prescription 2 8 3 and Forestwide S&Gs for Fisheries, Water and Riparian Resources As common loon sites are surveyed each year, habitat conditions and adherence to the management direction will be documented

#### Expected Precision and Reliability

- Precision - High for population trends Moderate to high for habitat changes

- Reliability - High for population trends Moderate to high for habitat changes

Tolerance or Variability Indicating Action - Successful reproduction by common loons has been documented at only three sites Our data indicates that occupancy by pairs and successful reproduction does not occur every year at these sites The Forest Plan has two objectives for common loons One objective is to evaluate the potential to provide and maintain suitable breeding habitat The second objective is to develop common loon management plans for suitable sites if the evaluation indicates there is potential to provide and maintain suitable breeding habitat While these objectives are being accomplished, we want to maintain existing habitat conditions and existing levels of common loon pairs

Frequency of Monitoring - Annually

Lead Responsibility - Forest biologist and Ranger Districts Other agencies and institutions will be involved whenever possible

Estimated Annual Cost -           \$1,600 (10 days at \$160/day)  
  400 (vehicle expense, equipment, etc )  
  400 (record keeping/report writing)  
  \$2,400

### **Monitoring Item - Harlequin Duck Population**

Type of Monitoring - Effectiveness and/or Validation Designed to measure populations of harlequin ducks and relationship to habitat changes

Priority - Forest Priority Group 1

Where Applies - Suitable harlequin duck nesting and brood rearing habitat identified in Process Paper D Additional sites may be added when new information documents that new sites are suitable

Indicator -

Population trend Occupancy at documented sites and productivity of breeding pairs at those sites

Habitat changes Changes in riparian and aquatic habitat conditions within or adjacent to documented sites, changes in human activities within or adjacent to documented sites

Method -

Population trend Annually document the presence of harlequin ducks at the sites listed in Process Paper D Several visits should be made to each site during the nesting and brood rearing seasons to document the presence of young

Habitat changes Harlequin duck habitat is to be managed according to Rx 2 8 3 and Forestwide S&Gs for Fisheries, Water and Riparian Resources, and Forestwide S&Gs for harlequin ducks As harlequin duck sites are surveyed each year, documentation will be done on the habitat conditions and adherence to the management directions

Expected Precision and Reliability

- Precision - Moderate for population trends Moderate to high for habitat changes
- Reliability - Moderate for population trends Moderate to high for habitat changes

Tolerance or Variability Indicating Action - Successful reproduction by harlequin ducks has been documented at only three sites. Our data indicates that occupancy by pairs and successful reproduction does not occur every year at these sites. If harlequin duck presence is to be maintained on the forest, existing habitat conditions and existing levels of harlequin duck pairs must be maintained. Any decline in existing habitat conditions may indicate the need for action.

Frequency of Monitoring - Annually

Lead Responsibility - Forest biologist will coordinate work by district personnel. Other agencies and institutions will be involved as much as possible.

Estimated Annual Cost -           \$3,200 (20 days at \$160/day)  
  800 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$4,800

**Monitoring Item - Elk Vulnerability and Elk Habitat Effectiveness**

Type of Monitoring - Effectiveness and/or Validation

Priority - Forest Priority Group 1

Where Applies - Forestwide

Indicator -

Population trend: Percent bull elk mortality during the general elk hunting seasons

Habitat changes: Open road and open motorized trail route density (OROMTRD), cross-country OHV use, hiding cover

Method -

Population trend: Percent bull elk mortality is gathered by the State Fish and Game Departments

Habitat changes: OROMTRD is covered in the Road and Trail Access monitoring. Cross-country OHV use will be monitored during the fall general elk seasons with the help of the State Fish and Game Departments. Cover analysis will be updated using the Forest GIS vegetation database to account for natural disturbances (such as fire) and management activities (such as timber harvesting)

Expected Precision and Reliability

- Precision - High
- Reliability - High

Tolerance or Variability Indicating Action - Failure to implement the Revision S&Gs for OROMTRD, cross-country OHV travel, and timber harvesting

Frequency of Monitoring - Annually

Lead Responsibility - Forest biologist compiles data. Percent bull elk mortality is done by the State Fish

and Game Departments Ranger Districts and the Supervisor's Office have the lead on OROMTRD, cross-country OHV travel, and cover analysis

Estimated Annual Cost -           \$9,600 (60 days at \$160/day)  
  2,400 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$12,800

**Monitoring Item - Red Squirrel Population**

Type of Monitoring - Effectiveness and/or Validation   Designed to measure population trends of red squirrels and relationship to habitat changes

Priority - Forest Priority Group 1

Where Applies - Grizzly bear BMU's and subunits

Indicator -

Population trend   Densities of active squirrel middens

Habitat changes   Cone producing conifer stands, with emphasis on cone producing whitebark pine

Method -

Population trend   Follow methodology described by David J Mattson and Daniel P Reinhart in "Indicators of Red Squirrel (*Tamiasciurus hudsonicus*) Abundance in the Whitebark Pine Zone," Great Basin Naturalist 56(3) 272-275 (1996)

Habitat changes   Documentation and mapping of changes in forest seral stages (due to timber harvest, fires, etc ) within grizzly bear BMU's and subunits, using the Forest GIS database

Expected Precision and Reliability

- Precision - Moderate to high
- Reliability - Moderate to high

Tolerance or Variability Indicating Action - Red squirrel populations will fluctuate with natural fluctuations in cone crops due to weather and other variables and disturbances which replace cone bearing age trees such as fire and timber harvesting. The management objective is to maintain red squirrel populations wherever suitable habitat occurs. Therefore, a population decline in suitable habitat that cannot be correlated with natural fluctuations in cone crops may indicate action is needed

Frequency of Monitoring - Annually

Lead Responsibility - Forest biologist

Estimated Annual Cost -           \$12,800 (2 person teams/40 days at \$160/day)  
  2,000 (vehicle expense, equipment, etc )  
  800 (record keeping/report writing)  
  \$15,600

## FOREST USE AND OCCUPATION

### Forest Users

#### Monitoring Item - User Satisfaction

Type of Monitoring - Implementation, Effectiveness Designed to measure forest customer satisfaction with the direction, progress, and administration of the Revision

Priority - Forest Priority Group 2

Where Applies - Forestwide

Indicator - Comments, both written and oral, approving or disapproving of the direction of Forest management and the rate of progress in implementing it

Method - Forest User mailing lists would be used to periodically build random samples Individuals and groups on this list would then be sampled using methods such as phone surveys or mailings These samples would be conducted by organizations or academic institutions with sampling expertise, under contract to the Forest Informal, optional, person-to-person user surveys would be conducted of trail users, campers, and sport recreationists by field-going Forest personnel Records and notes would be kept of public meetings held by the Forest Forest employees would be encouraged to record and submit informal notes of opinions and suggestions of friends and family for consideration by the Forest

#### Expected Precision and Reliability

- Precision - Samples designed with statistical principles could be quite accurate Otherwise it would still provide a reasonable indication to managers
- Reliability - The results should be reasonably reproducible

Tolerance or Variability Indicating Action - This would have to determined by Forest line officers based on the issue

Frequency of Monitoring - Annually or as needed

Lead Responsibility - Forest Public Affairs Officer

Estimated Annual Cost - Working with a survey organization would require three weeks per year for the Public Affairs Officer Helping to assess the surveys would require GS-9 employees To conduct field surveys of recreationists would require two weeks for two GS-9 employees

Contract to conduct phone sample	\$3,000
GS12 PAO, three weeks @ \$1,000/wk	\$3,000
GS9 45 hours at \$18/hr	\$ 810
GS9 (field survey), 4 wks @ \$18/hr	\$2,880
TOTAL	\$9,690

## **Forest Operation**

### **Monitoring Item - Budget**

Type of Monitoring - Implementation and Effectiveness

Priority - Forest Priority Group 1 Required by regulation at 36 CFR 219 12(K)(3)

Where Applies - Forestwide

Indicator - Forest budget adjusted for the effects of inflation

Method - Convert annual budget figures to the same basis as the Revision's projected budget Compare the results

Expected Precision and Reliability

- Precision - High
- Reliability - High

Tolerance or Variability Indicating Action - +/- 25 percent of projected budget

Frequency of Monitoring - Every five years

Lead Responsibility - Forest Budget and Finance Officer

Annual Estimated Cost - \$1,000 every five years

## **Recreation**

### **Monitoring Item - Seasonal Trail Use Impacts to Soil and Vegetation**

Type of Monitoring - Implementation and Effectiveness Designed to measure the impacts to on-trail and off-trail soils and vegetation from impacts from hiking, horse use and OHV use, for compliance with the 15 percent soil disturbance policy

Priority - Forest Priority Group 2

Where Applies - System trail and off-trail areas

Indicator - Soil displacement on the trail or within the adjacent meadow or basin area

Method - Visual and photo documentation and trail condition surveys

Expected Precision and Reliability

- Precision - 60-75 percent
- Reliability - 60-75 percent

Tolerance or Variability Indicating Action - When condition surveys show that use is impacting the trail tread or adjacent soils and vegetation such that significant resource damage, health, and safety, or trail maintenance are at risk

Frequency of Monitoring - Annually on approximately 5-10 percent of the system trail areas (60-120 miles) and adjacent off-trail areas (Priority areas initially are the Big Hole Mountains, Madison-Pitchstone Plateaus, Caribou Range Mountains and Lemhi-Medicine Lodge subsections )

Lead Responsibility - Recreation and Engineering Staffs

Estimated Annual Cost - \$25,000-35,000

### **Monitoring Item - Recreation/Wildlife Conflicts**

Type of Monitoring - Implementation and Effectiveness Designed to measure conflicts between all forms of recreation and wildlife

Priority - Forest Priority Group 2

Where Applies - Forestwide

Indicator - Number of violations of closure areas, observed wildlife disturbances, and diminishing wildlife populations or signs of stress

Method - Field and aerial observations, photography This item will depend partially on the results of monitoring of the effectiveness of road closures, which is another Priority Group 2 item

It is expected that partnerships can be developed with state game and fish agencies, State recreation agencies, other agencies and possibly recreation user groups to monitor this item

Expected Precision and Reliability

- Precision - 50-75 percent
- Reliability - 50-75 percent

Tolerance or Variability Indicating Action - When evaluation of wildlife populations indicates they are beginning to falter or seek out other areas for security and solitude, then an evaluation of recreation use levels will take place Evaluation of other uses of the area may also be appropriate

Frequency of Monitoring -

- Winter, in prescription areas emphasizing winter range values weekly in 10 percent of winter range per year for 3-4 months,
- Summer, in prescription areas emphasizing big game security or summer range values weekly for 3 to 4 months, especially in the early summer

Lead Responsibility - District Rangers

Estimated Annual Cost - \$30,000

### **Monitoring Item - Dispersed Campsite Soil Displacement**

Type of Monitoring - Implementation, Effectiveness Designed to measure soil displacement in heavy-use dispersed campsites, for compliance with the 15 percent soil disturbance policy

Priority - Forest Priority Group 3

Where Applies - 4 3 prescription areas

Indicator - Displaced soil

Method - Frissell Condition Class method

Expected Precision and Reliability

- Precision - 75 percent+
- Reliability - Very Good, 75 percent+

Tolerance or Variability Indicating Action - Significant or consistent violation of the 15 percent soil disturbance policy in 4 3 prescription areas will be cause to reexamine campsite use This may also trigger validation monitoring of the propriety of applying the policy in these areas

Frequency of Monitoring - Annually, within approximately 10 percent of the one hundred 4 3 prescription areas (Lemhi-Medicine Lodge and Caribou Range Mountains subsections will receive top priority for this monitoring initially )

Lead Responsibility - Forest Recreation Staff

Estimated Annual Cost - \$40,000

### **Monitoring Item - Jedediah Smith Wilderness LAC**

Type of Monitoring - Implementation and Effectiveness Designed to measure impacts from wilderness use on wilderness quality (from the Limits of Acceptable Change planning process for the Jedediah Smith Wilderness)

Priority - Forest Priority Group 3

Where Applies - Jedediah Smith Wilderness

Indicator - See The Jedediah Smith monitoring plan which follows

Method - See The Jedediah Smith plan which follows

Expected Precision and Reliability

- Precision - 75 percent
- Reliability - 75 percent

Tolerance or Variability Indicating Action - If it is determined that impacts from use of the Wilderness are exceeding those limits shown, then an evaluation will be made of the possible causes and potential remediations identified

Frequency of Monitoring - Annually

Lead Responsibility - Teton Basin Ranger District, and Forest Recreation Staff

Estimated Annual Cost - \$15,000-20,000

### Jedediah Smith Wilderness Monitoring Plan - Further Details

#### INDICATORS AND STANDARDS

Indicators and standards will be monitored yearly and may require adjustment if on site administration indicates resources or social conditions are deteriorating beyond an acceptable level. These measurements relate only within each specific zone of the Wilderness and not all of one type of zone lumped together. In other words, for Class 1, if the standard is exceeded in a particular Class 1 zone, then management action will be taken. Following each indicator is a list of management actions which could be used to bring the indicator back to the identified standard for its class. The order of the actions shown does not indicate priority.

Indicator #1	Standards			
	Class 1	Class 2	Class 3	Issues 1/
Number of occupied campsites users may see from their site	0	2	3	1, 2, 4

Possible Management Actions - If number of visible campsites is approaching or exceeds standards

- 1 Remove campsite(s) and restore the area to as near natural condition as possible
- 2 Relocate campsite(s) to more suitable location and restore to as near natural condition as possible
- 3 Talk with users and suggest other camping possibilities

Indicator #2	Standards			
	Class 1	Class 2	Class 3	Issues 1/
Condition of individual campsites	vegetation flattened, not permanently injured	vegetation worn away at center of activity	vegetation lost around center of activity	1, 2, 5

Possible Management Actions - If condition of campsite is approaching or exceeds standards

- 1 Rehabilitate the site, sign it for restoration, and/or close it
- 2 Talk with users about minimum impact camping techniques
- 3 Relocate site to a more durable location and restore the vacated campsite to as near natural condition as possible
- 4 Visit local schools, organizational groups to discuss wilderness ethics, regulations, minimum impact practices

Indicator #3	Standards			
	Class 1	Class 2	Class 3	Issues 1/
Condition of user-created routes and trail segments	game trail	18" to 42" wide, brush, rock, litter present	42" wide, brushed out along edge	1, 2, 4

Possible Management Actions - If user-created route or trail is approaching or exceeds standard

- 1 Talk with users about trail conditions and experiences
- 2 Ensure trail crews and maintenance volunteers are aware of standards and do not exceed them
- 3 Rehabilitate trail sections that exceed standards
- 4 Relocate trail segments to more suitable locations
- 5 Encourage use on other trails
- 6 Limit number of users on trail
- 7 Visit local schools, organizational groups to discuss wilderness ethics, regulations, minimum impact practices

Indicator #4	Standards			
	Class 1	Class 2	Class 3	Issues 1/
Number of encounters per mile with other parties along a user-created route or trail	0*	3*	5*	1, 2, 3, 4, 5
* Encounters may be higher within first mile of trail from trailhead				

Possible Management Actions - If number of encounters is approaching or exceeds standards

- 1 Encourage users to vary starting times
- 2 Lower party size and stock limits
- 3 Monitor user acceptance of trail use levels
- 4 Encourage users to go to other places

Indicator #5	Standards			
	Class 1	Class 2	Class 3	Issues 1/
Number of substantiated complaints about outfitters and grazing permittees from the public and other permittees	2	5	10	3, 5

Possible Management Actions - If the number of complaints concerning permittees is approaching or exceeds standards

- 1 Increase permit administration on the ground
- 2 Require wilderness ethics education as a condition of permit issuance
- 3 Restrict the number of permits issued
- 4 Bring parties together to discuss issue(s)

Indicator #6	Standards			
	Class 1	Class 2	Class 3	Issues 1/
Number of violations of regulations by type	5	10	15	1, 3, 5
1/ See process paper for Jedediah Smith Wilderness				

Possible Management Actions - If the number of violations is approaching or exceeding standards

- 1 Increase presence of uniformed Forest Service personnel
- 2 Visit local schools, organizational groups to discuss wilderness ethics, regulations, minimum impact camping techniques
- 3 Review regulations for appropriateness
- 4 Increase posting of regulations at trailheads

## MONITORING

### Air Quality

- 1 Monitor acid deposition in Wilderness lakes Specifically, Two Island Lake is extremely sensitive to acid deposition, and Middle Granite Lake is more typical of Wilderness lakes with some buffering capacity Reference for more information the water quality survey conducted in 1992 by personnel from the Targhee and Bridger-Teton National Forests
- 2 Monitor visual air quality by means such as periodic photography Consider establishing a monitoring station at the Grand Targhee ski area or other location which would permit observation of air quality in both the Wilderness and Grand Teton National Park

### Wildlife

- 1 Monitor human/grizzly interactions (confrontations and movements) to determine any change in the known range of the bear, and which management actions are needed if any
- 2 Monitor grizzly bear activity and movement relevant to domestic sheep grazing to determine which management actions are needed if any
- 3 Continue annual population censusing of bighorn sheep including lamb survival and ram harvest (Wyoming Game and Fish Department)

### Cultural Resources

Monitor cultural resource sites in high public use areas annually to assess potential and actual effects Formulate mitigations in conjunction with the Wyoming State Historic Preservation Officer when effects are adverse

## Roads and Trails Access

### Monitoring Item - Authorized Use Level

Type of Monitoring - Implementation Designed to measure the amount of authorized motorized use on closed roads and trails, to determine if a route or area is effectively open

Priority - Forest Priority Group 2

Where Applies - This item is most important in prescriptions which feature the following

- \* elk and deer habitat values—5 1 4, 5 4, 2 7,
- \* grizzly bear habitat values—5 3 5, 2 6 1, 2 6 2, 2 6 5,

Indicator - The number of motorized trips per week per route

Method - The districts will keep a record of administrative motorized use allowed on each route by date. This record could be maintained by the district ranger, and could be supported by an entry of dates and trips made per road, returned gate permits, or other means. At reporting time this record would be totalled and an evaluation made as to whether or not the number of trips throughout the summer effectively opened the road. Those roads opened would be noted to the GIS shop.

Expected Precision and Reliability

- Precision - Precision could be high depending on the accuracy of the record keeping
- Reliability - The results would be wholly dependent on the records kept

Tolerance or Variability Indicating Action - Reference prescription standards

Frequency of Monitoring - Annually

Lead Responsibility - The district ranger would keep records of allowed entries onto closed routes for administrative purposes, and evaluate the data. The Forest GIS shop would display any resultant roads which are effectively opened.

Estimated Annual Cost

- \* Two days per district per GS-9 biologist 5 (\$450)
- \* Two days for one GS-5 GIS technician \$240

TOTAL \$2,500

### Monitoring Item - Road Closure Effectiveness ✓

*Thru V-41*

Type of Monitoring - Effectiveness Designed to measure the effectiveness of road and trail closures

Priority - Forest Priority Group 1

Where Applies - This item is most important in prescriptions which feature the following

- \* elk and deer habitat values—5 1 4, 5 4, 2 7,
- \* grizzly bear habitat values—5 3 5, 2 6 1, 2 6 2, 2 6 5,

- \* any 1-series prescriptions where motorized use exceeds prescription limits,
- \* those areas where roads and/or trails were closed to stop direct resource damage

Indicator - The units of measure to be used are

- \* direct encounter of a prohibited use in a restricted area,
- \* evidence of prohibited use such as tire tracks

Method - Several methods would be used, in a rough stratified sampling approach. Visual checks of access points to closed road systems would be performed. Ocular check information from incidental employee observations would also be used. On the basis of evidence such as use encounters or tire tracks, roads would be placed into strata of confirmed-use, suspected-use and no-use. Each of these strata would then be sampled with mounted cameras activated by motion sensors. Although we might not be able to obtain a scientifically- valid number of samples due to cost, the data would help to refine our estimates of use and target areas of greatest concern.

There is an opportunity to develop partnerships with several entities, including state fish and game departments and the U S Fish and Wildlife Service. It is possible that user groups would be interested in assisting with this as well, though this would have to be done as appropriate.

Expected Precision and Reliability

- Precision - We can measure presence or absence of prohibited use with some accuracy. We will not be able to measure the number of offenses accurately.
- Reliability - Evidence of recent use at one point in time should be reliable. This data cannot be used reliably by itself to judge the frequency of prior use or predict future use since this will depend to some extent on the individual violators. The data could be entered into a predictive model if one is available and accepted.

Tolerance or Variability Indicating Action - Reference the standards in the Roads section of the Forest-wide Standards and Guidelines. Briefly, the point at which some action would be required is when use exceeds 1-2 trips per week during the majority of the weeks during the spring/summer/fall period.

Frequency of Monitoring - The visual checks would be performed three times during the spring/summer/fall seasons, to incorporate at least one holiday weekend and the fall hunting season. Due to the limited number of cameras and personnel costs, we may wish to target only one or two districts per year, or only portions of certain districts. Complete Forest coverage would take several years.

Lead Responsibility - Forest law enforcement officer

Estimated Annual Cost - Assume we will monitor one district per year. Assume one GS-5 tech can visually monitor ten roads per day, or thirty roads per sampling round of three days. Assume one GS-9 camera tech can install, monitor and remove six cameras (six roads) per one-week sampling round. Also assume we will purchase two camera units @ \$800 (the Forest wildlife shop already has 4-6 of these, but some need repairs). Then

For visual checks

- \* One GS-5 tech twice per summer @ three days \$ 750,
- \* Rental vehicle @ \$15/day \$ 90,

For camera confirmations

- \* two new camera units amortized over ten years \$ 160/year,
- \* install and read cameras-one week per sampling round three times per summer for one GS-9 @ \$700/week \$2,100,

\* materials/incidentals-mounting hardware, film, developing of film, incidental repairs \$ 500,  
 Analysis/evaluation - one GS11 for one week \$ 800

TOTAL \$4,400/year

**Monitoring Item - Achievement of Road Density Standards**

Type of Monitoring - Implementation monitoring Designed to measure the achievement of standards in prescription areas for Total Motorized Access Route Density (TMARD), and Open Road and Open Motorized Trail Route Density (OROMTRD)

Priority - Forest Priority Group 1

Where Applies - This item is most important in prescriptions which feature the following

- \* elk and deer habitat values-5 1 4, 5 4, 2 7,
- \* grizzly bear habitat values-5 3 5, 2 6 1, 2 6 2, 2 6 5,

Indicator - Miles per square mile of open roads and open motorized trails (for OROMTRD), and open and restricted roads and motorized trails (for TMARD)

Method - The method is explained in more detail in the Forestwide standards and guides for access The Forest geographic information system (GIS) and associated database will be used Highlights of the method include

- \* annually update the transportation database with road and trail closures and other pertinent data,
- \* GIS calculate the contiguous area of each prescription polygon,
- \* calculate the miles of routes that are open and seasonally open, and total these,
- \* moving-window technology will be used

No partners in this effort were identified

Expected Precision and Reliability

- Precision - High
- Reliability - High

Tolerance or Variability Indicating Action - Progress in achieving the TMARD and OROMTRD standards should follow an established activity schedule based on plan goals and objectives At the end of the specified time period the standards should be met If the standards are not met by the end of the time period a management review should be conducted to determine the cause

Frequency of Monitoring - Annually

Lead Responsibility - The district ranger will annually forward accomplishments toward meeting standards, and other pertinent data, to the Forest engineer The GIS shop will do the calculations and produce the report

Estimated Annual Cost - One GS-7 biologist for two days on each district - 2 (\$180) (5)  
 One GS-5 GIS technician for one week per district - 5 (\$600)  
 TOTAL \$4,800

**PRODUCTION OF COMMODITY RESOURCES**

**Range**

**Monitoring Item - Streambank Disturbance/Stubble Height/Channel Stability**

Type of Monitoring - Validation

Priority - Forest Priority Group 1

Where Applies - At any one of the 100 established correlation plot sites across the Forest

Indicator - Percent of streambank disturbance in relation to stubble height and how these parameters relate to channel stability

Method - Targhee Monitoring Protocol

Expected Precision and Reliability

- Precision - High
- Reliability - High

Tolerance or Variability Indicating Action - To be determined

Frequency of Monitoring - At various times throughout the field season for a five-year time period

Lead Responsibility - Forest range and watershed staffs, and district rangeland management specialists

Estimated Annual Cost - Each year, 150\* percent of the plots will be monitored for trampling and stubble height Fifty percent will be monitored for stream channel stability

1 day/plot x 150* plots x \$175/day (GS-9) =	\$26,250
55 days (50 field, 5 office) x \$200/day (GS-11) =	\$11,000
Total	\$37,250

\* 150 plot readings per year, of the 100 plots, some will be read twice

**Monitoring Item - Riparian Forage Utilization Within Key Areas**

Type of Monitoring - Implementation

Priority - Forest Priority Group 1

Where Applies - Key areas in grazing allotments

Indicator - Stubble height of key species in the hydric greenline and AIZ, percent utilization of browse in the entire key area, and soil disturbance levels in the AIZ

Method - Targhee Monitoring Protocol

Expected Precision and Reliability

- Precision - Moderate
- Reliability - Moderate

Tolerance or Variability Indicating Action - When the stubble height is more than one inch below allowable use levels or when browse use is more than 10 percent above proper use

Frequency of Monitoring - At least once a year on units within priority allotments and additional readings if time allows

Lead Responsibility - District Rangeland Management Specialist

Estimated Annual Cost - One-third of all allotments on each District will be monitored yearly 1 GS-9 @ \$175 00/day Each priority allotment will require one trip per unit Since the allotments have an average of five units each, it will total five days per priority allotment One-third of 154 allotments = 51

$$\begin{array}{r} (\$175\ 00) (5) = 875 \\ \phantom{(\$175\ 00) (5) = } 51 \\ \hline - - - - - \$44,625\ \text{yearly} \end{array}$$

**Monitoring Item - Upland Forage Utilization Within Key Areas**

Type of Monitoring - Implementation

Priority - Forest Priority Group 3

Where Applies - Key areas within grazing allotments These sites will be used in areas where upland forage is limiting

Indicator - Percent utilization of key species and soil disturbance in key areas

Method - Targhee Monitoring Protocol

Expected Precision and Reliability

- Precision - Moderate
- Reliability - Moderate

Tolerance or Variability Indicating Action - When the utilization is ten percent above proper use

Frequency of Monitoring - Once a year on units within priority allotments and additional readings if time allows

Lead Responsibility - District Rangeland Management Specialist

Estimated Annual Cost - Upland use will be monitored on one-third of the allotments on each district One GS-9 at \$175 00/day Average allotment requires 2 days per year One-third of 154 allotments = 51

$$\begin{array}{r} (\$175\ 00) (2) = 350\ 00 \\ \phantom{(\$175\ 00) (2) = } 51 \\ \hline \$17,850\ 00\ \text{yearly Forestwide} \end{array}$$

## **Monitoring Item - Riparian and Upland Long-Term Trend in Benchmarks**

Type of Monitoring - Implementation

Priority - Forest Priority Group 3

Where Applies - There should be at least one benchmark in each dominant ecological type unit within an area of interest

Indicator - Acres of riparian and uplands meeting or moving toward DVC's (range objectives 1 and 2)

Method - Targhee Monitoring Protocol

Expected Precision and Reliability

- Precision - High
- Reliability - High

Tolerance or Variability Indicating Action - When less than ten percent of the acres identified in range objectives 1 and 2 have improved each year

Frequency of Monitoring - Every five years

Lead Responsibility - District Rangeland Management Specialist

Estimated Annual Cost - One GS-9 @ \$175 00/day, 5 days per study (3 field, 2 office days) 35 ecological types x 2 sites/type = 105 Benchmark sites Ten percent of Benchmarks monitored annually = 11 Benchmarks/year

$$\begin{aligned}(11 \text{ sites})(5 \text{ days/site}) &= 55 \text{ days} \\ (\$175/\text{per day})(55\text{days}) &= \$9,625\end{aligned}$$

## **Timber**

### **Monitoring Item - Changes to Land Suitability**

Type of Monitoring - Validation of tentative suitability assessment made in the Revised Plan

Priority - Forest Priority Group 1

Where Applies - Applies primarily to lands in 5-series prescriptions, but could involve the review of projects anywhere on the Forest

Indicator - Change in total acreage in tentatively suited and unsuited lands using the criteria in the regulations and directives system

Method - Review project-level NEPA analyses for site-level confirmations of LMP tentative suitability calls Changes to initial calls on either suited or unsuited lands would be documented on a hardcopy map maintained in the planning shop This map would aggregate changes from various documents Changes to the Forest tentatively suited land base could be entered into the Forest GIS

#### Expected Precision and Reliability

- Precision - Site-specific analysis should give a precise description of true conditions
- Reliability - Using given parameters such as slope percent and soil stability, results should be reliable and reproducible

Tolerance or Variability Indicating Action - A significant overall change in tentatively suitable acres could trigger a revision of the ASQ

Frequency of Monitoring - Annually

Lead Responsibility - The Forest planning shop would aggregate the findings. Project ID teams would do the individual analyses

Estimated Annual Cost - \$1,000

#### **Monitoring Item - Maximum Created Opening Size**

Type of Monitoring - Implementation

Priority - Forest Priority Group 3

Where Applies - This item needs to be monitored in the following prescription areas

- Rx 5 2 1 - generally 1 to 5 acres, but less than 40,
- Rx 5 2 2, 2 1 2 - generally less than 5 acres,
- Rx 5 3 5, 2 6 1 (a) - less than 6 5 acres,
- Rx 5 4 (some areas) - 20 acres or less,

Indicator - Size of created openings, in acres

Method - Compliance with the standard would be described in environmental documents

#### Expected Precision and Reliability

- Precision - High
- Reliability - High

Tolerance or Variability Indicating Action - Proposals to exceed the respective area standard would need to be sound and ecologically-based, and would require a Forest Plan amendment. If a trend is seen in legitimate proposals to exceed the respective standards the standards would need to be reviewed.

Frequency of Monitoring - In each decision document, where vegetation management is selected

Lead Responsibility - IDT leader and line officer

Estimated Annual Cost - \$1000 per year, primarily in incidental GIS and other analysis costs to display compliance with the standard

### **Monitoring Item - Security Cover Retention**

Type of Monitoring - Implementation and effectiveness Designed to measure compliance with the standard governing security cover retained for grizzly bears in vegetation management projects

Priority - Forest Priority Group 3

Where Applies - This item must be monitored in the following prescription areas

5 3 5, 2 6 1 (a) - 70 percent

Indicator - Percent cover in area (see prescriptions for specifics)

Method - Environmental analysis and documentation for specific project proposals will display compliance with the respective standards. See prescriptions

Expected Precision and Reliability

- Precision - High
- Reliability - High

Tolerance or Variability Indicating Action - Proposals to exceed the standard will require a Revision amendment If a trend is seen toward exceeding the standard in soundly-based ecological management proposals the standard will need to be reviewed This may involve reopening formal consultation

Frequency of Monitoring - Every decision document selecting vegetation management in BMU's

Lead Responsibility - IDT leaders, District Biologists, line officers

Estimated Annual Cost - \$2000, primarily in incidental GIS and other analysis costs to display compliance with the standard If the information required to demonstrate security cover is not found in the Forest data base, then field survey may be required

### **Monitoring Item - Large Forested Block Retention**

Type of Monitoring - Implementation Designed to measure retention of 250-acre forested blocks where required

Priority - Forest Priority Group 3

Where Applies - This applies to prescription areas 5 1 4 (c) and 5 4 (a-c)

Indicator - Size of forested blocks within project areas

Method - Timber sale environmental documents will disclose compliance with this measure Additionally, follow-up activity reviews should review effectiveness of treatments

Expected Precision and Reliability

- Precision - High
- Reliability - High

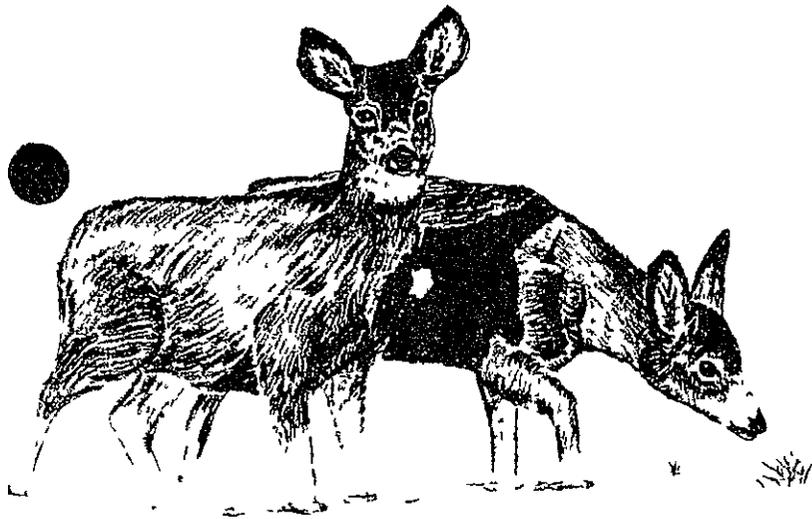
Tolerance or Variability Indicating Action - Any proposal to violate the standard requires a Revision amendment. If a trend develops of proposals citing ecologically-sound reasons to amend the Plan or change the standard, the standard needs to be reviewed

Frequency of Monitoring - With every decision document selecting a vegetation management alternative

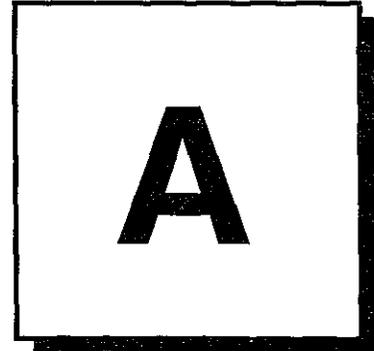
Lead Responsibility - IDT leaders and line officers

Estimated Annual Cost - \$1,000, primarily in incidental costs of GIS or other analysis to demonstrate compliance with the standard

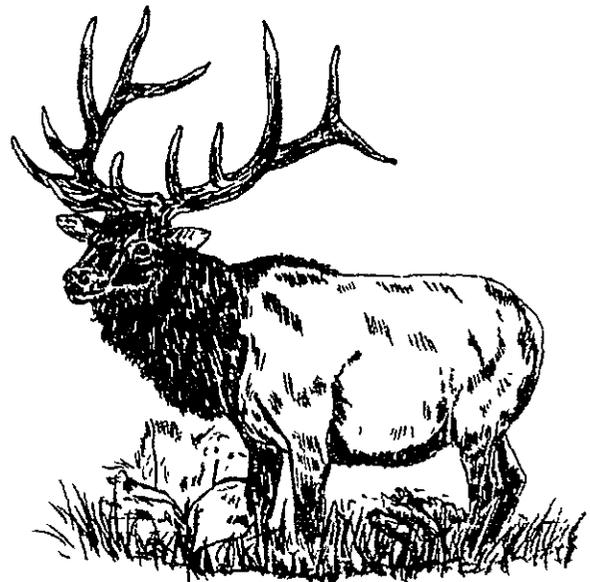




## Appendix



## National Direction Relevant to Land and Resource Management



**APPENDIX A**  
**NATIONAL DIRECTION RELEVANT TO LAND AND RESOURCE MANAGEMENT**  
**(BASED ON FSM OBJECTIVE STATEMENTS)**

Agency policy articulated in the Forest Service directives system (Forest Service Manual and Handbook) is hereby incorporated in its entirety as direction in this Revised Forest Plan. Some of the more commonly referenced objectives are found at the following locations:

American Indians \* 1563  
Noxious Weed Management \* 2080  
Solid Waste Management \* 2130 2  
Pesticide Management \* 2150 2  
Energy Management \* 2170 2

Range Management \* 2202 1  
Grazing and Livestock Use Permit System \* 2230 2  
Range Improvements \* 2240 2  
Structural Range Improvement \* 2242 02  
Maintenance of Improvement \* 2244 02  
Range Improvement Investment \* 2246 02

Recreation \* 2302  
National Wilderness Preservation System \* 2320 2  
Recreation in Wilderness \* 2323 11  
Range in Wilderness \* 2323 21  
Wildlife and Fish Management in Wilderness \* 2323 31  
Stocking Methods \*2323 34b  
Stocking Policy \*2323 34c  
Soil and Water in Wilderness \*2323 41  
Forest Cover in Wilderness \* 2323 51  
Air Resource in Wilderness \* 2323 61  
Minerals in Wilderness \* 2323 72  
Insects and Disease in Wilderness \* 2324 11  
Fire Management in Wilderness \* 2324 21  
Structures and Improvements in Wilderness \* 2324 31  
Research in Wilderness \* 2324 41  
Motorized Equipment in Wilderness \* 2326 02

Publicly Managed Recreation Opportunities \* 2330 2  
Privately Provided Recreation Opportunities \* 2340 2  
Concession Uses Involving Privately Developed Facilities \* 2343 02  
Group Use By Institutions or other Entities \* 2345 02

Trail, River, and Similar Recreation Opportunities \* 2350 2  
Forest Development Trails \* 2353 02  
Scenic and Historic Trails \* 2353 41  
National Wild and Scenic Rivers System \* 2354 02  
Off-Road Vehicle Management \* 2355 02  
Cave Management \* 2356 02  
Special Interest Areas \* 2360 3  
Cultural Resources \* 2361 02  
National Registry of National Landmarks \* 2373 02

Visual Quality \* 2380 2  
Interpretive Services/Visitor Information \* 2390 2

Timber Management \* 2402  
Commercial Timber Sales \* 2430 2  
Salvage Sales \* 2435 02  
Reforestation \* 2470 02  
Silvicultural Practices \* 2470 2  
Harvest Cutting \* 2471 02  
Timber Stand Improvement \* 2476 02

Watershed Management \* 2502  
Watershed Protection and Management \* 2520 2  
Watershed Improvement \* 2522 02  
Burned Area Emergency Rehabilitation \* 2523 02

Riparian Areas \* 2526 02  
Floodplain Management Wetland Protection \* 2527 02  
Water Quality Management \* 2532 02  
Municipal Supply Watersheds \* 2542 02  
Soil Resource Improvement \* 2553 02  
Air Quality \* 2580 2

Fish and Wildlife \* 2602  
Animal Damage Management \* 2650 2  
Threatened and Endangered Species \* 2670 21  
Sensitive Species \* 2670 22

Special Uses \* 2702  
Special Use Authorization \* 2710 2  
Special Use Administration \* 2716  
Special Uses Management \* 2730 2

Withdrawals \* 2761 02  
Federal Power Act Projects \* 2770 2  
Minerals and Geology \* 2802  
Minerals Reservations Outstanding Mineral Rights \* 2830 2  
Reclamation \* 2840 2  
Mineral Materials \* 2850 2

Rural Development \* 3602  
Rural Development \* 3610 2  
Resource Conservation and Development Program \* 3620 2  
Research Natural Areas \* 4063 02

Fire Management \* 5102  
Fire Suppression \* 5130 2  
Prescribed Fire \* 5140 2  
Fuel Management \* 5150 2

Landownership Adjustment \* 5402  
Land Purchases and Donations \* 5420 2  
Land Exchange \* 5430 2  
Partial Interest Acquisition \* 5440 2

National Forest System Modification \* 5450 2  
Right-of-Way Acquisition \* 5460 2  
Reservations and Outstanding Rights \* 5470 2  
Condemnation \* 5480 2

Land Surveying \* 7151 02  
Landline Location Program \* 7152 02  
Sign and Poster Program \* 7160 2  
Potable Water Supply \* 7420 2  
Wastewater Collection Systems and Treatment Works \* 7430 2

Transportation System \* 7702  
Transportation Planning \* 7710 2  
Development \* 7720 2  
Operation and Maintenance \* 7730  
Highway Safety Program \* 7733 02  
Federal Lands Highway Program \* 7740

## STATUTES

American Indian Religious Freedom Act  
Act of August 11, 1978  
Americans with Disabilities Act of 1990  
Anderson-Mansfield Reforestation and Revegetation  
Act of October 11, 1949  
Antiquities Act  
Act of June 8, 1906  
Archaeological Resources Protection Act of 1979, as amended 1988  
Act of October 31, 1979  
Architectural Barriers Act of 1968  
Bankhead-Jones Farm Tenant Act of 1937  
Act of July 22, 1937  
Clarke-McNary Act of 1924  
Act of June 7, 1924  
Clean Air Act Amendments of 1977  
Act of August 7, 1977  
Clean Water Act of 1977  
Clean Water Amendments (\*Federal Water Pollutions Control Act Amendments of 1972\*)  
Act of October 18, 1972  
Color of Title  
Act of December 22, 1928  
Common Varieties of Mineral Materials  
Act of July 31, 1947  
  
Comprehensive Environmental Response, Compensation and Liability Act, as amended  
Act of December 11, 1980  
Cooperative Forestry Assistance Act of 1978  
Act of July 1, 1978  
Disaster Relief Act of 1974  
Act of May 22, 1974  
Eastern Wilderness Act  
Act of January 3, 1975  
Economy Act of 1932  
Act of June 30, 1932

Emergency Flood Prevention (Agricultural Credit Act of 1978)  
Act of August 4, 1978  
Endangered Species Act of 1973  
Act of December 28, 1973  
Energy Security Act  
Act of June 30, 1980  
Federal Advisory Committee Act of 1972  
Act of October 6, 1972  
Federal Cave Resources Protection Act of 1988  
Act of November 18, 1988  
Federal Coal Leasing Amendments Act of 1975  
Act of August 4, 1976  
Federal Insecticide, Rodenticide, and Fungicide Act  
Act of October 21, 1972  
Federal Land Policy and Management Act of 1976  
Act of October 21, 1976  
Federal Noxious Weed Act of 1974  
Act of January 3, 1975  
Federal Onshore Oil and Gas Leasing Reform Act of 1987  
Act of December 22, 1987  
Federal Power Act of 1920  
Act of June 10, 1920  
Federal-State Cooperation for Soil Conservation  
Act of December 22, 1944  
Federal Water Pollution Control Act of 1956, as amended (Water Quality Act of 1965, Clean Water  
Restoration Act of 1966)  
Act of July 9, 1956  
Federal Water Project Recreation Act of 1965  
Act of July 9, 1965  
Fish and Wildlife Conservation  
Act of September 15, 1960  
Fish and Wildlife Coordination Act  
Act of March 10, 1934  
Forest Highways  
Act of August 27, 1958  
Forest and Rangeland Renewable Resources Planning Act of 1974  
Act of August 17, 1974  
Forest and Rangeland Renewable Resources Research Act of 1978  
Act of June 30, 1978  
Freedom of Information Act  
Act of November 21, 1974  
Geothermal Steam Act of 1970  
Act of December 24, 1970  
Granger-Thye Act  
Act of April 24, 1950  
Historic Preservation Act  
Act of October 15, 1966  
Intermodal Surface Transportation Efficiency Act  
Act of December 18, 1991  
Joint Surveys of Watershed Areas Act of 1962  
Act of September 5, 1962  
Knutson-Vandenberg Act  
Act of June 9, 1930  
Land Acquisition  
Act of March 3, 1925

Land Acquisition-Declaration of Taking  
Act of February 26, 1931  
Land Acquisition-Title Adjustment  
Act of July 8, 1943  
Land and Water Conservation Fund Act of 1965  
Act of September 3, 1964  
Law Enforcement Authority  
Act of March 3, 1905  
Leases Around Reservoirs  
Act of March 3, 1962  
Mineral Leasing Act  
Act of February 25, 1920  
Mineral Leasing Act for Acquired Lands  
Act of August 7, 1947  
*Mineral Resources on Weeks Law Lands*  
Act of March 4, 1917

*Mineral Springs Leasing*  
Act of February 28, 1899  
Mining Claims Rights Restoration Act of 1955  
Act of August 11, 1955  
Mining and Minerals Policy Act of 1970  
Act of December 31, 1970  
Multiple-Use Sustained-Yield Act of 1960  
Act of June 12, 1960  
National Environmental Policy Act of 1969  
Act of January 1, 1970  
National Forest Management Act of 1976  
Act of October 22, 1976  
National Forest Roads and Trails Act  
Act of October 13, 1964  
National Historic Preservation Act  
Act of October 15, 1966  
National Historic Preservation Act Amendments of 1980 and 1992  
Act of December 12, 1980  
National Trails System Act  
Act of October 2, 1968  
Occupancy Permits  
Act of March 4, 1915  
Organic Administration Act of 1897  
Act of June 4, 1897  
Petrified Wood  
Act of September 28, 1962  
Pipelines  
Act of February 25, 1920  
Preservation of Historical and Archaeological Data  
Act of May 24, 1974  
Public Land Surveys  
Act of March 3, 1899  
Public Rangelands Improvement Act of 1978  
Act of October 25, 1978  
Rehabilitaion  
Act of 1973, as amended  
Renewable Resources Extension Act of 1978  
Act of June 30, 1978

Research Grants

Act of September 6, 1958  
Right of Eminent Domain  
Act of August 1, 1888  
Rural Development Act of 1972  
Act of August 30, 1972  
Safe Drinking Water Amendments on 1977  
Act of November 16, 1977  
Sikes Act  
Act of October 18, 1974

Small Tracts Act

Act of January 22, 1983  
Smokey Bear Act  
Act of May 23, 1952

Soil and Water Resources Conservation Act of 1977

Act of November 18, 1977  
Solid Waste Dipsosal (\*Resource Conservation and Recovery Act of 1976\*)  
Act of October 21, 1976  
Supplemental National Forest Reforestation Fund  
Act of September 18, 1972  
Surface Mining Control And Reclamation Act of 1977  
Act of August 3, 1977  
Sustained Yield Forest Management  
Act of March 29, 1944  
Timber Export  
Act of March 4, 1917  
Timber Exportation  
Act of April 12, 1926  
Title Adjustment  
Act of April 28, 1930  
Toxic Substances Control Act  
Act of October 11, 1976  
Transfer Act  
Act of February 1, 1905  
Twenty-Five Percent Fund  
Act of May 23, 1908  
Uniform Federal Accessibility Standards (in accordance with the Architectural Act of 1968)  
U S Criminal Code (\*Title 18, United States Code, Chapter 91 \* Public Lands\*)  
Act of June 25, 1948  
U S Mining Laws (Public Domain Lands)  
Act of May 10, 1872

Volunteers in the National Forests Act of 1972

Act of May 18, 1972  
Water Quality Improvement Act of 1965  
Act of April 3, 1965  
Water Resources Planning Act  
Act of July 22, 1965  
Watershed Protection and Flood Prevention Act of 1954  
Act of August 4, 1954  
Weeks Act Status for Certain Lands  
Act of September 2, 1958

Weeks Act of 1911  
Act of March 1, 1911  
Wild and Scenic Rivers Act  
Act of October 2, 1968  
Wilderness Act of 1964  
Act of September 3, 1964  
Wildlife Game Refuges  
Act of August 11, 1916  
Wood Residue Utilization Act of 1980  
Act of December 19, 1980  
Woodsy Owl/Smokey Bear Act  
Act of June 22, 1974  
Youth Conservatin Corps  
Act of August 13, 1970

#### REGULATIONS

36 CFR 60 - National Register of Historic Places  
36 CFR 212 - Forest Development Transportation System  
36 CFR 213 - Administration Under Bank-Jones Act  
36 CFR 219 - Planning  
36 CFR 221 - Timber Management Planning  
36 CFR 222 - Range Management  
36 CFR 223 - Sale and Disposal of NFS Timber  
36 CFR 228 - Minerals  
36 CFR 241 - Fish and Wildlife  
36 CFR 251 - Land Uses  
36 CFR 254 - Landownership Adjustments  
36 CFR 261 - Prohibitions  
36 CFR 291 - Occupancy and Use of Developed Sites and Areas of Concentrated Public Use  
36 CFR 292 - National Recreation Areas  
36 CFR 293 - Wilderness - Primitive Areas  
36 CFR 294 - Special Areas  
36 CFR 295 - Use of Motor Vehicles off Forest Development Roads  
36 CFR 296 - Protection of Archaeological Resources  
36 CFR 297 - Wild and Scenic Rivers  
36 CFR 800 - Advisory Council on Historic Preservation  
40 CFR 1500-1508 - Council on Environmental Quality  
National Electrical Code  
National Fire Code  
Uniform Building Code  
Uniform Mechanical Code  
Uniform Plumbing Code

#### EXECUTIVE ORDERS

E O 11593 - Protection and Enhancement of Cultural Environment  
E O 11990 - Protection of Wetlands  
E O. 11644/11989 - Use of Off-Road Vehicles  
E O 11988 - Floodplain Management  
E O 12113 - Independent Water Project Review

## Specifics to the Targhee National Forest

Decomposition Classes for Down Logs, USFS 1985  
Bald Eagle Zones Publication

The Land Adjustment Plan and the Right-of-way Acquisition Plan are incorporated into this plan by reference. They are located in the Lands section office on the Forest, and are subject to annual update by the Lands section.

## BEST MANAGEMENT PRACTICES FOR IDAHO AND WYOMING

### Idaho

The Administrative Rules of the Idaho Department of Health and Welfare, Water Quality and Wastewater Treatment (IDAPA 16, Title 01, Chapter 02, February 20, 1996) lists documents that contain approved Best Management Practices. On page 71 (IDAPA 16 01 02,350 03) these documents are listed and include:

Idaho Forest Practices Rules as adopted by Board of Land Commissioners

Idaho Department of Health and Welfare (IDHW) Rules, Title 1, Chapter 6, "Rules Governing Solid Waste Management"

IDHW Rules, Title 1, Chapter 3, "Rules Governing Subsurface and Individual Sewage Disposal Systems"

"Rules and Minimum Standards for Stream-channel Alterations" as adopted by the Board of Water Resources

"Rules Governing Exploration and Surface Mining Operations in Idaho" as adopted by the Board of Land Commissioners

"Rules Governing Placer and Dredge Mining in Idaho" as adopted by the Board of Land Commissioners

### Wyoming

Grazing Draft BMPs have been developed (dated February 1996), but the State is currently working on a responsiveness summary, so the BMPs have not been certified yet (personal communication with Beth Pratt, Wyoming DEQ, November 26, 1996)

Hydrologic Modifications These BMPs have been certified by DEQ and the governor of Wyoming

Silviculture These measures include BMPs for roads. They have been certified by DEQ and the governor of Wyoming

Oil and Gas Exploration and Production, Mineral Extraction, Highway Construction, Underground Storage Tanks These activities are covered by site regulatory programs, and so BMPs will not be developed for them

NRCS SNOW MEASURING SITES - AS OF 12/23/96

Site Name	Site Legal Location
Webber Creek	12N 32E sec 23 NE1/4
Irving Creek	13N 33E sec 08 SW1/4
Camp Creek	13N 36E sec 21 SWNE
Crab Creek	13N 38E sec 21 NESW
White Elephant	14N 43E sec 17 SWSW
Lucky Dog	13N 44E sec 02 SESE
Big Springs	13N 44E sec 04 SWNW
Latham Springs	13N 45E sec 09 SESW
Grassy Lake	48N 116W sec 18 SWSW
McRenolds Reservoir	07N 46E sec 05 NWNW
Packsaddle Spring	05N 43E sec 26 SWSW
Darby Canyon	43N 118W sec 28 SENE
State Line	03N 46E sec 32 SENE
Teton Pass W S	41N 118W sec 23
Pine Creek Pass	03N 44E sec 24 NESW
Lava Creek	02S 42E sec 02 SENW
Island Park	13N 43E sec 28 NWSE
Jackpine Creek	46N 118W sec 22 SWNE

**Appendix**

**B**

**U. S. Fish and Wildlife Service  
Biological Opinion**





# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Snake River Basin Office, Columbia River Basin Ecoregion  
1387 South Vinnell Way, Room 368  
Boise, Idaho 83709

March 31, 1997

Jerry Reese, Forest Supervisor  
Targhee National Forest  
P O. Box 208  
St. Anthony, Idaho 83445

Subject: Biological Opinion for the Targhee National Forest Plan Revision  
1-4-97-F-2 File # 116 0020

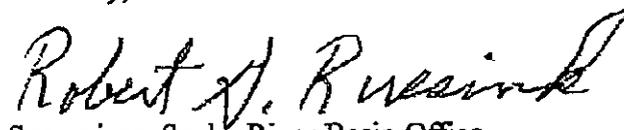
Dear Mr. Reese:

This letter transmits the U.S. Fish and Wildlife Service final biological opinion (opinion) on the proposed Targhee National Forest Plan Revision (Revision).

This opinion was prepared in response to your November 12, 1996, request to initiate formal consultation under section 7 of the Endangered Species Act of 1973, as amended. Your letter was received by this office on November 13, 1996. The Service reviewed the Revision in accordance with the Section 7 Interagency Cooperation Regulations (50 CFR 402, FR 51(106):19957-19963). This opinion refers only to the potential effects of implementing the Revision on the grizzly bear.

If you have any questions concerning this opinion, please contact Mike Donahoo of the Service Eastern Idaho Field Office at (208)233-8550.

Sincerely,

  
Supervisor, Snake River Basin Office

### Enclosure

cc Forest Service, Region 4, Ogden (Regional Forester)  
FWS, Cheyenne  
FWS, Helena  
FWS, Missoula (Serveen)  
FWS-ES, Region 6, Denver  
FWS-ES, Region 1, Portland (Salata)  
FWS-CRBE, Region 1, Portland (Diggs)  
FWS-ES, Pocatello (Donahoo)

## Final Biological Opinion for the Targhee National Forest Plan Revision

The U S Fish and Wildlife Service (Service) has reviewed the proposed Targhee National Forest Plan Revision and preferred alternative, Alternative 3-M (Revision), for the Targhee National Forest (Forest) in eastern Idaho and northwestern Wyoming. Your letter dated November 12, 1996, requesting formal consultation was received November 13, 1996. This document represents the Service's biological opinion on the effects of that action on threatened grizzly bear (*Ursus arctos horribilis*), bald eagle (*Haliaeetus leucocephalus*), Ute Ladies'-tresses (*Spiranthes diluvialis*), the endangered peregrine falcon (*Falco peregrinus*), and the experimental, non-essential population of gray wolf (*Canis lupus*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U S C 1531 et seq.)

This biological opinion addresses only the potential effects of the proposed Revision on the threatened grizzly bear (*Ursus arctos horribilis*) in the Greater Yellowstone Ecosystem (GYE). The Service has reviewed the biological assessments prepared for the proposed Revision and concurs with the Forest determinations that the Revision, as proposed, may affect but is not likely to adversely affect the threatened bald eagle (*Haliaeetus leucocephalus*), Ute Ladies'-tresses (*Spiranthes diluvialis*), and the endangered peregrine falcon (*Falco peregrinus*). The Service concurs that the project will not jeopardize the continued existence of the experimental, non-essential population of gray wolf (*Canis lupus*), the entire Forest is within the boundaries of the Yellowstone and Central Idaho Nonessential Experimental Areas.

This biological opinion is based on information provided in the November 12, 1996, biological assessment and updates as received, the March 19, 1997 letter from the Forest Supervisor, the January 1996 draft Forest Plan Revision and draft Environmental Impact Statement for the Forest Plan Revision, and the January 1994 and April 1995, biological opinions for the "Management Direction for the Grizzly Bear on the Portion of the Plateau Bear Management Unit" (Strategy). It is also based on other actions that have been consulted on since completion of and including the June 1984 biological opinion, consultation on the 1985 Forest Land Management Plan (LMP), current Cumulative Effects Model information, information in office files, discussions with others, including Forest biologists and administrators knowledgeable of the area and species, and from information obtained from field investigations. A complete administrative record of this consultation is on file in the Service's Eastern Idaho Field Office in Pocatello, Idaho.

### CONSULTATION HISTORY

The listing of the grizzly bear as threatened in 1975 required Federal agencies under the conditions of sections 7(a)(1) and 7(a)(2) of the Endangered Species Act (Act) to (1) utilize their authorities to carry out conservation programs for listed species, (2) ensure that their activities not jeopardize the continued existence of a listed species, and (3) ensure that their activities or programs not result in the destruction or adverse modification of critical habitat.

Formal consultation between the Forest and the Service concerning the grizzly bear occurred during development of the existing LMP. The Reasonable and Prudent Measures for the 1985 Biological Opinion issued by the Service for the LMP required security areas for grizzly bears.

(USDI 1984) Other informal and formal consultations between the Service and Forest, including biological opinions for the Management Direction for the Grizzly Bear on the Portion of the Plateau Bear Management Unit on February 22, 1994, and April 20, 1995 (USDI 1994, 1995), have developed and incorporated into the existing LMP, management standards and guidelines for listed species within which LMP activities are conducted. These standards and guidelines were developed for the grizzly bear because of evidence that impacts to the bears occurred as a result of logging, roads, recreation, mining, grazing, etc.

In the 1994 biological opinion on the Strategy, core areas were delineated for the Plateau Bear Management Unit (BMU) Subunits 1 and 2 to address the issue of habitat security needs of the grizzly bear. The geographic boundaries included sufficient territory to provide for a female grizzly bear with young, but did not strictly meet the Interagency Grizzly Bear Committee (IGBC) definition for core because of road densities and lack of security cover. Plans were in place to begin developing core and security areas for the Bechler-Teton BMU. The process was changed to focus on the Revision in an effort to address all of the remaining BMU's at one time.

The final report for the Henry's Lake and Plateau BMU habitat evaluation and grizzly bear presence study (IGBC 1994a) noted there was a management strategy that had been developed for the area by the Service and the Forest. The report states, "If this strategy were implemented it would greatly improve habitat effectiveness and security within the subunits (IGBC 1994a)." The management strategy is part of the biological opinion for the "Grizzly Bear Management Strategy for the Portion of the Plateau Bear Management Unit on the Targhee National Forest" also referenced as the "Strategy". This management strategy underwent formal consultation and was being implemented for the Plateau BMU Subunits 1 and 2 when the Forest suspended implementation of road closures to focus on the Revision. A few additional miles of were restricted on an interim basis through formal consultation and the entire road density and closure issue was incorporated into the Revision process (USDI 1995).

The original Grizzly Bear Management Guidelines for the Greater Yellowstone Area (USDA and USDI 1979) referenced in the existing Forest Plan were revised in 1986 by the IGBC (1986). The Service's biological opinion on the revised Guidelines states "It is our biological opinion that implementation of the Guidance for Management Involving Grizzly Bears in the Greater Yellowstone Area will promote the conservation of the grizzly bear" (USDI 1986 in IGBC 1986). The Guidelines include a plan for determining when a grizzly bear is considered a "nuisance" and delineate an action plan in case of human-grizzly conflicts.

The IGBC, of which the Forest and Service are members, appointed an Access Committee for the GYE (Access Committee) and a cumulative effects model (CEM) team to develop standard access definitions and implement a unified CEM across the GYE. Specific objectives for each team are referenced in the list of definitions. Information from the IGBC Access Committee and the CEM outputs are intended to be used together in preparation of Geographic Information System (GIS) based maps for analyzing impacts of human activities in grizzly bear habitat.

The proposed Revision is being prepared to comply with the National Forest Management Act (NFMA) of 1976 which directs the Forest to review and/or update forest plans every ten to fifteen years or more frequently when resource and management conditions change significantly. The existing management plan was finalized in 1985 and this is the first revision of the plan (USDA 1996a). The Revision includes the provisions of the Resources Planning Act as amended by the NFMA, the Endangered Species Act of 1973, as amended, and other guiding documents.

#### Description of the Proposed Action

The Forest contains approximately 1,810,000 acres of National Forest System land located in southeast Idaho and northwestern Wyoming. Parts of the Forest lie in the Idaho counties of Bonneville, Butte, Clark, Fremont, Jefferson, Lemhi, Madison, Teton, and in the Wyoming counties of Lincoln and Teton. The Forest is bordered on the east by Yellowstone and Grand Teton National Parks and the Bridger-Teton National Forest, on the south by the Caribou National Forest, on the west by the Salmon/Challis National Forest, and on the north by the Beaverhead and Gallatin National Forests (Figure 1).

The Forest will emphasize actions which contribute toward conservation and recovery of the bear within areas identified in the Grizzly Bear Recovery Plan. Objectives are to maintain and enhance habitat and to minimize potential for grizzly-human conflicts. The Forest will manage habitats essential to bear recovery for multiple land use benefits, to the extent these land uses are compatible with the goal of grizzly bear recovery. Land uses which cannot be made compatible with the goal of grizzly recovery, and are under Forest Service control, will be redirected or discontinued (IGBC 1986).

The Forest-wide Standards and Guidelines, Subsection Direction, and Prescriptions for Implementing the Preferred Alternative further define the proposed goals and objectives for grizzly bear habitat in the Revision as follows:

#### Goals

1. Habitat conditions will be sufficient to sustain a recovered population of grizzly bears.
2. Allow for unhindered movement of bears (continuity with Yellowstone National Park and adjacent bear management units).

#### Objectives

1. Meet recovery criteria in the Grizzly Bear Recovery Plan.
2. Implement guidelines developed by the IGBC.
3. Provide safe, secure sites for relocation of nuisance bears.

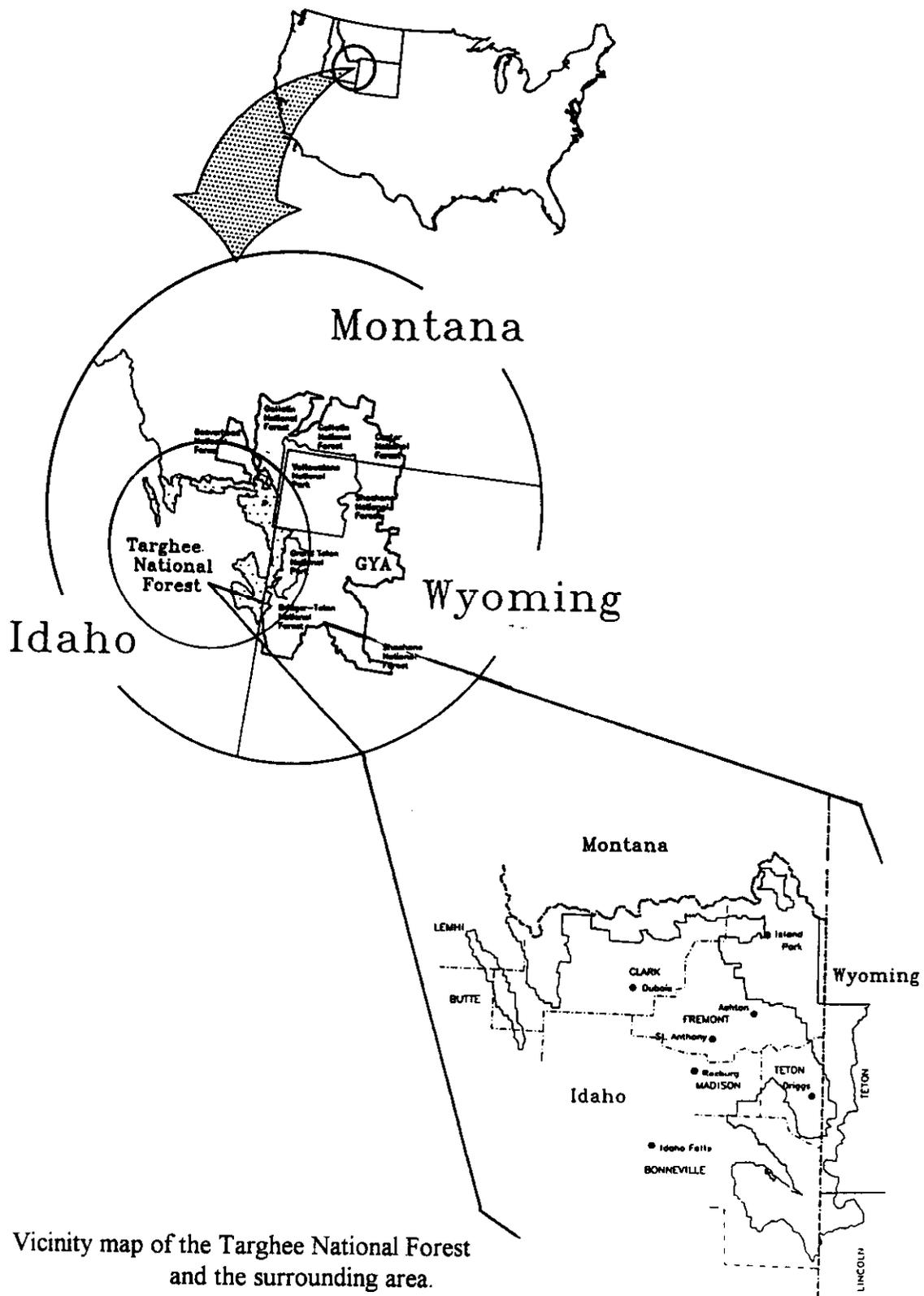


Figure 1. Vicinity map of the Targhee National Forest and the surrounding area.

- 4 Implement the road density standards in the BMU's within 3 years of signing the Record of Decision in coordination with the U S Fish and Wildlife Service and State wildlife agencies

#### Standard and Guideline

The grizzly bear education program will focus on residents in residential and summer home areas, developed recreation site users, wilderness users, and hunters

The Revision incorporates the following portions of the proposed IGBC Conservation Strategy for grizzly bear and grizzly bear habitat management into the Forest wide Goals, Objectives, and Standards and Guidelines

- 1 All Management Situation (MS) 2 habitat within the BMU subunits will receive the same emphasis for grizzly bear management as the MS-1 habitat, except livestock grazing in existing MS-2 habitat will continue to be managed under MS-2 guidelines Livestock grazing will be managed under MS-2 guidelines to allow for the proposed phase out, on an opportunity basis, of sheep allotments
- 2 Proposed timber harvesting activities will be strictly controlled in the BMU's as described in Management Prescription 5 3 5 Proposed timber harvest levels from the BMU's are a noninterchangeable component (NIC) of the allowable sale quantity (ASQ) and will not include designated core areas
- 3 Two Records of Decisions (ROD) will be signed, one to put into effect the Forest-wide Standards, Guidelines, Goals and Objectives, including the open and total route density standards The second ROD will implement the site specific Travel Plan that shows which areas, roads, and trails will be open to motorized use On-the-ground signing necessary to enforce the Travel Plan will be completed in 1997, the actual on-the-ground restrictions will be completed by the close of 1999 for all of the BMU's (USDA 1997a)
- 4 Total motorized access density (total route density) is reduced from existing levels to meet Forest wide standards of  $\leq 1.0$  mile per square mile (mi /sq mi )
- 5 Open road and open motorized trail route densities (open route density) are reduced from existing levels to meet Forest-wide standards of  $\leq 0.6$  mi /sq mi
- 6 Acres in each BMU which are designated core areas are increased from existing levels
- 7 Remaining domestic sheep grazing allotments are to be phased out on an opportunity basis
- 8 Cross-country off-highway vehicle (OHV) travel is eliminated, except in the MS-3

areas, which amounts to about 4 percent of the Forest acres within the BMU's

9 The MS-3 habitat in Henry's Lake Subunit 1 and those areas shown as MS-3 habitat on Map #5 of the 1985 Forest Plan, are managed as an area where grizzly bear presence is discouraged because of high human use and developments

The Revision will guide all natural resource management activities, establish management standards for the Forest, and serve as an "umbrella" for the environmental analysis of proposed projects at the Forest and District levels. Future environmental analysis documented in environmental assessments and environmental impact statements will refer to the Revision. Environmental assessments will be developed for project level activities not specifically described in the Revision and will concentrate on issues specific to the project (USDA 1996)

The Revision replaces previous resource management plans and generally incorporates conditions from previous actions that have undergone section 7 consultation. Upon final approval of the Revision, all Forest activities will conform to it. All permits, contracts, and other uses of Forest lands must also conform to the proposed Revision. The Forest has selected a preferred alternative, Alternative 3-M, for the Revision and prepared a Draft Environmental Impact Statement (DEIS). The Service has reviewed the DEIS and the biological assessments from the Forest that address the effects of the preferred alternative on the grizzly bear.

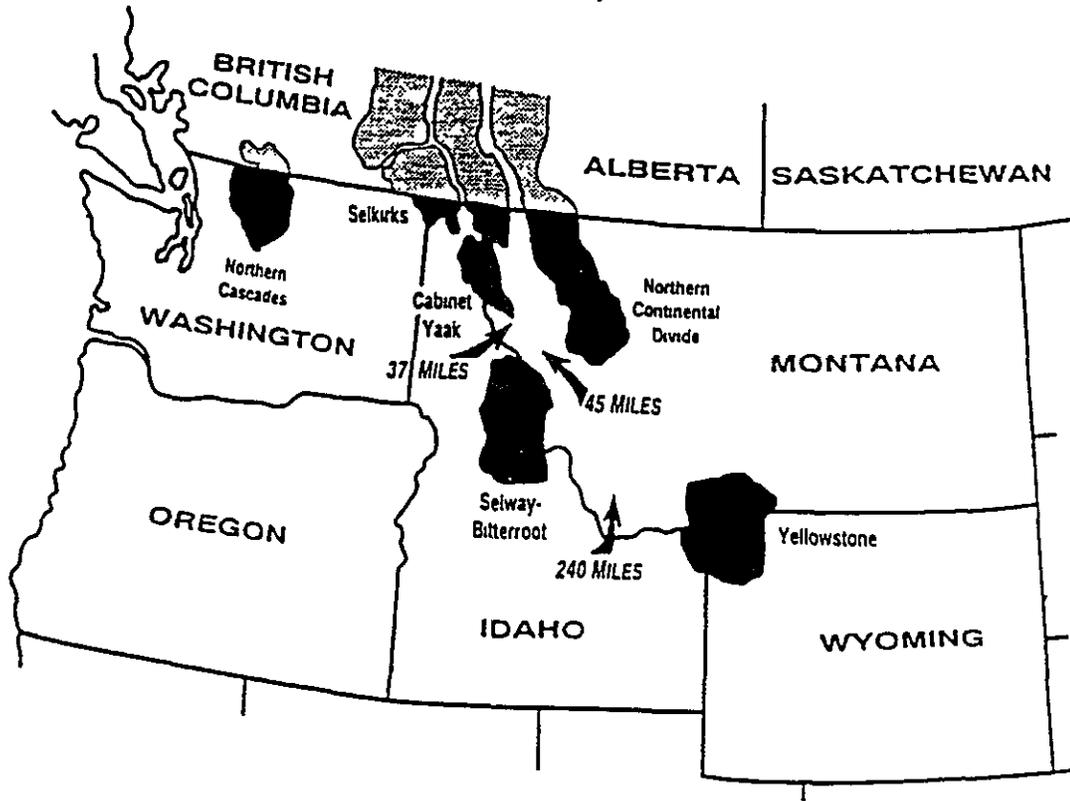
#### Status of the Species/Environmental Baseline

The grizzly bear (*Ursus arctos horribilis*) was classified as threatened on July 28, 1975. The grizzly bear was originally distributed in various habitats throughout western North America from Central Mexico to the Arctic Ocean. Current distribution is reduced to less than 2 percent of its former range south of Canada. In the conterminous 48 States, only 5 areas in mountainous regions, national parks, and wilderness areas of Washington, Idaho, Montana, and Wyoming (Hoak et al 1981, Servheen 1985) currently contain either self-perpetuating or remnant populations of grizzly bears (Figure 2)

The GYE grizzly bear recovery zone contains over 9,500 square miles of grizzly bear habitat. Grizzly bear management areas transcend Federal, State, private, and corporate ownership. The GYE includes Yellowstone and Grand Teton National Parks, parts of 5 national forests (the Targhee, Bridger-Teton, Teton, Gallatin, Shoshone, and Custer), Bureau of Land Management lands, and isolated parcels of State and private lands in the areas surrounding the publicly administered lands.

The Grizzly Bear Recovery Plan (Recovery Plan) specifies occupancy targets for female grizzly bears with young (cubs, yearlings, or 2-year olds) as a running six-year average (USDI 1993) in

Figure 2. Present grizzly bear ecosystems in the conterminous 48 States, 1990 (the San Juan Mountains area of Colorado is not shown). (USDI 1993)



each BMU in the GYE. Distribution of reproducing females may provide evidence of adequate habitat management, because it is assumed that successful reproduction is an indicator of habitat sufficiency. Adequate distribution of family groups indicates future occupancy of these areas because grizzly bear offspring, especially female offspring, tend to establish home ranges within or near the home range of their mother after weaning (USDI 1993, 1993a).

Recovery for the GYE population depends upon verifying that the population meets the criteria for a recovered population. It is important to recognize that one of the primary recovery objectives is to identify specific management measures needed to remove population and habitat limiting factors so the populations will increase and sustain themselves at levels identified in the recovery goals. Providing secure habitat for grizzly bears, especially adult females, is a high priority in MS-1 habitat. Monitoring data from 1987 through 1996 indicate the Recovery Plan population recovery parameters for the numbers of females with cubs and numbers of BMU's with family groups are being met. The average annual known human-caused grizzly bear mortalities and female mortality limits are close to being met (IGBC 1996).

The environmental baseline of the Forest has changed considerably since the 1985 Forest Plan was prepared. Extensive management activities including timber harvest and road construction have reduced vegetative cover, lowered food values, and created a vast road network across the Forest. These values are portrayed in CEM outputs for habitat value and effectiveness (HV and HE) as determined by the Forest (USDA 1997). In some portions of the BMU's, the lack of suitable habitat away from human access is continuing to displace grizzly bears from the area and induce various stress-related behavioral adaptations and habitat modifications, including

- 1 avoidance/displacement of grizzly bears away from roads and road activity,
- 2 changes in grizzly bear behavior, especially habituation, as well as breeding, feeding, reproduction, shelter, and travel, due to ongoing contact with roads and human activities conducted along roads,
- 3 habitat loss, modification, and fragmentation due to roads and road construction, including vegetative and topographic disturbances, and
- 4 direct mortality from road kills, legal and illegal harvest, and other factors resulting from increased human-bear encounters (IGBC 1987)

The GYE grizzly bear recovery zone has been subdivided into smaller units to facilitate both the assessment of projects and recovery of the species. Eighteen BMU's have been formally delineated in the GYE (Figure 3)

These BMU's are designed to

- 1 assess the effects of existing and proposed activities on grizzly bear habitat without having the effects diluted by consideration of too large an area,
- 2 address unique habitat characteristics and bear activity/use patterns,
- 3 identify contiguous complexes of habitat which meet yearlong needs of the grizzly bear, and
- 4 establish priorities for areas where land use management needs would require cumulative effects assessment (USDA et al 1990)

BMU's have been further divided into smaller units, termed subunits. The rationale for defining subunits are the same as described above for the BMU. The BMU or subunit provides the basic scale for project impact analysis (USDA et al 1990). The Forest has three BMU's divided into 4 subunits, they are the Henry's Lake BMU with subunits 1 and 2, the Plateau BMU with subunits 1 and 2, and the Bechler-Teton BMU.

#### Existing Conditions by Bear Management Unit

The Service used the figures for "acres and percent of areas" as presented and updated in Table 4a of the biological assessment for the grizzly bear to evaluate the existing conditions of the BMU's (see Table 1).

The IGBC Access Committee addressed the need for secure habitat for grizzly bears through the definition of a core area in a BMU. The Forest has expanded the definition of core area to include their own terms of "designated and undesignated" core. Core areas provide important habitat needs for grizzly bears and "(r)esearchers and managers throughout the recovery zones agree that core areas, areas free of motorized access during the non-denning period, are an important component of adult females that have successfully reared and weaned offspring" (IGBC 1994).

A study to evaluate habitat and grizzly bear presence in the Henry's Lake BMU and to finalize the requirements for occupancy by female grizzly bears in the Plateau BMU, was begun in March of 1993 and completed in the fall of 1994 (IGBC 1994a). The study concluded the habitat and habitat effectiveness values for the Henry's Lake BMU were of moderate value. It was not expected that a female grizzly bear with young would occupy the area on a yearlong basis, however, because the BMU was too small in size and the 9 sheep allotments in the area pose a significant mortality risk.

The report recommended adding the Madison Subunit 2, some of which is on the Gallatin N F in Montana, to the Henry's Lake BMU. This would increase the size of the BMU and provide a more ecologically based area for a female with young. This recommendation was implemented in 1994 with the acceptance of the report by the IGBC. The entire BMU, according to the latest

Table 1 Existing Habitat Components for the Targhee N F Bear Management Units

Habitat Component	HL #1	HL #2	PBMU #1	PBMU #2	B-T	
N F Acres	93,345	37,350	87,177	76,090	191,346	
Total Acres in BMU	128,515	97,944	183,203	275,708	341,894	
Acres in MS-1 Habitat	0	37,350	0	0	136,392	
Acres in MS-2 Habitat	74,676	0	82,818	76,090	53,041	
Acres in MS-3 Habitat	18,669	0	4,359	0	0	
Designated Core Habitat	17,384	14,027	0	0	65,314	
Undesignated Core Habitat	19,927	0	45,643	28,616	38,215	
Open Road Miles	92.6	36.8	115.2	71.1	187.5	
Yearlong Restricted Miles	48.1	4.8	117.4	135.5	152.0	
Total Road Miles	140.7	41.6	232.6	206.6	339.5	
Open Road Density (mi /mi <sup>2</sup> )	0.79	0.63	0.85	0.60	0.63	
Open Motorized Trail Miles	3.9	7.9	8.6	15.6	38.6	
Yearlong Restricted Miles	39.4	17.5	10.5	0	91.8	
Total Trail Miles	43.3	25.4	19.1	15.6	130.4	
Open Motorized Trail Density	0.03	0.14	0.06	0.13	0.13	
Total Motorized Access Miles	184.0	70.0	251.7	222.2	469.9	
Total Motorized Access Density	1.23	0.85	1.77	1.87	1.27	
Snowmachine/OHV Use	MS-1	N/A	Y/N	N/A	N/A	Y/N
	MS-	Y/N	N/A	Y/Y	Y/Y	Y/N
	MS-	Y/Y	N/A	Y/Y	N/A	N/A
Sheep Allotments in Use	9	0	0	0	2	
Cattle Allotments in Use	3	1	0	0	3	
Habitat Value	1.8547	2.3818	0.2935	0.342	0.9861	
Habitat Effectiveness	1.1465	1.5194	0.1376	0.1554	0.6579	
HE/HV Index	0.62	0.64	0.47	0.45	0.67	

figures, encompasses approximately 226,415 acres (128,515 acres in Subunit 1 and 97,900 acres in Subunit 2) of MS-1, 2 and 3 habitat

The study also concluded the existing habitat values for the Plateau BMU were moderate, however, it was not expected that a female grizzly bear with young would occupy the area on a yearlong basis. The reason for this conclusion is that habitat effectiveness is low and there is a 51 percent reduction of the current habitat value. The reduction in habitat value and high mortality risk to grizzly bears is due to the high road densities and human use of the existing road network (IGBC 1994a). Similar results were obtained for the Moose Creek/Pitchstone portion of the Plateau BMU Subunit 2. The study team recommended the Forest improve habitat effectiveness in both areas by implementing access management measures approved by the IGBC in July 1994. The team, in speaking of Subunit 1, further stated, "With improved habitat effectiveness occupancy should be expected. Continued monitoring for evidence of reproducing females is recommended" (IGBC 1994a).

Table 1 shows the acres of MS-1, 2, and 3 habitat, the core areas (designated and undesignated), the open and total route densities, snowmachine and off-highway vehicle (OHV) use, sheep and cattle allotments, and the habitat effectiveness and habitat value ratings for each BMU.

#### Henry's Lake BMU, Subunits 1 and 2

The Henry's Lake Subunit 1 covers about 128,515 acres [201 square miles (sq mi)], with approximately 93,345 acres (146 sq mi) on the Forest. The Centennial Mountains form part of the Continental Divide and border the BMU on the north. The mountain range contains high mountain meadows scattered through spruce fir and Douglas-fir forests and at lower elevations sagebrush/grasslands transition into Douglas-fir and lodgepole pine forests. Other vegetation communities found in the area include aspen, some whitebark pine, mountain brush, and herbaceous types, both upland and riparian. Less than 2 percent of the riparian vegetation in the BMU is not meeting the desired vegetation condition for lands open to grazing. The MS-3 portion of this subunit (18,669 acres) is dominated by the world famous Henry's Lake (6,672 acres) and the Henry's Lake Flat area. From 1959 to 1986 this subunit has had fewer sightings of grizzly bears than any of the other BMU's (Orme and Williams 1986). Since 1986 there has only been 1 grizzly bear sighted in the area.

Henry's Lake BMU Subunit 2 covers approximately 97,944 acres (153 sq mi) of which 38 percent [37,350 acres (58 sq mi)] are in Idaho on the Forest, the remainder is in Montana, primarily on the Gallatin National Forest. Vegetation habitat types and conditions are similar in Subunits 1 and 2. The entire Subunit 2 on the Forest is classified as MS-1 habitat. This Subunit has the second highest number of grizzly bear sightings from 1959 to 1986 (Orme and Williams 1986) when compared to the other BMU's. Eight grizzly bear sightings have been recorded, in addition to numerous recorded observations of a radio collared bear since 1986.

#### Plateau BMU, Subunits 1 and 2

The Plateau BMU, Subunit 1, covers about 87,177 acres (136 sq mi) in Idaho, approximately 83,690 acres (131 sq mi) is on the Forest along the southwestern edge of the Yellowstone National Park. The landscape is dominated by lodgepole pine with small pockets of Douglas fir, whitebark pine, spruce fir, aspen, sagebrush/grass, grass meadows, and mountain brush. Approximately 19 percent of the area has high berry-producing shrubs in the understory, an important food source for grizzly bears. Within the Subunit there are 86,124 acres of forested lands on which timber harvest has occurred on 33,502 acres (38.9 percent), the 1988 North Fork Fire burned approximately 17,700 acres (20.6 percent) in the Subunit. The Forest has determined there are no designated core areas in this Subunit, however, they have identified 45,643 acres of undesignated core area. The determination is based on the IGBC definition of core area and because this Subunit is so highly roaded, the Forest indicates the area has no designated core habitat. The 1994 biological assessment and opinion on the Strategy identified core areas for Subunits 1 and 2. These areas are included in the "undesignated" area and are treated as core areas under the existing LMP.

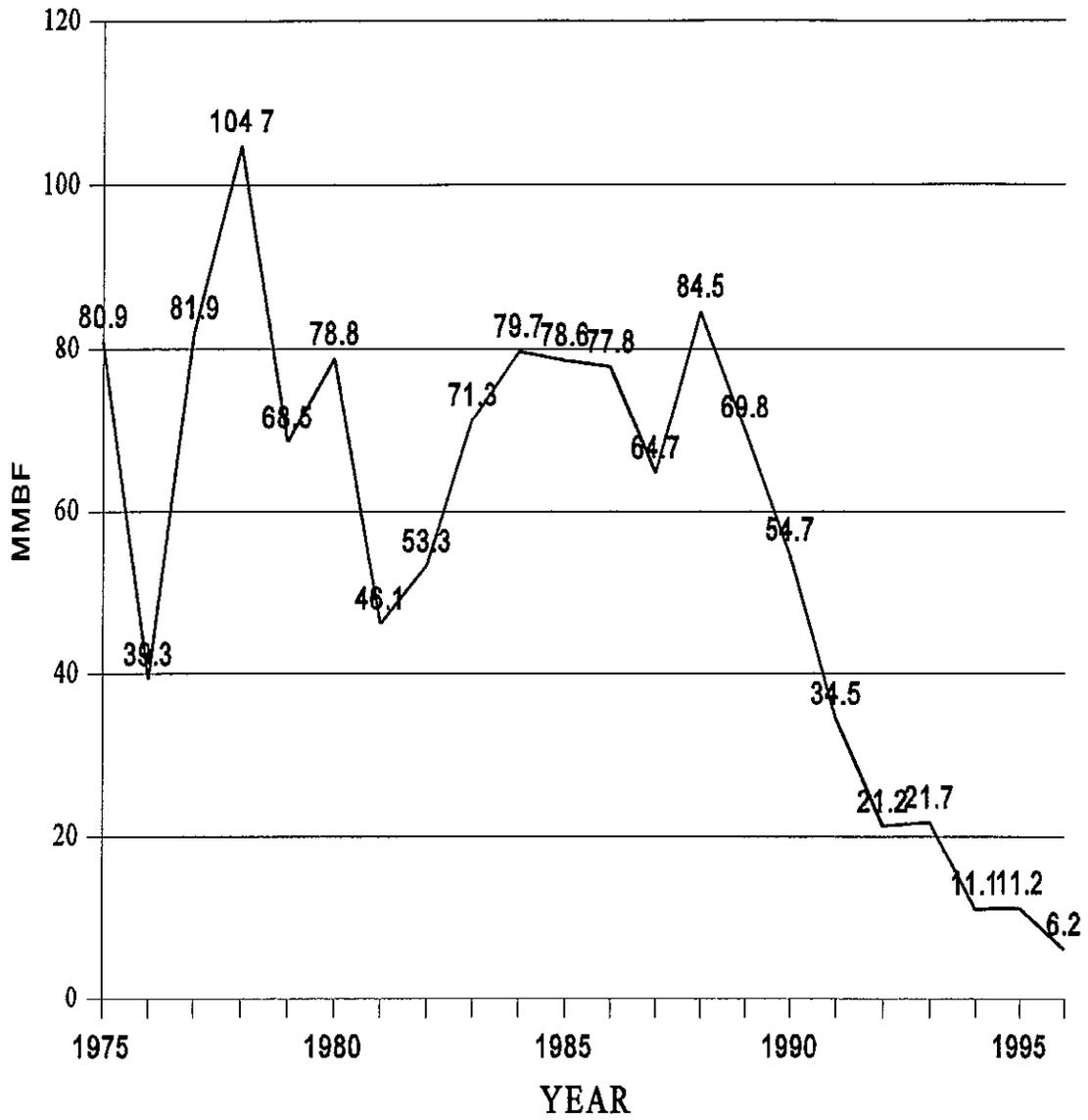
Between 1959 and 1984 several more human caused grizzly bear mortalities occurred than were noted in the biological assessment report (Craighead et al 1988). These occurred in and around Reas Pass where sheep were being grazed, in the Island Park area around cabins, and along the southern boundary of the BMU. The bears may or may not have lived in the BMU but, from the mortality locations, it is apparent they traveled across the area. Displacement of grizzly bears has occurred and continues to occur across the BMU because of the degraded condition of the environmental baseline. Since 1986 there have been 5 sightings in the Subunit and many recorded observations of a radio collared male grizzly bear.

Plateau BMU, Subunit 2 is directly south of Plateau BMU Subunit 1, and the 28 percent of the unit that is on the Forest covers 76,090 acres (119 sq mi). The landscape is dominated by lodgepole pine with pockets of whitebark pine, Douglas fir, aspen, sagebrush/grass, grass meadows, and mountain brush. The entire area is classified as MS-2 habitat. There are no designated core areas, however, undesignated core areas cover 28,616 acres. Recorded grizzly bear observations and mortalities from 1959 to the present indicate bears have used the area. The last recorded sighting of a female grizzly with cubs was in 1994.

Extensive areas in Plateau BMU Subunits 1 and 2 that have flat terrain were recently clear-cut and are close to either open or closed roads. These areas are used by OHVs since there are currently no OHV restrictions in the Plateau BMU, except in the North Fork Fire portion of the Island Park District (USDA Forest Travel Plan Map 1994). Standard OHV closures and the existing road closures with gates are often ineffective at excluding motorized vehicles, especially motorcycles and other OHVs, and will not significantly reduce the mortality risk to the grizzly bear (USDI 1994). Also, due to the terrain in the area, enforcement of road closures in the BMU is difficult without intense monitoring of gate conditions and barrier effectiveness.

From 1975 to 1991, many new roads were constructed, extensive volumes of timber were sold by the Forest (Figure 4), and large areas were clear-cut to remove the "bug" infected trees in this

Figure 4 Timber volumes sold on the Targhee National Forest between 1975 and 1995



subunit This action also removed security cover for the grizzly bear and displaced animals into less desirable habitat and in some cases may have lead to confrontations with humans, resulting in permanent removal of the bear The lack of occupancy of the BMU from 1985 to the present has been caused in part by the displacement of grizzly bears away from areas with high human access via roads

### The Bechler-Teton BMU

The Bechler-Teton BMU covers about 191,340 acres (299 sq mi) and 189,433 acres (99 percent/ 296 sq mi) is administered by the Forest Service This BMU joins the extreme southwest corner and southern boundary of Yellowstone National Park and extends along the western edge of the Grand Teton National Park The BMU includes the Winegar Hole and Jedediah Smith Wilderness areas which cover about 34 percent (65,165 acres) of the area The landscape is similar to the other BMU's with large stands of lodgepole pine interspersed with aspen, Douglas fir, sagebrush/grass, grass meadows, riparian habitat, and mountain brush

This BMU has the highest numbers of sightings of grizzly bears of all of the BMU's on the Forest There have been more grizzly bear mortalities in this BMU than the others (Craighead 1988), however, there have been no bear mortalities from 1983 to the present There have been two documented grizzly bear/sheep conflicts in the past During 1996 a female grizzly bear and her cubs were moved to another area off the Forest due to a bear/sheep encounter The incident occurred in MS-2 habitat on a sheep allotment within 2 or 3 miles of MS-1 habitat

## EFFECTS OF THE PROPOSED ACTION

### General Effects of the Proposed Action

Habitat security conditions cannot be defined entirely by motorized access route density Other factors such as vegetation (food, cover), concentrated human use locations (towns, summer homes, campgrounds), heavily used non-motorized trails, and areas of high levels of dispersed human use will also influence the effectiveness of habitat security in an area Motorized access routes and the human use associated with these routes, however, are one of the most easily defined and measurable factors to evaluate Motorized access is also one of the more influential parameters affecting habitat security Timber harvest, other human activities, and impacts associated with roads and increased road densities have had a major influence on grizzly bear population and habitat use patterns in numerous widespread areas (Tracy 1977, Schallenberger and Jonkel 1980, Jonkel et al 1981, Brannon 1984 Manley and Mace 1992, Mace and Manley 1993)

The concepts of precise open and total motorized access density to assess and manage the effects of roads on grizzly bear habitat has received widespread acceptance by public land and wildlife managers and biologists The IGBC Roads Taskforce (1994) advocated the concepts of open and total motorized access density management and core habitat Using definitions provided by the

IGBC Taskforce, the GYE Access Committee is currently developing the recommended levels at which open and total motorized route density and core area in grizzly bear habitat should be managed. The GYE Access Committee is using the most current computer models to determine access standards, however, the final recommendations are not yet available. In the interim, the Forest Service is using the IGBC Access Committee recommended definitions for open, restricted, and closed roads and trails and methods of identifying existing and potential core habitat to address access management in the Revision. When the final recommendations are presented, the Forest will evaluate the access management conditions via CEM and incorporate changes as needed to comply with the findings.

Mortality - Mortalities are the most serious consequences of roads in grizzly habitat. Research has confirmed that grizzlies experience increased vulnerability to legal harvest and poaching (direct mortality) as a consequence of increased road access by humans (Schallenberger 1980, Zager 1980, McLellan and Mace 1985, Aune and Kasworm 1989). McLellan and Mace (1985) found that a disproportionate number of mortalities occurred near roads. Aune and Kasworm (1989) reported 63 percent of known human-caused grizzly deaths on the east front of the Rocky Mountains occurred within 1 kilometer (km) of roads including 10 of 11 known female grizzly deaths. In the GYE, Mattson and Knight (1991) reported areas impacted by secondary roads and major developments were most lethal to bears. In Montana, Dood et al (1986) reported 48 percent of all known nonhunting mortalities during 1967-1986 occurred within 1 mile of roads.

Increased human access into grizzly bear habitat also increases grizzly habituation to humans, which increases the potential for human-bear conflicts. Habituated bears are those that have lost their natural wariness of humans and generally experience higher mortality rates than bears that are not habituated. Continued exposure to human presence, activity, noise, etc. without negative consequences results in habituation. Habituated bears often end up obtaining human food or garbage and become involved in nuisance bear incidents, become threats to human life or property, and are eventually destroyed or removed from the population through management actions. Habituated bears are also more vulnerable to illegal killing because of their increased exposure to people.

Mortality rates that result from roads are unevenly distributed between different ages and sexes. In the GYE subadult males and adult females with young are more likely to be found near roads during years of low whitebark pine seed availability (Blanchard 1990). Mattson et al (1987) reported that subadults were most often located near roads, perhaps displaced into roaded, marginal habitat by dominant bears. Females with cubs avoid adult males because males have been known to kill cubs (McLellan and Shackleton 1988). Habitat near roads may be selected by females with cubs and yearlings because this habitat is unoccupied by male grizzly bears. In addition, these cohorts have higher energy demands so they may need the additional native or non-native foods that lie near roads despite the risk of encountering humans.

Displacement - In addition to mortality, roads cause displacement of grizzlies from roads and surrounding habitat (Lloyd and Fleck 1977, Schallenberger and Jonkel 1980, Brannon 1984, Aune

and Kasworm 1989, Manley and Mace 1992, Mace and Manley 1993) Aune and Stivers (1985) reported that bears avoided roads and surrounding corridors even when the area contained preferred habitat for breeding, feeding, shelter, and reproduction. Areas in the Northern Continental Divide Ecosystem show radio-instrumented grizzlies may have avoided harvested stands (less than 30 years old) during "all" seasons (USDA 1993)

Mattson et al (1987) found that individual age and sex classes of bears were impacted differently by roads. Zager (1980) stated that the avoidance of roads by females with cubs was a major concern. Some subadult bears, perhaps displaced into roaded, marginal habitat by dominant bears, become habituated, thus becoming more vulnerable to illegal kills and conflict with people, which may result in removal of bears through management action. Mattson et al (1992) reported wary bears consistently avoid areas within 2 km of major roads and 4 km of major developments or townsites. Such animals are unlikely to change this avoidance behavior even after road closures and the lack of negative reinforcement. The general relationship of roads and grizzly bear under-utilization of habitat as described in these studies is applicable to the GYE. The lack of or low level of occupancy in the BMU's on the Forest has been caused, in part, by the displacement of grizzly bears away from areas with high human access via roads, this is especially true in the Plateau BMU.

Based on the available information, the Service believes the use of important low elevation spring habitat, such as riparian areas, is very limited in many areas of the BMU's on the Forest. This is the result of the high road densities, timber harvest, and human encroachment of the low elevation habitat areas. When roads are located in important habitats such as riparian zones, scrub/shrub areas, and timber cover areas, habitat loss through avoidance behavior can be significant because bears cannot use the resources in these areas (USDI 1993), thus, normal behavioral patterns are significantly modified and bears are injured.

Aune and Kasworm (1989) and McLellan (1989) showed that female cubs generally establish their home range within or have a significant overlap with their mother's home range, while males generally disperse from their mother's home range. Long-term displacement of a female from a portion of her home range may result in that area being lost to female bears because her offspring have no chance to learn the foraging opportunities in areas no longer used. Research by Mace and Jonkel (1980) showed monitored grizzlies were displaced from a drainage during the time logging was occurring, and as a result, normal behavior was significantly altered. If timber harvesting occurs in a drainage for extended periods of time, historical bear use of the area may be lost, particularly to female bears.

The end result of displacement is direct or indirect mortality. Based on the preceding discussion, the Service concludes that it is likely some individual bears will not select home ranges which include low elevation habitats that are highly roaded on the Forest, but those that do will suffer higher risks of human-caused mortality.

Habitat Fragmentation - As human populations and roads increase in bear habitat, bear

populations become fragmented. As fragmented populations become smaller and more isolated, they become vulnerable to extinction, especially when human-induced mortality pressures continue. Habitat fragmentation is particularly important to the survival of large carnivores, such as grizzly bears, which have great metabolic demands, require large home ranges, and wide vegetative and topographic habitat diversity (Servheen 1986). Their low densities, low reproductive rate, individualistic behavior, and association with riparian habitat, an area also used extensively by humans, require careful management involving all the principles of island population management and conservation biology (USDI 1993).

Mobility is an important aspect of grizzly bear behavioral patterns (Quimby and Snarski 1974). Movements of grizzly bears may exceed 60 air miles, and their home ranges can encompass 1,000 to 1,500 square miles, thus, space is essential to bears. With a wide-ranging species like the grizzly bear, large expanses of unfragmented areas defined as MS-1 and MS-2 habitat are essential for feeding, breeding, sheltering, traveling, and other essential behavioral patterns (USDI 1993). Grizzly bear habitat on the Forest, particularly on the Plateau BMU, has been fragmented by management activities during the past 20 years. The fragmented habitat has reduced the quantity of available habitat for grizzly bears which has contributed to conditions that could reduce grizzly bear survival and reproduction in the BMU's on the Forest.

Security Habitat - Grizzlies know no competitors that restrict their use of habitat except man, and it appears that they have not evolved behavioral adaptations to contend with the scope of current human influences. Grizzly bear populations require a level of safety from human depredation and competitive use of habitat such as roading, logging, mining, human settlement, grazing, and recreation. Competitive use of habitat encompasses all factors that lead eventually to increased negative impact of human activity on grizzly populations. The density and management of roads is one of the most powerful tools available to balance the needs of people with the needs of bears (USDI 1993).

The Service believes security habitat is important to grizzlies and should be one of the basic considerations in grizzly bear management. However, at this time no absolute criteria are available for identifying grizzly bear security areas. Research has shown, in some cases, grizzly bears and elk react in a similar manner to logging and roads. Most elk studies indicate full utilization of available elk habitat does not occur where security is inadequate. Based on scientific literature, the Service concludes grizzly bear security needs are vital to maintaining healthy, viable populations just as they are for elk. Certain security measures most often used in elk management may also be appropriate for grizzly bear management. Security has been recognized as a requirement for elk during the period of active logging in a timber sale. However, additional research has made it clear security is a continuing requirement in all elk habitats, whether logging is in progress or not. More important, security has been recognized as a requirement which is not necessarily satisfied simply because hiding cover is maintained at a minimum level. In many situations, space may be as important as hiding cover in establishing security values. The quantity of security habitat on the Forest has been reduced during the past 20 years due to road construction associated with resource extraction activities and subsequent human access into

previously inaccessible areas used by grizzly bears

Based on the above information, the Service concludes the environmental baseline for the Forest is resulting in the following effects to grizzly bears

- 1 Increased risk of direct mortality to grizzly bears because of high road densities due to human use of roads and the visual access provided by roadways through the forest environment,
- 2 High risk of increased habituation of grizzly bears to human activities along roads and in association with summer home developments by some bears thereby increasing the mortality risk of these bears,
- 3 Displacement from critical, seasonally important feeding sites (i.e., spring and fall ranges) which actually kills or injures bears by significantly impairing essential behavior patterns such as foraging, breeding, travel and sheltering,
- 4 Habitat fragmentation which actually kills or injures bears by significantly impairing essential behavior patterns by displacing bears from important constituent habitat elements including food, cover, solitude, and space,
- 5 Loss of habitat needed for security which results in actual injury or death of grizzly bears

#### Specific Effects of the Proposed Action

Habitat effectiveness on the Forest is essential to the recovery of grizzly bears in the GYE. The Forest administers approximately 485,308 acres (758 sq. mi.) of land covering three BMU's within the GYE Recovery Zone on the Forest. Under the existing Forest Plan the Forest has designated 35.8 percent of the land as MS-1 habitat, 59.2 percent MS-2 habitat, and 5 percent as MS-3 habitat as defined in the IGBC Guidelines (USDA 1985). The Revision proposes to set into action a series of changes in management to recover and protect the habitat in the BMU's, thereby increasing the probability that the area can support a resident family unit of grizzly bears. Existing habitat conditions in portions of some of the BMU's on the Forest, as described in the environmental baseline section, are such that occupancy by a grizzly bear family unit is highly improbable because of past habitat manipulations and high road densities. Without a change in Forest management actions, road densities would remain at high levels and other habitat conditions related to food and cover resources in the BMU's would continue to decline. The Revision seeks to reverse the decline in grizzly bear habitat components and restore grizzly use, while addressing the multiple use obligations mandated by various existing laws, regulations, and directives the Forest must operate under.

The desired future conditions for BMU's on the Forest aim at providing habitat conditions for

resident free-ranging grizzly bears (including family groups or population segments) throughout suitable habitat in each unit. This condition would be achieved by providing seasonal foraging needs, free-ranging movement and dispersal of resident grizzly bears, and minimizing mortality risks due to human-bear conflicts. Available habitat, secure space, and a diversity of habitats, to the extent they naturally occur within each BMU, are key components of the desired future condition. Established core and security areas and the protection they provide are, in the short and long-term, designed to be predictable in space and time and of sufficient size to provide for occupancy by a bear or bears. These areas delineate the highest quality habitat to meet the seasonal needs of grizzly bears, allow for the exchange to and from "source" areas of known, consistent bear use, and provide connectivity to adjacent BMU's in the GYE. In this condition the BMU's administered by the Forest should be capable of fully contributing to grizzly bear conservation and recovery.

The Forest-wide actions and the specific management prescriptions incorporate scientifically based management actions, recovery goals from the Recovery Plan, IGBC guidelines for access management as they currently exist and direction to implement additional guidelines as they are developed, and reasonable and prudent measures and recommended actions from consultations on past project activities in addition to those of this biological opinion for each BMU.

Table 2 shows the desired future condition of the Forest with respect to acres of MS-1, 2, and 3 habitat, core areas (designated and undesignated), open and total route densities, snowmachine and OHV use, sheep and cattle allotments, and habitat effectiveness and habitat value ratings for each BMU. The signing of the Record of Decision (ROD) for the Revision will put into effect the Forest-wide Standards, Guidelines, Goals and Objectives, including the open and total route density standards. A second ROD will be signed at the same time to "implement the site specific Travel Plan that shows which areas, roads and trails will be open to motorized use. The Travel Plan will implement the road density standards on-the-ground" (USDA 1997a). The on-the-ground signing necessary to enforce the Travel Plan will be completed in 1997. By the end of calendar year 1999 the actual on-the-ground restrictions will be in place in all of the BMU's.

## CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Within the GYE, actions on private lands, such as summer and residential homes and recreational development, logging, road building, and livestock grazing will continue to contribute to mortality risk and habitat degradation and loss. Year-long distribution of visitors and types of recreational pursuits in the GYE have changed from seasonal peaks, mainly spring, summer and fall, to year-round activity. All of these activities may affect the ability of grizzly bears to adequately utilize important habitats in the GYE.

Table 2 Habitat Components for the Targhee N F Bear Management Units, Alternative 3-M

Habitat Component	HL #1	HL #2	PBMU #1	PBMU #2	B - T
N F Acres	93,345	37,350	87,177	76,090	191,346
Total Acres in BMU	128,515	97,944	183,203	275,708	341,894
Designated Core Area	28,490	15,491	17,581	16,131	80,238
Undesignated Core Area	20,961	10,082	35,300	34,512	41,972
Open Road Miles	64.0	20.7	75.0	64.7	144.1
Yearlong Restricted Miles	22.3	4.6	55.3	23.3	50.9
Total Road Miles	86.3	25.3	130.3	88.0	195.0
Open Road Density (mi/mi <sup>2</sup> )	0.55	0.35	0.56	0.54	0.48
Open Motorized Trail Miles	0	6.5	4.6	0.20	4.10
Yearlong Restricted Miles	0	0	0	0	0
Total Trail Miles	0	6.5	4.6	0.20	4.10
Open Motorized Trail Density	0	0.11	0.03	0.00	0.01
Total Motorized Access Miles	86.3	31.8	134.9	88.2	199.1
Total Motorized Access Density	0.74	0.54	1.00	0.74	0.67
Snowmachine/OHV Use	MS-1	Y/N	Y/N	Y/N	Y/Y
	MS-2	N/A	N/A	N/A	N/A
	MS-3	Y/Y	N/A	N/A	N/A
Habitat Value	1.8547	2.3818	0.2935	0.342	0.9861
Habitat Effectiveness	1.2536	1.5961	0.1715	0.1932	0.7065
HE/HV Index	0.68	0.67	0.58	0.56	0.72

Cumulative effects from the proposed action on the Forest include the continued use of private lands around and within the BMU's. The associated loss of grizzly bear habitat, as a result of human access, is anticipated to continue. Habitat fragmentation and loss of habitat would be expected to continue as secondary development from increasing recreational use of the BMU's will create a demand for new public services and facilities. Population pressures from private residential development are increasing in eastern Idaho (USDA 1996a) and are expected to continue in the future. Increasing human occupancy in and adjacent to the BMU's emphasizes the importance of managing human access on adjacent public lands. Residential and recreation homesites are increasing in eastern Idaho. Human development in low elevation areas has, and will continue to have, a cumulative impact on grizzly bears through loss of habitat and continued displacement due to human disturbance. The Revision includes standards and guidelines that stipulate Forest activities not increase total or open motorized access densities in the BMU's above 0.6 mi<sup>2</sup>/sq mi open route density, and 1.0 mi<sup>2</sup>/sq mi total route density. Existing core and security areas established from previous consultations will remain in place on the Plateau BMU. Additional delineations for designated and undesignated core areas have been established for the Bechler-Teton BMU. The management prescription for nonmotorized recreation within the Henry's Lake BMU will meet and maintain IGBC Roads Taskforce criteria for grizzly bear core areas. The Service believes adverse cumulative effects to bears will continue as a consequence of non-Federal actions on private lands. However, according to the proposed Revision, Forest actions would not contribute to, and in certain areas may alleviate, the impacts of some of these adverse effects.

The Service did not identify any other future state or private activities in the GYE that are reasonably certain to occur within the action area that would contribute as cumulative effects to the proposed action. State and private activities outside of the Forest will not influence the determination in this biological opinion because implementation of the proposed action would not change the impact these other activities may have on the grizzly bear in the GYE.

## CONCLUSION

After reviewing the current status of the grizzly bear (*Ursus arctos horribilis*), the environmental baseline for the Forest, the effects of the Revision preferred alternative, Alternative 3-M, and the cumulative effects, it is the Service's biological opinion that implementation of the Revision, Alternative 3-M, as proposed, is not likely to jeopardize the continued existence of the GYE grizzly bear population. No critical habitat has been designated for this species, therefore, none will be affected.

## INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulation pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or

degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding or sheltering. Harass is defined by the Service as actions that create the likelihood of injury to a listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the agency so they become binding conditions of any grant or permit issued to an applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest (1) fails to require an applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

A special regulation for the grizzly bear pursuant to section 4(d) of the Act provides that no person shall take a grizzly bear in the 48 conterminous states, with certain specified exceptions [50 CFR 17.40(b)].

#### Amount or Extent of Take

The Service anticipates that use of the open and total route system on the Forest will increase as recreation use increases during this cycle of the Revision process. Therefore, based on the most current biological information, the Service believes that until open and total route densities meet IGBC and the Revision standards, and habitat conditions for grizzly bear feeding, breeding, travel and sheltering are increased, take, direct and indirect, will continue at the present level. The Service believes the level of access and lack of cover in the BMU's is an indicator of the level of take, direct and indirect, that may be occurring.

It is the opinion of the Service that the current level of incidental take associated with the existing use is not at a level that is likely to jeopardize the recovery and survival of the grizzly bear population in the GYE. This is based in part, on the fact that measured population parameters have met established recovery plan levels, with the exception of mortality of female grizzly bears across the GYE during the last 2 years. However, the Service anticipates that the direct and indirect effects of implementing the Revision will not reduce the level of take until the access management plan is completed. The level of "take" may be in the form of direct take, as a result of illegal killing or human-grizzly bear conflicts, or in the form of indirect take such as harm resulting from displacement of grizzly bears from important habitats. The best scientific and commercial data available are not sufficient to enable the Service to quantify a specific amount of incidental take for the Revision. The effects of the Revision are largely unquantifiable in the short

term and may be measurable only as long-term effects on the species' habitat and population levels. Without additional information and analysis that are currently unavailable, we must designate the anticipated level of incidental take for the Revision as **unquantifiable**.

However, the Service believes the level of human-grizzly bear conflict is an indicator of the level of take occurring and provides an early warning of changes in the level of take. Therefore, within the BMU's, all human-grizzly bear conflicts will be handled according to the IGBC Nuisance Grizzly Bear Guidelines and the Forest will immediately reinstate consultation on the Revision. Any incidents that occur outside the BMUs should also be handled according to the IGBC Nuisance Grizzly Bear Guidelines. The Forest should immediately contact the Service to discuss the conditions surrounding the incident and the possible need to reinstate consultation on the Revision. Problem bears translocated onto the Forest from other areas of the ecosystem under the direction of the IGBC Nuisance Grizzly Bear Guidelines would not cause reinstatement of consultation. However, the Forest should immediately contact the Service to discuss the conditions surrounding the incident.

#### Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species. There is no critical habitat designated, therefore, none will be affected.

#### Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the grizzly bear on the Forest:

1. Effectively implement and complete an open and total motorized route management program for roads and trails on the Forest by the end of calendar year 1999 that will contribute to the conservation, survival and recovery of the grizzly bear in the GYE as described in Section V of the Revision and the March 19, 1997, letter from the Forest.
2. The Forest shall implement and comply with monitoring and reporting procedures that allow the Forest and the Service to keep up-to-date on the status of access density and other management activities on the Forest as described in Section V of the Revision and the March 19, 1997, letter from the Forest.
3. Where wilderness lands occur, the Forest should, in coordination with the Idaho Department of Fish and Game and the Service, ensure that the "secure habitat" contains seasonal habitat in approximately the same proportion to its availability across the BMU as currently designated through management prescriptions for wilderness and adjacent lands.
4. The Forest shall implement an information program that provides the public with

accurate and accessible information regarding the biological basis for and the resulting effects of the Revision to adequately minimize take of grizzly bears

### Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Forest must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. The Forest will, by the end of calendar year 1999, have in place in each BMU or subunit a precise open motorized route standard not to exceed 0.6 mi/sq mi and a precise total route density standard not to exceed 1.0 mi/sq mi. Forest activities that involve new road or motorized trail construction should be designed to improve, or at a minimum, designed so as not to increase existing open and/or total motorized route densities within a BMU or subunit above these levels.

2. The Forest shall adopt the open and total motorized route density recommendations of the IGBC Access Committee and implement these recommended levels of motorized access on areas of the Forest that are in the GYE Recovery Zone. This includes, but is not confined to, site specific restrictions (such as area closures, timing restrictions, etc.) on recreation and other activities to resolve human-grizzly bear conflicts, revision of access density standards, and use of CEM to refine core and security area percentages. However, the final IGBC access standards are not yet available, therefore, upon their completion, the Forest will contact the Service and jointly develop a time frame for implementation and attainment of the standards.

Until the standards are available, the Forest will ensure the above effective access restrictions are in place in the BMU's by the close of 1999 as described in the Travel Plan, Section V of the Revision and the March 19, 1997, letter from the Forest. At the end of 5 years from the date the ROD is signed, routes to be restricted that are in close proximity to, but outside the BMU's, will be effectively restricted according to the Revision standards and guidelines.

3. The Forest shall submit an annual report to the Service in December of each year. The report shall detail the progress in achieving the open and total route densities and core area criteria in the BMU's and subunits, including but not limited to listing road and trail closures and the number, location, and kinds of incidents and/or activities that occurred on closed roads and trails. The report to the Service should also document the duration, location, and type of activities proposed to take place in each BMU or subunit during the next activity season. The Forest will provide information to the Service on efforts taken to ensure that core areas contain seasonal habitat approximately proportional to its availability in the BMU and BMU Subunits.

The Service will use these reports to ascertain whether sufficient progress is being made toward realizing the Forest's 1999 and overall Revision objectives. Within 90 days after meeting the open and total road motorized access densities and core area requirements in each BMU or subunit, the Forest shall provide the Service with a final report for the BMU or subunit detailing all activities undertaken in association with the terms and conditions of this biological opinion.

4 Within one year of issuance of the Revision, the Forest will develop and implement a public information program on the positive effects of road closures for fish and wildlife, water quality, and other Forest resources. The effort should focus on both information that is available and relevant at a local, district level and on information pertinent to a more broad-based Forest level approach. The public should be provided a thorough and understandable analysis of existing road densities and future road densities resulting from implementation of the Revision. The net reduction in open motorized access density and the remaining opportunities for motorized public access, timber extraction, recreation, and other Forest uses should be emphasized.

5 In conjunction with implementation of the Travel Plan Standards and Guidelines of the Revision, the Forest should include the following:

A As management recommendations are developed by the GYE Access Committee, the CEM moving windows analysis or most current up-to-date scientific methodology should be used to evaluate and monitor the habitat effectiveness and value across each BMU or subunit. The information will be used by the Forest and the Service to evaluate and update management actions and recommendations for the Forest.

B The IGBC Access Committee definitions make allowances for the occurrence of restricted roads within core areas. Although restricted roads in core areas must be effectively blocked in such a way to prevent motorized access, the presence of a roadbed within a core area increases the potential for illegal motorized use. Effective road closures require effective monitoring of the closures. The Service supports the Forest monitoring efforts and encourages the use of records of violations in closure areas to monitor effectiveness of closures and focus remedial efforts on those areas where the highest incidents of trespass occur.

C Road reclamation should be emphasized in core areas. The number of restricted roads which are still available for use in core areas should be minimized.

D Roads constructed or reconstructed for timber sale purposes should be single purpose roads according to the IGBC Guidelines. New roads or road reconstruction should be of minimum design specifications and placed on the landscape to reduce costs and facilitate reclamation of the roads after the timber

sale is completed

## CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed Revision and do not necessarily represent complete fulfillment of the Forest section 7(a)(1) responsibility for the grizzly bear.

1. Motorized access management is only one of several factors influencing grizzly bear habitat and grizzly bear security. The presence of attractants is a major factor leading to food conditioning and habituation and the eventual direct mortality or management removal of grizzly bears. The Service supports the continuing efforts to implement the food storage order for the Forest within the BMU's. To further address security for grizzly bears and safety for recreationists outside of the BMU's, the Service recommends the Forest develop and implement a range of alternative food storage options Forest-wide to accommodate a variety of Forest user groups. The Service encourages the implementation of these orders at the earliest date possible.

2. All travel routes scheduled to be restricted outside the BMU's, but on the remaining areas of the Forest will be effectively restricted 10 years from the date the ROD is signed.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

## REINITIATION NOTICE

This concludes formal consultation on the actions outlined in your November 1996, request for consultation and subsequent updates. As provided in 50 CFR §402.16, reinitiation of consultation is required when discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of incidental take is exceeded (as discussed under the "Incidental Take Statement" section of this opinion, the Service believes this limit is exceeded if a human-grizzly bear incident occurs in a BMU), (2) new information reveals effects of the Forest action that may affect listed species or habitat in a manner or to an extent not considered in this opinion, (3) the action is subsequently modified in a manner that causes an effect to the listed species or habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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## DEFINITIONS

### Cummulative Effects Model (CEM) for IGBC

CEM is intended to 1) quantify individual and collective effects of land uses and activities in space and through time, and 2) provide an analytic tool for evaluating alternative land use scenarios relative to grizzly bear recovery goals and objectives (USDA et al 1990)

### Access Committee for IGBC

The Access Committee is to 1) establish standardized definitions for roads, i.e., open road reclaimed road, etc., 2) standardize methods to measure road densities and define the analysis areas within which density should be measured, and 3) assure that developed definitions and procedures interface with the existing unified cumulative effects model (IGBC 1994)

### Grizzly Bear Recovery Plan Objectives

A recovered population is defined as one that

- 1 can sustain the existing level of known and estimated unknown, unreported human-caused mortality that exists in the GYE, and
- 2 is well distributed throughout the recovery zone in the GYE

Recovery parameters for the GYE are as follows

- 1 15 females with cubs over a running 6-year average both inside the recovery zone and within a 10 mile area immediately surrounding the recovery zone,
- 2 16 of 18 BMU's occupied by females with young from a running 6-year sum of observations with no two adjacent BMU's unoccupied,
- 3 known, human-caused mortality not to exceed 4% of the minimum population estimates based on the most recent three-year sum of females with cubs, and
- 4 no more than 30% of known, human-caused mortality shall be females

### IGBC Core Area and Forest Designated and Undesignated Core Area

Core area criteria include the following

- 1 No motorized use of roads and trails during the non-denning period Within the core

area, restricted roads require closure devices that are permanent such as tank traps, large boulders, dense vegetation, etc

- 2 No roads or trails that receive non-motorized, high intensity use as defined in established cumulative effects activity definitions
- 3 Minimum of 0.3 miles from any open road or motorized trail This will be accomplished by buffering all open roads and open motorized trails
- 4 Consideration should be given, when information is available, to ensure the core area(s) meet seasonal bear habitat needs by assuring that spring, summer, fall, and denning habitat within the core areas are representative of these seasonal habitats in the entire analysis area
- 5 Once core areas become established and effective, these areas should remain in place for at least 10 years This duration is based upon the generation time for a female grizzly bear or the time it takes a female grizzly bear to replace herself

The Forest Service has expanded the definition of core area to include the terms "designated and undesignated"

Designated core areas are those areas which meet all of the core area criteria and their boundaries are mapped with a management prescription

Undesignated core areas are those areas which meet all of the core area criteria, but their boundaries are not mapped with a management prescription There is concern since undesignated core areas are not mapped, they may not be established and effective for at least 10 years, therefore, criteria number 5 may not be fully guaranteed in all cases However, undesignated core areas have existed in some areas for many decades, and they may exist into the future for a decade or more For however long they exist, they do provide some habitat benefit to the bear

#### IGBC Management Situation (MS)

MS-1 areas are those which contain grizzly population centers and/or habitat that is needed for the survival and recovery of the species The needs of the grizzly bear will be given priority over other management considerations Land uses which can affect grizzly bears and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated

MS-2 areas are those that do not contain grizzly population centers although grizzlies do occur, and highly suitable habitat components do not generally occur The needs of the grizzly bear will be given consideration where feasible Management would accommodate

grizzly populations and/or habitat use if feasible, but not to the extent of exclusion of other land uses. Human-bear conflict minimization will be given high priority.

MS-3 areas contain no suitable habitat for grizzlies and their presence is possible but infrequent. Grizzly use of such areas will be discouraged. Management within these areas will encourage measures that minimize the potential for human-bear conflict. Examples include towns or other residential areas, established campgrounds, or highways.

#### IGBC Total and Open Road and Motorized Trail Route Density

**Total Motorized Access Route Density** - includes all open and restricted roads and motorized trails. Density is displayed as a percentage of the analysis area in a defined density category. Example 20% >2.0 miles per square mile.

**Open Road and Open Motorized Trail Route Density** - includes all open roads and open motorized trails. Density is displayed as a percentage of the analysis area in a defined density category. Density is a single cumulative total of open roads and open motorized trails.

**Percentage of Analysis Area in Core Area(s)** - percentage of the analysis area that meets core area criteria. Minimum size and connectivity of patches will be established at the recovery zone level. It is recommended that the minimum size for the core area(s) be that area necessary to support a female grizzly bear for 24 hours of foraging.

#### Habitat Value

Habitat value (HV) is a measure of the amount and quantity of vegetative and non-vegetative habitat currently in the unit. While HV does not explicitly include human activity, the effects of past activity in the landscape, such as roads, implicitly affects both the vegetative (e.g. habitat type, cover type, and successional stage) and non-vegetative (e.g. ungulate range use) components of grizzly bear habitat (IGBC 1994a).

Habitat value is a relative figure representing the inherent quality of an area to support grizzly bears (USDA et al. 1990).

#### Habitat Effectiveness

Habitat effectiveness (HE) is the habitat value after discounting for current human activity. Each activity has a zone of influence and a set of dates over which it occurs. The impact of an activity depends upon its level of use and the surrounding security cover. An activity may therefore have high impact during one season and no impact during another. Activities located outside the BMU boundary may have zones of influence extending into the boundary area (IGBC 1994a).

Habitat effectiveness is the product of the values from the habitat routine and disturbance routine calculations, and reflects the area's actual ability to support bears given the quality of habitat and the type of human disturbance imposed upon the area (USDA et al 1990)

#### Management Prescription 5 3 5      Description

This management prescription emphasizes a high degree of security and resource conditions which contribute toward the conservation and recovery of the grizzly bear, and benefits to other wildlife. Habitats will be managed to meet the goals of grizzly bear recovery. Other uses may be allowed when compatible with these goals.

Grizzly habitat maintenance and improvement, and grizzly-human conflict minimization will receive the highest management priority. Management decisions will favor the needs of the grizzly bear when grizzly habitat and other land use values compete. Land uses which can affect grizzlies and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated. Grizzly-human conflicts will be resolved in favor of grizzlies unless the bear involved is determined to be a nuisance bear (IGBC 1986)

The abundance and distribution of natural food sources (such as huckleberry habitats, whitebark pine, etc ) are maintained or improved by natural events such as fire and insect disturbances, or by designed vegetation management activities. A variety of forested successional stages are present, and are the result of natural disturbances such as fire and insects or by designed vegetation management activities. Habitat conditions which contribute to the movement of bears to adjacent bear management units are maintained. Human activities are managed or restricted so that human conflicts with grizzlies are unlikely, this includes restricting human activities and generally reduced public access.

#### Objectives

- 1 Any nonfederal lands within this area will be a high priority for acquisition
- 2 Maintain grizzly bear security through a low density of open, motorized roads and trails
- 3 Manage recreation to minimize grizzly conflicts with humans
- 4 Domestic sheep grazing will be phased out over time, on an opportunity basis
- 5 Wildlife habitat improvement projects will maintain or improve grizzly bear habitat. Vegetation manipulation to improve grizzly bear habitat includes treatment to maintain long term ecosystem vegetation patterns

6 Effects analysis will be analyzed at multiple scales. Analysis areas will follow ecological boundaries, watersheds, and topographic breaks. Cumulative effects will be analyzed on no less than a *BMU* subunit scale.

#### Standards and Guidelines

Forestwide standards and guidelines apply. The Interagency Grizzly Bear Guidelines for Management Situation 1 habitat apply to this management prescription, except that livestock grazing in existing Management Situation 2 habitat will continue to be managed under Management Situation 2 guidelines.

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# GLOSSARY

## -A-

**Abiotic** - Nonliving substances or environmental factors.

**Accelerated Soil Erosion** - Erosion much more rapid than normal, natural, geological erosion; primarily a result of the influence of the activities of man, animals, or catastrophic events.

**Acceptable Storage/Acceptably Stored** - (a) stored in a bear resistant container or; (b) stored in a closed vehicle constructed of solid, nonpliable material or; (c) suspended at least 10 feet clear of the ground at all points and 4 feet horizontally from any supporting tree or pole.

**Acre-foot** - A measure of water or sediment volume equal to the amount which would cover an area of one acre to a depth of one foot (325,851 gallons).

**Active Nest Site** - See Nest Site.

**Activity Area** - (regarding soil disturbance) A land area impacted by a management activity, excluding specified transportation facilities, dedicated trails, mining excavations, and dumps. Activity areas include harvest units within timber sale areas, prescribed burn areas, and grazing areas within range allotments. Riparian and other environmentally sensitive areas may be monitored and evaluated as individual activity areas.

**Activity Area** - (regarding wildlife habitat management for grizzly bear and other wildlife species) A geographic area in which activities are conducted. Refers primarily to long-term activities as described in Prescription 5.3.5. A geographic area delineation which reasonable encompasses and supports the primary and immediate effects of the management action which is carried out within it as measured in time and space.

**Adaptation** - A change in either the genetic makeup or behavior of an organism that enhances its ability to cope with or survive in its environment.

**Adaptive Management** - A type of natural resource management that implies making decisions as part of an ongoing process. Monitoring the results of

actions will provide a flow of information that may indicate the need to change a course of action. Scientific findings and the needs of society may also indicate the need to adapt resource management to new information.

**Adaptive Planning** - A strategy whereby planning efforts are directed towards meeting temporary crises which arise in response to changing conditions.

**Aerial Logging** - Removing logs from a timber harvest area by helicopter. Fewer roads are required, so the impact to an area is minimized.

**Affected Environment** - The natural environment that exists at the present time in an area being analyzed.

**Afforestation** - The establishment of a forest cover on areas not previously forested.

**Age Class** - An age grouping of trees according to an interval of years, usually 20 years. A single age class would have trees that are within 20 years of the same age, such as 1-20 years or 21-40 years and so on.

**Air Pollution** - The undesirable addition to the atmosphere of substances (gases, liquids, or solid particles) that are either foreign to or are in quantities exceeding their natural concentrations.

**Air Quality** - The composition of air with respect to quantities of pollution therein; used most frequently in connection with "standards" of maximum acceptable pollutant concentrations.

**Air Shed** - A collection of geographic areas that because of topography, climate and meteorology share the same air mass.

**Allocation** - The assignment of management practices to specific land areas to achieve established goals and objectives; for example the allocation of a wilderness management zone to an opportunity class.

**Allotment (range allotment)** - The area designated for use by a prescribed number of livestock for a prescribed period of time. Though an entire Ranger District may be divided into allotments, all

land may not be grazed, because other uses, such as recreation or tree plantings, may be more important at a given time

**Allotment Management Plan (AMP)** - A document that specifies the program of action needed to reach a given set of objectives for a livestock allotment. It is prepared in consultation with the permittee(s) involved and prescribes the manner and extent to which the permittee's livestock operations will be conducted in order to meet multiple use, sustained yield, economic, and other needs and objectives as determined for the lands involved. It describes the type, location, ownership, and specifications for the range improvements in place or to be installed and maintained on the lands to meet the livestock grazing and other objectives for the land. It contains such other provisions relating to the permittee's livestock management responsibilities and other objectives as may be prescribed by the Forest Service.

**Allowable Sale Quantity (ASQ)** - The amount of chargeable timber volume which can be sold from a plan area for a decade. The volume sold from suitable lands cannot exceed the allowable sale quantity standard established for the plan area. Each forest plan which provides for a timber sale program must establish a standard setting the allowable sale quantity. The allowable quantity is a ceiling, it is not a future sale level projection or target and does not reflect all of the factors that may influence future sale levels. This quantity may be expressed on an annual basis as the "average annual allowable sale quantity."

**Allowable Use** - The degree of utilization considered desirable and attainable on various specific parts of an allotment considering the present nature and condition of the resource, management objectives, and level of management.

**All-Aged Stand** - A portion of a forest or a stand that contains trees of all, or almost all, age classes.

**All Terrain Vehicle (ATV)** - A type of off-highway vehicle 50 inches or less in width, having an unladen dry weight of 700 pounds or less, traveling on three or more low pressure tires, having a seat designed to be straddled by the operator and designed for or capable of travel over unimproved terrain.

**Alternative** - One of several policies, plans or projects proposed for decision making.

**AMP** - Allotment Management Plan

**Analysis** - A detailed examination of anything complex in order to understand its nature or determine its essential features.

**Analysis Area** - A geographic area used for environmental analysis. Analysis areas will vary in size, depending on the type of activity and/or project being analyzed, and the associated issues, concerns and opportunities.

**Animal Carcass** - The dead body or parts thereof, of any mammal, bird, or fish, including domestic livestock.

**Animal Unit (AU)** - Considered to be one mature dry cow of approximately 1000 pounds based upon an average daily forage consumption of 26 pounds dry matter per day.

**Animal Unit Conversion Factor** - A numerical figure expressing the forage requirements of a particular kind or class of animal relative to the requirement for an animal unit. A conversion factor is satisfactory with respect to the amount of forage required to maintain an animal, but may not be applicable in determining stocking rates for range use for particular kinds or classes of animals because of different grazing preferences.

**Animal Unit Month (AUM)** - The amount of feed or forage required by an animal unit for 1 month. Each wildlife species will utilize some fraction of this as follows: Elk = 7, Deer = 3, and Antelope = 3.

**Annual Operating Plan** - The yearly annual plan of use for livestock grazing activities on an allotment. The annual operating plan prescribes the annual actions that are necessary to implement and comply with the AMP and/or Forest Land Management Plan goals, objectives, standards and guidelines. It clearly specifies the permittee's obligations as well as those of the Forest Service for the current year. It is the working agreement with the permittee for carrying out the management action prescribed for that year. The term Annual Operating Plan is synonymous with the term Annual Plan of Use.

**Annual Plan of Use** - See Annual Operating Plan.

**Anthropogenic** - Involving the impact of humans on natural systems.

**Apparent Trend** - An estimate of trend drawn from the presence or absence of indicators noted or measured during a onetime observation. Conclusion drawn from such a method can be borne out or refuted only by making additional observations or measurements over time. Apparent trend is described in the same terms as measured trend except that when no trend is apparent it shall be described as "not apparent."

**Appeal** - A request to a higher ranking Forest Service official for review of and relief from a written decision.

**Appropriate Suppression Response** - The planned strategy for wildfire suppression action, in terms of kind, amount and timing, which most efficiently meets fire management direction under current and expected burning conditions. The response may range from a strategy of prompt control to one of containment, confinement or surveillance.

**Aquatic Connectivity** - The level of connection between aquatic habitat patches. Aquatic ecosystems and species coevolved to function within certain limits of connectivity. When aquatic habitat patches are fragmented beyond natural limits, the key ecological linkages between the biological (aquatic biota, soil microbes, riparian plants) and physical (water, parent material, gradient) elements are weakened and result in reduced aquatic ecosystem health.

**Aquatic Ecosystem** - Any body of water, such as streams, lakes, or springs, and all organisms and nonliving components within it, functioning as a natural system and interacting with associated terrestrial ecosystems.

**Aquatic Influence Zone (AIZ)** - Used in the context of a land management prescription, the area encompassing aquatic and riparian ecosystems and adjacent lands which directly affect the hydrologic, geomorphic, and ecological processes controlling aquatic and riparian ecosystem health and function.

**Aquatic Macroinvertebrates** - Invertebrates living within aquatic systems that are large enough to be seen with the naked eye, i.e. most aquatic insects.

**Aquifer** - A water-bearing geologic formation or structure that transmits water.

**Artificial Regeneration** - Replacement of forest stands by planting young trees or applying seed (direct seeding).

**Aspect** - The direction a slope faces. A hillside facing east has an eastern aspect.

**ASQ** - Allowable Sale Quantity.

**Assessment** - The Renewable Resource Assessment required by the Forest and Rangeland Renewable Resources Planning Act (RPA).

**Associated Species** - A species found to be numerically more abundant in a particular forest successional stage as compared to other stages.

**Association** - Any assemblage of populations living in a prescribed area or physical habitat. A loosely organized unit to the extent that it has characteristics additional to its individual components.

**ATV** - All Terrain Vehicle.

**AUM** - Animal Unit Month.

**Avoidance Areas** - Areas having one or more physical, environmental, institutional or statutory impediments to corridor designation. These are two types of avoidance areas.

**Discretionary** - areas that may be crossed by corridors only if necessary and reasonable mitigation or avoidance of significant impacts can be obtained.

**Nondiscretionary** - areas that may not be crossed by corridors unless authorized by the appropriate official (for example, Governor, President, etc.).

-B-

**BA** - Biological Assessment.

**Background** - The visible terrain beyond the foreground and middleground where individual trees are not visible but are blended into the total fabric of the stand. (See "Foreground" and "Middleground").

**Background Level (Background, Natural Background)** - The ever-present environmental conditions or effects above which a phenomenon must manifest itself in order to be detected.

**Bald Eagle Occupied Nesting Zone (Zone I)** - The area within a 400 m (1312 ft) radius of an occupied nest, or where monitoring data is sufficient, it is the distance at which the presence of humans first causes significant stress or behavior that results in inattentiveness to young or eggs

**Bald Eagle Primary Use Area (Zone II)** - The area within an 800 m (2625 ft) radius of the active nest and of all known alternative nests, or where monitoring data is sufficient, the area where over 75% of the adults foraging and loafing activity occurs during the nesting season (excluding Zone I) The area could be discontinuous if movement data indicate the need

**Bald Eagle Home Range (Zone III)** - Includes all potential foraging habitat along rivers and streams within 4 Km (2.5 mi) of Zone I areas, which is not included in Zones I or II The zone will include a 400 m (1312 ft) buffer along the potential foraging habitat

**Bark Beetle** - An insect that bores through the bark of trees to eat the inner bark and lay its eggs Bark beetles and associated fungi are important killers of forest trees

**Basal Area** - 1 The area of the cross section of a tree stem, including the bark, generally at breast height (4.5 feet [1.4 m] above the ground) 2 The total area of ground covered by trees measured at breast height 3 The actual surface area of soil covered or occupied by a plant measured close to the ground (basal cover, ground cover)

**Base Sale Schedule** - A timber sale schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade and that this planned sale and harvest for any decade is not greater than the long-term sustained-yield capacity This definition expresses the principle of nondeclining flow

**BE** - Biological Evaluation

**Bear Management Units (BMUs)** - Eighteen land units delineated within the Yellowstone Grizzly Bear Recovery Zone These units are approved by the IGBC for grizzly bear population and habitat analysis There are three bear management units which encompass portions of the Targhee National Forest

**Bear Management Unit Subunits** - Smaller divisions of BMUs approved by the IGBC for additional habitat and population analysis

**Bear Resistant Container** - A securable container constructed of solid nonpliable material capable of withstanding 200 foot-pounds of energy (using the approved bear-resistant container impact testing machine) When secured and under stress the container will not have any cracks, openings, or hinges that would allow a bear to gain entry by biting or pulling with its claws Wood containers are not considered bear-resistant unless they are reinforced with metal

**Benchmark** - (1) A permanent reference point (2) In range monitoring, it is used as a point where changes in vegetation through time are measured

**Best Management Practices (BMPs)** - Practices which have been designed to prevent or reduce the amount of nonpoint pollution, to a level compatible with State water quality standards and quality goals These practices may be determined by the State, the Forest, a designated area wide planning agency, or on a project level basis Also referred to as Soil and Water Conservation Practices (SWCPs)

**Big Game** - Those species of large mammals normally managed for sport hunting

**Biodegradable** - Chemicals or substances which can be readily broken down into their component parts by biological action

**Biodiversity** - See Biological Diversity

**Biological** - Relating to, or affecting life and living organisms

**Biological Assessment (BA)** - A document that reviews and evaluates proposed actions of Federal agencies for possible effects on any species listed, or proposed to be listed, as threatened or endangered, and their designated or proposed critical habitat

**Biological Control** - The use of natural means to control pests Examples include introduced or naturally occurring predators such as wasps, or hormones that inhibit the reproduction of pests Biological controls can sometimes be alternatives to mechanical or chemical means

**Biological Diversity** - The distribution and abundance of different plant and animal species and communities within an area. Biodiversity can be defined as the number of different items and their relative frequency. Diversity can occur on the genetic, species, ecosystem and landscape levels.

**Biological Evaluation (BE)** - A document that reviews all Forest Service planned, funded, executed, or permitted programs and activities for possible effects on endangered, threatened, proposed, or sensitive plant and animal species.

**Biological Potential** - The maximum possible resource output limited only by inherent physical and biological characteristics.

**Biomass** - The total weight of the living organisms in some biological system.

**Biosphere** - That part of the earth's crust, waters and surrounding air-layer which is inhabited by living organisms.

**Biota** - The plants and animals of an area, taken collectively.

**Biotic** - Pertaining to life or living organisms.

**Biotic Climax** - A climax caused by a permanent influence or culmination of influences from one or more kinds of organisms, including humans. See Climax.

**Biotic Community** - See Community.

**Biotic Diversity** - See Biodiversity.

**BMP** - Best Management Practices.

**Board Foot** - The amount of wood equivalent to a piece 1 foot long by 1 foot wide by 1 inch thick. Generally, five board feet log measure is approximately equivalent to 1 cubic foot of round wood.

**Bog** - An inadequately drained area rich in plant residues, usually acid in reaction, frequently surrounding a body of open water, and having a characteristic flora.

**Broadcast Burn** - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard, improve forage for wildlife and livestock, or encourage successful regeneration of trees.

**Browse** - Twigs, leaves and young shoots of trees and shrubs that animals eat. Browse is often used to refer to the shrubs eaten by big game, such as elk and deer.

**Brush** - Stands of shrubby, woody plants or low growing trees.

**Buffer** - A designated land or water area, along the perimeter of some feature (e.g., a stream), whose use is regulated so as to resist, absorb or preclude unwanted effects to the protected feature.

**Buffer Strip** - A protective area adjacent to an area requiring special attention or protection.

**Burning Index (BI)** - A number related to the contribution of fire behavior to the effort of containing a fire. BI is represented in NFDRS by a calculation of flame length in feet multiplied by 10.

**BURP** - Beneficial Use Reconnaissance Project. It includes methods used by Idaho DEQ to measure water quality, beneficial use status and attainability, and general stream health.

-C-

**C&H Allotment** - A cattle and horse allotment.

**Cable Logging** - Logging that involves the transport of logs from stump to collection points by means of suspended steel cables. Cable logging reduces the need for the construction of logging roads.

**Candidate Species** - A species being considered for Federal listing as a threatened or endangered species.

**Canopy** - The more or less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth. It usually refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multi-storied forest.

**Canopy Closure** - The degree to which the collective forest canopy, as projected onto the surface, occupies or covers that surface, the degree to which the sunlight is blocked or the sky obscured.

**Canopy Cover** - The percentage of ground covered by a vertical projection of the outermost pe-

rimeter of the natural spread of foliage of plants. Small openings within the canopy are included. The sum of canopy cover of several species may exceed 100 percent. (Syn: crown cover)

**Capability** - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fire, insects and disease.

**Capability for Livestock Grazing** - Refers to the ability (given physical, biological, and technological feasibility) of land to produce forage resources that can be grazed by domestic or wild ungulates. Areas designated as "open" to domestic livestock grazing have the potential to produce resources, supply goods and services, and allow resource uses under an assumed management intensity. Capability depends upon factors such as soils, slope, landform, etc.

**Carnivore** - A flesh eating organism.

**Carrying Capacity** - The number of organisms that the resources of a habitat can support. Usually used with respect to specific species even though the carrying capacity of a habitat depends on the interactions of both its abiotic and biotic components.

**Catastrophic Condition** - A significant change in forest conditions on the area that affects Forest Plan resource management objectives and their projected and scheduled outputs, uses, costs, and effects on local communities and environmental quality.

**Catastrophic Event** - A large-scale, high-intensity natural disturbance that occurs infrequently.

**Cavity** - The hollow excavated in trees by birds or other natural phenomena, used for roosting and reproduction by many birds and mammals.

**CEM** - Cumulative Effects Model (Bear)

**Channel** - A natural or artificial conduit which periodically or continuously contains moving water, such as a stream. A channel has defined bed and banks.

**Chargeable Volume** - All volume included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantity, based on regional utilization standards.

**Chemical Control** - The use of chemical pesticides and herbicides to control pests and undesirable plant species.

**Class I Areas (Airsheds)** - An area designated for the most stringent degree of air quality protection by the Clean Air Act. Included are National parks established before August 1977 and wildernesses designated by the 1964 Wilderness Act. Increases in sulfur dioxide and particulate matter concentrations in ambient air are strictly regulated to protect visibility.

**Class II Areas (Airsheds)** - The level of air quality protection assigned to areas other than Class I Areas.

**Class of Livestock** - Age and/or sex group of a kind of livestock. (compare to class of animal)

**Classification** - The systematic grouping (and naming) of entities based on shared characteristics.

**Clean Air Act** - Public Law 84-159 as amended. Section 309 of 42 U.S.C. 7609 provides authority for the Environmental Protection Agency to review other agency environmental impact statements.

**Clearcutting** - A method of regenerating an even-aged stand in which a new age class develops in a fully-exposed microclimate after removal, in a single cutting, of all trees in the previous stand.

**Clearcutting with Reserves Regeneration Method** - A variant of the Clearcutting Method in which varying numbers of reserve trees are not cut to attain goals other than regeneration. The method normally creates a two-aged stand.

**Climate** - The average course or condition of the weather at a particular place over a period of many years as exhibited in extremes, means, ranges and seasonal distributions.

**Climax** - The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition.

**Climax Community** - The final stage in plant succession for a site. Its nature is determined largely by the climate and soil of a region. Absent disturbance, the climax community develops and maintains itself in steady state conditions.

**Climax Species** - Species that are self-perpetuating in the absence of disturbance.

**Climax Vegetation** - The pattern or complex of climax communities in a landscape corresponding to the pattern of environmental gradients or habitats.

**Closed Allotment/Area** - An allotment or area where livestock grazing is not permitted.

**Coarse-filter Analysis** - An analysis of aggregates of elements such as cover type or plant community.

**Coarse Filter Management** - Land management that addresses the needs of all associated species, communities, environments, and ecological processes in a land area. (See fine filter management.)

**Collector Roads** - Roads that serve small land areas and are usually connected to a Forest System Road, a county road, or a state highway.

**Commercial Forest Land** - Forest land that is producing or is capable of producing crops of industrial wood and (a) has not been withdrawn by Congress, the Secretary, or the Chief, (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions, and (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within 5 years after final harvesting.

**Commercial Thinning** - Selective cutting in immature stands in which all or part of the felled trees are extracted for useful products and designed to improve the quality and growth of the remaining trees.

**Commodity** - A resource product for which a monetary value has been established.

**Common Variety Mineral** - (also called salable mineral) In general, common variety mineral ma-

terials occur widely and have a low unit value. These include common varieties of sand, gravel, cinders, stone, pumice, clay and other similar materials. Defined in the Materials Act of 1947 and Public Law 167 of 1955, these minerals are sold rather than located or leased. Their disposal is totally at the discretion of the Forest Service.

**Community** - All of the organisms inhabiting a common environment and interacting with one another, or an association of interacting populations usually defined by the nature of their interaction in the place in which they live.

**Community Cohesion** - The degree of unity and cooperation within a community in working toward shared goals and solutions to problems. Used in the context of human relationships.

**Community Stability** - A community's capacity to handle change without major hardships or disruptions to component groups or institutions. Measurement of community stability requires identification of the type and rate of proposed change and an assessment of the community's capacity to accommodate that level of change.

**Community Type** - An aggregation of all plant communities distinguished by floristic and structural similarities in both overstory and undergrowth layers. A unit of vegetation within a classification.

**Compartment** - A unit of forested land, usually between 1,000 and 3,000 acres in size, defined by natural and man-made features and used to facilitate timber planning.

**Competition** - The general struggle for existence and dominance in which living organisms compete for a limited supply of the necessities of life.

**Composition** - What an ecosystem is composed of. Composition could include water, minerals, trees, snags, wildlife, soil, microorganisms, and certain plant species that comprise a biotic community or other ecological unit.

**Concern** - (Also management concern) An issue, problem or condition which constrains the range of management practices identified by the Forest Service in the planning process.

**Confine** - To limit fire spread within a predetermined area principally by use of natural or precon-

structed barriers or environmental conditions. Suppression action may be minimal and limited to surveillance under appropriate conditions

**Conifer** - A tree, usually evergreen, that produces cones, such as a pine, spruce, or fir tree

**Connected Actions** - Closely related actions which automatically trigger other actions, cannot proceed unless other actions are taken previously or simultaneously, or are interdependent parts of a larger action and depend on the larger action for justification

**Connectivity (of habitats)** - The linkage of similar but separated vegetation stands by patches, corridors or "stepping stones" of like vegetation. This term can also refer to the degree to which similar habitats are linked

**Connectivity** - The condition in which the spatial arrangement of land or water habitats allows biological and ecological processes to function across the landscape. Connectivity is the opposite of fragmentation

**Conservation** - The careful protection, utilization and planned management of natural resources to prevent their depletion, exploitation, destruction, waste or neglect

**Consistency** - The degree to which all resource plans and permits, contracts and other instruments for the use and occupancy of National Forest System land adhere to Forest Plan direction

**Constraint** - A limitation, action which cannot be taken or must be taken

**Consumer Organism** - An organism which ingests other organisms or existing organic matter

**Consumptive Use** - A use of resources that reduces the supply, such as logging and mining (See also nonconsumptive use)

**Contain** - To surround a fire, and any spot fires therefrom, with control lines as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions

**Contingency Plan** - A plan for providing timely recognition of approaching critical fire situations, priority setting, and deployment of forces and other action to resolve those situations

**Continuous Grazing System** - Unrestricted grazing throughout the entire grazing season every year

**Contour** - A line drawn on a map connecting points of the same elevation

**Contrast** - The degree to which adjacent landscape elements differ from each other, with respect to species composition and physical attributes

**Control** - To complete the control line around a fire, any spot fires therefrom, and any interior islands to be saved, burn out any unburned area adjacent to the fire side of the control line, and cool down all hot spots that are immediate threats to the control line, until the line can reasonably be expected to hold under foreseeable conditions

**Coordinated Resource Management (CRM)** - The process whereby various user groups are involved in discussion of alternative resource uses and collectively diagnose management problems, establish goals and objectives, and evaluate multiple use resource management

**Core Area** - A term used to describe a component of grizzly bear habitat. Core areas are free of motorized access during the nondenning period. Core areas must meet the following criteria

No motorized use of roads and trails during the nondenning period. Within the core area, restricted roads require closure devices that are permanent such as tank traps, large boulders, dense vegetation, etc

No roads or trails that receive nonmotorized, high intensity use as defined in established cumulative effects activity definitions

Minimum of 3 miles from any open road or motorized trail. This will be accomplished by buffering all open roads and open motorized trails

Consideration should be given to ensure that the core areas meet seasonal bear habitat needs by assuring that spring, summer, fall and denning habitat within the core areas are representative of these seasonal habitats in the entire analysis area

Once core areas become established and effective, these areas should remain in place

for at least 10 years. This duration is based upon the generation time for a female grizzly bear or the time it takes a female grizzly bear to replace herself.

**Corridor** - A linear strip of land managed for specific vegetational and other (roads) characteristics to allow the movement of species between areas of suitable habitat. The landscape elements that connect similar patches through a dissimilar matrix or an aggregation of dissimilar patches.

**Cost-efficiency** - The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values but are achieved at specified levels in the least cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates-of-return may be appropriate.

**Council on Environmental Quality (CEQ)** - The Council issues regulations binding on all federal agencies, to implement the procedural provisions of the National Environmental Policy Act. The regulations address the administration of the NEPA process, including preparation of Environmental Impact Statements (EIS) for major federal actions which significantly affect the quality of the human environment.

**Cover** - Any feature that conceals wildlife or fish. Cover may be dead or live vegetation, boulders, or undercut streambanks. Animals use cover to escape from predators, to rest or to feed.

**Cover Class** - Represents a percentage range for a fixed area covered by the crowns of plants. It is measured as a vertical projection of the outermost portion of the foliage. Cover Class A = <40% canopy cover, Cover Class B = 40-60% canopy cover, Cover Class C = >60% canopy cover.

**Cover-forage Ratio** - The ratio of hiding cover to foraging areas for wildlife species.

**Cover, Percent** - The area covered by the combined aerial parts of plants and vegetative ground cover expressed as a percent of the total area.

**Cover Type (forested cover type)** - Stands of vegetation that are distinguished by the existing dominant or codominant plant canopies. The as-

pen cover type contains plants distinct from the pinyon-juniper cover type.

**Created Opening** - An opening in the forest cover (nonstocked and seedling stages) created by the application of even-aged silvicultural practices (clearcuts, seed cuts of a shelterwood, or group selection), and nonstocked and seedling stages following natural or prescribed fire.

**Critical Area** - A portion of rangeland which has a critical issue related to it, such as a threatened or endangered or sensitive species, a high use recreation area, or a key wildlife habitat. The area serves as a monitoring and evaluation site for the critical issue.

**Critical Habitat** - Specific area occupied by threatened or endangered species, on which are found those physical and/or biological features that are essential to the conservation of the species.

**Crop Tree** - A tree that forms, or is selected to form, a component of the final stand, specifically, one selected to be carried through to maturity. Also known as a final crop tree or growing stock tree.

**Crown** - The upper part of a tree or other woody plant carrying the main branch system and foliage above a more or less clean stem.

**Crown Closure** - See cover class.

**Crown Cover** - The amount of canopy provided by branches and foliage of trees, shrubs, and herbs in a plant community. May be specified by species, growth form or collectively.

**Crown Fire** - A fire that advances from top to top of trees or shrubs more or less independently of the surface fire. Sometimes crown fires are classed as either running or dependent, to distinguish the degree of independence from the surface fire.

**Crown Height** - The distance from the ground to the base of the crown of a tree.

**CU Allotment** - An allotment grazed by both sheep and cattle (common use).

**Culmination of Mean Annual Increment** - For a tree or stand of trees, the age at which the average annual increment is greatest. It coincides precisely with the age at which the current annual increment just equals the mean annual increment of

the stand and thereby define the rotation of a fully stocked stand that yields the maximum volume growth

**Cultural Resource** - The remains of sites, structures, or objects used by humans in the past - historical or archaeological

**Cultural Sensitivity** - Refers to the likelihood of encountering significant cultural values (quantity and/or quality) that may affect and may be affected by ground-disturbing activities

**Cumulative Actions** - Actions which when viewed with other proposed actions have cumulatively significant impacts

**Cumulative Effects or Impacts** - The impact on the environment which results from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other action. Cumulative effects or impacts can result from individually minor but collectively significant actions taking place over a period of time

**Cumulative Effects Analysis** - An analysis of the cumulative effects

**Cutting Cycle** - The planned lapse of time between successive cuttings in a stand

**Cutting Method** - Describes cuttings used either to help reproduce forest stands (reproduction or harvest cuttings) or to maintain their vigor and desired composition and structure in terms of tree species, ages, and size classes (intermediate cuttings)

**Cycling** - One of the ways functions are described, resources which are transported within the system (such as animal migration, nutrient cycling in a forest stand, snow melt becoming part of the surface or groundwater flow )

-D-

**Data** - Any measurements, facts, evidence or observations reduced to a recorded and retrievable format

**DB** - Database

**DBH** - Diameter at Breast Height

**Decomposer** - An organism, usually a bacterium or fungus, that breaks down the bodies or parts of dead plants and animals into simpler compounds

**Decomposition** - The process of separating into constituent parts, elements, or simpler organic and inorganic compounds. In biological systems, a process usually accomplished by fungi and bacteria

**Decomposition Class** - Any of five stages of decomposition of logs left in the forest, stages range from essentially sound to almost total decomposition (See table at end of glossary for additional information)

**Defoliation** - The removal of leaves from plants, especially by herbicides or plant eating animals

**Density** - Numbers of individuals or stems per unit area (Density does not equate to any kind of cover measurement )

**Departure** - A timber sale schedule that deviates from the principle of nondeclining flow by exhibiting a planned decrease in the sale schedule at any time during the planning horizon. A departure is characterized by a temporary increase, usually in the beginning decade(s) of the planning horizon, over the base sale schedule originally established. This increase does not impair the future attainment of the long-term sustained yield capacity

**Dependent Species** - A species for which a habitat element (for example, snags) is deemed essential for the species to occur regularly or to reproduce

**Desirable Plant Species** - Species which contribute to the management objectives

**Desired Condition (DC)** - A portrayal of land or resource conditions which are expected to result if planning goals and objectives are fully achieved

**Desired Future Condition (DFC)** - A description of the cumulative results of implementing the goals expressed in the Forest Plan

**Desired Future Vegetation** - The future state of the plant community on a site or an ecological unit which meets forest plan or other management objectives

**Desired Plant Community** - A plant community which produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the Forest Land Management Plan or Allotment Management Plan objectives established for an ecological type(s). The desired plant community must be consistent with the type's capability to produce the desired vegetation through management, land treatment, or a combination of the two. The desired plant community must conserve to the extent practicable the long-term potential of the site to produce vegetation, and produce in the short-term those combinations of desired goods and services.

**Desired Soil Protection** - Desired soil quality standards which meet forest plan or other management objectives for maintaining soil productivity potential, including thresholds for soil cover, erosion, compaction and soil displacement.

**Desired Vegetation Condition (DVC)** - For both riparian areas and nonforested uplands is defined as The specific future condition of rangeland vegetation and other resources such as aquatic habitat and water quality that meet management objectives as identified in the Forest Plan, Allotment Management Plans, or other documents. Additional clarification can be found in the nonforested vegetation sections of Chapters 3 and 4 of the EIS.

**Detrimental Compaction** - See Soil section of glossary.

**Detrimental Displacement** - See Soil section of glossary.

**Detrimental Disturbance** - See Soil section of glossary.

**Detrimental Puddling** - See Soil section of glossary.

**Developed Recreation Sites** - Relatively small, distinctly defined and developed areas where facilities are provided for concentrated public use, (for example, campgrounds, picnic areas, and swimming areas). These areas have more than \$50,000 of investment and two or more developed facilities are present.

**Development Scale** - The following scale describes facility development levels for dispersed and developed recreation sites.

1- Minimum site modification. Rustic or rudimentary improvements designed for protection of the site rather than comfort of the users. Use of synthetic materials excluded. Minimum controls are subtle. No obvious regimentation. Spacing informal and extended to minimize contacts between users. Motorized access not provided or permitted.

2- Little site modification. Rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of the users. Use of synthetic materials avoided. Minimum controls are subtle. Little obvious regimentation. Spacing informal and extended to minimize contacts between users. Motorized access provided or permitted. Primary access over primitive roads. Interpretive services informal, almost subliminal.

3- Site modification moderate. Facilities about equal for protection of site and comfort of users. Contemporary/rustic design of improvements is usually based on use of native materials. Inconspicuous vehicular traffic controls usually provided. Roads may be hard surfaced and trails formalized. Development density about 3 family units per acre. Primary access may be over high standard roads. Interpretive services informal, but generally direct.

4- Site heavily modified. Some facilities designed strictly for comfort and convenience of users. Luxury facilities not provided. Facility design may incorporate synthetic materials. Extensive use of artificial surfacing of roads and trails. Vehicular traffic control usually obvious. Primary access usually over paved roads. Development density 3-5 family units per acre. Plant materials usually native. Interpretive services often formal or structured.

5- High degree of site modification. Facilities mostly designed for comfort and convenience of users and usually include flush toilets, may include showers, bathhouses, laundry facilities, and electrical hookups. Synthetic materials commonly used. Formal walks or surfaced trails. Regimentation of users is obvious. Access usually by high-speed highways. Development density 5 or more family units per acre. Plant materials may be foreign to the environment. Formal interpretive services usually available. Designs formalized and architecture may be contemporary. Mowed lawns and clipped shrubs not unusual.

**DFC** - Desired Future Condition

**Diameter at Breast Height (DBH)** - The diameter of a tree measured 4 feet 6 inches (1.4 m) above the ground

**Direct Effect** - An effect that is caused by an action and occurs in [generally] the same time and place as the action

**Discount Rate** - An interest rate that represents the cost or time value of money in determining the present value of future costs and benefits. A "real" discount rate is one adjusted to exclude the effects of inflation

**Discounting** - An adjustment, using a discount rate, for the value of money over time so that costs and benefits occurring in the future are reduced to a common time, usually the present, for comparison

**Dispersal** - The movement of plants and animals away from their point of origin to another location where they subsequently get established and produce offspring

**Dispersed Recreation** - Recreational activities that do not require developed facilities. These include hiking, fishing, hunting, biking, camping at undeveloped campsites, etc

**Dispersed Recreation Sites** - Relatively small, undeveloped areas where public recreation use occurs. These areas have less than \$50,000 of investment in facilities such as toilets, tables, fencing, etc. These sites are generally adjacent to roads or trails and are used for dispersed recreation activities, such as camping, fishing, hunting, hiking, etc

**Dispersion** - To spread out the impacts of timber harvest by distributing harvest units more or less uniformly throughout a drainage

**Distinctive (Class A) landscape** - Areas where features of landform, vegetation patterns, water forms, and rock formations are of unusual or outstanding visual quality

**Disturbance** - Any event such as a forest fire or insect infestation that alters the structure, composition, or function of an ecosystem

**Disturbed Soil** - see Soil Disturbance

**Diversity** - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan. See also Biological Diversity, Edge, and Horizontal Diversity

**Dominant** - A taxon or group of taxa which by their collective size, mass, or numbers exert the most influence on community composition and form

**Drainage** - A large area mostly bounded by ridges, encompassing part, most or all of a watershed

**Drought Index** - A number representing net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers

**Durability** - The ability of resources to tolerate sustained use, without degradation of the resource base (i.e., productivity or quality)

**Dwarf Mistletoe (*Arceuthobium spp.*)** - Parasitic, seedbearing plants that attack most western conifers. Infected trees can be recognized by presence of witches' brooms, cankers, swellings, and other abnormalities. Economic losses can be heavy, as damage results in smaller trees, lower timber quality, and increased mortality

-E-

**EA** - Environmental Assessment

**Early Forest Succession** - The biotic (or life) community that develops immediately following the removal or destruction of vegetation in an area. For instance, grasses may be the first plants to grow in an area that was burned, followed by forbs and shrubs

**Ecocentric** - A conservation strategy that focuses on providing habitat patterns that are manifestations of ecological processes operating at several scales

Also, a philosophical viewpoint which emphasizes the maintenance of natural systems at the expense of commodity production and other human uses. The goal of this philosophy is to permit natural ecological processes to operate as freely as possible,

because wild land values for society ultimately depend on the retention of naturalness

**Ecoclass** - Classification system for the biological and earth sciences based on linking together existing disciplinary classifications of the major ecosystem components

**Ecological Approach** - A natural resource planning and management method that assures consideration of the relationship among all organisms (including humans) and their environment

**Ecology** - The interrelationships of living things to one another and to their environment, or the study of these interrelationships

**ECOMAP** - The name given to the Forest Service workgroup that developed the National Hierarchy of Ecological Units for the United States

**Economic impacts** -

**direct economic impact** - Effects caused directly by forest product harvest or processing or by forest uses

**indirect economic impact** - Effects that occur when supporting industries sell goods or services to directly affected industries

**induced economic impact** - Effects that occur when employees or owners of directly or indirectly affected industries spend their income within the economy

**Ecoregion** - A continuous geographic area over which the macroclimate is sufficiently uniform to permit development of similar ecosystems on sites with similar properties. Ecoregions contain multiple landscapes with different spatial patterns of ecosystems

**Ecosystem** - An arrangement of living and nonliving things and the forces that move among them. Living things include plants and animals. Nonliving parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems

**Ecosystem Composition** - The constituent elements of an ecosystem

**Ecosystem Function** - The processes through which the constituent living and nonliving elements

of ecosystems change and interact, including biogeochemical processes and succession

**Ecosystem Health** - Ecosystems at any temporal or spatial scale are "healthy" when they are dynamic and resilient to perturbations to structures, compositions and processes of their biological or physical components

**Ecosystem Management** - The use of an ecological approach to blend social, physical, economic and biological needs and values to provide productive, healthy ecosystems

**Ecosystem Pattern** - The structure that results from the distribution of organisms in, and their interaction with their environment. Includes zonation, stratification, activity or periodicity, food-webs, reproductive, social and stochastic

**Ecosystem Resilience** - The tendency of an ecosystem to return after a disturbance to its former structure and function

**Ecosystem Resistance** - The tendency of an ecosystem to remain unchanged in the face of a disturbance

**Ecosystem Restoration** - Returning an ecosystem from a nonsustainable to a sustainable condition

**Ecosystem Stability** - The degree to which an ecosystem is resistant and/or resilient to disturbances

**Ecosystem Structure** - The spatial arrangement of the living and nonliving elements of an ecosystem

**Ecosystem Sustainability** - The ability to sustain diversity, productivity, resilience to stress, health, renewability, and/or yields of desired values, resource uses, products, or services from an ecosystem while maintaining its integrity over time

**Edge** - The margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand, or a Douglas-fir stand next to an aspen stand

**Edge Effect** - The increased richness of plants and animals resulting from the mixing of two communities where they join

**Effects** - The environmental consequences of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air, water and other natural systems, including ecosystems.

Effects and impacts as used in this statement are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social or health whether direct, indirect or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial.

**EHE** - Elk Habitat Effectiveness

**EIS** - Environmental Impact Statement

**Elk Habitat Effectiveness (EHE)** - A measure of the quality of an area for elk during the spring/summer/fall seasons. Two habitat parameters are considered to be most important for EHE: 1) motorized road and trail densities (measured in miles/square mile), 2) elk hiding cover (measured as a percentage of an area in cover).

**Elk Hiding Cover** - Vegetation capable of hiding 90 percent of a standing adult elk from the view of a human at a distance equal to or less than 200 feet.

**Elk Vulnerability (EV)** - The percent mortality of bull elk during the fall general rifle hunting season. Two parameters are considered to be most important for EV: 1) hunter densities (measured in hunter-days/square mile), 2) motorized road and trail densities (measured in miles/square mile).

**Emergent Vegetation** - Plants rooted in shallow water and having most of the vegetative growth above water.

**Emission** - A release of air contaminants into the outdoor atmosphere.

**Endangered Species** - Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified (listed) by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

**Endangered Species Act** - Public Law 93-205 (16 U.S.C. 1531-1536, 1538-1540). Cited as the Endangered Species Act of 1973. The Act requires consultation with U.S. Fish and Wildlife Service if practices on National Forest System lands may impact a threatened or endangered species (plant or animal).

**Endemic** - Native to, and restricted in distribution to, a defined area. (Not epidemic).

**Environment** - The complex of climatic, soil and biotic factors that act upon and influence an ecosystem. The complex of these factors which make up the immediate habitat of an organism.

**Environmental Analysis** - An analysis of alternative actions and their predictable long and short-term environmental effects. Environmental analyses include physical, biological, social and economic factors.

**Environmental Assessment (EA)** - A document providing evidence and analysis relating to a proposed action by a Federal Agency. It establishes whether an environmental impact statement (EIS) must be written, or a finding of no significant impact (FONSI) will be issued. It includes the proposed action and alternatives, and evaluates their potential environmental impacts.

**Environmental Impact Statement (EIS)** - A statement of the environmental effects of a proposed action and alternatives to it. It is required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA) and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal.

**Ephemeral Streams** - Streams that flow only as the direct result of rainfall or snowmelt. They have no permanent flow.

**Erosion** - The wearing away of the land surface by wind, water, ice or gravity.

**ESA** - Endangered Species Act

**Escaped Fire** - A fire which has exceeded, or is anticipated to exceed, initial attack capabilities or the fire management direction or prescription

**EV** - Elk Vulnerability

**Even-aged Forest** - A forest stand comprising trees with less than a 20-year difference in age

**Even-aged Management** - Timber management actions that result in the creation of a stand of trees in which the trees are essentially the same age. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands

**Even-aged Stand** - A portion of a forest or a stand composed of trees having no, or relatively small, differences in age, although differences of as much as 30 percent are admissible in rotations greater than 100 years

**Even-aged System** - A silvicultural system that produces stands in which all trees are about the same age, that is, the difference in age between trees forming the main crown canopy level will usually not exceed 20 percent of the rotation length

**EWU** - Ecological Water Unit

**Exclusion Areas** - Areas having a statutory prohibition to rights-of-way for lineal facilities or corridor designation

**Extensive Management** - The practice of forestry on a basis of low operating and investment costs per acre. Also known as extensive forestry

**Extinct** - A species is extinct when it no longer exists

**Extinction** - The process which results in the complete elimination of a species leaving no living descendants. Extinctions may be local or global

**Eyrie** - A ledge along a cliff used for nesting peregrine falcons

sanitary landfills, dams, bridges and communication systems

**Fauna** - The animal life of an area

**Felling** - Cutting down trees

**Fen** - Low peaty land covered wholly or partly with water

**Final Cut** - The removal of the last seed bearers or shelter trees after regeneration of new trees has been established in a stand being managed under the shelterwood system of silviculture

**Final Removal** - Removal of all remaining overstory trees to release an adequately stocked salvageable understory

**Final Removal Cut** - A type of cut that releases established regeneration from competition with seed trees under the seed tree and shelterwood regeneration methods. Reserve trees may or may not be retained

**Fine Fuels** - Fast drying fuels such as grass, leaves, draped pine needles, and small twigs that when dry ignite readily. Fine fuels are considered 1 hour timelag fuels (see timelag definition)

**Fine Organic Matter** - Organic material on top of mineral soil consisting of fallen vegetative matter in various stages of decomposition. Specifically referred to as horizons in soil descriptions. Fine organic matter includes woody material up to 3 inches in diameter

**Fines** - Waterborn particles the size of silt and clay

**Fire** - The rapid, persistent chemical reaction of a fuel and oxygen that releases heat, light and unburned particulate (smoke)

**Fire Ecology** - Area of study addressing the relationships among fire, the environment, and living organisms

**Fire Frequency** - The number of wildland fires started in a given area over a given time

**Fire Group** - A collection of similar habitat types and their associated fire ecology

**Fire Hazard** - A fuel complex, defined by volume, type condition, arrangement, and location, that

**-F-**

**Facilities** - Physical infrastructure such as administrative buildings, water and sanitation systems,

determines the degree of ease of ignition and of resistance to control

**Fire Management** - All activities required for the protection from fire of burnable wildland values and the use of fire to meet land management goals and objectives

**Fire Management Area** - One or more parcels of land having a common set of fire management objectives

**Fire Occurrence** - Number of fires per unit time in a specified area

**Fire Regime** - The characteristic frequency, extent, intensity, severity and seasonality of fires in an ecosystem

**Fire Risk** - The chance of fire starting, as affected by the nature and incidence of causative agents, an element of the fire danger in any area

**Fire Suppression** - All work and activities associated with fire extinguishing operations beginning with discovery and continuing until the fire is completely extinguished

**Fireline Intensity** - The amount of heat released in BTUs per foot of fire front per second Related to the difficulty of containment of a fire

**Fish** - Any of numerous cold-blooded aquatic vertebrates having fins, gills and a streamlined body

**Fish-bearing Stream Reaches** - Those portions of streams and rivers that support fish of any species during all, or a portion of, their life cycle

**Fisheries Habitat** Streams, lakes, and reservoirs that support fish, or have the potential to support fish

**Floodplain** - The lowland and relatively flat area adjoining waters including, at a minimum, the area subject to a one percent or greater chance of flooding in any given year (100-year recurrence)

**Flora** - The plant life of an area

**Fluvial** - Of or relating to rivers and streams

**FOIA** - Freedom of Information Act

**Food Chain** - A series of spatially associated species, each of which lives as a predator, parasite or absorber of the next lower species down in the series

**FOR** - FORPLAN or FORPLAN Alternative

**Forage** - All browse and herbaceous foods that are available to grazing animals It may be grazed or harvested for feeding

**Forb** - A broadleaf plant that has little or no woody material in it

**Foreground** - The part of a scene or landscape that is nearest to the viewer

**Forest** - An ecosystem characterized by a more or less dense and extensive tree cover Usually supporting or capable of supporting forests at a density of 10 percent crown closure or more

**Forest and Rangeland Renewable Resources Planning Act (RPA) (1974)** - Public Law 93-378 (16 U S C 1600-1614) This act requires the development of long term strategies for the management and inventory of the renewable forest and range resources of National Forest System lands

**Forest Health** - A measure of the robustness of forest ecosystems Aspects of forest health include biological diversity, soil, air, and water productivity, natural disturbances, and the capacity of the forest to provide a sustained flow of goods and services for people

**Forest Land** - See "Timber Classification "

**Forest Plan** - Source of management direction for an individual National Forest unit Specifies allowable activities, minimum requirements, expected outputs and land use allocations for a 10 to 15-year period

**Forest Roads and Trails** - A legal term for Forest roads or trails that are under the jurisdiction of the Forest Service

**Forest Structure** - Often divided into four conceptual aspects age, species composition, horizontal or mosaic pattern, and vertical

**Forest Supervisor** - The official responsible for administering National Forest System lands on an

administrative unit, usually one or more National Forests The Forest Supervisor reports to the Regional Forester

**Forest Trees** - Woody plants having a well-developed stem and usually more than 12 feet in height at maturity

**Forest Type** - A descriptive concept used to differentiate groups of stands of similar character of development and species composition from other groups of stands

**FORPLAN** - A linear programming-based forest planning model This model allows the user to find the combination of activities and outputs that will maximize or minimize the desired objective, subject to constraints (Schuster and others, 1993 )

**Fragile** - Those land or water areas containing ecosystems, possibly but not necessarily rare, that are sensitive to external stimuli which may disturb their balance, especially in an irreversible direction

**Fragmentation** - The splitting or isolating of patches of similar habitat, typically forest cover, but including other types of habitat Habitat can be fragmented naturally or from forest management activities, such as clearcut logging

**Freedom of Information Act (FOIA) (1966)** - Public Law 93-502 (5 U S C 552) The act provides public access to records of the agencies and departments of the Executive Branch of the U S government

**Frequency** - A quantitative expression of the presence or absence of individuals of a species in a population

**FRES** - Forest Range Environmental Study (See Process Paper K)

**Frissell Condition Classes** - A classification system which rates the degree of person-caused change that a wilderness, dispersed campsite or concentrated-use area has undergone There are five classes as follows

Frissell Condition Class 1 - Visible Indicators Ground vegetation flattened, but not permanently injured Minimal physical change except for possibly a simple rock fireplace

Frissell Condition Class 2 - Visible Indicators Ground vegetation worn away around fireplace or center of activity

Frissell Condition Class 3 - Visible Indicators Ground vegetation lost on most of the site, but humus and litter still present in all but a few areas

Frissell Condition Class 4 - Visible Indicators Bare mineral soil widespread Tree roots exposed on the surface

Frissell Condition Class 5 - Visible Indicators Soil erosion obvious Trees reduced in vigor or dead

**FSRAMIS** - Forest Service Range Management Information System

**Fuel Loading** - The dry weight of fuels in a given area, usually expressed in tons per acre Fuel loading may be referenced to fuel size and may include total biomass

**Fuel Management** - The treatment of fuels that would otherwise interfere with effective fire management or control For instance, prescribed fire can reduce the amount of fuels that accumulate on the forest floor before the fuels become so heavy that a natural wildfire in the area would be explosive and impossible to control

**Fuel Model** - Simulated fuel complex for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified

**Fuel Moisture Content** - The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees F

**Fuels** - Plants and woody vegetation, both living and dead, that are capable of burning

**Fuelwood** - Wood that is round, split, or sawn and/or otherwise generally refuse material cut into short lengths or chipped for burning

**Function** - All the processes within an ecosystem through which the elements interact, such as succession, the food chain, fire, weather, and the hydrologic cycle

**Functional Planning** - Planning which focuses on a single aspect or resource of a total complex

**Grazing Season** - The season of use specified on the grazing permit for a specific allotment

**-G-**

**Game Species** - Any species of wildlife or fish that is harvested according to prescribed limits and seasons

**Grazing System** - A specialization of grazing management which defines systematically recurring periods of grazing and deferment for two or more pastures or management units. Includes deferred, intermittent, deferred-rotation, and short-duration grazing systems

**Geographic Information System (GIS)** - A set of procedures and computer hardware and software for organizing, storing, retrieving, analyzing, and displaying data that includes a geographic position component

**Greater Yellowstone Area** - A term for the 117-million-acre area made up of parts of six National Forests and two National Parks in northwest Wyoming, eastern Idaho, and southwest Montana

**Ghost Road** - See Nonsystem Road

**GIS** - Geographic Information Systems

**Greenline** - The first perennial vegetation from the waters edge. Riparian areas that are in late seral status with stable stream banks will exhibit a continuous line of vegetation at the bankfull discharge level. Rocky stream types may have a significant amount of rock causing breaks in the vegetation. This rock is considered part of the green line. Other breaks may occur in the first perennial band of vegetation (watercourses or bare ground). The amounts of these (perennial vegetation, rock, and bare ground) should be recorded

**Goal** - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and may not have a specific date for accomplishment

**Goods and Services** - The various outputs, including on-site users, produced from forest and rangeland resources

**Grizzly Bear Security Cover** - Forested areas (all tree species) which have not been managed or burned in the last 20 years, and forested areas managed or burned within the last 20 years which meet the following criteria

**Grassland** - Plant communities whose potential natural and dominant vegetation is comprised of grasses and grasslike plants

The overstory and understory categories are to be considered separately. A stand having either 130 sq ft of basal area per acre or 250 understory trees per acre over 7 ft tall would meet the requirements for full security cover. Both live and dead tree basal areas were used for overstory calculations

**Grasslike Plant** - A plant of the Cyperaceae or Juncaceae families which vegetatively resembles a true grass of the Gramineae family

**Grazing** - Consumption of forage by animals

**Grazing Formula** - The specific order of grazing or sequence within a grazing system

**Ground Cover** - Material covering the land surface. It may include live vegetation, standing dead vegetation, litter, cobble, gravel, stones and bedrock. Ground cover plus bare ground would total 100 percent of the area evaluated

**Grazing Period** - The period of time livestock use a specific pasture or unit within a grazing allotment, as identified in the yearly Annual Operating Plan or Allotment Management Plan. The end of the grazing period will not coincide with the end of the grazing season, unless that pasture or unit is grazed last. There is usually more than one grazing unit or pasture in an allotment. The grazing period for a pasture or unit usually changes from year to year as a result of rotation grazing systems

**Ground Fire** - A fire that burns along the forest floor and does not burn in the crowns of mature trees

**Ground Water** - The supply of fresh water under the earth's surface in an aquifer or in the soil

**Group Selection** - A method of tree harvest in which trees are removed periodically in small groups. This silvicultural treatment results in small openings that form mosaics of age class groups in the forest.

**Group Selection Regeneration Method** - A method of regenerating uneven-aged stands in which trees are cut, and new age classes are established, in small groups.

**Growing Stock Trees** - Live trees, meeting specified standards of quality or vigor, included in growth and yield projections to arrive at the allowable sale quantity.

**Guideline** - In Forest Plans, guidelines represent a preferred or advisable course of action that is generally expected to be carried out. Deviation from compliance with a guideline does not require a Forest Plan amendment, but the rationale for such a deviation shall be documented in the project decision document.

**Guilds** - A group of organisms that share a common food resource.

## -H-

**Habitat** - The area where a plant or animal lives and grows under natural conditions.

**Habitat Capability** - The ability of a land area or plant community to support a given species of wildlife.

**Habitat Diversity** - The number of different types of habitat within a given area.

**Habitat Type** - An aggregation of all land areas capable of supporting similar plant communities at climax (Pflister and other, 1977).

**Hard Snag** - See Snag-hard.

**Harvest Activity** - In timber management, a reference to a specific type of cut applied under a regeneration or intermediate treatment method. Refer to FSH 2409 14, Chapter 78 for valid values.

**Harvest Cutting** - The felling of the final crop of trees either in a single cutting or in a series of regeneration cuttings. Generally, the removal of fi-

nancially or physically mature trees, in contrast to cuttings that remove immature trees. Also referred to as main felling and major harvest.

**Harvesting** - A loose term for the removal of natural resource for human use or consumption.

**Hawksworth Classes** - A six-class dwarf mistletoe rating system useful to (1) quantify the degree of infection so that stand management priorities can be established, (2) aid quantification and estimation of growth loss and mortality, (3) help define which trees are suitable for seed trees, and (4) help quantify the mistletoe-infection hazard of overstory trees or stands to understory stands.

For this system the live crown is divided into thirds, and each third is rated as 0, no mistletoe, 1, light mistletoe (less than half of the branches infected), and 2, heavy mistletoe (more than half of the branches infected). The ratings of each third are added to obtain a total for the tree. For example, a tree heavily infected in the lower third of the crown, lightly infected in the middle third, and not infected in the upper third, would be a Class 3. A tree heavily infected in each third would be a Class 6. The system is simple to use, and different observers tend to rate an infected tree similarly.

**Healthy Ecosystem** - An ecosystem in which structure and functions allow the maintenance of the desired condition of biological diversity, biotic integrity, and ecological processes over time.

**Herb** - Any flowering plant except those developing persistent woody stems above ground.

**Herbivore** - Any animal (mammal, bird, insect, etc.) that consumes living plants or their parts.

**HGL** - Hydric Greenline.

**Hiding Cover** - Vegetation or other surface characteristics (rocks, downed logs, etc.) that will hide 90% of an animal from the view of a human at some distance that varies by species. For deer and elk that distance is 200 feet.

**Hierarchical** - A type of classification technique whose successively lower level units must fit entirely within the separate units delineated by the next higher level in that system.

**Hierarchical Approach** - An analysis approach

accounting for differences in space and time (USDA Forest Service 1994)

**Historic Nest Site** - See Nest Site

**Historical Variation** - See Variability, Range of

**Home Range** - The area in which an animal conducts its activities during a defined period of time

**Horizontal Diversity** - The distribution and abundance of plant and animal communities or different stages of plant succession across an area of land. The greater the numbers of communities in a given area, the higher the degree of horizontal diversity

**Human Dimension** - An integral component of ecosystem management that recognizes people are part of ecosystems, that people's pursuits of past, present, and future desires, needs, and values (including perceptions, beliefs, attitudes, and behaviors) have and will continue to influence ecosystems, and that ecosystem management must include consideration of the physical, emotional, mental, spiritual, social, cultural, and economic well-being of people and communities

**Human Impact or Influence** - A disturbance or change in ecosystem composition, structure, or function caused by humans

**Hydric Greenline** - A belt of perennial riparian vegetation found closest to the water's edge. It is the area where recovery of riparian and aquatic ecosystems is first expressed and, therefore, can be monitored to test the impacts of livestock grazing. It is also the area which approximates the geographic elevation of the active floodplain, a feature otherwise difficult to locate

**Hydric Soil** - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation

**Hydrologic Cycle** - Also called the water cycle, this is the process of water evaporating, condensing, falling to the ground as precipitation, and returning to the ocean as runoff

**Hydrologically Disturbed Condition** - Changes in natural canopy cover (vegetation removal) or a change in surface soil characteristics (such as compaction) that may alter natural streamflow quanti-

ties and character. Acres of vegetation within a watershed that are in a non-stocked, seedling, sapling, or first entry category, acres in roads, acres from other types of mechanical treatments (e.g., roto-beat acres within the sagebrush ecosystem), and burned acres are included in the calculation of hydrologically disturbed area

**Hydrologically Recovered Condition** - Vegetative life form where natural canopy coverage is achieved and subsequent streamflow quantities and character (timing and amount) reflect more natural conditions. Within the forested ecosystem this equates roughly with the sapling/early pole life form. This life form is achieved at approximately 20 to 30 years of age, depending upon cover type and inherent site productivity potentials

**Hydrology** - The science dealing with the study of water on the surface of the land, in the soil and underlying rocks and in the atmosphere

-I-

**Idaho and Wyoming Species of Concern** - Plant or animal species which are officially listed by state agencies due to concerns for habitats and/or populations

**Igneous Rock** - Rocks formed when high temperature, molten mineral matter cooled and solidified

**Implementation Schedules** - The schedules of projects and specific actions to implement a Land and Resource Management Plan. Implementation schedules are normally revised annually. They include site-specific actions, responsibilities and target dates

**Improvement Cutting** - The elimination or suppression of less valuable trees in favor of more valuable trees, typically in a mixed, uneven-aged forest

**Increaser** - Plant species of the original vegetation that increase in relative amount, at least for a time, under overuse

**Index** - A number derived from a formula to characterize a complex set of information

**Indicator** - An organism or an ecologic community that is so strictly associated with particular environmental conditions, that its presence (or ab-

sence) is a fairly certain sign or symptom of the existence of these conditions

**Indicator Species** - A plant or animal species adapted to a particular kind of environment. Its presence is sufficient indication that specific habitat conditions are also present

**Indigenous Species** - Any species of flora or fauna that naturally occurs in an area and that was not introduced by man

**Indirect Effect** - Those effects occurring at a later time or distance from the triggering action

**Individual (Single) Tree Selection** - The removal of individual trees from certain size and age classes over an entire stand area. Regeneration is mainly natural, and an uneven-aged stand is maintained

**Individual Tree Selection Cutting** - An uneven-aged cutting method in which selected trees from specified size or age classes are removed over the entire stand area to meet a predetermined goal of size or age distribution and species composition in the remaining stand

**Infrastructure** - The foundation (transportation, communications, utilities, schools, etc.) underlying an area's economy

**Input** - Broadly referring to anything that is taken in by or enters into the workings of a system

**Insect Pests** - Any of a variety of insects that can impact forest health by damaging or killing trees. Insect population levels may also affect other forest resources and activities like wildlife habitat, visual quality and fire management. Some of the important insects in the Intermountain Region include Douglas-fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir tussock moth (*Orgyia pseudotsugata*), Fir engraver (*Scolytus ventralis*), Mountain pine beetle (*Dendroctonus ponderosae*), Spruce beetle (*Dendroctonus rufipennis*), Western balsam bark beetle (*Dryocoetes confusus*) and Western spruce budworm (*Choristoneura occidentalis*)

**Instream Flows** - The minimum water volume (cubic feet per second) in each stream necessary to meet seasonal streamflow requirements for maintaining aquatic ecosystems, visual quality, recreational opportunities, and other uses

**Integrated Pest Management (IPM)** - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are considered, including the impact of the unregulated pest population to resources, alternative regulation strategies, and benefit/cost estimates of these alternative strategies

**Integrated Resource Management** - A management strategy which emphasizes no resource element to the exclusion or violation of the minimum legal standards of others

**Interdisciplinary Team (IDT)** - A team of individuals with skills from different disciplines that focuses on the same task or project

**Intermediate Cut** - The removal of trees from a stand sometime between the beginning or formation of the stand and the regeneration cut. Types of intermediate cuts include thinning, release, and improvement cuttings

**Intermittent Stream** - A stream that flows only at certain times of the year when it receives water, usually from a surface source such as melting snow. These streams have a defined bed and banks

**Intermountain Region** - The fourth of nine geographical regions of the United States designated by the Forest Service for administrative purposes. Headquartered in Ogden, Utah, the Intermountain Region oversees administration of National Forests in Utah, Nevada, Southern Idaho and Southwestern Wyoming

**Invader** - Plant species that were absent in the original vegetation and will invade under disturbance or continued overuse

**Inventoried Roadless Area** - (West of the 100th meridian) An area which meets the statutory definition of wilderness, does not contain improved roads maintained for travel by standard passenger-type vehicles, and meets one or more of the following criteria

- Contains 5,000 acres or more
- Contains less than 5,000 acres, but

- Due to physiography or vegetation, is manageable in a natural condition
- Is a self-contained ecosystem such as an island

- Is contiguous to existing wilderness, primitive area, Administration-endorsed wilderness, or roadless area in other Federal ownership, regardless of size

**Inventoried Roadless Area** - (East of the 100th meridian) An area which contains no more than a half mile of improved road for each 1,000 acres, in which the road is under Forest Service jurisdiction and

- The land is regaining a natural, untrammelled appearance
- Improvements existing in the area are being affected by the forces of nature rather than humans and are disappearing or muted
- The area has existing or attainable National Forest System ownership patterns, both surface and subsurface, that could ensure perpetuation of identified wilderness values
- The location of the area is conducive to the perpetuation of wilderness values, considering the relationship of the area to sources of noise, air and water pollution and other unsightly conditions that would have an effect on the wilderness experience

**Inventory** - The gathering of data for future use Also, a collection of such data

**Inversion** - A condition in which air temperatures increase rather than decrease with increasing elevation in the atmosphere A rising air mass in the atmosphere is inhibited by this stratification, allowing for pollutants to be trapped near the surface

**Irretrievable** - Applies to losses of production, harvest or commitment of renewable natural resources For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site If the use is changed, timber production can be resumed The production lost is irretrievable, but the action is not irreversible

**Irreversible** - Applies primarily to the loss or commitment of nonrenewable resources, such as minerals or cultural resources, or to those that are renewable only over long time spans, such as soil productivity Irreversible also includes loss of future options

**Issue** - A point, matter or question of public discussion or interest to be addressed or decided through the planning process

Preliminary issue is an issue identified early in the scoping phase and is sometimes referred to as a tentative issue

Significant issue is an issue within the scope of the proposed action which is used to formulate alternatives in an Environmental Analysis (EA) or Environmental Impact Statement (EIS)

**-K-**

**Key Area** - A relatively small portion of rangeland which because of its location, grazing or browsing value, and/or use, serves as a monitoring and evaluation site (A key area guides the general management of the entire area of which it is a part, and will reflect the overall acceptability of current grazing management over the range )

**Key Species** - (1) Forage species whose use serves as an indicator to the degree of use of associated species (2) Those species which must, because of their importance, be considered in the management program

**Key Summer Range** - The portion of a wildlife species' summer range that is essential for the animal's pre, post, and reproduction cycles Deer require "fawning areas" where does give birth and hide their fawns for an essential period of time in the spring

**Key Winter Range** - That portion of range where big game animals find food and cover during severe winter weather

**Kind of Livestock** - Species of animal

**-L-**

**LAC** - Limits of Acceptable Change

**Ladder Fuels** - Vegetation located below the crown level of forest trees which can carry fire from the forest floor to tree crowns Ladder fuels may be low-growing tree branches, shrubs, or smaller trees

**Land** - A term denoting the entire complex of surface and near-surface attributes of the solid portion of the surface of the earth which are significant to mankind

**Land Class** - The topographic relief of a unit of land Land classes are separated by slope This

coincides with the timber inventory process. The three land classes used in the Forest Plan are defined by the following slope ranges: 0 to 40%, 41-60%, and greater than 60%.

**Landform** - Any physical, recognizable form or feature of the earth's surface having a characteristic shape and produced by natural causes.

**Landscape** - A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts. Landscapes are often used for coarse grain analysis.

**Landscape Ecology** - The body of knowledge pertaining to the ecological effects of spatial patterns in ecosystems.

**Landtype** - A group of defined and named taxonomic soil units occurring together in an individual and characteristic pattern over a geographic region.

**Land Unit** - One of the hierarchy levels used for project planning, encompassing one to tens of acres.

**Land Use Allocation** - In land management planning, the committing of a given area of land or resources to one or more specific uses such as to campgrounds, wilderness, etc.

**Large Woody Debris** - Organic materials such as plant stems and branches with a diameter greater than 3 inches. Included are both natural materials and management induced post-harvest slash. Large trees, or parts of them, that accumulate in streams or other water bodies. This material is important for aquatic habitat and stream channel stability, and in maintenance of on-site productivity.

**Late-Successional Forests** - Forest seral stages that include mature and old-growth age classes.

**Leasable Mineral** - Leasable minerals are hard-rock and liquid minerals that are subject to exploration and development under leases, permits, and licenses under the Mineral Leasing Act of 1920 and several other subsequent Acts. Oil, gas, coal and phosphates have been the most sought-after leasable minerals on the Forest, along with the geothermal resource. The Forest Service decides which lands are available for leasing and under what

conditions these lands are leased. The BLM decides whether or not to offer for lease the lands authorized by the Forest Service.

**Legal Notice** - A notice of a decision which can be appealed that is published in the Federal Register or in the legal notice section of a newspaper of general circulation.

**Lentic** - Relating to, or living in, still waters (as lakes, ponds and swamps).

**Limiting Factor** - Any environmental factor whose presence, absence or abundance is the main factor restricting the distribution numbers or condition of an organism.

**Limits of Acceptable Change (LAC)** - A planning framework that establishes explicit measures of the acceptable and appropriate resource and social conditions in wilderness settings as well as the appropriate management strategies for maintaining or achieving those desired conditions.

**Line Officer** - The official (District Ranger, Forest Supervisor, Regional Forester, etc.) having authority for a specific district, forest, region, etc.

**Litter (forest litter)** - The freshly fallen or only slightly decomposed plant material on the forest floor. This layer includes foliage, bark fragments, twigs, flowers and fruit.

**Locatable Mineral** - In general, locatable minerals are hardrock minerals which are mined and processed for the recovery of metals, or mineral which are "valuable" in the economic sense. Examples which occur on the Forest include gold, silver, lead, copper and opal. Citizens rights to exploration and access are granted under the General Mining Law of 1872. By agreement with the BLM the Forest Service administers locatable mining activities on Forest lands.

**Logging Residues** - The residue left on the ground after timber cutting. It includes unused logs, uprooted stumps, broken branches, bark, and leaves. Certain amounts of "slash" provide important ecosystem roles, such as soil protection, nutrient cycling, and wildlife habitat.

**Long-term Sustained Yield Capacity (LTSYC)** - The highest uniform wood yield from lands being managed for timber production that may be sus-

tained, under a specified management intensity, consistent with multiple-use objectives

**LTSL** - Less-Than-Standard Service Level

**LTSYC** - Long-term Sustained Yield Capacity

**-M-**

**M** - Thousand Five thousand board feet of timber can be expressed as 5M board feet

**MAI** - Mean Annual Increment

**Maintenance Class** - In facilities management a method of classifying existing facility needs for budget purposes and others

Maintenance Class 1, Satisfactory Facility is safe and sanitary Annual maintenance will not exceed 10 percent of replacement cost

Maintenance Class 2, Substandard Facility is safe and sanitary, although substandard as to type, construction standard, or not in keeping with planned experience-level for the site Annual maintenance will not exceed 10 percent of current replacement cost of standard type facility May be scheduled for eventual elimination or replacement but will serve intended purpose for next 3-5 years

Maintenance Class 3, Heavy Maintenance Facility unsafe or otherwise unsatisfactory May be put back in good condition at a cost not to exceed 50 percent of current replacement of like kind facility

Maintenance Class 4, Replacement Facility unsafe or otherwise unsatisfactory To put back in good condition would cost more than 50 percent of the replacement cost Replace with like kind and standard of facility Cost includes both removal of old facility and replacement

**Manage** - To treat with care, handle or direct with skill

**Management Action** - Any activity undertaken as part of the administration of the National Forest

**Management Area** - Units of land small enough for Districts and the public to characterize and develop issues for, but large enough to provide for

management flexibility A desired future condition developed for the management area describes and will assist in achieving the shared land expectations

**Management Concern** - An issue, problem or a condition which constrains the range of management practices identified by the Forest Service in the planning process

**Management Direction** - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them

**Management Ignition** - A fire started by a scheduled, deliberate management action

**Management Indicator Species** - A wildlife species whose population and trend in a certain habitat type indicates the population and trend of other species that are dependent upon the same habitat

**Management Intensity** - A management practice or combination of management practices and associated costs designed to obtain different levels of goods and services

**Management Practice** - A specific activity, measure, course of action or treatment

**Management Prescription** - Management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives

**Management Situation 1** - Population and habitat conditions The area contains grizzly population centers (areas key to the survival of grizzly where seasonal or yearlong grizzly activity, under natural, free-ranging conditions is common) and habitat components needed for the survival and recovery of the species or a segment of its population The probability is very great that major Federal activities or programs may affect (have direct or indirect relationships to the conservation and recovery of) the grizzly (IGBC, 1986 )

**Management Situation 2** - Population and habitat conditions Current information indicates that the area lacks distinct population centers, highly suitable habitat does not generally occur, although some grizzly habitat components exist and grizzlies may be present occasionally Habitat re-

sources in Management Situation 2 either are unnecessary for survival and recovery of the species, or the need has not yet been determined but habitat resources may be necessary. Certain management actions are necessary. The status of such areas is subject to review and change according to demonstrated grizzly population and habitat needs. Major Federal activities may affect the conservation of the grizzly bear primarily in that they may contribute toward (a) human-caused bear mortalities or (b) long-term displacement where the zone of influence could affect habitat use in Management Situation 1 (IGBC, 1986)

**Management Situation 3** - Population and habitat conditions. Grizzly presence is possible but infrequent. Developments, such as campgrounds, resorts, or other high human use associated facilities, and human presence result in conditions which make grizzly presence untenable for humans and/or grizzlies. There is a high probability that major Federal activities or programs may affect the species' conservation and recovery (IGBC, 1986)

**Market-Value Outputs** - Goods and services valued in terms of what people are willing to pay for them rather than go without, as evidenced by market transactions

**Mass Movement/Wasting** - The downslope movement of large masses of earth material by the force of gravity. Also called a landslide or earthflow

**Mature Forest** - Trees that have attained full development, especially height, and are in full seed production

**Mature Timber** - Generally used in an economic sense to indicate that a forest has attained harvest age

**Maximum Modification** - See "Visual Quality Objectives"

**MBF** - Thousand board feet (See board feet)

**Mean Annual Increment** - The average yearly growth of trees in a stand over a period of years, usually expressed in annual cubic feet of growth per acre

**Mean Annual Increment of Growth** - The total increase in size or volume of individual trees. Or, it can refer to the increase in size and volume of a

stand of trees at a particular age, divided by that age in years

**Mean Fire Interval** - Arithmetic average of all fire intervals determined in years, in a designated area during a specified time period. The size of the area and the time period must be specified

**Microclimate** - The climate of a small site. It may differ from the climate of the larger area due to aspect, tree cover (or the absence of tree cover), or exposure to winds

**Microhabitat** - A restricted set of distinctive environmental conditions for a small habitat, such as the area under a log

**Microsite** - A localized area in which environmental conditions differ in a significant or important way from those of the region outside the area

**Middleground** - A term used in the management of visual resources, or scenery. It refers to the visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly from the stand

**Mineral Soil** - Soil that consists mainly of inorganic material, such as weathered rock, rather than organic matter. Any soil composed chiefly of mineral matter (sand, silt, clay, rocks, etc.)

**Minimum Impact Suppression Tactics (MIST)** - In wildland firefighting, a concept employing the minimum amount of forces needed to effectively achieve fire management protection objectives consistent with land and resource management objectives. Derives from a sensitivity to the impacts of suppression tactics and their long-term effects in areas such as wilderness with special values. Can feature a range of suppression and support actions to minimize impacts to these values, and special rehabilitation measures

**Minimum Streamflow** - A specified minimum level of flow through a channel that must be maintained by the users of the stream for biological, physical, or other purposes

**MIS** - Management Indicator Species

**MIST** - Minimum Impact Suppression Tactics

**Mitigate/mitigation** - To lessen the severity. Actions taken to avoid, minimize or rectify the impact of a land management practice

**Mixed Stand** - A stand of trees in which less than 80 percent of the trees in the main crown canopy are of a single species

**MM** - Million

**MMBF** - Million board feet (See board feet )

**Modification** - A visual quality objective, management activities may visually dominate the original characteristic landscape, but they must borrow from naturally established form, line, color or texture so that the activity blends with the surrounding area

**Monitoring** - The determination of how well project or plan objectives have been met and how closely management practices should be adjusted (See adaptive management )

**Mortality** - The volume in trees that were merchantable and have died within a specified period of time. The term mortality can also refer to the rate of death of a species in a given population or community

**Mountain Pine Beetle** - A tiny black beetle, *Dendroctonus ponderosae*, ranging from 1/8 to 1/4-inch in size, that bores through a pine tree's bark to feed in the phloem layer in the inner bark. Such feeding by large numbers of beetles girdles and kills the tree. The beetle also carries the blue stain fungus that clogs the trees water transport system

**Multiple-Use** - The management of all the various renewable surface resources of National Forest System lands for a variety of purposes such as recreation, range, timber, wildlife and fish habitat, and watershed

**Municipal Supply Watershed** - A watershed that serves a public water system as defined in Public Law 93-523 (Safe Drinking Water Act), or as defined in State safe drinking water regulations. The definition does not include communities served by a well or confined ground water unaffected by Forest Service activities

**National Environmental Policy Act (NEPA) (1970)** - Public Law 91-190 (42 U S C 4321-4347, parts ) The basic national charter for the protection of the environment. It establishes policy, sets goals and provides means for carrying out the policy. The NEPA process helps public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment

**National Forest Management Act (NFMA) (1976)** - Public Law 94-588 (16 U S C 1600-1614 and others ) This act amended the Forest and Rangeland Renewable Resources Planning Act of 1974, and lays out the process for developing, adopting and revising land and resource management plans for National Forest System lands

**National Forest System (NFS) Lands** - Federal lands that have been designated by Executive Order or statute as National Forests, National Grasslands, Purchase Units, and other lands under the administration of the Forest Service, including Experimental Areas and Bankhead-Jones Title III lands

**Native** - Species indigenous to an area of consideration

**Native Organisms** - Animals or plants which originated in the area in which they are found, i.e., were not introduced and naturally occur in the area

**Native Species** - Any species of flora or fauna that naturally occurs in the United States and that was not introduced by humans

**Native Trout Watersheds** - Those primary watersheds identified as containing contiguous well connected subwatersheds with high aquatic integrity and population strongholds of native cutthroat trout or have the capability to achieve this condition through recovery efforts. They have been determined to be necessary for species recovery. Of the 39 primary watersheds on the Forest, 17 have been designated: Elk Creek (003), Palisades Creek (004), Rainey Creek (005), Pine Creek (006), Heise (007), Henry's Fork Headwaters (008), Robinson Creek (013), Trail Creek (017), Mahogany Creek (022), Moody Creek (024), Bitch Creek (032), Burns-Pat Canyon (035), McCoy-Jensen Creeks (036), Elk-Bear Creeks (037), Fall Creek (038), Pritchard Creek (039), and Brockman Creek (040)

Additional fish population and habitat inventory and analysis will be conducted in the future and will provide the basis for determining the capability of these Native Trout Watersheds in meeting recovery goals. Based on this information, specific subwatersheds will be designated for maintenance or recovery efforts and others may be designated as not vital to recovery goals. Additional Native Trout Watersheds may be designated, or existing Native Trout Watersheds may be deleted.

**Natural** - Existing in, or formed by, nature, not artificial.

**Natural Barrier** - A natural feature, such as a dense stand of trees or downfall, that will restrict animal travel.

**Natural Catastrophic Condition** - A significant change in forest conditions in the planning area that affects Forest Plan resource management objectives and their projected and scheduled outputs, uses, costs, and impacts on local communities and environmental quality.

**Natural Ignition** - A fire started at random by natural causes.

**Natural Range of Variability** - See Variability, Range of.

**Natural Regeneration** - Renewal of a tree crop by self-sown seed or from sprouts.

**Natural Resource** - A feature of the natural environment that is of value in serving human needs.

**Naturalized Species** - Introduced or alien (not native) species that are now permanently established and reproducing spontaneously (without human fostering).

**Nest Site** - The location of nest structures used by birds for incubating and hatching eggs.

**a) Active Nest Site** - The location of nest structures which have been used within a current year or one year previous.

**b) Historic Nest Site** - The location of nest structures which are known to have been used, but not within 2 years. Historic nest sites must be documented in Forest or District databases to be subject to standards and guidelines.

**Nest Survey** - A way to estimate the size of a bird population by counting the number of nests in a given area.

**Net Public Benefits** - An expression used to signify the overall long-term value to the Nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of net public benefits to be derived from management of units of the National Forest System is consistent with the principle of multiple-use and sustained-yield.

**NFRS** - National Forest recreation sites that have been inventoried.

**No Action Alternative** - The most likely condition expected to exist in the future if management practices continue unchanged.

**Nonchargeable Volume** - All volume not included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantity.

**Noncommercial Vegetation Treatment** - The removal of trees for reasons other than timber production.

**Nonconsumptive Use** - The use of a resource that does not reduce its supply, for example, nonconsumptive uses of water include hydroelectric power generation, boating, swimming and fishing.

**Noncontinuous Grazing System** - Rotational and repeated seasonal grazing systems.

**Nondeclining Flow** - See base sale schedule.

**Nondegradation** - A policy of not allowing resources to deteriorate any further than what exists at a chosen point in time. The objective is to either maintain the status quo, or to improve resource conditions.

**Nonforest Land** - See "Timber Classification."

**Nongame** - Species of animals not managed for sport hunting.

**Noninterchangeable Component (NIC)** - A portion of the allowable sale quantity (ASQ) which cannot be substituted for from other areas or species types. Volume programmed from a NIC will not be replaced by volume from other NICs. The volume in the NICs are mutually exclusive.

**Nonmarket-Valued Outputs** - Goods and services not generally traded in the marketplace, but valued in terms of what reasonable people would be willing to pay for them rather than to do without them. Those obtaining the actual outputs do not necessarily pay what they would be willing to pay for them.

**Nonnative Species** - A species introduced into an ecosystem through human activities.

**Nonpoint Source Pollution** - Pollution whose source is not specific in location. The sources of discharge are dispersed, not well-defined, or constant. Examples include sediments from logging activities, and runoff from agricultural chemicals.

**Nonrenewable Resource** - A resource whose total quantity does not increase measurably over time, so that each use of the resource diminishes the supply.

**Notice of Intent** - A notice printed in the Federal Register announcing that an Environmental Impact Statement (EIS) will be prepared.

**Noxious Plant** - A plant recognized by law as being especially undesirable, troublesome, and difficult to control.

**Noxious Weed** - See Noxious plant.

**NTU** - Nephelometric Turbidity Units.

**Nutrient Cycle** - The circulation of chemical elements and compounds, such as carbon and nitrogen, in specific pathways from the nonliving parts of ecosystems into the organic substances of the living parts of ecosystems, and then back again to the nonliving parts of the ecosystem. For example, nitrogen in wood is returned to the soil as the dead tree decays, the nitrogen again becomes available to living organisms in the soil, and upon their death, the nitrogen is available to plants growing in that soil.

**Nutrient Cycling** - The assimilation of an element by organisms and its release in a reusable inorganic form.

**Objective** - A clear and quantifiable statement of planned results to be achieved within a stated time period. Something aimed at or striven for within a predetermined time period. An objective must be achievable, be measurable, have a stated time period for completion, be quantifiable, be clear, and its results must be described.

**Off-Highway Vehicle (OHV)** - Any of a class of vehicles, regardless of width, weight or number of wheels, designed for or capable of travel over unimproved terrain. Snowmobiles, all terrain vehicles, high clearance four-wheel-drive pickups, and trail bikes and motorcycles are all off-highway vehicles.

**OHV** - Off-Highway Vehicle.

**Old Growth** - Terrestrial ecosystems characterized by vegetation of, and associated animals requiring, the most mature seral stages. Old growth forests contain trees normally beyond the age of optimum maturity for economic harvest. The precise definition of old growth varies with the tree species comprising the stand.

**Opportunities** - Ways to address or resolve public issues or management concerns in the land and resource management planning process.

**Opportunity Class** - In the Limits of Acceptable Change wilderness planning method, opportunity classes represent the desired conditions management would attempt to achieve and maintain over the planning period.

**Optimum** - A level of production that is consistent with other resource requirements as constrained by environmental, social, and economically sound conditions.

**Organism** - A plant or animal.

**OROMTRD (Open Road and Open Motorized Trail Route Density)** - See definition under Roads.

**Output** - One of the ways functions are described, resources which leave a system, such as, animals migrating out of an area, mass erosion, removal of commercial timber from an area, etc.

**Overmature Timber** - Trees that have obtained full development, particularly in height, and are declining in vigor, health, and soundness.

**Overstory** - The upper canopy or canopies of plants Usually refers to trees, tall shrubs, and vines

**Overstory Removal** - The final harvest cut of the shelterwood method in which overstory trees are removed releasing the established regeneration

-P-

**Packing** - A temporary influx of organisms of various sex and age classes into remaining suitable habitat as previously available habitat is changed to unsuitable conditions

**PAOT** - Persons-At-One-Time

**Parasites** - Organisms that absorb nutrients from the body fluids of living hosts Parasites may be fungal, bacterial, plant or animal, (examples include the braconid wasp that parasitizes the fir engraver beetle, or dwarf mistletoe)

**Parent Material** - The unconsolidated and more or less chemically weathered, mineral or organic matter from which soils developed by soil-forming processes

**Partial Retention** - A visual quality objective which, in general, means human activities may be evident, but must remain subordinate to the characteristic landscape

**Particulates** - Small particles suspended in the air and generally considered pollutants

**Partnership** - A cooperative, working relationship between the Forest Service and individuals, corporations, organizations or public agencies to pool financial and human resources to complete projects on National Forest System lands

**Patch** - A small (20-60 acres) part of the forest An area of vegetation that is internally homogeneous, differing from what surrounds it (matrix)

**Patch Cut** - A clearcut that creates small openings in a stand of trees, usually between 1 and 20 acres in size

**Payment in Lieu of Taxes (PILT)** - Payments to local or State governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing Specifically, includes payments made under the payments in

Lieu of Taxes Act of 1976 by U S Department of the Interior

**Payments to Local Government** - The portion of receipts derived from Forest Service resource management that is distributed to State and county governments such as the Forest Service 25 percent fund payments

**Percent Use** - The percentage of current year's forage production that is consumed or destroyed by grazing animals May refer to a single species or to the vegetation as a whole

**Percolation** - Downward flow or infiltration of water through the pores or spaces of rock or soil

**Perennial Streams** - Streams that flow continuously throughout most years These streams have defined bed and banks

**Permitted Grazing** - Grazing on a National Forest range allotment under the terms of a grazing permit

**Personal Use** - Normally used to describe the type of permit issued for removal of wood products (firewood, posts, poles, and Christmas trees) from National Forest System land when the product is for home use and not to be resold for profit

**Persons-At-One-Time (PAOT)** - A recreation capacity measurement term indicating the number of people who can use a facility or area at one time

**Planning** - The act of deciding in advance, what to do A dynamic problem solving effort used to guide future actions and decisions

**Planning Area** - The area covered by a Regional Guide or Forest Plan

**Planning Period** - One decade The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits

**Planning Regulations** - The regulations at 36 CFR 219 implementing NFMA which guide land and resource management planning on the National Forests

**Plant Association** - A potential natural plant community of definite floristic composition and uniform appearance See Association

**Plantation** - Clearcut harvested area that has regenerated with natural and/or planted seedlings

**Plant Community** - An aggregation of plants that are similar in species composition and structure, and occupy similar habitats over the landscape  
See Community

**Plant Vigor** - Plant health

**PM-10** - Smoke and debris particles with an aerodynamic diameter smaller than or equal to a nominal ten micrometers

**PNV** - Present Net Value or Potential Natural Vegetation

**Pole Timber** - Trees of at least 3.0 inches DBH, but smaller than 8.0 inches DBH, (except lodgepole pine and aspen which includes trees less than 7.0 inches DBH)

**Policy** - A guiding principle which is based on a specific decision or set of decisions

**Pollution** - The presence of matter or energy whose nature, location or quantity produces undesired environmental effects

**Porosity** - Pertaining to landscapes, the density of a particular type of patch within a matrix. Porous landscapes have many small patches of similar type contained within the matrix

**Potential Natural Community (PNC)** - (nonforested vegetation) - The biotic community that would become established on an ecological type if all successional sequences were completed without interference by man under the present environmental conditions. Natural disturbances, such as drought, floods, wildfire, grazing by native fauna, insects, and disease, are inherent in its development. The Potential Natural Community (PNC) may include acclimatized or naturalized nonnative species

The similarity between the present plant community and the PNC is the seral stage, and can be expressed as a percentage. PNC is the ecological status of vegetation that ranges from 86% - 100% of the Potential Natural Community

**Potential Vegetation** - Vegetation that would develop if all successional sequences were completed under present site conditions

**Practicable** - When funding is obtained or a project is initiated

**Practice (Also Management Practice)** - A specific activity, measure, course of action, or treatment

**Precommercial Thinning** - Removal of trees from a young stand to promote increased growth on the remaining stems and maintain a specific stocking or stand density range, controlling species composition and stand quality through selection of trees that are to remain in the stand

**Predator** - An animal (rarely a plant) that kills and eats animals. Sometimes used in the sense of an insect consuming a seed

**Preparatory Cut** - The removal of trees near the end of a rotation, which opens the canopy and enables the crowns of residual trees to enlarge, to improve conditions for seed production and natural regeneration. Typically done in the shelterwood system

**Prescribed Fire** - Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions which allow fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to attain planned resource management objectives

**Prescribed Fire or Burn** - A wildland fire ignited by humans under pre-planned, specified conditions, to accomplish specific, planned resource management objectives. This practice is common in California and is also known as "controlled burning"

**Prescribed Natural Fire** - A wildland fire ignited by natural sources such as lightning or volcanism. These fires are allowed to burn in designated areas under carefully established conditions to provide for safety and fire control. If these conditions are exceeded, or predicted to worsen, a fire is reclassified as a wildfire and suppressed

**Prescription** - A set of management practices selected to accomplish specific land and resource management objectives

**Present Net Value** - The difference between the discounted value (benefits) of all outputs to which monetary values or established market prices are

assigned and the total discounted costs of managing the planning area

**Preservation** - See "Visual Quality Objectives "

**Presuppression** - Activities organized in advance of fire occurrence to assure effective suppression action

**Prey** - Animals eaten by predators

**Primary Succession** - The concept in which there is a sequence of vegetation development initiated on newly formed soils or upon surfaces exposed for the first time (as by landslides) which have never previously supported vegetation

**Primitive ROS (Recreation Opportunity Spectrum)** - A classification of wilderness and recreation opportunity It is characterized by an essentially unmodified environment, where trails may be present but structures are rare, and, where it is highly probable to be isolated from the sights and sounds of people (See ROS )

**Principal Watersheds** - The National Forest System watersheds used for purposes of project and Forest planning

**Probability of Ignition** - A rating of the probability that a firebrand (glowing or flaming) will cause a fire, provided it lands on receptive fuels It is calculated from air temperature, fuel shading, and fuel moisture

**Production** - The generation or "manufacturing" of resources within a system (such as, plant growth, animal reproduction, snags falling and becoming down woody material )

**Productive** - The ability of an area to provide goods and services and to sustain ecological values

**Productivity** - The amount of material (wood, forage, meat, etc ) yielded by an ecosystem, or its inherent potential to yield such material

**Program** - When capitalized, the Renewable Resource Program required by the RPA Generally, sets of activities or projects with specific objectives, defined in terms of specific results and responsibility for accomplishment

**Project** - A single activity or an integrated group of activities designed to accomplish a specific on-the-

ground purpose or result

**Properly Functioning Condition** - Ecosystems at any temporal or spatial scale that are dynamic and resilient to disturbance to structure, composition, and processes of their biological and physical components

**Proposal** - A proposal exists at the stage in the development of an action when an agency is actively preparing to make a decision on one or more alternative means of accomplishing a goal and the effects can be meaningfully evaluated

**Proposed Action** - A proposal by the Forest Service to authorize, recommend or implement an action

**Province** - The third-highest level in the National Hierarchical Framework of Ecological Units developed by ECOMAP See also Chapter III, Part 2

**Public Issue** - A subject or question of widespread public interest relating to management of the National Forest System or one of its units

**Public Land** - Land for which title and control rests with a government - federal, state, regional, county or municipal

**Public Participation** - Generally, collaboration by the public at large in Forest Service planning and decision making Can be facilitated by meetings, conferences, seminars, workshops or tours, and can take the form of written or oral comments or responses or other such contributions

**Purpose and Need** - The underlying reason(s) to which the agency is responding in generating a proposed action

-R-

**Range (of a species)** - The area or region over which an organism occurs

**Range** - Land on which the principal natural plant cover is native grasses, forbs, and shrubs available as forage for big game and livestock

**Range Allotment** - An area designated for the use of a prescribed number and kind of livestock under one management plan

**Range Analysis** - Systematic acquisition and evaluation of rangeland resources data for allotment management and overall land management planning

**Range Inspection** - A field inspection of rangeland to determine if the forest plan standards and guides, the allotment management plan goals and objectives, and the grazing permit requirements are being met and followed

**Range of Natural Variability** - See Variability, Range of

**Rangeland** - All land producing or capable of producing native vegetation, and lands that have been revegetated naturally or artificially. Includes all grasslands, shrublands, and those forest lands which will continually or periodically, naturally or through management, support an understory of herbaceous or shrubby vegetation

**Rangeland Condition** - The state of vegetation, soil cover, and soils in relation to a standard or ideal for a particular ecological type. (See satisfactory rangeland and unsatisfactory rangeland condition)

**Range Management** - The art and science of planning and directing range use intended to yield the sustained maximum animal production and perpetuation of the natural resources

**Range of Variability (Natural Variability, Historical Variability)** - See Variability, Range of

**Ranger District** - The administrative subunit of a National Forest that is supervised by a District Ranger who reports directly to the Forest Supervisor

**Raptor** - A bird of prey, primarily meat eating birds with strong hooked bills and sharp talons. Includes but is not limited to members of the Strigidae (Owls), Cathartidae (New World Vultures), Accipitridae (Hawks and Eagles), Falconidae (Falcons), and Laniidae (Shrikes)

**RARE II** - Roadless Area Review and Evaluation. The national inventory of roadless and undeveloped areas within the National Forests and Grasslands

**Reach** - A continuous unbroken stretch of a stream, with homogeneous characteristics

**Real Dollar Value** - A monetary value that compensates for the effects of inflation

**Recharge** - The addition of water to ground water by natural or artificial processes

**Record of Decision** - An official document in which a deciding official states the alternative that will be implemented from a prepared EIS

**Recovery** - The achievement of viable populations of threatened or endangered plant or animal species

**Recreation Capacity** - The number of people that can take advantage of any supply of recreation opportunity at any one time without substantially diminishing the quality of the experience sought after

**Recreation Opportunity Class or Spectrum (ROS)** - A system categorizing land areas by settings and probable or desired recreation experiences. Six categories have been defined as follows

**Primitive (P or Class I)** Very high probability of experiencing solitude, freedom, closeness to nature, tranquility, self-reliance, challenge and risk. Unmodified natural or natural appearing environment. Very low interaction between users. Minimal evidence of other users. Restrictions and controls not evident after entry. Access and travel is nonmotorized on trails or cross country. No vegetation alterations. Access for people with disabilities can be most difficult and very challenging. No site modifications for facilities. Interpretation through self-discovery. No on-site facilities. No facilities for user comfort. Rustic and rudimentary ones for site protection only. Use undimensioned native materials. (USDA Forest Service 1994)

**Semi-Primitive Nonmotorized (SPNM or Class II)** High probability of experiencing solitude, closeness to nature, tranquility, self-reliance, challenge and risk. Natural appearing environment. Low interaction between users. Some evidence of other users. Minimum of subtle on-site controls. Access and travel is nonmotorized on trails, some primitive roads or cross country. Vegetation alterations sanitation salvage to very small units in size and number, widely dispersed and not evident. Access for

people with disabilities is difficult and challenging. Rustic and rudimentary facilities primarily for site protection. No evidence of synthetic materials. Use undimensioned native materials. Interpretation through self-discovery. Some use of maps, brochures, and guidebooks. No on-site facilities.

**Semi-primitive Motorized (SPM or Class III)**

Moderate probability of experiencing solitude, closeness to nature, tranquility. High degree of self-reliance, challenge and risk in using motorized equipment. Predominantly natural appearing environment. Low concentration of users but often evidence of others on trails. Minimum on-site controls and restrictions present but subtle. Vegetation alterations very small in size and number, widely dispersed and visually subordinate. Access for people with disabilities is difficult and challenging. Rustic and rudimentary facilities primarily for site protection. No evidence of synthetic materials. Use undimensioned native materials. Interpretation through very limited on-site facilities. Use of maps, brochures and guidebooks.

**Roaded Natural (RN or Class IV)** Opportunity to affiliate with other users in developed sites but with some chance of privacy. Self-reliance on outdoor skill of only moderate importance. Little challenge and risk. Mostly natural appearing environment as viewed from sensitive roads and trails. Interaction between users at camp sites is of moderate importance. Some obvious on-site controls of users. Access and travel is conventional motorized including sedan, trailers, RV's and some motor homes. Vegetation alterations done to maintain desired visual and recreational characteristics. Access for people with disabilities is of only moderate challenge. Rustic facilities providing some comfort for the user as well as site protection. Use native materials but with more refinement in design. Synthetic materials should not be evident. Moderate site modification for facilities. Interpretation through simple wayside exhibits. Use native-like materials with some refinement in design. Some casual interpretation by forest staff.

**Rural (R or Class V)** Opportunity to observe and affiliate with other users is important as is convenience of facilities. Self-reliance on

outdoor skills of little importance. Little challenge and risk except for activities such as downhill skiing. Natural environment is culturally modified yet attractive. Backdrop may range from alterations not obvious to dominant. Interactions between users may be high as is evidence of other users. Obvious and prevalent on-site controls. Access and travel facilities are for individual intensified motorized use. Access for people with disabilities is easy and meets ADAAG standards. Some facilities designed primarily for user comfort and convenience. Some synthetic but harmonious materials may be incorporated. Design may be more complex and refined. Moderate to heavy site modification. Interpretation through more complex wayside exhibits including small lighted structures. Interpretive facilities such as kiosks and portals may be staffed part-time.

**Urban (U or Class VI)** Opportunity to observe and affiliate with other users is very important as is convenience of facilities and recreation opportunities. Outdoor skills, risk, and challenge are unimportant except for competitive sports. Urbanized environment with dominant structures, traffic lights and paved streets. May have natural appearing backdrop. Recreation places may be city parks and large resorts. Interaction between large numbers of users is high. Intensive on-site controls are numerous. Access and travel facilities are highly intense, motorized and often with mass transit supplements. Vegetation is planted and maintained. Access for people with disabilities is easy and meets ADAAG standards. Facilities mostly designed for user comfort and convenience. Synthetic materials are commonly used. Facility design may be highly complex and refined but in harmony or complimentary to the site. Heavy site modifications for facilities. Interpretation through very sophisticated exhibits in staffed visitor centers, wayside exhibits, etc.

**Recreation Visitor Day (RVD)** - Twelve visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

**Recruitment** - The addition to a population from all causes, including reproduction, immigration and stocking.

**Reforestation** - The natural or artificial restocking of an area with forest trees

**Regeneration** - The renewal of a tree crop, whether by natural or artificial means. Also, the young crop itself, which commonly is referred to as reproduction

**Regeneration Method** - A harvest method by which a new age class is created. The major methods are clearcutting, seed-tree, shelterwood, selection, and coppice regeneration methods and their variants

**Regional Forester** - The official of the USDA Forest Service responsible for administering an entire region of the Forest Service

**Regulations** - A set of directions drafted to implement a law or laws. Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers management of the Forest Service

**Rehabilitation** - A short-term management activity used to return visual impacts in the natural setting to a desired visual quality

**Release** - Freeing trees from competition for light, water, and nutrients by removing or reducing the vegetation growth that is overtopping or closely surrounding them

**Release Cutting** - Removal of competing vegetation to allow desired tree species to grow

**Release Treatment** - A treatment designed to free young trees from undesirable, usually overtopping, competing vegetation. Treatments include liberation, cleaning, and weeding

**Removal Cut** - The removal of the last seed bearers or shelter trees after regeneration is established

**Renewable Resource** - Resources whose total physical quantity is replenished over time and thus can sustain some rate of consumption

**Repeated Seasonal Grazing** - A situation in which a pasture is grazed at the same time each year

**Research Natural Area (RNA)** - Lands that are protected for the purpose of maintaining biological diversity, conducting nonmanipulative research and monitoring, and promoting education

**Reserve Trees** - Trees deliberately retained in a stand for a specific resource use

**Resident Fish** - Fish that are not migratory and complete their entire life cycle in fresh water

**Resource** - A broad term denoting anything that is useful for something

**Resource Value** - The value of an ecosystem for a particular use or benefit on an ecological type. This value may be expressed as the value amount or as a relative rating, when compared to the maximum value for an ecological type

**Responsible Official** - The Forest Service employee who has been delegated the authority to carry out a specific planned action

**Restoration** - Actions taken to modify an ecosystem in whole or in part to achieve a desired condition

**Restoration Ecology** - The study of recreating entire communities of organisms closely modeled after communities that occur naturally

**Retention** - A visual quality objective whose guidelines stipulate that management activities are not visually evident, and activities repeat form, line, color, and texture characteristics found in the landscape

**Revalidation** - Pertaining to prescribed natural fire, the daily certification by the approving line officer that the fire is within prescription and will remain in prescription through the ensuing 24-hour period, given reasonably foreseeable weather conditions and fire behavior

**Revegetation** - The reestablishment and development of a plant cover by either natural or artificial means, such as reseeding

**Right-of-Way** - An accurately located strip of land with defined width, point of beginning, and point of ending. Within this area the user has authority to conduct operations approved or granted by the landowner in an authorizing document, such as a permit, easement, lease, license, or Memorandum of Understanding (MOU)

**Riparian** - Of, on, or relating to the bank of a natural course of water

**Riparian Area** - Areas adjacent to water and composed of vegetation communities dependent on water near the ground surface. Associated with lakes, reservoirs, potholes, springs, bogs, wet meadows, and ephemeral, intermittent, or perennial streams.

**Risk** - Refers to situations in which the outcome is not certain, but the chance of system degradation beyond the point of resiliency and sustainability can be estimated.

**RNA** - Research Natural Area

**Road** - A created or evolved travel route greater than 500 feet long (minimum inventory standard for the Forest Service Route Management System), which is reasonably and prudently drivable with a conventional passenger car or pickup (vehicles greater than 50 inches wide and having a dry weight of 600 pounds or more).

**System Road/Managed Road** A road which is part of the official Forest Transportation Management System, these roads usually have a number and a name and are usually on the Forest travel plan maps.

**Nonsystem Road (Unmanaged Road or Ghost Road)** A road which is not part of the official Forest Transportation Management System, these roads usually do not have a number or a name and they are not on the Forest travel plan maps.

**Open Road/Motorized Road** Any road without restriction on motorized vehicle use.

**Restricted Road** Any road on which motorized vehicle use is restricted seasonally or yearlong by physical obstruction (generally gated), and on which motorized vehicle use is legally restricted. Motorized administrative use by personnel of resource management agencies is acceptable at low intensity levels as defined in existing cumulative effects analysis models. This includes contractors and permittees in addition to agency employees.

**Reclaimed/Obliterated Road** Any road which has been treated in such a manner so as to no longer function as a road or trail. This can be accomplished through one or a combination of several means including recontouring to original slope, placement of logging, road, or forest

debris, planting of shrubs or trees, etc.

**TMARD (Total Motorized Access Route Density)** Includes all open and restricted roads and open and restricted motorized trails. Density may be displayed as follows: 1) Density (miles/square mile) for an analysis area (such as a watershed or a management prescription area); 2) Density as a percentage of the analysis area in a defined density category (example: 20% > 2.0 miles per square mile).

Calculating TMARD for Grizzly Bear Management Units. Follow the procedures outlined in the Interagency Grizzly Bear Committee Taskforce Report - Grizzly Bear/Motorized Access Management, Final, approved by the IGBC, July 21, 1994.

**OROMTRD (Open Road and Open Motorized Trail Route Density):** Includes all open roads and open motorized trails. Density may be displayed as follows: 1) Density (miles/square mile) for an analysis area (such as a watershed or a management prescription area); 2) Density as a percentage of the analysis area in a defined density category (example: 20% > 2.0 miles per square mile).

A. Calculating OROMTRD for elk habitat effectiveness (the spring/summer/fall period, but not including the general big game rifle seasons).

1. OROMTRD will be calculated on the basis of principal watersheds. The area in square miles of each principal watershed will be calculated, and the miles of open roads and open trails within that principal watershed will also be calculated to determine the OROMTRD (expressed as miles/square mile). The acreage and road and trail mileage included in the calculation will include all acres (NF and private) within the principal watershed.

a. Open roads include (a) all system (managed) roads which are open for motorized use on the Forest Plan Travel Maps, plus (b) all system (managed) and nonsystem (unmanaged) roads which have more than 1 to 2 motorized vehicle trips per week for the majority of the weeks.

during the spring/summer/fall period, even if they are designated closed on the Forest Plan Travel Maps, plus (c) all highways and county roads and private roads which are open for motorized use

b Open motorized trails include (a) all system (managed) trails which are open for motorized use on the Forest Plan Travel Maps, plus (b) all system (managed) and nonsystem (unmanaged) trails which have more than 1 or 2 motorized vehicle trips per week for the majority of the weeks during the spring/summer/fall period, even if they are designated closed on the Forest Plan Travel Maps

c Open roads and open motorized trails which are on the boundary of principal watersheds will be calculated as having one-half the total mileage of that road or trail in each of the watersheds it separates. Open roads and open motorized trails which form the Forest boundary will likewise have one-half of that boundary mileage counted as occurring within the Forest

## B Calculating OROMTRD for elk vulnerability (the general big game rifle seasons)

1 OROMTRD will be calculated on the basis of principal watersheds. The area in square miles of each principal watershed will be calculated. The miles of open roads and open motorized trails within the principal watershed will also be calculated. In addition, "infinitely open areas" will be determined and included in the calculation using a factor of 6 miles of open road per square mile of infinitely open area. Open road and open motorized trail density will be expressed as miles/square mile. The acreage and road and trail mileage included in the calculation will include all acres (NF and private) within a principal watershed

a Open roads include (a) all system (managed) roads which are open for

motorized use on the Forest Plan Travel Maps during the general big game rifle seasons, plus (b) all system (managed) and nonsystem (unmanaged) roads which have motorized vehicle use during the general big game rifle seasons, even if they are designated closed on the Forest Plan Travel Maps, plus (c) all highways and county roads and private roads which are open for motorized use during the general big game rifle seasons

b Open motorized trails includes (a) all system (managed) trails which are open for motorized use on the Forest Plan Travel Maps during the general big game rifle seasons, plus (b) all system (managed) and nonsystem (unmanaged) trails which have motorized vehicle use during the general big game rifle seasons, even if they are designated closed on the Forest Plan Travel Maps

c Infinitely open areas include areas which have terrain and vegetation which allow OHV use and they are not closed to OHV use on the Forest Plan Travel Maps during the general big game hunting seasons. Calculate the total square miles for these areas, and use a factor of 6 miles of open road for each square mile of area

d Open roads and open motorized trails which are on the boundary of principal watersheds will be calculated as having one-half the total mileage of that road or trail in each of the watersheds it separates. Open roads and open motorized trails which form the Forest boundary will likewise have one-half of that boundary mileage counted as occurring within the Forest

## C Calculating OROMTRD for Management Prescription Areas. Follow the same procedure as for elk habitat effectiveness, except the boundaries will be contiguous management prescription areas (and in some cases adjacent management

prescription areas as directed in the management prescriptions)

D Calculating OROMTRD for Grizzly Bear Management Units Follow the procedures outlined in the Interagency Grizzly Bear Committee Taskforce Report - Grizzly Bear/ Motorized Access Management, Final, approved by the IGBC, July 21, 1994

**Roadless Areas** - Areas of National Forest land which qualify for placement on the inventory of potential wilderness if, in addition to meeting the statutory definition of wilderness, they meet one or more of the following criteria

- 1 They contain 5,000 acres or more
- 2 They contain less than 5,000 acres but
  - a Due to physiography of vegetation, they are manageable in their natural condition
  - b They are self-contained ecosystems such as an island
  - c They are contiguous to existing wilderness, primitive areas, Administration-endorsed wilderness, or roadless areas in other Federal ownership, regardless of their size
- 3 They do not contain improved roads maintained for travel by standard passenger-type vehicles, except as permitted in areas east of the 100th meridian

**ROD** - Record of Decision

**ROS** - Recreation Opportunity Spectrum

**Rosgen Channel Types** - A classification system developed by Dave Rosgen which places stream reaches into categories based on physical characteristics This system is useful in comparing the existing classification (condition) of a stream to its natural potential

**Rotation** - The number of years required to establish (including the regeneration period) and grow timber crops to a specific condition or maturity for regeneration harvest Selected management prescriptions in the forest plan provide the basis for the rotation age

**Rotational Grazing System** - A livestock grazing system under which animals are moved from pasture to pasture on a scheduled basis

**RPA** - The Forest and Rangeland Renewable Resources Planning Act of 1974 Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of this Act

**RPA Assessment** - An analysis of present and anticipated uses, demand for, and supply of renewable resources The Assessment is prepared every 10 years in response to the Forest and Rangeland Renewable Resources Planning Act

**Runoff** - The portion of precipitation that flows over the land surface or in open channels

**RVD** - Recreation Visitor Day

**RVR** - Resource Value Rating

-S-

**S&G Allotment** - A sheep and goat allotment

**Salable Mineral** - See Common Variety Mineral

**Sale Schedule** - The quantity of timber planned for sale by time period from the area of suitable land covered by a forest plan The first period, usually a decade, of the selected sale schedule provides the allowable sale quantity Future periods are shown to establish that long-term sustained yield will be achieved and maintained

**Salvage Cutting** - See Salvage Harvest

**Salvage Harvest** - Harvest of trees that are dead, dying, or deteriorating because they are overmature or have been materially damaged by fire, wind, insects, fungi, or other injurious agents before the wood becomes unmerchantable

**Sanitation Cutting** - See Sanitation Harvest

**Sanitation Harvest** - The harvest of dead, damaged or susceptible trees done primarily to prevent the spread of pests or disease and to promote forest health

**Sapling** - A young tree larger than a seedling but smaller than a pole Size is within the range of 1 0 to 2 9 inches DBH

**Satisfactory Condition** - (nonforested vegetation) - Vegetation that is meeting Desired Vegetation Conditions (DVC)

**Sawtimber** - Trees of a given diameter at breast height or larger that can be made into lumber. For lodgepole, this minimum diameter is 7.0 inches, for Douglas-fir, it is 8.0 inches

**Scoping** - The ongoing process to determine public opinion, receive comments and suggestions, and determine issues during the environmental analysis process. It may involve public meetings, telephone conversations or letters

**SDI** - Stand Density Index

**Second Growth** - Forest growth that was established after some kind of interference with the previous forest crop, such as cutting, fire, or insect attack

**Security Cover** - See Grizzly Bear Security Cover

**Sediment** - Solid material, both mineral and organic, transported from its site of origin by air, water, gravity or ice

**Sedimentation** - The action or process of forming or depositing excessive amounts of sediment

**Seed Cut** - Timber harvest designed to prepare the seed bed and create a new age class in an even-aged or two-aged stand under the Seed-Tree or Shelterwood Regeneration Method. Reserve trees may or may not be retained

**Seedling** - A young tree less than 1.0 inches DBH

**Seed Tree Cutting** - An even-aged cutting method in which most of the mature timber from an area is removed in one cut except for a small number of desirable trees retained to provide seed or shelter for regeneration

**Seed Tree Harvest** - Removal of the mature timber crop from an area in one cut, except for a small number of seed bearers

**Seed Tree Regeneration Method** - A method of regenerating a stand in which a new age class develops from seeds that germinate in a fully-exposed microenvironment after removal of the previous stand, except for a small number of trees left to

provide seed. This method creates an even-aged stand

**Selection** - See "Group Selection" and "Individual (Single) Tree Selection"

**Selection Cutting** - The annual or periodic removal of trees (particularly mature trees), individually or in small groups, from an uneven-aged forest, to realize the yield and to maintain age stratification

**Selection System** - An uneven-aged silvicultural system in which trees are removed individually or in groups, from a large area on a set temporal cycle

**Sensitive Species** - Those species that are recognized by the U.S. Forest Service as needing special management considerations

**Sensitivity Level** - A particular degree of measure of viewer interest in scenic qualities of the landscape. Three sensitivity levels are employed, each identifying a different level of user concern for the visual environment

Level 1 - Highest Sensitivity

Level 2 - Average Sensitivity

Level 3 - Lowest Sensitivity

**Seral** - A plant or animal community that is transitional. If left alone, the seral stage will give way to another plant or animal community that represents a further stage of succession

**Seral Stage** - Any of a series of relatively transitional planned communities that develop during ecological succession from bare ground to the climax stage. There are five stages

**Early seral stage** - (forested vegetation) - The period from disturbance to crown closure of conifer stands managed under the current forest management regime. Grass, herbs, or brush are plentiful

(nonforested vegetation) - The developmental stage of an existing plant community in progression toward a Potential Natural Community (PNC). Early seral stage is the ecological status of vegetation that ranges from 0-39% of the Potential Natural Community

**Mid seral stage** - (forested vegetation) - The period in the life of a forest stand from crown closure to first merchantability usually ages 15-

40 Due to stand density, brush, grass, or herbs rapidly decrease in the stand. Hiding cover may be present

(nonforested vegetation) - The developmental stage of an existing plant community in progression toward a Potential Natural Community (PNC). Mid seral stage is the ecological status of vegetation that ranges from 40% - 59% of the Potential Natural Community

**Late seral stage** - (forested vegetation) - The period in the life of a forest stand from first merchantability to culmination of mean annual increment. This is under a regime including commercial thinning, or to 100 years of age, depending on wildlife habitat needs. During this period, stand diversity is minimal, except that conifer mortality rates will be fairly rapid. Hiding and thermal cover may be present. Forage is minimal

(nonforested vegetation) - The developmental stage of an existing plant community in progression toward a Potential Natural Community (PNC). Late seral stage is the ecological status of vegetation that ranges from 60% - 85% of the Potential Natural Community

**Mature seral stage** - The period in the life of a forest stand from culmination of mean annual increment to an old-growth stage or to 200 years. This is a time of gradually increasing stand diversity. Hiding cover, thermal cover, and some forage may be present

**Old-growth seral stage** - This stage constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. For forest communities this stage exists from approximately age 200 until when stand replacement occurs and secondary succession begins again. Depending on fire frequency and intensity, old growth forests may have different structures, species composition, and age distributions. In forests with longer periods between natural disturbance, the forest structure will be more even-aged at late mature or early old-growth stages

**Sere** - See Seral Stage

**Series** - An aggregation of taxonomically related plant associations which take the name of (climatic) climax species that dominate, or have the potential to dominate, the principal vegetative layer in a

time frame appropriate to the vegetative or taxonomic group under consideration

**Severely Burned** - Soil organic matter and nutrient loss as a result of having been burned over. Severely burned is detrimental if it adversely affects site productivity or hydrologic function

**Shade-Tolerant Plants** - Plants that grow well in shade

**Shelterwood Regeneration Method** - A method of regenerating a stand in which a new age class develops beneath the partially-shaded microenvironment provided by the residual trees. The method creates an even-aged stand

**Shelterwood Removal Cut** - A type of cut that releases established regeneration from competition with seed trees while retaining some trees needed for shelter under the Shelterwood Regeneration Method. Reserve trees may or may not be retained

**Shrub** - A plant that has persistent, woody stems and a relatively low growth habit, and that generally produces several basal shoots instead of a single bole. It differs from a tree by its low stature and nonarborescent form

**Sight Distance** - The distance at which 90 percent or more of a deer or elk is hidden from an observer. Hiding cover exists when 90 percent or more of a standing deer or elk is hidden at a distance of 200 feet or less

**Significance** - As used in NEPA, requires consideration of both context and intensity. (See regulations at 40 CFR 1508.27)

**Silvicultural System** - The planned process whereby a stand is tended, harvested, and re-established. The system name is based on the number of age classes, and/or the regeneration method used

**Silviculture** - The art and science that promotes the growth of single trees and the forest as a biological unit to meet management objectives

**Single-Tree Selection** - See "Individual (Single) Tree Selection"

**Site** - A small area or parcel of land considered in terms of its environment

**Site Development Scale** - See Development Scale

**Site Preparation** - The general term for removing unwanted vegetation, slash, roots, and stones from a site before reforestation. Naturally occurring wild-fire, as well as prescribed fire can prepare a site for natural regeneration

**Site Productivity** - Production capability of specific areas of land

**Size Class** - One of the intervals of tree stem diameters used to classify timber in the Forest Plan data base. See Seedling, Sapling, Pole Timber, and Sawtimber

**Skidding** - Hauling logs by sliding, not on wheels, from stump to a collection point

**Skid Trail** - Narrow path on which logging equipment travels when moving logs from the forest to a designated landing location

**SL** - Standard Service Level

**Slash** - The residue left on the ground after timber cutting and/or as a result of storm, fire, or other damage. Includes unused logs, uprooted stumps, broken or uprooted stems, branches, twigs, leaves, bark and chips

**Slope Distance** - The physical measured distance on the slope (not horizontal distance)

**Small Game** - Birds and small mammals typically hunted or trapped

**Snag** - A standing dead tree greater than 20 feet tall from which the leaves and most of the limbs have fallen (USDA Forest Service 1979). Or, for wildlife habitat, a standing dead or partly dead tree at least 6 inches dbh and at least 5 feet tall (this definition is based on minimum dbh and height of trees used by primary cavity nesting species)

**Snag-hard** - Composed of sound wood, especially on the outside

**Snag-soft** - In advanced stages of decay and deterioration both inside and outside

**Snowmachine** - Any motorized vehicle which is used for over snow travel

**Soil** - The unconsolidated mineral material on the immediate surface of the earth that serves as a natural medium for the growth of land plants

**Soil and Water Conservation Practices (SWCPs)** - See Best Management Practice

**Soil Cover** - Ground cover consisting of vegetation, litter, and rock fragments larger than three-fourths inch in diameter in contact with the soil. Also, perennial canopy cover that is within 3 to 30 feet of the ground

**Soil Disturbance** - The effect upon soil of having been displaced, compacted, puddled, or severely burned. Any of these disturbances which adversely affect hydrologic function or site productivity are termed detrimental

**Detrimental Displacement** - The loss of either two inches or one-half of the humus-enriched top soil (A-horizon), or both, from an area of one square meter or larger

**Detrimental Compaction/Puddling:**

Decreases in soil porosity by 10 percent or more from undisturbed values, or doubling of the soil strength, in any two-inch increment in the top foot of soil

**Soil Hydrologic Function** - The inherent capacity of a soil to take up, retain and transmit water

**Soil Organic Matter** - The organic fraction of soil. Includes plant, animal and microbial residues, fresh and at all stages of decomposition, and the relatively resistant soil humus

**Soil Productivity** - The capacity of a soil to produce a specific crop. Productivity depends on adequate moisture and soil nutrients, as well as favorable climate

**Soil Puddling** - Puddling is generally evaluated at the mineral soil surface. Infiltration and permeability are affected by detrimental soil puddling. Visual indicators of detrimental puddling include clearly identifiable ruts with berms or hoof prints in mineral soil, or in an Oa horizon of an organic soil

**Soil Quality** - Long term soil productivity and soil hydrologic function

**Soil Survey** - The systematic examination of soils in the field and laboratory, including description,

classification, interpretation of productivity and mapping

**Soil Wood** - Woody debris, larger than 3 inches in diameter, that is incorporated into the soil surface layers

**Spatial Scale** - The level of resolution in space perceived or considered

**Special Forest Products** - Nontimber renewable plant products (such as mushrooms, berries, flowers, etc )

**Special Use Permit** - A permit issued to an individual or group by the USDA Forest Service for use of National Forest System land for a special purpose. Examples of permitted activities could include a Boy Scout Jamboree or a mountain bike race

**Species** - A fundamental category of plant or animal classification

**Species Composition** - The proportions of various plant or animal species in relation to the total on a given area. Plant species may be expressed in terms of cover, density, weight, and so on

**Stand** - A community of trees or other vegetation sufficiently uniform in composition, constitution, age, spatial arrangement or condition to be distinguishable from adjacent communities and so form a silvicultural or management entity

**Stand Exam** - The activity of looking at a stand in the field to obtain measure of stand conditions, physical site factors, and other environmental data to help determine future management of the stand

**Stand Replacement Fire** - Fire which kills all or most living overstory trees in a forest and initiates regrowth at an earlier seral stage

**Standard** - A measurable constraint on management activities or practices often expressed as a maximum or minimum. Deviation from compliance with a standard requires a Forest Plan amendment

**Standard Service Level (SL)** - Management level designed to enhance the recreation experience, ensure public safety, correct resource damage, and maximize the longevity and serviceability of recreation facilities

**Standards and Guidelines** - Requirements found in a Forest Plan which impose limits on natural resource management activities, generally for environmental protection. See Chapter III

**State Air Quality Regulations** - The legal base for control of air pollution sources in a State. Prescribed burning is generally covered under these regulations

**State Implementation Plan** - A State plan that covers implementation, maintenance, and enforcement of primary and secondary standards in each air quality control Region, pursuant to section 110 of the Clean Air Act

**Stocked Stand** - A stand is certified as stocked when there are 140-300 established trees per acre, depending on species, over 70% of the stand five years after a regeneration cut. See FWSG for timber

**Stocking** - A measure of the proportion of the area in a stand actually occupied by trees, expressed in terms of stocked quadrats or percent of canopy closure (as distinct from stand density)

**Stocking Level** - (Timber management) The number of trees in an area as compared to the number of trees desired. (Livestock grazing) The area of land allotted to each animal unit for the entire grazing period. Usually expressed as a ratio

**Storage** - A description of resources which are conserved within a system such as, sediments and water retained in wetlands, or carbon and other nutrient storage in down woody material

**Stream Reach** - A segment of stream with similar characteristics

**Structure** - How the parts of ecosystems are arranged, both horizontally and vertically. Vegetation patches, edge, canopy layers, snags, down wood, steep canyons, rocks in streams, and roads may be arranged in some pattern or mosaic, or the structure may be totally random

**Subregion** - One of the hierarchy levels used for RPA assessments and statewide planning encompassing hundreds to thousands of square miles

**Subsection** - An ecological unit of land that has uniform climatic and geologic characteristics

Seven subsections have been delineated within the Targhee National Forest

**Subwatershed** - A drainage delineated for one of the streams within a National Forest System (NFS) watershed, often to analyze the effects of a proposed action. The subwatershed chosen for analysis may depend on the size and anticipated effects of a proposal

**Succession** - The natural replacement, in time, of one plant community by another. Conditions of the prior plant community (or successional or seral stage) create conditions that are favorable for the establishment of the next stage

**Succession, Plant** - The process of vegetation development whereby an area is successively occupied by different plant communities of higher ecological order

**Successional Stage** - See Seral Stage

**Suitability** - The appropriateness of applying certain management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the opportunity cost of uses foregone

**Suitability for Livestock Grazing** - The appropriateness of applying livestock grazing practices to a particular area of land (grazing allotment), as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices

**Suitability for Timber Production** - The appropriateness of commercial timber management on a given land area. Timber harvest, other than salvage sales or sales to protect other multiple-use values, cannot occur on lands not suited for timber production

**Suitable Forest Land** - See Timber Classification

**Suitable Habitat** - The biological and physical components necessary to meet some or all of the life needs of a species

**Suitable Range** - Rangeland that is accessible and used by grazing animals, that produces forage or has inherent forage producing capabilities, and that

can be grazed on a sustained yield basis under reasonable management goals

**Suppression** - The action of extinguishing or confining a fire

**Surface Resources** - Renewable resources that are on the surface of the earth, such as timber and forage, in contrast to ground water and minerals which are located beneath the surface

**Sustainability** - The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time

**Sustainable** - For a renewable resource, the capacity to produce continuously at a given intensity of management

**Sustainable Development** - The use of land and water to sustain production indefinitely without environmental deterioration, ideally without loss of native biodiversity

**Sustainable Ecosystem Management** - Management directed towards developing or maintaining a synergistic complex of plants and animals which can be perpetuated indefinitely

**Sustained-Yield** - The yield of a renewable resource which can be produced continuously at a given intensity of management

**Swing Allotment** - A vacant allotment open to grazing that can be temporarily grazed by an existing forest livestock grazing permittee whose existing authorized allotment is not available in whole or part. Nonforest permittees are not allowed to use swing allotments. Cattle are not allowed to use swing sheep allotments and sheep are not allowed to use swing cattle allotments

**Systems at Risk** - Ecosystems which demonstrate a potential for loss of resilience or sustainability if disturbed

-T-

**Target** - A National Forest's annual goal for accomplishment for natural resource programs. Targets represent the commitment of the Forest Service to Congress to accomplish the work Congress has funded, and are often used as a measure of the agency's performance

**Temporary Roads** - Roads other than specified which are constructed by the purchaser for the purpose of harvesting included timber. A timber sale road is a temporary road when it is the purchaser's road. It is not needed by anyone else for any reason. The purchaser develops it, maintains it, and eliminates its function as a road when it has served its purpose. If the Forest Service access needs are only short-term, such as for post-sale work or fuelwood access, the road will be specified in the timber sale contract. The Forest Service will then be responsible for eliminating its function as a road when it has served its purpose.

**Tentatively Suitable Forest Land** - See Timber Classification

**Thermal Cover** - Cover used by animals to moderate the effects of weather and provide protection from heat or cold. Thermal cover requirements vary with species and the prevailing climate.

**Thinning** - An intermediate cutting made in an immature stand primarily to maintain or accelerate diameter increment, enhance forest health or recover mortality, and also to improve the average form of the remaining trees without permanently breaking the canopy.

**Threatened Species** - Any species listed in the Federal Register under terms of the Endangered Species Act which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

**Timber Base** - The lands within the Forest which are capable, available and suited for timber production.

**Timber Classification** - In forest planning, the disaggregation of forested lands into strata to aid in the development of management alternatives. The strata are based on the ability of the land to produce commercial timber, and are as follows:

**Forest Land** - Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for nonforest use. Lands developed for nonforest use include areas for crops, improved pasture, residential, or administrative areas, improved roads of any width and adjoining road clearing and powerline clearing of any width. The term occupancy when used to define forest

land will be measured by canopy cover of live forest trees at maturity. The minimum area for classification of forest land is 1 acre. Unimproved roads, trails, streams and clearings in forest areas are classified as forest if they are less than 120 feet in width.

**Nonforest Land** - Lands never having or incapable of having greater than 10 percent of the area occupied by forest trees and lands formerly forested and currently developed for nonforest use.

**Suitable (Suited) Forest Land** - Tentatively suitable forest lands selected for management for timber production on a regulated basis in a Forest Plan.

**Tentatively Suitable (Commercial) Forest Land** - Forest Land which is producing or is capable of producing crops of industrial wood and for which (1) a withdrawal has not been entered by Congress, the Secretary of Agriculture or the Chief of the Forest Service (for example, as designated wilderness), (2) technology and knowledge exists to ensure timber production without irreversible damage to soil productivity or watershed condition, (3) technology and knowledge exists, and is reflected in current research and experience, to reasonably assure that the lands can be adequately restocked (regenerated) within five years after final harvest, and (4) adequate information is available to project responses to timber management activities.

**Unsuitable (Unsuited) Forest Land** - Land not scheduled (designated) for timber management in the Forest Plan. May be tentatively suitable land on which timber management is inconsistent with or not cost-efficient in meeting Forest Plan multiple-use objectives or management requirements, or land not found tentatively suitable for timber production.

**Timber Harvest Schedule** - See "Sale Schedule"

**Timber Production** - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees for cutting into logs, bolts, or other round sections for industrial or consumer use. For purposes of forest planning, timber production does not include fuelwood or harvests from unsuitable lands.

**Timber Sale Program Quantity (TSPQ)** - The volume of timber planned for sale during the first decade of the planning horizon. It includes the allowable sale quantity (chargeable volume) and any additional material (nonchargeable volume) planned for sale. The timber sale program quantity usually is expressed as an annual average for the first decade.

**Timber Stand Improvement (TSI)** - Measures such as thinning, pruning, release cutting, prescribed fire, girdling, weeding, or poisoning of unwanted trees aimed at improving growing conditions of the remaining trees.

**Timelag** - In fire planning an indication of the rate at which dead fuel gains or loses moisture due to changes in its environment. The time necessary for a fuel particle to gain or lose approximately 63 percent of the difference between its initial moisture content and its equilibrium moisture content. Fuels are usually grouped into the following groups:

Classification	Diameter (Inches)
1 hour	0-1/4
10 hour	1/4-1
100 hour	1-3
1,000 hour	3-8

**TMARD (Total Motorized Access Route Density)** - See definition under Roads.

**TMDL** - From the Clean Water Act, Total Maximum Daily Load. TMDLs for given pollutants may be assigned to Water Quality Limited streams.

**Tractor Logging** - A logging method that uses tractors to carry or drag logs from the stump to a collection point.

**Trail** - Any created or evolved travel (access) route that does not qualify as a road. Used for both motorized and nonmotorized modes of travel. For motorized travel, trails are generally routes for vehicles less than 50 inches wide and which have a dry weight of 600 pounds or less. Trails are not reasonably and prudently drivable with a conventional passenger car or pickup.

**System Trail/Managed Trail** - A trail which is part of the official Forest Transportation Management System. These trails usually have a number and a name, they are usually on the Forest travel plan maps.

**Nonsystem Trail/Unmanaged Trail/Ghost Trail** - A trail which is not part of the official Forest Transportation Management System. These trails usually do not have a number or a name, they are not on the Forest travel plan maps.

**Open Motorized Trail** - A trail without restriction on motorized use and used by motorized vehicles. Trails used by 3-wheelers, 4-wheelers, and motorized trail bikes are examples of this type of access route.

**Restricted Motorized Trail** - A trail on which motorized use is legally restricted seasonally or yearlong. Motorized administrative use by personnel of resource management agencies is acceptable at low intensity levels as defined in existing cumulative effects analysis models. This includes contractors and permittees in addition to agency employees.

**Trail Maintenance** - There are five levels of trail maintenance which are defined as follows:

**Level I** - Trails maintained for primitive experience level. Custodial care only. No tread maintenance. Drainage functional and not likely to fail. Trail sides not brushed but tread is kept passable. Small slides may remain except for those with erosion potential. Structures maintained as needed. Signing may be deferred.

**Level II** - Trails maintained for near-primitive experience level. Tread maintained for public safety. Logs or similar rustic structures may be provided at stream crossing. Drainage same as Level I. Signing at a minimum level commensurate with level of trail use.

**Level III** - Trails maintained for intermediate experience level. Tread maintained for public safety and user convenience. Drainage same as Level I. Trail sides brushed out at policy standards. Signing same as Level II.

**Level IV** - Trails maintained at relatively high standards to provide for public safety and convenience. Tread relatively smooth, firm and may require stabilization. Signing at high level, all other elements same as Level III. These trails are generally maintained for family or senior citizen use.

Level V Trails maintained for high use and experience levels, including special purposes such as VIS trails, bicycle trails, trails to major vista points, trails for persons with disabilities, etc. Basic care same as Level IV but patching of paved tread may be needed annually. Trail sides maintained to meet high visual quality standards by brushing and cleanup of debris beyond the trail limits. Vistas are maintained.

**Transportation Analysis** - A systematic analysis conducted to determine the transportation facilities and management needed to meet land and resource management objectives.

**Transportation System or Network** - All existing and proposed roads, trails, airfields, and other transportation facilities wholly or partly within or adjacent to and serving the National Forests and other areas administered by the Forest Service or intermingled private lands.

**Treatment Area** - The specific site location of a resource improvement activity.

**Tree Opening** - An opening in the forest cover created by even-aged silvicultural practices.

**TSI** - Timber Stand Improvement

**TTS** - Tentative Timber Suitability

-U-

**Underburn** - A surface fire that can consume ground vegetation and "ladder" fuels.

**Understory** - The trees and woody shrubs growing beneath the overstory in a stand of trees.

**Uneven-aged** - The condition of a forest, crop, or stand composed of intermingling trees that differ markedly in age. In practice a minimum age difference of 25 percent of the length of the rotation usually is used.

**Uneven-aged Management** - Actions that maintain a forest or stand of trees composed of intermingled trees that differ markedly in age. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

**Uneven-aged Stand** - A stand of trees of three or more distinct age classes, either intimately mixed or in small groups.

**Uneven-aged System** - A planned sequence of treatments designed to maintain and regenerate a stand with three or more age classes (see Individual Tree Selection, and Group Selection Regeneration Methods).

**Unregulated Harvest** - Timber harvest that is not part of the allowable sale quantity (ASQ). Can include the removal of cull or dead material or non-commercial species. Also includes volume removed from unsuitable areas for research, to meet objectives other than timber production (such as wildlife habitat improvement), or to improve administrative sites such as campgrounds.

**Unsatisfactory Condition** - (nonforested vegetation) - Vegetation that is not meeting Desired Vegetation Conditions (DVC).

**Unsuitable Forest Land (Not Suited)** - See Timber Classification.

**Unsuitable Range** - Rangeland that should not be grazed by livestock because of physical or biological limitations.

**Use, allowable** - An estimate of proper range use by grazing animals. Also, the amount of forage planned to be used to accelerate range rehabilitation.

**Utility and Transportation Corridors** - A strip of land, up to approximately 600 feet in width, designated for the transportation of energy, commodities, and communications by railroad, State highway, electrical power transmission (66 KV and above), oil and gas and coal slurry pipelines 10 inches in diameter or larger, and telecommunication cable and electronic sites for interstate use. Routes conducting minor amounts of power for short distances, such as short feeder lines from small power projects including geothermal or wind, or to serve customer subservice substations along the line, are not designated corridors.

-V-

**Vacant Allotment** - An allotment for which a livestock grazing permit has not been issued. The allotment may or may not be available for grazing.

**Variability, Range of (Natural, Historic)** - The spectrum of conditions possible in ecosystem composition, structure and function considering both temporal and spatial factors. The natural range of the spatial, structural, compositional and temporal characteristics of ecosystem elements specified to represent "natural" conditions. The flux in composition, structure, and function of an ecosystem over the long term in a landscape.

**Vegetation** - Collectively, the plants growing in a given area.

**Vegetation Management** - Activities designed primarily to promote the health of forest vegetation for multiple-use purposes.

**Vegetation Type** - A plant community with distinguishable characteristics. See Cover Type.

**Vegetative Structural Stage** - A method of describing the growth stages of a stand of living trees. It is based on tree size (DBH = diameter at breast height) and total canopy cover. The stages are Grass/forb/shrub (VSS 1) = 0-1 inch DBH, Seedling/sapling (VSS 2) = 1-5 inches DBH, Young Forest (VSS 3) = 5-12 inches DBH, Mid-aged Forest (VSS 4) = 12-18 inches DBH, Mature Forest (VSS 5) = 18-24 inches DBH; Old Forest (VSS 6) = 24+ inches DBH.

**Viable Population** - A number of individuals of a species sufficient to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

**Viewshed** - An expansive landscape or panoramic vista seen from a specific viewpoint, such as a road.

**Vigor** - The relative robustness of a plant in comparison to other individuals of the same species. It is reflected primarily by the size of the plant and its parts in relation to its age and the environment in which it is growing.

**Visual Quality Objectives (VQO's)** - In forest planning, a set of measurable goals for the management of visual resources. Used to measure the amount of visual contrast with the natural landscape caused by human activities. The following are VQOs.

**Preservation** - Ecological change only here.

**Retention** - Human activities should not be evident to the casual Forest visitor.

**Partial Retention** - Human activity may be evident but must remain subordinate to the characteristic landscape.

**Modification** - Human activity may dominate the characteristic landscape but must, at the same time, follow naturally established form, line, color, and texture. The activity should appear as a natural occurrence when viewed in foreground or middleground.

**Maximum Modification** - Human activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background.

**Visual Resource** - A part of the landscape important for its scenic quality. It may include a composite of terrain, geologic features, or vegetation.

-W-

**Watershed** - The area of land above a given point on a stream that contributes water to the streamflow at that point. Also the land that contributes water to a lake or reservoir.

**Watershed Improvement Needs (WIN) Inventory** - A broad reconnaissance inventory oriented primarily to problem identification rather than specific project design. Forms the basis for identifying potential soil and water resource restoration project areas and assigning priority for detailed planning and treatment.

**Watershed Information System (WIS)** - Inventory of Forest Service water rights and uses. The inventory includes such information as location of water right or use, the amounts of water involved, status of the use or right, purpose, etc.

**Water Table** - The upper surface of groundwater. Below it, the soil is saturated with water.

**Water Yield** - The runoff from a watershed, including groundwater outflow.

**Weeding** - In timber management, a release treatment in stands of sapling stage or younger that

eliminates or suppresses undesirable vegetation regardless of crown position

**Wet Areas** - These sites, often occurring at the heads of drainages, may be wet sedge meadows, bogs, or seeps. Often referred to as "moist sites," they are very important components of elk summer range.

**Wetlands** - Areas that are inundated by surface or ground water with a frequency sufficient, under normal circumstances, to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands include wet meadows, springs, seeps, bogs, etc.

**Wild and Scenic Rivers** - Rivers and their immediate environs that are managed to be unpolluted and free of impoundments and diversions. Designated by Congress pursuant to the Wild and Scenic Rivers Act.

**Wilderness** - Areas designated by congressional action pursuant to the Wilderness Act that are managed for primeval characteristics, solitude or unconfined primitive recreation, natural conditions and where the imprint of man is substantially unnoticeable.

**Wilderness Act (1964)** - Public Law 88-577 (16 U.S.C. 1131-1136). The Wilderness Act allows preservation of designated areas of federal land under the National Wilderness Preservation System for the benefit of present and future generations. The land must be primarily affected by the forces of nature (not man), have outstanding opportunities for solitude or primitive recreation, be at least 5000 acres in size, and may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

**Wildfire** - Any wildland fire not designated and managed as a prescribed fire within an approved prescription and occurring in natural fuels.

**Wildlife** - All undomesticated mammals, birds, reptiles and amphibians living in a natural environment. Does not include feral animals, such as wild horses and burros.

**Wildlife Habitat Diversity** - The distribution and abundance of different plant and animal communities and species within a specific area.

**WINI** - Watershed Improvement Needs Inventory

**Windthrow** - Trees that have been uprooted by the wind.

**WIS** - Watershed Information System

**Wood Fiber Production** - The growing, tending, harvesting and regeneration of harvestable trees.

**Woody Plant** - Perennial plants that have stems consisting of wood (shrubs, trees, and vines).

**Woody Residue/Residue** - Organic materials such as plant stems and branches having a minimum diameter of three inches (small end). Included are both natural materials and materials remaining after timber harvest (slash).

**WQL** - Water Quality Limited. Water bodies listed by EPA as not meeting State water quality standards. They are to be monitored to determine if water quality standards are, or are not, being met. On those not meeting water quality standards, TMDLs may be assigned.

-X-

**Xeric** - Refers to a habitat characterized by dry soil conditions.

-Y-

**Yield** - The amount of forest produce that may be harvested periodically from a specified area in accordance with the objectives of management.

-Z-

**ZOI (Zone of Influence)** - The area influenced by Forest Service management activities.

**Zoning** - The demarcation of a planning area into zones, usually accompanied by the establishment of regulations to govern the types of activities and uses within each zone.

**Zoological Area** - A protective area designated for its authentic, significant and interesting evidence of important animals, animal groups and animal communities.

Decomposition Class (cont )

Log Characteristics	Log decomposition class				
	1	2	3	4	5
Bark	intact	intact	trace	absent	absent
Twigs < 3 cm	present	absent	absent	absent	absent
Texture	intact	intact to partly soft	hard, large pieces	small, soft, blocky pieces	soft and powdery
Shape	round	round	round	round to oval	oval
Color of wood	original color	original color	original color to faded	light brown to faded brown or yellowish	faded to light yellow or gray
Portion of log on ground	log elevated on support points	log elevated on support points but sagging slightly	log is sagging near ground	all of log on ground	all of log on ground