United States
Department of
Agriculture

Forest Service

**Pacific
Northwest
Region**

1990

Final Environmental Impact Statement

Land and Resource Management Plan

Wallowa-Whitman National Forest

00694

ACRONYMS AND ABBREVIATIONS USED IN THIS DOCUMENT

Those listed with an asterisk are further explained in the Glossary

AC - Acres
AMP - Allotment Management Plan *
AMS - Analysis of the Management Situation •
ASQ - Allowable Sale Quantity •
ATV - *All Terrain Vehicle* *
AU - Animal Unit *
AUM - Animal Unit Month *
BAP - Benzo (A) Pyrene
BCR - *Benefit Cost Ratio*
BF - Board Foot •
BIA - Bureau of Indian Affairs
BLM - Bureau of Land Management *
BMP - Best Management Practice •
BTU - British Thermal Unit •
CCC - Civilian Conservation Corps
CEQ - Council on Environmental Quality •
CFL - Commercial Forest Land •
CFR - Code of Federal Regulations •
CI - Capital Investment
CMAI - Culmination of Mean Annual Increment *
CMP - Comprehensive Management Plan (HCNRA)
CRITFC - Columbia River Inter-tribal Fish Commission
DBH - Diameter at Breast Height *
DEIS - Draft EIS •
DEP - Departure •
EA - Environmental Assessment *
EHF - Earned Harvest Factor
EIS - Environmental Impact Statement •
EO - Executive Order
EPA - Environmental Protection Agency •
FEIS - Final EIS •
FERC - Federal Energy Regulatory Commission
FIL - Fire Intensity Level •
FORPLAN *
FPFO - Forestry Program for Oregon
FRES - Forest Range Environmental Study *
FS - Forest Service
FSH - Forest Service Handbook
FSM - Forest Service Manual
FVB - Future Value of Benefits
FVC - Future Value of Costs
FY - Fiscal Year
GIS - Geographic Information System
GNP - *Gross National Product*
HCNRA - Hells Canyon National Recreation Area
HCRS - Heritage Conservation and Recreation Service
HEI - Habitat Effectiveness Index
ICO's - Issues, concerns, and Opportunities
I&DC - Insect and Disease Control
ID - Interdisciplinary
IPM - Integrated Pest Management *
IMPLAN •
INTEGER •
K-V Act - Knutson-Vandenberg Act •
KV - Kilovolt
LRMP - Land and Resource Management Plan
LTSY - Long Term Sustained Yield •
MA - Management Area
MAUM - Thousand Animal Unit Month
MBF - Thousand Board Feet
MCF - Thousand Cubic Feet
MIH - Management Information Handbook
MIS - Management Indicator Species
MM$ - Million Dollars
MMBF - Million Board Feet
MMCF - Million Cubic Feet
MOU - Memorandum of Understanding
MR - Management Requirement
MRVD - Thousand Recreation Visitor Days
MS - Management Strategy(ies)
MWFUD - Thousand Wildlife/Fish User Day
NA - No Action
NAS - National Activity Structure
NC - No Change
NDF - Nondeclining Flow •
NEPA - National Environmental Policy Act
NFMA - National Forest Management Act
NFMAS - National Fire Management Analysis System
NPB - Net Public Benefits
NRA - National Recreation Area (HCNRA)
NRT - National Recreation Trail •
O&M - Operation and Maintenance
OBERS - Office of Business Economics - Economic Research Service
ODFW - Oregon Department of Fish and Wildlife
ONRC - Oregon Natural Resources Council
ORV - *Off Road Vehicle*
PAOT - Persons At One Time
P&M - Protection and Management Funds
PILOT - Payment in Lieu of Taxes
PL - Public Law
PNV - Present Net Value
PNW - Pacific Northwest
POM - Polycylic Organic Matter
PVB - Present Value of Benefits
PVC - Present Value of Costs
R-6 - Region 6
RARE II - Roadless Area Review and Evaluation *
RIM - Recreation Information Management •
RNA - Research Natural Area •
ROD - Record of Decision
ROS - Recreation Opportunity Spectrum •
RPA - Forest and Rangeland Renewable Resources Planning Act of 1974 *
RVD - Recreation Visitor Day *
SAF - Society of American Foresters
S&G - Standards and Guidelines
SCORP - Statewide Comprehensive Outdoor Recreation Plan
SHCI - Smolt Habitat Capability Index
SHPO - State Historical Preservation Officer (Office)
SIC - Standard Industrial Classification
SMA - Special Management Area
SMU - Streamside Management Unit •
SPM - Semiprimitive, Motorized
SPNM - Semiprimitive, Nonmotorized
T&E - Threatened and Endangered *
TRI - Total Resource Inventory •
TSI - Timber Stand Improvement *
TSPIRS - Timber Sale Program Information Reporting System
TSPQ - Timber Sale Program Quantity *
TSP - Total Suspended Particulates •
USGS - United States Geological Survey
U S - United States
USDA - United States Department of Agriculture
USDI - United States Department of Interior
VAC - Visual Absorption Capacity •
VMS - Visual Management System
VQO - Visual Quality Objective •
WFUD - Wildlife and Fish User Day •
WRC - Water Resources Council
WRS - Wilderness Recreation Spectrum *

APRIL 1990

FINAL ENVIRONMENTAL IMPACT STATEMENT

Wallowa-Whitman National Forest Land and Resource Management Plan

Baker, Union, Wallowa, Grant, Malheur, and Umatilla Counties in Oregon;
Adams, Nez Perce, and Idaho Counties in Idaho

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Abstract: This Final Environmental Impact Statement describes eleven alternatives for the Land and Resource Management Plan for the Wallowa-Whitman National Forest and those portions of the Nez Perce and Payette National Forests within the Hells Canyon National Recreation Area (HCNRA). These areas, in combination, total 2,349,215 acres

This FEIS has been prepared following public review periods for the DEIS and Supplement to the DEIS, during which 22,045 comments were received and considered. The eleven alternatives of the FEIS include acknowledgement of the substantive public and other agency comments received. Each alternative responds differently to identified major issues and concerns The alternatives are: (NC) Continuation of management under the 1962 Timber Management Plan, as amended, (A) continuation of current management direction with levels of outputs and activities updated to reflect the current data base; (B) high commodity - to the extent possible, this alternative achieves outputs and activities for the Wallowa-Whitman National Forest as specified in the Pacific Northwest Regional Guide; (B-departure) provides a high level of timber outputs requiring a departure from nondeclining flow; (C) a commodity/amenity blend slightly more commodity oriented than the current direction alternative; (C-departure) a commodity/amenity blend slightly more commodity oriented than the current direction alternative with a timber harvest schedule that departs from nondeclining flow; (D) commodity/amenity blend with commodity emphasis, (E) commodity/amenity blend emphasizing roadless recreation opportunities; (F) an amenity oriented alternative which emphasizes roadless recreation opportunities and maximizes fish and wildlife habitat; (G) an efficiency-oriented alternative with timber harvest limited to stands having a positive present net value; (H) a commodity/amenity blend with economic efficiency emphasis The Forest Service preferred alternative is Alternative C.

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ORGANIZATION OF THE DOCUMENTS

Included in the package are five books and a packet of maps They are the Final Environmental Impact Statement (FEIS), the books of appendices to the FEIS, the Forest Plan, the Record of Decision, and the maps

A general outline of the documents and a brief summary of the chapters follow:

In the *FEIS*

Summary, briefly discusses the major facets of Chapters I through IV.

Chapter I, "Purpose and Need," identifies the laws and regulations used to direct the planning and environmental analysis process. It also identifies the public issues and management concerns about the land and resource management of the Wallowa-Whitman National Forest.

Chapter II, "Alternatives, including the Proposed Action," describes the alternatives, explains their formulation, and compares them

The accompanying *map packet* contains maps of land management areas on the Forest for each of the alternatives

Chapter III, "Affected Environment," presents the biological, physical, social, and economic setting of the Wallowa-Whitman National Forest

Chapter IV, "Environmental Consequences," discusses the environmental consequences of the alternatives, including unavoidable adverse impacts, irreversible or irretrievable effects, energy requirements, and coordination with other agencies.

Following these four chapters are the List of Preparers; list of agencies or organizations, and persons to whom copies of the statement are sent, References; Glossary, and Index.

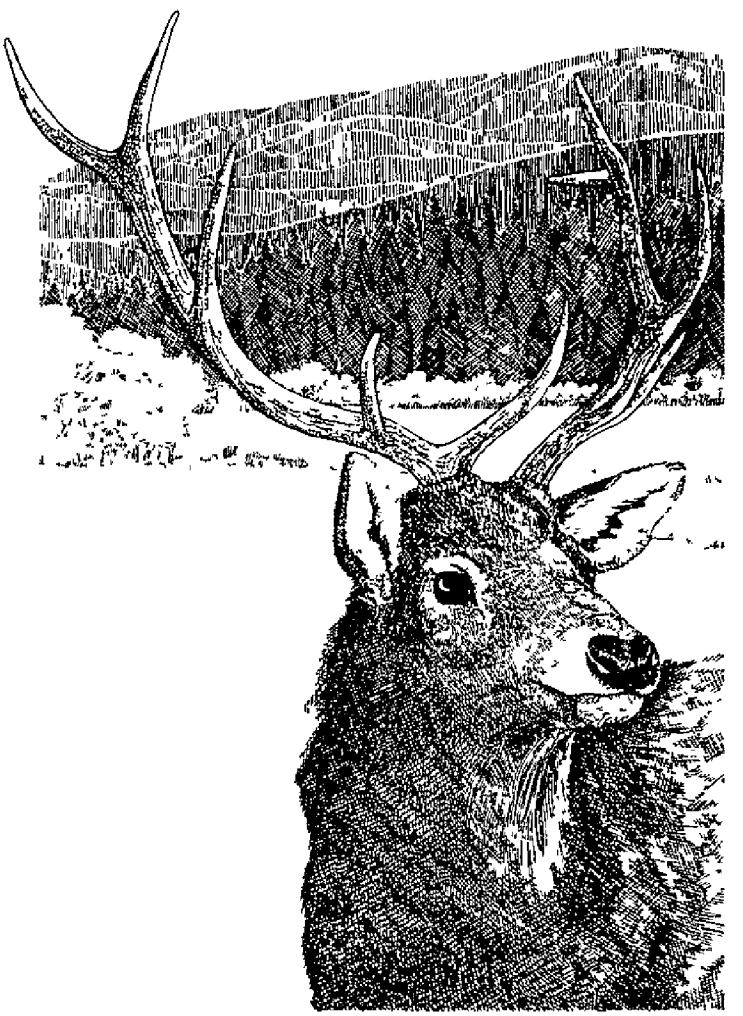
The Appendices contain technical discussions about various aspects of the planning process They contain more detailed descriptions of some environments, analyses, and effects.

The Forest Plan contains information about how the Forest land and resources will be managed if the preferred alternative is implemented Here are found the detailed standards and guidelines for the preferred alternative.

The Record of Decision clarifies what decisions are being made and the rationale behind them

In addition to the material included in the FEIS, Forest Plan, and supporting appendices, other process records are on file at the Supervisor's Office, Wallowa-Whitman National Forest, P.O Box 907, Baker City, OR 97814. These include records documenting the timber land suitability determination, process material for recreation, wildlife, range, diversity, and yield table development This information is available upon request.

SUMMARY



SUMMARY

INTRODUCTION

This Final Environmental Impact Statement (FEIS) discusses the alternative strategies for future management of the Wallowa-Whitman National Forest The preferred alternative is developed into the accompanying Land and Resource Management Plan (the Forest Plan) The Record of Decision describes the decision to implement the Forest Plan and the rationale for that decision While the Forest Plan will guide the management of the Forest for the next 10 to 15 years, the analysis covers a planning horizon of 150 years to evaluate and display the long-term effects of current actions.

The Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan were released for public review and comment in March, 1986 A Supplement to that Draft was issued in August, 1988 The Supplement added a "no change" alternative and included analysis of management requirements

This FEIS and the Forest Plan were developed in response to comments received on those documents and incorporate many suggestions made by the public and other agencies. Changes that were made between the DEIS and FEIS are described throughout the document and highlighted in sections near the beginning of each chapter

This is a general summary of the entire FEIS. It emphasizes the issues and concerns raised by the public, other agencies, and Forest Service personnel regarding management of the Wallowa-Whitman National Forest The Summary describes the public response to the DEIS, changes made between the DEIS and FEIS, the affected environment, the purpose of and need for the proposed action, how the major issues and concerns were identified, how 11 alternatives respond to these issues, and the environmental consequences of implementing each of the alternatives.

PUBLIC RESPONSE TO THE DEIS

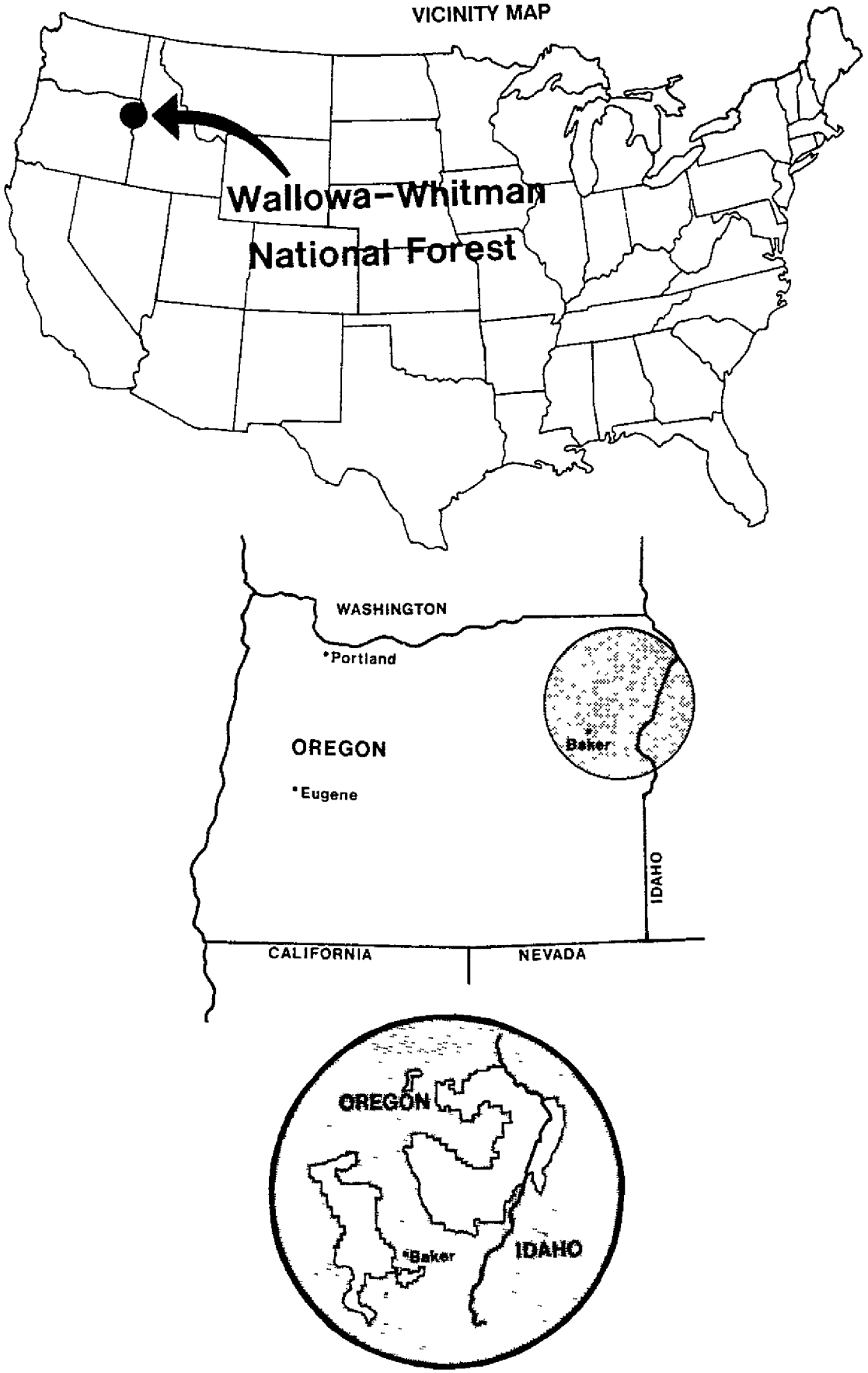
Some 1,200 copies of the DEIS and its Supplement were distributed to government agencies, local libraries, and interested members of the public. Public meetings were held in numerous locations to better acquaint people with the documents and the process.

The Forest received 6,600 responses to the DEIS and Supplement during the review period The most popular way to respond was with response forms provided by private organizations (40%) followed by letters (30%) and form letters (20%). Oral comments, petitions, and the Forest's own response form comprised the remainder Almost all the respondents (98%) were from Oregon and 92% of them were from northeastern Oregon. Most of the responses were a direct result of campaigns instituted by special interest groups

Each response contained at least one comment These were analyzed and considered in preparing the FEIS. The largest group of respondents commented on the broad area of timber harvesting. Many of the comments dealing with the timber harvest derived from concerns about recreation, watershed conditions, and other concerns that interact with timber production

Respondents called for changes in the amount of timber harvested, the species composition, its size, and the timing of the harvest. Effects on the local economy were commonly mentioned as a reason for maintaining or increasing the timber harvest.

FIGURE S-1
VICINITY MAP



The second largest group of comments (1,900) dealt with roadless areas. Specific concerns raised dealt with keeping all or individual roadless areas roadless or opening them to management

Road system management/road closures, county receipts, and wilderness were the remaining resource concerns receiving the most comments Roading questions revolved around whether new road work was needed for timber, recreational use, and livestock permittees, whether roads should be left open for woodcutting and recreational use following timber harvest, and cost-effectiveness.

Concern over county receipts ties directly with concerns over timber harvest levels and corresponding timber harvest receipts Respondents were concerned that reductions in timber production would be translated into a lower level of payment to local governments, which in turn would either cause a reduction in area road and school programs or an increase in taxes.

Comments on wilderness generally called for either more or less wilderness Those calling for more wilderness felt that the available wilderness resource was already overutilized or would soon be overutilized, that it was scarce and irreplaceable, and that good candidate areas should be designated wilderness. Those calling for less wilderness or no wilderness additions felt that designated wilderness was underutilized, that it would become less utilized in the future due to the aging of the population, and that the resources present in the wilderness should be managed for a nonwilderness form of recreation or for consumptive uses A large number of respondents believed that the proposed plan called for wilderness additions even though the document had no such provision

Appendix N of the FEIS provides detail on public response.

CHANGES BETWEEN DRAFT AND FINAL

The public response to the DEIS provided the Forest with a wealth of suggestions for improvements about how to provide more benefits to the public These ranged from broad conceptual approaches to specific technical changes. Numerous changes have been made in response to both public input and other factors. These are summarized below

1. All alternatives (except Alternative NC) have been adjusted to reflect the addition of wild and scenic rivers by the Omnibus Oregon Wild and Scenic Rivers Act of 1988

2 All alternatives have been tiered to the Regional Final Environmental Impact Statement (FEIS) entitled "Managing Competing and Unwanted Vegetation" (November 1988) See Chapter II of this EIS (Elements Common to All Alternatives) for additional discussion.

3. Six vacant range allotments are closed to grazing by domestic livestock. Additionally, projected livestock grazing in all alternatives was reduced to reflect the effects of new standards and guidelines for forage utilization.

4. All alternatives (except Alternative NC) now maintain small-diameter (less than 20 inches) snags on all timber harvest units at all times to provide wildlife habitat.

5. Lodgepole pine trees less than seven inches in diameter have been removed from the calculation of sawtimber volume to conform with the standards of the Pacific Northwest Region.

6 A timber industry alternative, and alternatives developed by the Friends of Lake Fork, and the Wallowa Alliance have been added as alternatives considered, but eliminated from detailed study

7 The draft "State of Oregon" alternative (submitted by the Governor of Oregon) is described and compared to the proposed alternative

8 *These specific changes were made to Alternative C as a result of public and management* concerns.

- The area of big-game habitat emphasis area (Management Area 3) has been reduced by 62,000 acres to help increase the level of timber harvesting.

- The miles of road corridor managed for higher visual quality objectives (foreground retention and partial retention) have been reduced by 18 percent to help increase allowable timber harvests

- Ponderosa pine harvest levels in the first decade of plan implementation have been increased from 29 MMBF to 34 MMBF per year in response to public input

- Seven new research natural area recommendations have been added and two areas which appeared in the DEIS have been dropped to better accommodate research needs.

9. Adjustments have been made in acreage identified by recreation type (Recreation Opportunity *Spectrum or ROS) to more accurately reflect expected conditions*

10. A new issue termed Fish Habitat/Water Quality was added in response to public comment

A SUMMARY OF CHAPTER I - PURPOSE AND NEED

The purpose of the Forest Land and Resource Management Plan (Forest Plan) is to direct natural resource management activities on the Forest. Preparation of the Forest Plan is required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), plus the associated Planning Regulations (36 CFR 219). The Forest Plan will be revised on a 10 year cycle, or at least every 15 years. It may be revised sooner, if needed

The preparation of an Environmental Impact Statement disclosing any preferred alternative(s) and a broad range of additional alternatives is required by the National Environmental Policy Act of 1969 (NEPA), its implementing regulations (40 CFR 1500), and the implementing regulations of NFMA (36 CFR 219) *The EIS is required because the Forest Plan is a major federal action with a significant effect* on the quality of the human environment. For purpose of disclosure under NEPA, this EIS, its Appendices, and the accompanying Forest Plan are treated as combined documents

Issues

An extensive and continuing process has been used to identify issues, concerns, and opportunities. Public meetings, the local news media, newsletters, many personal contacts by Forest Service officials, and the response to the DEIS and Proposed Forest Plan have been used to gather and confirm the issues In 1980, an interdisciplinary team of specialists prepared the initial set of issues and concerns based on public comments This set has been revised as needed in order to keep current with public interests and changes in policies and procedures.

Several issues or aspects of issues have received fresh emphasis since the publication of the DEIS and Proposed Forest Plan Increased attention has surfaced related to Wild and Scenic Rivers, tourism and recreation, diversity, reforestation, fish habitat, water quality, and various technical questions regarding timber harvest amounts Many of the issues and concerns are highly interrelated Having more of one thing often requires having more or less of something else, whether desired or not.

The issues confronting Forest management are the driving force in the planning process They set the stage for analysis, public participation, and decisionmaking. Frequently they are more easily posed as questions, as shown in the following

Transportation How should the Forest provide the access needed for timber management while minimizing the impact of the roads? How should the Forest satisfy recreation and wildlife objectives considering the road system already in place and the road system which is necessary for management of the timber resource? How much road access do people want, are the roads needed, and are they economically efficient?

Timber Production. How much timber should be harvested from the Wallowa-Whitman? What species mix? What size trees? What should the harvest schedule be? Should there be a departure from nondeclining flow? 1/ What is the cost in other resource values foregone?

Local Economy. How should the Forest be managed considering the importance it has for the local economy in terms of jobs, personal income, 2/ and payments to local governments? 3/

Management of Nonwilderness Roadless Areas How much nonwilderness roadless area should be retained in an undeveloped state?

Old-Growth Forest. What level of old growth is necessary to provide wildlife habitat diversity and to satisfy the recreation and aesthetic desires of various Forest users? What will be the cost in terms of dollars and timber supplies for management of this resource as old growth?

Wildlife Habitat - Deer and Elk. What mix of cover 4/ and forage is desired for deer and elk on the Wallowa-Whitman and what is the cost of providing it in terms of dollars and other resource production?

Recreation Diversity. What mix of Forest conditions would best satisfy expressed desires of the users of the Wallowa-Whitman National Forest for a broad range of recreation opportunities?

Livestock Grazing. How much grazing by permitted livestock should occur on the Forest and under what intensity of management and funding levels? What level of investment in range management is appropriate considering national objectives for range vegetation management, local industry and community needs, and returns to the federal treasury? What levels of wildlife and permitted livestock grazing use are appropriate within the proposed investment levels? Are such levels consistent with other multiple-use objectives?

1/ Nondeclining flow - a harvest schedule for timber or any other resource in which the average annual harvest increases or remains static through time but never decreases.

2/ As used here, personal income refers to employee compensation in the form of wages and salaries

3/ Payments to local governments are monies remitted from the federal treasury to local governments based on Forest receipts such as those generated from the sale of timber and forage.

4/ Cover refers to the vegetation which provides big-game species with protection from extremes of heat and cold and which also provides them security.

Minerals. How much and which lands should remain open to mineral entry on the Wallowa-Whitman National Forest?

Fish Habitat/Water Quality What kinds of protection and rehabilitation are needed to protect water quality and fish habitat and provide for improvement of areas currently in a less-than-satisfactory condition? What direction is needed to ensure protection and provide needed rehabilitation of fish habitat at the project level?

A SUMMARY OF CHAPTER II - ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternative Development Process

Formulating a broad range of reasonable management alternatives for a National Forest is an extensive and complex process Each alternative is a combination of land uses, Forest management activities, and schedules.

Alternatives must consider the resource capabilities (including both the potentials and the limitations) of the different lands found throughout the Forest Each alternative is designed to manage the land to achieve specific goals and objectives. Some of these objectives, such as maintaining air and water quality, are common to all alternatives; other objectives, such as the mix and amount of resource outputs, vary among the alternatives.

By managing the Forest lands and resources in different ways, varied objectives can be achieved which respond to the issues differently, providing different combinations of public benefits. Forest management can vary by what is done, where it is done, when it is done, and how it is done These varying combinations of management activities and schedules result in different resource outputs and environmental conditions, thus responding to the unique objectives of each alternative

An alternative is formulated to address an issue, or issues, by considering these factors:

- the resources available on different areas of the Forest;
- the public's need or demand for different combinations of commodities and amenities; 1/
- combinations of actions which are planned for different areas,
- the schedule of activities, and
- the interrelationship of capabilities, management activities, and schedules which result in resource outputs and environmental conditions which are consistent with the objectives of the alternative

1/ "Commodities" refers to timber, livestock grazing, minerals, and anadromous fish "Amenities" refers to such considerations as recreation, scenery, and wildlife

Presentation of the Alternatives

Alternatives are the different ways the Forest can be managed in response to the issues. There are, of course, literally hundreds of alternatives which could have been developed. Those chosen for display are intended to represent a reasonable range. Each of the alternatives is described in the following pages and the response to the issues, concerns, and opportunities of each alternative is summarized in Table S-1. Maps which illustrate the land management direction for each alternative accompany this document.

Alternative NC (No Change) This alternative represents continued implementation of the Wallowa-Whitman Timber Management Plan. This timber management plan, developed in 1962, was not an integrated resource management plan, and consequently did not address all resource uses and outputs This alternative does not incorporate all provisions of the National Forest Management Act of 1976 (NFMA) and regulations promulgated by the Secretary of Agriculture to implement NFMA, and could not be used in future management of the Forest without change in the law and its implementing regulations.

Alternative A (No Action) This alternative represents continued implementation of the management direction provided by the six existing land management plans (unit plans) including the comprehensive management plan for the Hells Canyon NRA Adjustment has been made for the Oregon Wilderness Act of 1984 and the Omnibus Oregon Wild and Scenic Rivers Act.

The intent of this alternative is to continue management under the direction found in the unit plans and to approximate its outputs. It also serves as a point of comparison for evaluating the other alternatives

To make this alternative consistent and comparable with the other alternatives, current resource yield tables are used along with the most recent inventory information This includes current timber inventory information and improved data on the suitability of land for timber production Only National Forest Management Act requirements that are a part of the current direction, as established in the unit plans, are incorporated in this alternative

The total Forest budget is held to the average budget level experienced during the period 1980-1983, expressed in 1982 dollars The proportion of the Forest budget expended by various functions (such as Timber, Range, or Recreation) varies depending upon the level of outputs being provided. Within this budget, output levels projected by the unit plans and resource management plans are met as closely as possible

Alternative B (RPA). This alternative was formulated with primary emphasis on RPA targets and the timber, livestock grazing, and local economy issues This alternative is the RPA alternative.1/ It attempts to provide outputs assigned the Forest through National and Regional planning RPA targets for recreation, timber, and anadromous fisheries are met or exceeded. Timber harvest and road management activities on winter ranges are restricted to better mitigate impacts on big game.

Alternative B-departure This alternative was formulated with primary emphasis on the timber, forage, and local economy issues Timber outputs are provided at high levels to mitigate a projected State-wide shortfall in timber harvest from private lands.

1/ The alternative specified in the Regional Guide, itself the result of RPA (Forest and Rangeland Renewable Resources Planning Act of 1974) and NFMA (National Forest Management Act of 1976).

In order to do so, it is necessary to depart from the policy of nondeclining flow The harvest level scheduled for the first five decades cannot be sustained indefinitely. It is also necessary to harvest many timber stands significantly earlier than their culmination of mean annual increment (CMAI). (CMAI is the age at which the average annual increment of growth in a timber stand reaches its maximum level). Since the National Forest Management Act requires that CMAI shall generally have been reached before harvest occurs, this alternative cannot be implemented without a change in law.

This alternative also places higher emphasis on range improvements and increased levels of livestock grazing than does Alternative B. As a result of increased timber and livestock production, economic activity indicators for personal income and jobs are among the highest of any alternative Payments to counties are reduced from Alternative B because this alternative requires harvest from less efficient timber-producing lands that require more intensive (and more expensive) timber management practices Thus, total economic returns to the federal government are reduced along with the local governments' share of those returns 1/

Management areas are the same as for Alternative B The increased rate of timber harvest and the emphasis on forage production for livestock reduce elk habitat effectiveness

Alternative C (Proposed Action) This alternative was formulated to respond to goals for timber and range by maintaining moderately high outputs of timber and output of livestock forage commensurate with Forest Plan standards and guidelines. It places increased emphasis on managing range resources to ensure improved vegetation, soil and related resource conditions. It places greater emphasis on deer and elk habitat than do Alternatives B or B-departure. Emphasis is also placed on the transportation management and recreation diversity issues Alternative C was modified between draft and final as discussed earlier in this summary.

The alternative provides near-optimum hiding cover, thermal cover and forage conditions on most big-game winter ranges and on selected summer ranges Use of roads within big-game habitat emphasis areas is restricted to reduce harassment of big game. Nonwilderness portions of the North Fork John Day watershed are managed emphasizing anadromous fish habitat protection.

A high level of visual quality is retained and a wide variety of recreational opportunities are maintained throughout the Forest

Alternative C-departure. This alternative was formulated to emphasize the timber, forage, and local economy issues. Emphasis is also placed on deer and elk habitat on selected summer ranges and on the recreation diversity and transportation system management issues

The land management areas for this alternative are identical to that of Alternative C (as it was displayed in the DEIS) However, the timber harvest schedule is adjusted to provide higher levels in the first decade (a departure from nondeclining flow) The objective of this harvest schedule is to provide recent historical volumes of nonlodgepole pine sawtimber during the first decade

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1/ Money received from timber purchasers is remitted the federal treasury By federal law, local governments are given one-fourth of the gross value of the trees on the stump (what the purchaser pays in cash and in kind for the right to harvest the timber) and one-fourth of other Forest receipts.

Alternative D. This alternative was formulated to respond to the timber management and livestock issues by maintaining moderately high outputs of timber and forage for livestock. Alternative D places greater emphasis on deer and elk habitat than do Alternatives B or B-departure but less than Alternatives C or C-departure. Emphasis is also placed on the transportation management and recreation diversity issues

This alternative provides near-optimum hiding cover, thermal cover and forage conditions on big-game winter ranges Use of roads within big-game habitat emphasis areas is restricted to reduce harassment of big game Nonwilderness portions of the North Fork John Day watershed are managed to protect anadromous fish habitat but with more emphasis on commodity production than in Alternative C.

Similar to Alternative C, alpine and subalpine areas in the Elkhorn Mountains and around the perimeter of the Wallowa Mountains remain in a roadless condition to provide additional semiprimitive recreation opportunities. High quality deer and elk habitat is provided on 340,000 acres A high level of visual quality is retained.

Alternative E This alternative emphasizes issues related to undeveloped areas, transportation system management, recreation diversity, and timber management. All existing roadless areas are retained in a roadless condition. This serves to retain the existing opportunities for semiprimitive types of recreation and preserve all options for future wilderness designation.

Outside the existing roadless areas, production of commodity outputs is emphasized A minimal level of habitat protection is provided on big-game winter ranges. Use of roads on winter ranges is restricted to reduce harassment of big game Visual quality is substantially reduced outside roadless areas.

Alternative F. This alternative was formulated emphasizing the wildlife habitat, recreation diversity, old-growth trees, transportation system management, and fish habitat/water quality issues. It provides a high level of protection and enhancement of anadromous fisheries Approximately 60 percent of the nonwilderness roadless area outside the Hells Canyon National Recreation Area remains in a roadless condition

All watersheds used by anadromous fish are managed emphasizing fish habitat protection and enhancement This includes the Grande Ronde, Wallowa, and North Fork John Day River systems and that portion of the Imnaha River system not in the National Recreation Area. Timber is managed to provide snags for wildlife at not less than the 40 percent level across the Forest. Both winter and summer big-game ranges provide high quality big-game habitat.

Alternative G. This alternative was formulated in a land use pattern identical to Alternative B except that timber harvest is limited to stands having a positive present net value. The discounted dollar benefits of managing the existing and future stands of timber on a particular piece of land must be greater than the discounted dollar costs. This alternative reflects the national concern over timber sales which are sold below cost

Under this alternative, no "below-cost"* timber sales are scheduled. This results in a substantial reduction in timber outputs from those of Alternative B. Its present net value, as shown in Figure S-9, is higher than for Alternative B because it eliminates expenditures for timber harvest on lands where the projected dollar returns of harvest do not exceed the dollar costs

*"Below-Cost" timber sale is defined here as a sale in which the dollar costs of the sale, including all costs resulting from the sale, are greater than the dollar benefits.

Other differences include reduced economic stability in local communities and reduced adverse impacts on other resources such as wildlife The only difference in land use between Alternatives B and G is that G leaves more land unharvested, including the Lake Fork Roadless Area, based on economic criteria

Alternative H. This alternative was formulated to address the timber issue by maintaining a moderately high output for timber but with greater emphasis on deer and elk habitat than in Alternatives B, B-departure, or E and with less emphasis on livestock grazing. Its land use pattern is identical to that of Alternative C (as displayed in the DEIS) except that less land is used for timber management

The biggest difference between Alternatives C and H is that Alternative H emphasizes economic efficiency in timber management more than C does This tends to reduce logging of steep slopes and investment in tree planting, site preparation, and precommercial thinning. It results in reduced timber harvest and a higher present net value.

Other consequences of this increased emphasis on economic efficiency include reduced economic stability of local communities, reduced impact on big game and other wildlife species, a higher level of old growth, and reduced potential for soil and water degradation Alternative H shares Alternative C's direction on transportation management and recreation diversity issues It provides near-optimum hiding cover, thermal cover, and forage conditions on big-game winter ranges and on selected summer ranges Use of roads within big-game habitat emphasis areas is restricted to reduce harassment of big game.

Nonwilderness portions of the North Fork John Day watershed are managed to emphasize anadromous fish habitat protection. Alpine and subalpine areas in the Elkhorn Mountains and around the perimeter of the Wallowa Mountains remain in a roadless condition to provide additional semiprimitive recreation opportunities. Management activities provide high quality deer and elk habitat on 520,000 acres. A high level of visual quality is retained

Management Areas (MA's)

Each alternative distributes the lands of the Forest to different management areas. Acreages in the different management areas vary from one alternative to another (see Table S-2).

The management area locations can be found on the alternative maps accompanying this Final Environmental Impact Statement. In essence, a management area is a unit of land to be managed for certain goals and objectives to achieve or maintain a desired condition in the future.

While the number of acres in each management area may vary by alternative, the management activities within each management area remain constant

Although certain renewable resources are emphasized in each of the following descriptions, each management area provides for a combination of Forest uses All management areas provide water, wildlife, forage, protection of riparian habitat and many forms of recreation; many provide timber yields Management direction identifies the renewable resource use which has highest priority and therefore tends to limit the output levels of other resources which may be competing on the same land

The following are brief descriptions of the management areas for the Wallowa-Whitman National Forest Detailed descriptions are found in the Forest Land and Resource Management Plan accompanying this EIS and Appendix D.

Management Area 1 (Timber Production Emphasis)

Management emphasizes wood fiber production while providing relatively high levels of forage and recreational opportunities. Temporary forage increases result from silvicultural activities. Timber is managed according to standards and guidelines common to all management areas (see Forest Plan Chapter 4)

Timber management provides a mixture of even-aged stands up to 40 acres in size and uneven-aged stands with no size limitation. These stands are to be managed at intensities promoting vigorous, healthy trees commensurate with the productive potential of the sites.

Regeneration harvest units will be separated by uncut stands containing one or more logical logging units. Regeneration harvest of units adjacent to an existing regenerated unit will not be initiated until the desired crop tree stocking on the existing unit reaches 4.5 feet in height This mixture of stand ages and sizes provides a degree of diversity for aesthetics, wildlife and a high level of wood fiber and forage production. Open roads are normally limited to 2.5 miles per square mile.

Management Area 2 (Timber/Wildlife)

Management Area 2 emphasizes wood fiber and forage production although timber harvest scheduling is constrained to provide greater recreational variety (especially hunting experiences) and wildlife diversity than are found in Management Area 1.

Timbered areas consist of timber stands (40 acres or less) of a variety of ages. Regeneration harvest of units adjacent to an existing regenerated unit is not to be initiated until adequate crop tree stocking on the existing unit reaches 10 feet in height.

Management Area 3 (Wildlife/Timber)

This area emphasizes big-game habitat while providing relatively high levels of timber production Like Management Areas 1 and 2, this management area provides a broad array of Forest uses and outputs However, management emphasizes maintenance of high quality big-game (particularly elk) habitat and more challenging hunting opportunities

Timber harvest is the primary tool for managing big-game habitat. Harvested stands are of different ages and are dispersed to provide a mixture of forage areas, thermal cover, and security cover Even- and uneven-aged management is practiced Even-aged harvest units are a maximum of 40 acres in size As in Management Area 2, regenerated trees must be 10 feet tall before harvesting adjacent units, but in Management Area 3 additional restrictions apply to any harvest which reduces cover, in order to better achieve optimum distribution of cover for elk Open public road access is generally not more than 1.5 miles per square mile

Management Area 4 (Wilderness)

The intent is to preserve the wilderness resource of these areas These areas are managed in accordance with the laws that established them as wilderness and the 2320 section of the Forest Service Manual The existing 582,700 acres of wilderness are common to all alternatives with slight increases proposed in Alternatives E and F.

The intent of the legislation is to preserve and protect the natural condition and characteristics of designated lands and to provide for current and future public enjoyment of these areas and their

wilderness character These areas remain essentially unaltered and undisturbed by man, with natural ecological processes (including the natural role of fire) permitted to operate with a minimum of human interference

Management Area 5 (Phillips Lake Area)

This area includes Mason Dam, Phillips Lake and its surrounding lands as described in the Reservoir Area Management Plan of March 1971 The area is to be managed recognizing a variety of resource values with emphasis on recreation opportunities.

Timber resources are managed to provide an aesthetically pleasing forest for public enjoyment. Timber stands are maintained in a thrifty condition with tree spacing providing a park-like appearance at some periods during a stand's life

Management Area 6 (Backcountry)

Management emphasizes opportunities for those dispersed recreation activities which are normally conducted within relatively large undeveloped areas outside wilderness The recreation activities usually involve combinations of viewing scenery, hunting, fishing, rock hunting, observing wildlife, snowshoeing, cross-country skiing, camping, hiking, backpacking, and gathering forest products such as mushrooms and berries.

These areas are to remain relatively natural and undeveloped. A road density level similar to 1985 levels will be maintained These areas will be accessed largely by trail with some trails or primitive roads open to motorized use Timber harvest is permitted in the event of catastrophic tree mortality when doing so would maintain or improve recreational or visual characteristics, or to prevent the spread of insects onto adjacent lands

Management Area 7 (Wild and Scenic Rivers)

Management is intended to preserve the wild, scenic, and recreational values of those rivers or river segments included in the National Rivers System. (Also see Wild and Scenic Rivers Act, Public Law 90-542)

Management Area 8 (HCNRA Snake River Corridor)

This area includes the wild and scenic river corridor along the Snake River within the Hells Canyon National Recreation Area and is common to all alternatives. The primary emphasis is on maintaining the recreation experiences available at the time the area was established. Maintenance of visual quality is especially important Management of this area is detailed in the Comprehensive Management Plan for the Hells Canyon National Recreation Area

Management Area 9 (HCNRA Dispersed Recreation/Native Vegetation)

In these areas, activities are conducted to provide opportunities for dispersed recreation and to enhance native vegetation It is expected that these areas will eventually be almost entirely occupied by native plant species Range condition will be satisfactory and this condition will be achieved and maintained primarily by nonstructural means Range vegetation and soil conditions will meet Forest Plan objectives. This status will be achieved and maintained primarily through the use of vegetation

management techniques as opposed to structural improvements These areas will provide a mix of primitive, semiprimitive nonmotorized and semiprimitive motorized recreation opportunities Management of this area is detailed in the Comprehensive Management Plan for the Hells Canyon National Recreation Area

Management Area 10 (HCNRA Forage Emphasis)

This management area includes grasslands interwoven with timbered stringers in the Hells Canyon National Recreation Area and is common to all alternatives It is intended that the grassland portions of these areas will be managed to provide range vegetative and soil conditions that are at or near the natural potential of the individual community type Structural improvements will be designed to blend with the surroundings and will be rustic in nature. Timbered portions will provide old-growth habitat at approximately current levels. Management of this area is detailed in the Comprehensive Management Plan for the Hells Canyon National Recreation Area.

Management Area 11 (HCNRA Dispersed Recreation/Timber Management)

These areas combine dispersed recreation with timber management on the more productive timber growing sites within the NRA. Use of this area is constant throughout all alternatives.

The objective is to provide a variety of tree species, a diversity of healthy timber stands and ample dispersed recreation opportunities Management of this area is detailed in the Comprehensive Management Plan for the Hells Canyon National Recreation Area

Management Area 12 (Research Natural Areas)

Research natural areas (RNA's) are intended to promote and protect natural diversity RNA's typify important forest, shrubland, grassland, alpine, aquatic and geologic types and other natural situations that have special and unique characteristics of scientific interest and importance Activities in RNA's are limited to research, study, observations, monitoring, and the kinds of activities that are nondestructive and nonmanipulative

Management Area 13 (Homestead Further Planning Area)

This management area includes that portion of the Homestead Further Planning Area under Forest Service management and is common to all alternatives. The USDI Bureau of Land Management, which manages the largest share of the further planning area, is responsible for preparing a recommendation to Congress either for wilderness or nonwilderness use

This area will be managed to preserve wilderness characteristics until the detailed study is completed and Congress determines whether or not wilderness is the most suited allocation If allocated to nonwilderness, this largely nontimbered area will be managed according to Management Areas 1 or 3 as illustrated on the alternative maps.

Management Area 14 (Starkey Experimental Forest and Range)

This management area is the 27,100-acre Starkey Experimental Forest and Range and is common to all alternatives.

The area is allocated to research use and will be managed to protect existing research projects and provide for future research needs In addition to its range and wildlife research contribution the experimental forest is expected to provide a variety of other benefits including timber and livestock forage when compatible with research uses

Management Area 15 (Old-Growth Preservation)

This area preserves old-growth forest Although there is no wildlife species known to rely solely on old-growth habitat, there are 20 animal species on the Wallowa-Whitman which indicate definite preference for mature or old-growth forest. Examples of these are the goshawk, barred owl, pileated woodpecker, and Townsend's warbler Old-growth forest habitat represents the best habitat for these species. It is not known whether other habitats are sufficient to maintain viable populations of these species without an available reservoir of old growth

These areas include timber stands at widely ranging elevations and aspects, and in a variety of plant communities. It is intended that these stands will continue to provide the quality habitat needed by those wildlife species dependent upon mature and old-growth timber

Management Area 16 (Administrative and Recreation Sites Retention)

This management area retains present and proposed administrative sites such as work centers, fire lookouts, campgrounds and other areas which are occupied by facilities for administration, public recreation or features of cultural significance Included are three summer home tracts and two ski areas.

Management Area 17 (Power Transportation Facility Retention)

This area retains areas which are currently in use or are proposed for the transport of gas, oil, or electricity

Management Area 18 (Anadromous Fish Emphasis)

This area is intended to provide optimum habitat for anadromous fish and high quality habitat for big game It also provides good habitat for resident trout Within this area, stream shade and stream channel conditions are managed to provide anadromous fish habitat at not less than 90 percent of the smolt habitat capability index

The dispersion of hiding cover, thermal cover, and forage is managed to provide near-optimum conditions

Comparison of Alternatives

Table S-1 compares the alternatives to the issues, concerns, and opportunities important to managing the Forest and also summarizes other important facets of the alternatives Figures S-2 through S-13 compare the alternatives graphically

Tradeoffs Among Alternatives

Forest management affects a wide range of people Some are primarily concerned about the Wallowa-Whitman National Forest because it is their closest National Forest, and is the Forest which

best meets their needs for local recreation. Others, overwhelmingly Oregon residents, see the Forest as their venue for big-game hunting Still others see the Wallowa-Whitman as the basis for their livelihoods, whether it be logging, guiding, livestock grazing, or mining Every individual's perspective is different and is itself a combination of perspectives--work-related and recreational, e.g

At other levels, people are concerned about how Wallowa-Whitman outputs affect the state economy or the national recreation picture In this array of considerations, no one individual fits into a single slot, and no one is unaffected by the needs and aspirations of others

Local area inhabitants are affected by Forest activities directly (as in the case of millworkers); indirectly (as in the case of a saw repair shop), and through their expenditures in the local economy (theaters, restaurants, and so on). The Forest's influence is also important in the local area because its activities determine how much money the federal treasury will remit the local governments from the "25 percent fund," an important part of area road and school budgets.

Briefly, those whose main interest in the Forest arises from its ability to generate commodities would be well served by Alternatives NC, C-departure, and B-departure. Following those three would be Alternatives B, C, D, E, and A--in that order H, G, and F round out the field

Amenity interests would appear to be best served by Alternative F, which was designed to be especially responsive to those concerns. Alternatives H, C, D, E, and G would follow but their relative placing is arguable Those with a particular interest in maintaining roadless areas might rank E number one--perhaps in front of all other alternatives Those whose amenity inclination centers on overall land usage would likely place H and C in front of E and G Those whose interests in amenities combine with a concern for efficiency might place Alternative G first. Because Alternative H offers less sawtimber for sale, it may be regarded as more amenity-oriented than Alternative C.

Alternatives B, B-departure, C-departure, and NC complete the field, becoming progressively less satisfying to amenity interests.

Table S-1
RESPONSE TO ISSUES, CONCERNS, OPPORTUNITIES, AND SUMMARY CHARACTERISTICS BY ALTERNATIVE*
AVERAGE ANNUAL FIGURES

Issue	Goal/Comparative Factor	Recent Levels		NC		B-dep 1/		B		A (No Action)		D	
Timber Production	Maintain or increase timber production/ timber offered for sale Sawtimber (Allowable Sale Quantity)	MMCF 28 6	MMBF 159	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF
	Decade 1			35 1	183	34.4	167	30 1	151	27 1	134	28 6	143
	Decade 2			35.1		36 5		30 2		27.3		28 7	
	Decade 5			35 1		39 0		30 2		27 2		28 4	
	Total wood fiber including sawtimber (MMCF) *in Decade 1*	43 2		50 2		49 4		43 8		39 8		41 8	
	Allowable sale quantity in excess of maximum PNV in Decade 1 2/			NE	NE	11 0	52 5	6 3	36 1	NE	NE	7 0	34 4
	Reforestation Decade 1												
	Acres Planted	2,407		NE		9,900		3,100		4,300		4,400	
	Acres of Site Prep Only 3/			NE		4,800		1,600		2,000		2,100	
	Acres Not Treated 4/			NE		5,900		10,100		7,000		8,500	
	Total Acres			NE		20,600		14,800		13,300		15,000	
	Precommercial Thinning Decade 1	3,942		10,400		12,000		7,700		9,200		7,400	
Transportation System Management	Minimize new road construction /miles of road in Decade 5	9,300 100%		NE NE		12,300 132%		12,100 130%		11,700 126%		11,800 127%	
	Miles of road open to public use	7,305 100%		NE NE		7,400 101%		7,300 100%		7,000 96%		7,100 97%	
Management of (Nonwilderness) Undeveloped Areas	Retain existing undeveloped area/acres of undeveloped area remaining after 15 years	484,443 100%		343,932 71%		298,209 62%		298,209 62%		343,932 71%		333,341 69%	

1/ Alternative B-departure cannot be implemented *without change to federal legislation.* It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
2/ Volume generated in excess of what an identical alternative without a minimum timber harvest level would have generated This indicates an increased possibility of below-cost timber sales
3/ The site is prepared to facilitate natural regeneration of the timber stand
4/ No funds are spent to achieve reforestation, per se Reforestation is assisted through the normal logging practices and treatment of fuels created by timber harvest
NE - Not estimated
* Arranged in order of decreasing suitable land acreage, i e , forested lands scheduled for harvest during the planning horizon

Table S-1 (Continued)
RESPONSE TO ISSUES, CONCERNS, OPPORTUNITIES, AND SUMMARY CHARACTERISTICS BY ALTERNATIVE
AVERAGE ANNUAL FIGURES

Issue	Goal/Comparative Factor	Recent Levels		C-dep		C (Preferred)		H		G		F		E	
Timber Production	Maintain or increase timber production/ timber offered for sale	MMCF 28 6	MMBF 159	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF
	Sawtimber (Allowable Sale Quantity)														
	Decade 1			34 4	169	27 7	144	24 0	118	23 7	117	20 6	98	26 9	136
	Decade 2			25 2		27 3		24 2		24 4		21 0		27 1	
	Decade 5			25.1		27 3		24 6		24 0		21 3		26 8	
	Total wood fiber including sawtimber (MMCF) in Decade 1	43.2		49 3		40 6		35 9		35 6		31 6		39 7	
	Allowable sale quantity in excess of maximum PNV in Decade 1 1/			13 8	65 9	6 6	38 6	3 4	15 3	5/	5/	10 5	38 8	6 4	33 1
	Reforestation Decade 1														
	Acres Planted	2,407		5,100		4,700		3,200		1,600		3,800		4,100	
	Acres of Site Prep Only 3/			2,200		1,700		1,700		500		2,000		1,900	
	Acres Not Treated 4/			9,500		7,900		8,100		9,300		4,800		8,400	
	Total Acres			16,700		14,300		13,000		11,400		10,600		14,300	
	Precommercial Thinning														
	Decade 1	3,942		6,600		7,400		5,400		4,800		2,000		8,200	
Transportation System Management	Minimize new road construction /miles of road in Decade 5	9,300 100%		11,900 128%		11,600 125%		11,500 124%		11,600 125%		11,100 119%		11,800 127%	
	Miles of road open to public use	7,305 100%		7,000 96%		6,900 94%		6,700 92%		6,800 93%		5,500 75%		6,900 94%	
Management of (Nonwilderness) Undeveloped Areas	Retain existing undeveloped area/acres of undeveloped area remaining after 15 years	484,443 100%		336,820 70%		353,933 73%		336,820 70%		313,107 65%		378,823 78%		484,443 100%	

1/ Volume generated in excess of what an identical alternative without a minimum timber harvest level would have generated This indicates an increased possibility of below-cost timber sales
2/ On a maximum efficiency basis this alternative would schedule 1 0 MMCF more but 4 MMBF less The difference is due to harvesting material with different board foot/cubic foot conversion ratios
3/ The site is prepared to facilitate natural regeneration of the timber stand
4/ No funds are spent to achieve reforestation, per se Reforestation is assisted through the normal logging practices and treatment of fuels created by timber harvest
5/ Timber volume offered for sale in this alternative could be increased and generate an increase in PNV This is because this is the only alternative whose timber sale offerings were constrained to provide no below-cost timber sales

Table S-1 (Continued)
RESPONSE TO ISSUES, CONCERNS, OPPORTUNITIES, AND SUMMARY CHARACTERISTICS BY ALTERNATIVE
AVERAGE ANNUAL FIGURES

Issue	Goal/Comparative Factor	Recent Levels	NC	B-dep 1/	B	A (No Action)	D
Local Economy	Maintain economic stability of local communities/First Decade						
	- Jobs 2/	3,000	3,300	3,200	3,100	2,900	3,000
	- Personal Income MM$ 3/	44 5	49 2	47 8	45 3	42 8	44 0
	- Payments to Counties MM$ 4/	4 0	4 3	4 3	4 7	4 0	4 4
Livestock Production	Maintain or increase forage available to domestic livestock/ Animal unit months	186,000	186,000	204,000	207,000	186,000	191,000
Old-Growth Forest	Maintain existing old-growth forest/levels meeting Regional old-growth definition in Decade 5	173,029 100%	105,000 61%	132,000 76%	142,000 82%	147,000 85%	153,000 88%
Minerals	Maximize opportunities for mineral exploration and extraction/ *acres of known mineral potential* available for unrestricted mineral entry	189,400	205,400	205,400	205,400	189,400	195,000
Wildlife Production, Deer and Elk	Maximize big game habitat effectiveness/elk numbers (Decade 2)	20,960	NE	19,900	19,890	20,820	20,050
	Elk numbers as a percent of State management objectives	100	NE	95	95	99	95

1/ Alternative B-departure cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual *increment* (CMAI) before harvesting
2/ Jobs include part time and full time, temporary and permanent positions with no differentiations Includes direct, indirect, and induced employment
3/ Represents employee compensation from direct, indirect, and induced employment MM$ = Million 1982 dollars
4/ Funds remitted local governments based on gross federal receipts MM$ = Million 1982 dollars
NE - Not Estimated

Table S-1 (Continued)
RESPONSE TO ISSUES, CONCERNS, OPPORTUNITIES, AND SUMMARY CHARACTERISTICS BY ALTERNATIVE
AVERAGE ANNUAL FIGURES

Issue	Goal/Comparative Factor	Recent Levels	C-dep	C (Preferred)	H	G	F	E
Local Economy	Maintain economic stability of local communities/First Decade							
	- Jobs 1/	3,000	3,200	3,000	2,800	2,800	2,600	2,900
	- Personal Income MM$ 2/	44 5	47 9	43 9	40 6	40 4	37 5	42 8
	- Payments to Counties MM$ 3/	4 0	4 9	4 3	3 8	4 0	3 0	4 2
Livestock Production	Maintain or increase forage available to domestic livestock/ Animal unit months	186,000	186,000	186,000	186,000	207,000	143,000	163,000
Old-Growth Forest	Maintain existing old-growth forest/levels meeting Regional old-growth definition in Decade 5	173,029 100%	156,000 90%	161,000 93%	160,000 92%	152,000 88%	172,000 99%	167,000 97%
Minerals	Maximize opportunities for mineral exploration and extraction/ acres of known mineral potential available for unrestricted mineral entry	189,400	195,000	195,000	195,000	205,400	190,200	183,200
Wildlife Production, Deer and Elk	Maximize big game habitat effectiveness/elk numbers	20,960	20,380	20,082	20,380	19,910	22,400	20,100
	Elk numbers as a percent of State management objectives	100	97	96	97	95	106	96

1/ Jobs include part time and full time, temporary and permanent positions with no differentiations. Includes direct, indirect, and induced employment
2/ Represents employee compensation from direct, indirect, and induced employment MM$ = Million 1982 dollars
3/ Funds remitted local governments based on gross federal receipts MM$ = Million 1982 dollars

Table S-1 (Continued)
RESPONSE TO ISSUES, CONCERNS, OPPORTUNITIES, AND SUMMARY CHARACTERISTICS BY ALTERNATIVE
AVERAGE ANNUAL FIGURES

Issue	Goal/Comparative Factor	Recent Levels	NC	B-dep 1/	B	A (No Action)	D
Recreation Diversity	Maintain or enhance the diversity of recreational opportunities/ acres by Recreation Opportunity Spectrum (ROS) class in Decade 5						
	Nonwilderness						
	Primitive	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%
	Semiprimitive Nonmotorized	269,000 2/ 100%	171,700 64%	126,800 47%	126,800 47%	171,700 64%	154,700 58%
	Semiprimitive Motorized	260,200 2/ 100%	148,600 57%	128,600 49%	128,600 49%	148,600 57%	149,900 58%
	Roaded Natural	985,600 100%	262,300 27%	222,000 23%	222,000 23%	262,300 27%	234,700 24%
	Roaded Modified	242,100 100%	1,174,300 485%	1,279,500 529%	1,279,500 529%	1,174,300 485%	1,217,600 503%
	Rural	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%
	Wilderness						
	Primitive (Trailed)	515,200	546,400	546,400	546,400	546,400	546,400
	Semiprimitive	67,500	36,300	36,300	36,300	36,300	36,300
	Subtotal	582,700	582,700	582,700	582,700	582,700	582,700
	Grand Total	**2,349,215**	**2,349,215**	**2,349,215**	**2,349,215**	**2,349,215**	**2,349,215**
Developed Recreation Use 3/	Thousand Recreation Visitor Days	367					
	Decade 1		399	399	399	399	399
	Decade 2		464	464	464	464	464
	Decade 5		621	621	621	621	621

1/ *Alternative B-departure cannot be implemented without change to federal legislation.* It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
2/ Values for recent levels include some lands which are under contract for road construction or timber harvest These lands are not retained in the semiprimitive ROS classes in any alternative
3/ Includes visitor information service

Table S-1 (Continued)
RESPONSE TO ISSUES, CONCERNS, OPPORTUNITIES, AND SUMMARY CHARACTERISTICS BY ALTERNATIVE
AVERAGE ANNUAL FIGURES

Issue	Goal/Comparative Factor	Recent Levels	C-dep	C (Preferred)	H	G	F	E
Recreation Diversity	Maintain or enhance the diversity of recreational opportunities/ acres by Recreation Opportunity Spectrum (ROS) class in Decade 5							
	Nonwilderness							
	Primitive	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%
	Semiprimitive Nonmotorized	269,000 1/ 100%	154,700 58%	154,700 58%	154,700 58%	126,800 47%	205,300 76%	218,000 81%
	Semiprimitive Motorized	260,200 1/ 100%	149,900 58%	149,900 58%	149,900 58%	141,700 54%	172,800 66%	178,600 69%
	Roaded Natural	985,600 100%	237,100 24%	237,100 24%	237,100 24%	223,800 23%	220,300 22%	246,700 25%
	Roaded Modified	242,100 100%	1,215,200 502%	1,215,200 502%	1,215,200 502%	1,264,600 522%	1,157,400 478%	1,112,600 460%
	Rural	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%
	Wilderness							
	Primitive (Trailed)	546,400	546,400	546,400	546,400	546,400	546,400	546,400
	Semiprimitive	36,300	36,300	36,300	36,300	36,300	37,300	37,300
	Subtotal	582,700	582,700	582,700	582,700	582,700	583,700	583,700
	Grand Total	**2,349,215**	**2,349,215**	**2,349,215**	**2,349,215**	**2,349,215**	**2,349,215**	**2,349,215**
Developed Recreation Use 2/	Thousand Recreation Visitor Days	367						
	Decade 1		399	399	399	399	399	399
	Decade 2		464	464	464	464	464	464
	Decade 5		621	621	621	621	621	621

1/ Values for recent levels include some lands which are under contract for road construction or timber harvest These lands are not retained in the semiprimitive ROS classes in any alternative
2/ Includes visitor information service

Table S-1 (Continued)

RESPONSE TO ISSUES, CONCERNS, OPPORTUNITIES, AND SUMMARY CHARACTERISTICS BY ALTERNATIVE

AVERAGE ANNUAL FIGURES

Issue	Goal/Comparative Factor	Recent Levels	NC	B-dep 1/	B	A (No Action)	D
Dispersed Recreation Use 2/	Thousand Recreation Visitor Days	1,144					
	Decade 1		NE	1,244	1,244	1,244	1,244
	Decade 2		NE	1,445	1,445	1,445	1,445
	Decade 5		NE	1,623	1,623	1,720	1,707
Economic Efficiency	Returns to Federal Treasury 3/	8 8					
	Million Dollars Decade 1		NE	12 0	15 0	12 1	13 3
	Million Dollars Decade 2		NE	17 1	15 5	11 4	14 0
	Present Net Value 4/ Million Dollars		399	406	583	498	562
	Benefit/Cost Ratio 5/		NE	1 60	2.11	1 96	2 08
	Budget (Decade 1)6/ Million Dollars	23 1	NE	27.5	21.9	21 6	21 7

1/ Alternative B-departure cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting

2/ Includes wilderness recreation and recreation related to wildlife and fish

3/ Cash receipts for Forest outputs--remitted to the U S Treasury

4/ Present value of benefits minus the present value of costs Includes all outputs and costs to which dollar values have been assigned (whether the values and costs were derived from market transactions or not) A 4 percent discount rate was used for the 150-year period of analysis

5/ Present value of benefits divided by the present value of costs The result is normally expressed as a ratio of dollars returned per single dollar expended. A benefit cost ratio of 1 4 means that $1 40 is expected to be returned for every dollar of expenditure A 4 percent discount rate was used for the 150-year period of analysis

6/ Recent level is the average of the period 1980-1983 Includes all costs identified in the Forest's Unit Summary Report, regardless of funding source Includes purchaser credit road work (as did the recent levels) Starting in FY 1985 this money was retained in the Regional Office until distribution is needed and therefore is not normally included in Forest budget proposals

NE - Not estimated

Table S-1 (Continued)
RESPONSE TO ISSUES, CONCERNS, OPPORTUNITIES, AND SUMMARY CHARACTERISTICS BY ALTERNATIVE
AVERAGE ANNUAL FIGURES

Issue	Goal/Comparative Factor	Recent Levels	C-dep	C (Preferred)	H	G	F	E
Dispersed Recreation Use 2/	Thousand Recreation Visitor Days	1,144						
	Decade 1		1,244	1,244	1,244	1,244	1,244	1,244
	Decade 2		1,445	1,445	1,445	1,445	1,445	1,445
	Decade 5		1,707	1,726	1,707	1,671	1,782	1,805
Economic Efficiency	Returns to Federal Treasury 3/	8 8						
	Million Dollars Decade 1		15 7	12 8	11 9	13 1	8 8	13 3
	Million Dollars Decade 2		10 7	13 6	12 1	13 6	9 6	14 2
	Present Net Value 4/							
	Million Dollars		545	551	593	624	543	575
	Benefit/Cost Ratio 5/		2 04	2 06	2 31	2 42	2 25	2 15
	Budget (Decade 1) 6/	23 1						
	Million Dollars		23 4	22 2	18 7	17 9	17 9	20 7

1/ Alternative B-departure cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
2/ Includes wilderness recreation and recreation related to wildlife and fish
3/ Cash receipts for Forest outputs–remitted to the U S Treasury
4/ Present value of benefits minus the present value of costs Includes all outputs and costs to which dollar values have been assigned (whether the values and costs were derived from market transactions or not) A 4 percent discount rate was used for the 150-year period of analysis
5/ Present value of benefits divided by the present value of costs The result is normally expressed as a ratio of dollars returned per single dollar expended A benefit cost ratio of 1 4 means that $1 40 is expected to be returned for every dollar of expenditure A 4 percent discount rate was used for the 150-year period of analysis
6/ Recent level is the average of the period 1980-1983 Includes all costs identified in the Forest's Unit Summary Report, regardless of funding source Includes purchaser credit road work (as did the recent levels) Starting in FY 1985 this money was retained in the Regional Office until distribution is needed and therefore is not normally included in Forest budget proposals

Table S-2 Management Area Acreages by Alternative

Management Area	NC	A (No Action) 1/	B (RPA), B-dep	C (Preferred)	C-dep, H	D	E	F	G
1 Timber Production Emphasis	1,269,631	399,660	872,975	716,245	647,347	826,098	736,495	0	858,077
2 Timber/Wildlife	0	0	350,167	0	0	0	306,240	0	350,167
3 Wildlife/Timber	0	706,124	0	382,113	459,749	343,681	0	422,339	0
4 Wilderness 6/	582,700	582,700	582,700	582,700	582,700	582,700	583,713	583,713	582,700
5 Phillips Lake Area*	0	4,967	4,967	4,967	4,967	4,967	4,967	4,967	4,967
6 Backcountry	62,543	134,790	62,543	122,788	108,654	106,194	247,126	150,442	77,441
7 Wild and Scenic Rivers	26,909	26,909	26,909	26,909	26,909	26,909	26,909	26,909	26,909
8 HCNRA Snake River Corridor*	14,355	14,355	14,355	14,355	14,355	14,355	14,355	14,355	14,355
9 HCNRA Disp Rec /Nat Veg *	161,078	161,078	161,078	161,078	161,078	161,078	161,078	161,078	161,078
10 HCNRA Forage*	128,009	128,009	128,009	123,029	128,009	128,009	128,009	128,009	128,009
11 HCNRA Dsp Rec /Tmbr Mgt *	71,206 5/	71,206	71,206	70,706	70,706	70,706	70,706	70,706	71,206
12 Research Natural Areas 2/	0	974	12,960	15,160	14,560	14,560	14,560	14,560	12,960
			(11,960)	(12,450)	(13,360)	(13,360)	(13,360)	(13,360)	(11,960)
13 Homestead Further Planning Area 3/*	5,733	5,733	5,733	5,733	5,733	5,733	5,733	5,733	5,733
14 Starkey Exp For & Range*	27,051	27,051	27,051	27,051	27,051	27,051	27,051	27,051	27,051
15 Old-Growth 4/	0	76,919	28,184	36,750	38,196	38,196	23,295	40,312	28,184
16 Administrative and Recreation Sites	0	0	5,744	5,744	5,744	5,744	5,744	5,744	5,744
17 Utility Corridors	0	0	6,594	6,594	6,594	6,594	6,594	6,594	6,594
18 Anadromous Fish Emph	0	0	0	59,743	60,223	0	0	680,063	0
Baker City Watershed	0	8,740							
Total	2,349,215								

* Denotes management areas which, because of Congressional or administrative designation, do not vary among alternatives except as needed to provide research natural areas

1/ Alternative A is the No Action Alternative Since this alternative is made up of numerous allocations from six unit plans, the summary and comparison of acres allocated are necessarily approximate

2/ Figures in parentheses indicate acres within wilderness, Snake River Corridor, Dispersed Recreation/Native Vegetation, or further planning allocations

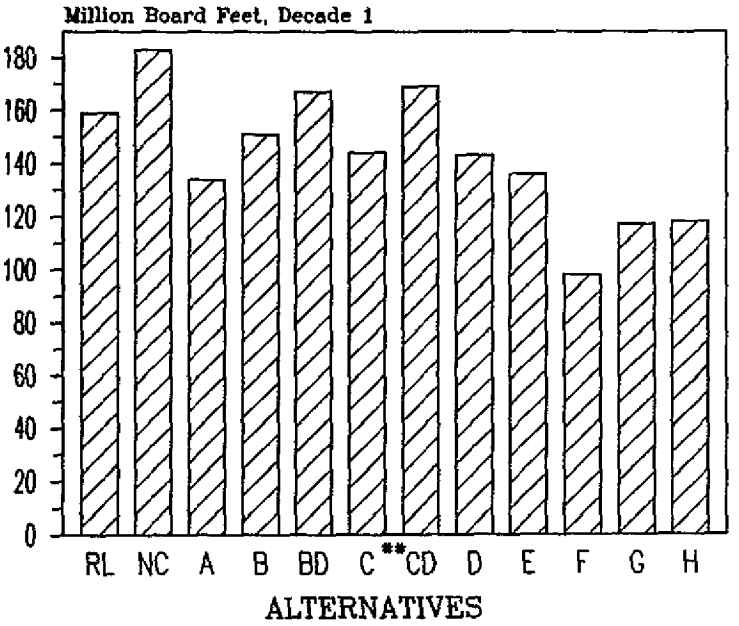
3/ If the Homestead Further Planning Area does not become wilderness 3,708 acres would become part of Management Area 10 with the remaining acres being within Management Areas 1, 2, or 3, depending on the alternative

4/ Old growth in Alternative A is managed with about 28,000 acres currently in an old-growth condition All other alternatives show dedicated old-growth, nearly all representing old-growth condition

5/ The dispersed recreation/timber management allocation is recognized in the timber management plan but full yields are assumed to accrue from forested lands within that allocation

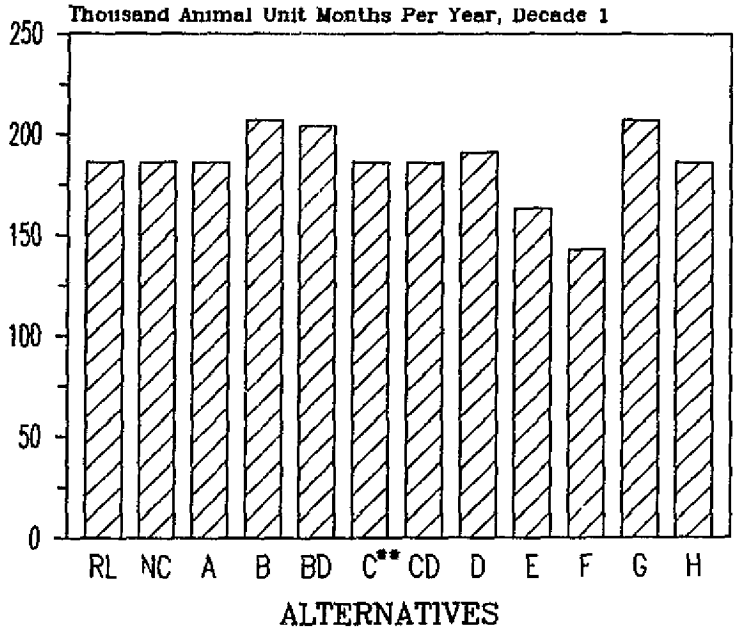
6/ Includes 23,760 acres within wilderness that is in the Omnibus Oregon Wild and Scenic Rivers Act of 1988

FIGURE S-2
ALLOWABLE SALE QUANTITY
(Average Annual)*



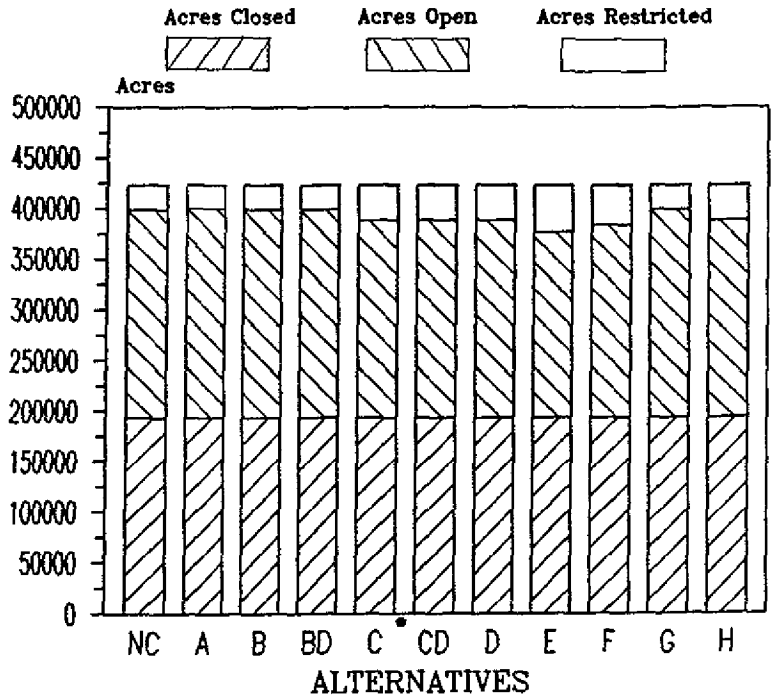
RL Recent Level
NC No Change (Potential Yield From Timber Management Plan)
BD B-dep , CD C-dep
** Preferred Alternative
* Excludes Roundwood and Fuelwood

FIGURE S-3
PERMITTED LIVESTOCK GRAZING
(Average Annual)*



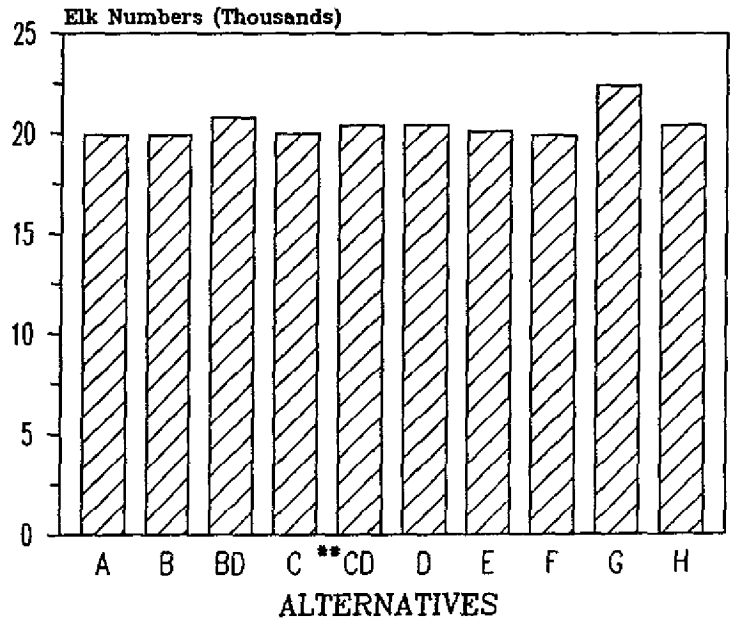
RL Recent Level
NC No Change
BD B-dep CD C-dep
** Preferred Alternative
* Excludes Forest Service Permitted Use On Private Land

FIGURE S-4
AREA OF KNOWN MINERAL POTENTIAL



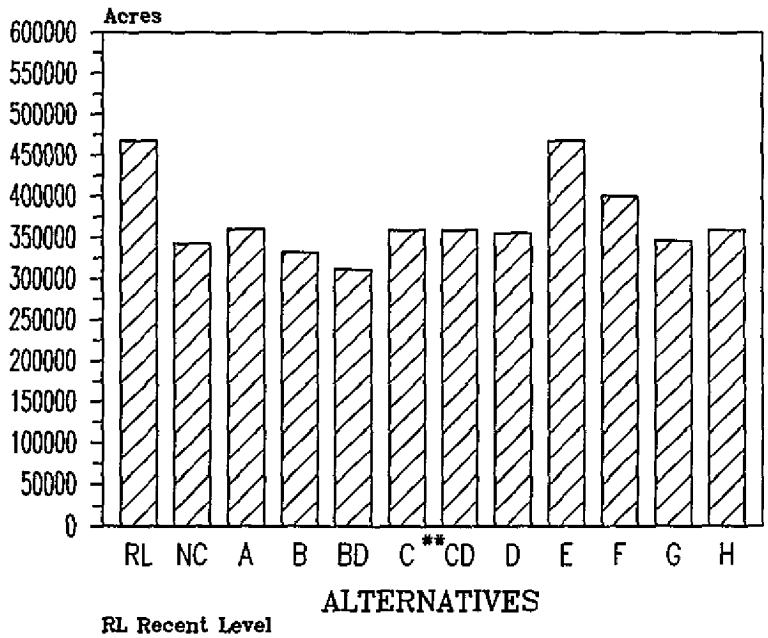
NC No Change
BD B-dep
CD C-dep
● Preferred Alternative

FIGURE S-5
ELK NUMBERS, DECADE 2
(Average Annual)*



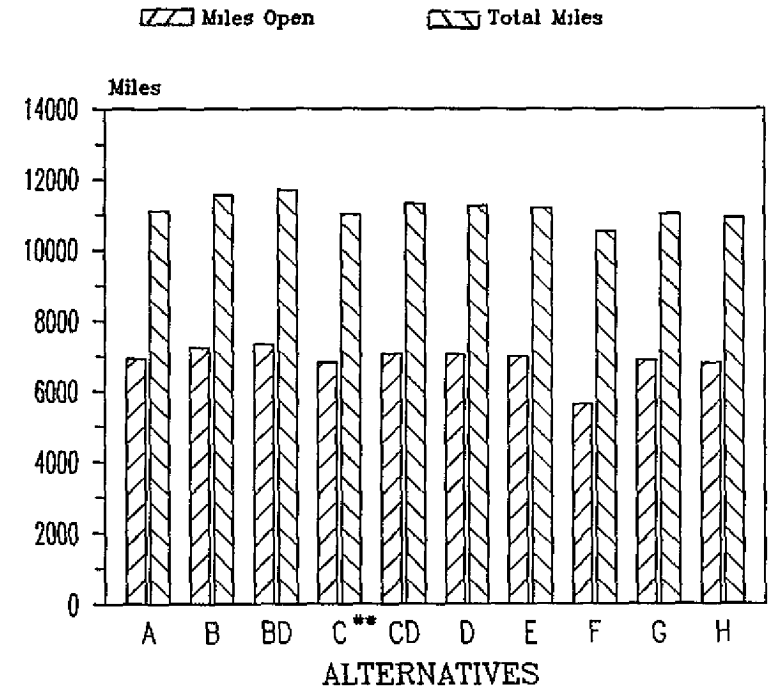
BD B-dep
CD C-dep
● Alternative NC Not Estimated
** Preferred Alternative

Figure S-6
LAND UNDEVELOPED AFTER TWO DECADES
(Nonwilderness)



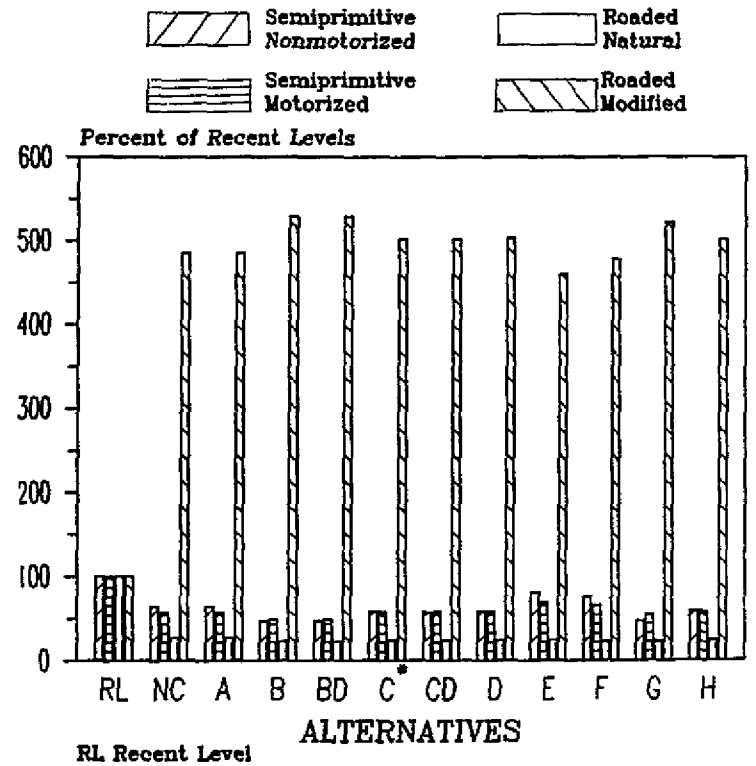
RL Recent Level
NC No Change
BD B-dep
CD C-dep
** Preferred Alternative

Figure S-7
TOTAL ROAD MILES, ROADS LEFT OPEN



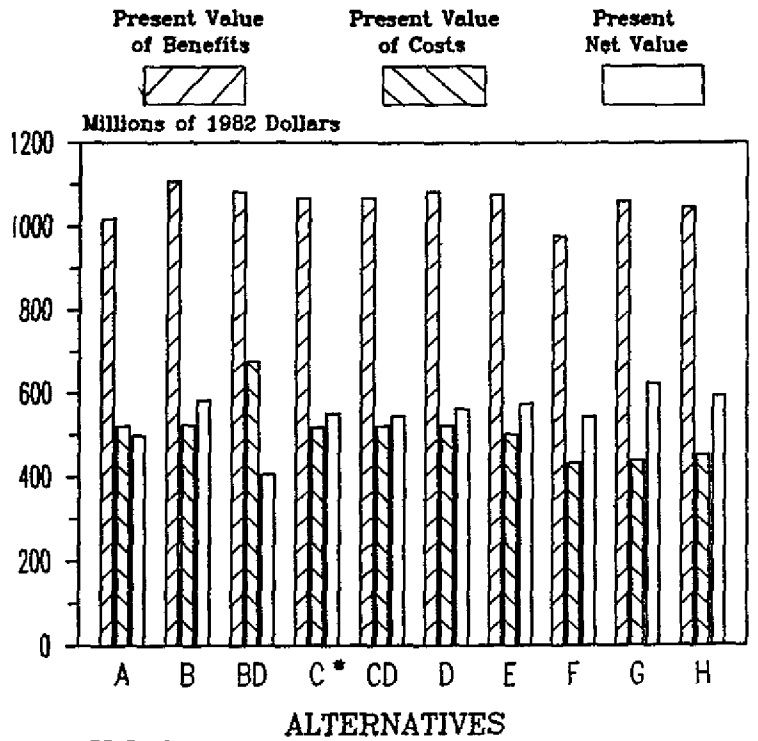
BD B-dep
CD C-dep
* Over The Next Fifty Years
NC – Not Estimated
** Preferred Alternative

FIGURE S-8
RECREATION DIVERSITY



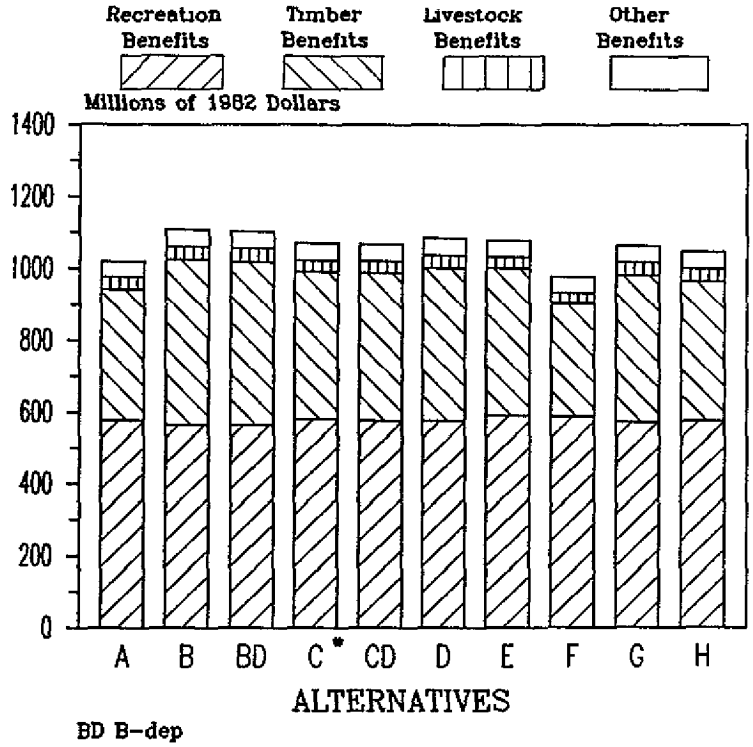
RL Recent Level
NC No Change
BD B–dep
CD C–dep
* Preferred Alternative

FIGURE S-9
PRESENT NET VALUE AND ITS COMPONENTS



BD B–dep
CD C–dep
* Preferred Alternative

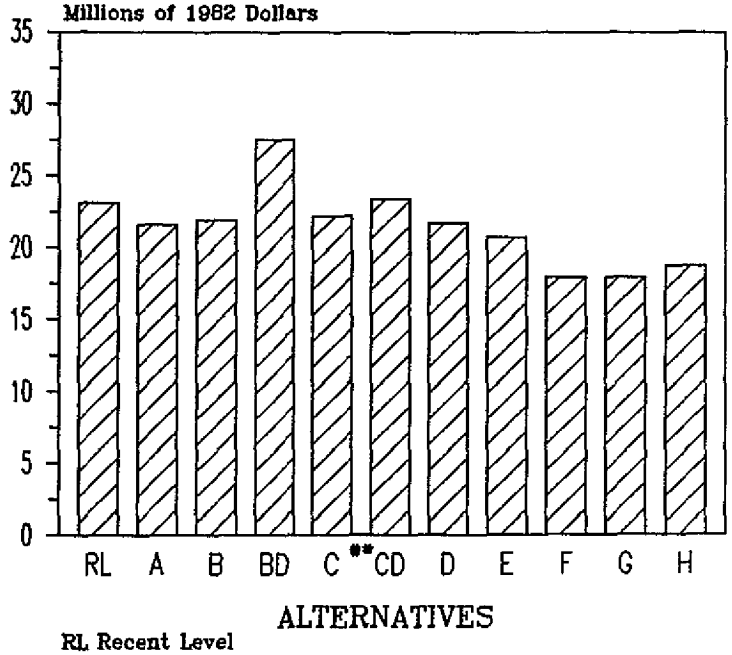
FIGURE S-10
PRESENT VALUE OF THE BENEFITS - ITS COMPOSITION



BD B-dep
CD C-dep
● Preferred Alternative

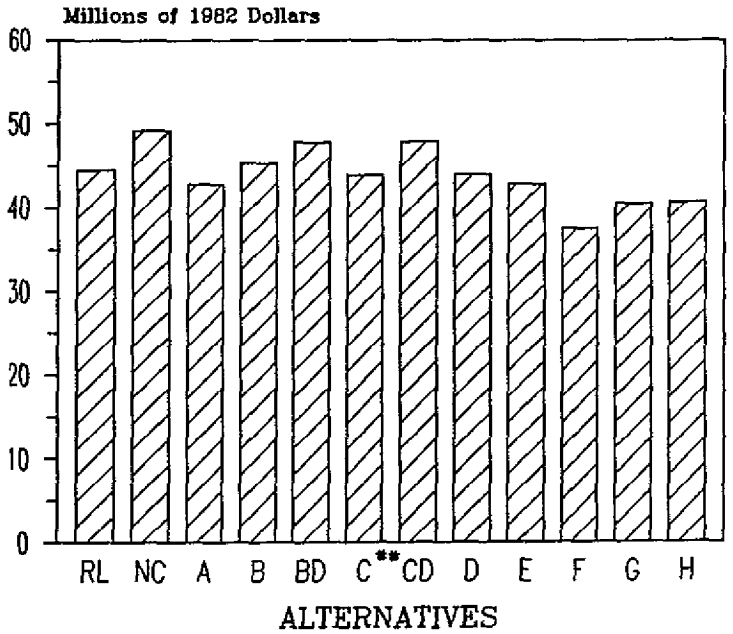
FIGURE S-11
FOREST BUDGET, DECADE 1

(Average Annual)



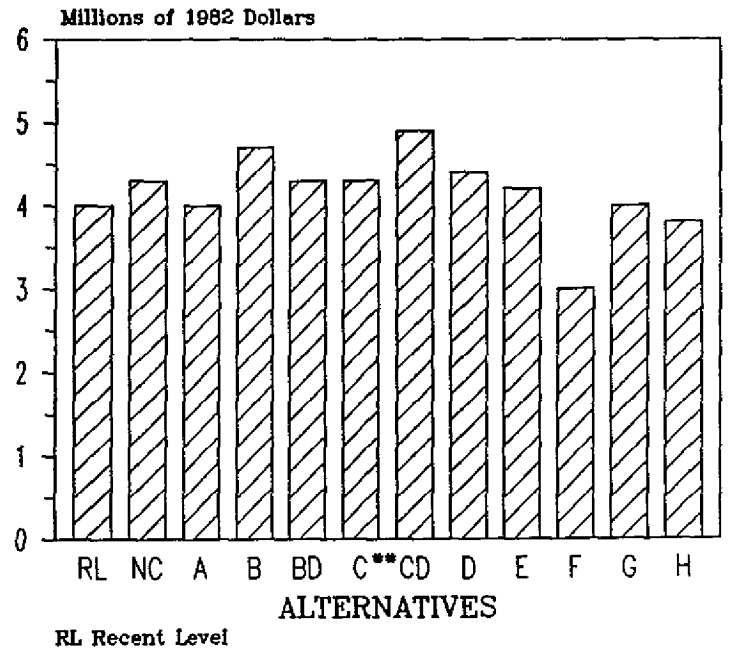
RL Recent Level
BD B-dep
CD C-dep
● Includes Purchaser Credit Road Costs And All Other Expenditures
** Preferred Alternative

FIGURE S-12
FOREST-RELATED PERSONAL INCOME, DECADE 1



RL Recent Level
NC No Change
BD B-dep
CD C-dep
* Includes Direct and Induced Personal Income, Decade 1
** Preferred Alternative

FIGURE S-13
PAYMENTS TO LOCAL GOVERNMENTS, DECADE 1



RL Recent Level
NC No Change
BD B-dep
CD C-dep
** Preferred Alternative

A SUMMARY OF CHAPTER III - AFFECTED ENVIRONMENT

Location

There are 2 6 million acres within the boundaries of the Forest Included are the Wallowa and the Whitman National Forests in Oregon and portions of the Nez Perce and Payette National Forests in Idaho. Of the total, 2 3 million acres are National Forest System lands Interspersed within the administrative area of the Forest are various other Federal, State, county, and private land parcels The Forest is in the northeast corner of Oregon and the west central edge of Idaho as shown on the vicinity map (Figure S-1) It lies within Wallowa, Union, Baker, Malheur, Umatilla, and Grant Counties in Oregon, and Idaho, Adams, and Nez Perce Counties in Idaho The Forest Supervisor's Office is in Baker City, Oregon

The Forest borders the Malheur and Umatilla National Forests. The acreages of National Forest System lands by county, administered by the Wallowa-Whitman National Forest Supervisor, are shown below.

NATIONAL FOREST SYSTEM LANDS

Oregon Counties			*Idaho Counties **		
Baker	-	595,110 acres	Adams	-	24,638 acres
Grant	-	82,782	Idaho	-	112,278
Malheur	-	3,460			
Umatilla	-	25,586			
Union	-	515,320			
Wallowa	-	990,071			

* Does not include 8,288 acres in the Rapid River portion of the Hells Canyon National Recreation Area administered by Nez Perce and Payette National Forests

Topography

The Forest includes all or portions of three distinct mountain ranges the Blue Mountains (including the Elkhorn Range) and the Wallowa Mountains in Oregon, and the Seven Devils Mountains in Idaho South and west of Baker City and extending northerly past La Grande, the Blue Mountains provide high ridges with alpine meadows and dense timber, interrupted by the broad prairie valleys of the Burnt, Powder, and Grande Ronde Rivers.

The Wallowa Mountains are a range of jagged mountain peaks with alpine meadows and dense timber, giving way to Pine Valley on the south, Baker and Grande Ronde Valleys on the west, the Wallowa Valley on the north, and dropping sharply into the Snake River to the east. The Seven Devils Mountains of Idaho are located to the east of the Snake River, rising to provide alpine conditions similar to those in the Wallowa Mountains.

Elevations vary from 860 feet where the Snake River leaves the HCNRA to nearly 10,000 feet for several peaks in the Wallowa and Seven Devils Mountains. Elevations of several mountain peaks on the Elkhorn Ridge approach 9,000 feet.

Human Environment

Area of Influence--The area of influence (the area in which almost all the social effects of Forest management are discernible) includes the Oregon counties of Baker, Union, and Wallowa (Tri-Counties) These three counties process most of the Forest's timber outputs and 95 percent of the Forest's area falls within their boundaries. Many local residents rely on Forest fuelwood for primary home heat

Major employment comes from city, county, state, and federal agencies; trade, lumber and wood products manufacturing, and agriculture. Small in population (45,750 in 1987), the Tri-Counties comprise an area of 5.3 million acres separated by long distances (100 to 200 miles) from the nearest metropolitan area, Boise, Idaho For a more complete description of the local area see Appendix B and the Forest's Social Appraisal.

A SUMMARY OF CHAPTER IV - ENVIRONMENTAL CONSEQUENCES

General

This chapter provides the scientific and analytical basis for the comparison of alternatives presented in Chapter II

Different mixes of practices in the alternatives produce different levels of resource outputs, such as recreation capacity, habitat diversity, timber production, and grazing use The level and mix of outputs and their locations translate into varying environmental consequences by alternative Management area direction includes standards and guidelines that provide mitigation measures to ensure that long-term productivity of the land is not significantly impaired. Forest-wide standards and guidelines that apply to all management areas also protect the resources and mitigate adverse impacts

Environmental consequences are the expected effects of activities scheduled to implement an alternative They are described as quantitative or qualitative changes from the current situation in terms of significance, magnitude, duration, and degree of risk.

Vegetation

All alternatives will affect vegetation to varying degrees These changes may take several forms, including diversity (changes in species composition, age class distribution), vigor (health), and extent (for example, how much of the land is covered with vegetation vs. how much is occupied with such things as roads). Activities which affect vegetation include timber management, grazing by livestock and wildlife, mining, road construction, construction and maintenance of utility corridors, fire and fuels management, recreation, insects, and diseases.

Diversity Diversity is expected to peak between the third and fifth decades with mature and old-growth timber stands still represented, but will decline from there as mature timber stands continue to be harvested

Tree species diversity will remain high in all alternatives. Tree species which do not reproduce well under the shade of existing tree crowns, such as western larch and ponderosa pine, will occur less

frequently in stands managed under uneven-aged methods Shade tolerant species (true firs and Englemann spruce) will increase These changes will be most noticeable in Alternatives E, F, and G, since timber management is generally less intensive in these alternatives, encouraging shade-tolerant species. Douglas-fir, ponderosa pine, western larch, and lodgepole pine will increase in Alternatives NC, B, B-departure, and D. The high level of even-aged regeneration harvest (clearcutting, seed tree, or shelterwood) in these alternatives will encourage these shade-intolerant species White fir, spruce, and subalpine fir will remain strong components of riparian areas, wilderness, and Management Area 6 in all alternatives

Ground disturbance also creates the opportunity for plants considered undesirable such as Canadian thistle or knapweed species Use and maintenance of roads tend to promote the spread of noxious plants onto and within the Forest, and from the Forest

Changes in species composition (such as increases in shrubs, some forbs, and mushrooms) which are dependent upon ground-disturbing activities will be most pronounced in Alternatives NC, B-departure, B, and C-departure, with their high levels of timber management activities. Changes would be slight in Alternatives F and G which have relatively low levels of timber management activities, and intermediate in Alternatives C, D, E, and H.

Forest Vegetation On those portions of the Forest where *timber management activities* are proposed under any alternative, forest vegetation will be significantly changed These changes or effects vary by the frequency of treatment and the type of treatment

The two major silvicultural systems are even-age management and uneven-age management

Within the Hells Canyon National Recreation Area, selective harvest is required Selective harvest may be uneven-aged, but may include even-aged methods such as shelterwood harvest (Crowell 1984). The interim rule for management of the area, 36 CFR 292, October 5, 1989, interpreted selective harvest to mean selection harvest

Throughout the remainder of the Forest, either uneven-aged or even-aged regimes may be used depending on which methods best meet resource management objectives as determined by site-specific analysis. Since even-aged methods are preferable for disease control and economic efficiency, they are most likely to be used where timber production is emphasized.

All alternatives include a mix of even-aged and uneven-aged management. (The decision on the most appropriate harvest methods for each individual stand is made at the project level) Regardless of alternative, uneven-aged management is expected to predominate in the sensitive visual corridors adjacent to major travel routes, in riparian areas, and within the Hells Canyon National Recreation Area, with even-aged management most common elsewhere.

Regeneration harvesting by both even-aged and uneven-aged methods removes much of the existing forest vegetation. During the period between when logging occurs and trees regain dominance on the site, cover for some species of wildlife will be reduced or eliminated. However, increases in grass, forbs, and shrubs will benefit animals whose habitat in early seral vegetation. The increase in grasses and forbs will benefit domestic livestock Where adequate cover remains after logging, forage increases will also benefit some wildlife species.

Salvage of dead and dying trees will directly reduce the numbers of standing snags and down logs in the forest. This may indirectly affect the wildlife species dependent on this type of habitat. (For details, see Wildlife and Wildlife Habitat section of this chapter.)

Removing dead trees from the forest may reduce dead and down woody material needed for nutrient recycling Salvage of dead trees may also reduce the future numbers of down logs and improve access for domestic livestock These are both indirect effects.

Other activities may also affect forest vegetation. The construction of utility corridors may result in a cleared strip of land, miles long, and devoid of trees. Mining activities may also result in some loss of forest Neither of these is likely to affect much of the forest nor to vary by alternative.

Recreational activities have little direct or indirect effect on forest vegetation, although recreation-caused soil compaction may inhibit tree and other plant establishment in some very localized instances.

Most effects of recreational use on other resources increase as use increases This includes soil disturbance and compaction, damage to vegetation within and adjacent to developed sites, and the variety of other effects that occur when people are concentrated. However, the very fact that use is concentrated at particular attractions makes it easier to deal with the associated effects on other resources, than if use were less concentrated These effects are not expected to vary significantly by alternative.

Soil compaction caused by *livestock trampling* can make it more difficult for trees to become established and/or cause reduced growth rates Neither of these effects on forest vegetation is considered significant They will not vary significantly among the alternatives.

Roads may also reduce the amount of forest vegetation. Roads accessing the Forest are necessary to manage timber, mineral, and other resources Within the clearing limits, all trees are removed On the road running surface, all vegetation is removed Native and exotic grass species may be seeded on cut and fill slopes to reduce erosion and inhibit invasion by noxious weeds. On constant service roads, vegetation is permanently excluded from the running surface. Where roads are used only intermittently, the running surface may be scarified and seeded with native or exotic grass and forb species. Miles of road construction vary by alternative These alternatives which schedule more intensive harvest or access more roadless area, such as Alternative B, B-departure, and C-departure, have high levels of road construction and will have greater road-related effects on vegetation than will the other alternatives. Alternatives F, G, and H, with relatively low levels of timber harvest, also require fewer roads The remaining alternatives are intermediate.

Alternatives having the largest amount of timber management activity are expected to have the greatest cumulative effects on forest vegetation These are, from most to least in descending order: NC, C-departure (first decade), B-departure, B, D, A, C (Preferred), E, H, G, and F.

Old-Growth Forest Old-growth forest is directly impacted by timber harvesting To assure that old-growth forest is retained across the Forest, some lands are allocated for old-growth preservation

The old-growth forest allocation (Management Area 15) varies by alternative as described in Chapter II The areas vary in size from 40 to 300 acres and are scattered over the Forest to maintain associated recreational experiences, wildlife habitat, genetic diversity, and old-growth ecosystems The areas will not be scheduled for timber harvesting, but harvest may occur in the event of a catastrophe or when the timber stands deteriorate and no longer serve the intended purposes If an old-growth stand is lost, a replacement stand will be selected

The management requirement for old-growth groves throughout the Forest, while providing habitat for wildlife species which depend on large dead trees, also provides forest habitat that benefits other wildlife species, and variety for human enjoyment

There are presently 173,000 acres of old growth on the Forest. In the long term, the amount will range from 172,000 acres in Alternative F to 105,000 acres in Alternative NC as illustrated in Table S-3 The acreage remains fairly high because of the amount of old growth in the Hells Canyon National Recreation Area and the four wilderness areas

Although all alternatives (except NC) meet management requirements, distribution of old-growth stands is poorest in alternatives having the least acreage of old growth. With the exception of Alternative E, distribution is best in alternatives with the greatest acreage of old-growth. Except for extensive roadless areas where old-growth is maintained, Alternative E shares the distribution pattern of Alternative B.

Table S-3
ACRES OF OLD-GROWTH FOREST BY ALTERNATIVE
(Thousands of Acres)

Decade	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
1	122	154	150	143	164	160	158	169	172	157	163
2	112	150	145	137	162	158	155	168	172	154	161
5	105	147	142	133	161	156	153	167	172	152	160

In the absence of specific old-growth allocations, Alternative NC has the lowest level of old growth of any alternative In the long term, old growth would be found only in the Hells Canyon National Recreation Area, Wilderness, and some roadless areas

Range Vegetation Range vegetation is directly affected by a variety of activities. The more significant of these are livestock and wildlife grazing Lesser effects are those associated with timber management, recreation, and mining

Livestock and some *wildlife* directly affect range vegetation through forage removal. This effect may be beneficial or detrimental depending on how much forage is removed and when it is removed

Direct benefits of grazing include trampling of seed to cover it (thus encouraging germination) and improvement of decadent shrubs on winter range (breaking down dead material and cropping to promote new growth). Livestock use of forage that would otherwise die and become a fire hazard is a beneficial indirect effect of grazing.

On the negative side, livestock directly contribute to soil compaction which can change the soil structure, affect water absorption and holding capacity, and inhibit plant growth.

All alternatives include livestock grazing, so all include the risk of adverse grazing-related effects The degree of risk is related to the amount of livestock grazing under each alternative. Those alternatives such as B and G which have high levels of livestock grazing also have the highest risk of grazing-related vegetation damage. Alternatives E and F, with substantially less total grazing use, present proportionately less risk of grazing-related effects on range vegetation Projected permitted livestock for all alternatives is shown in Table S-4.

Table S-4
PERMITTED LIVESTOCK FORAGE ALLOCATION BY ALTERNATIVE
(Thousands of AUM's Per Year, First Decade)

Target	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
	186	186	207	204	186	186	191	163	143	207	186

As *timber* is harvested, understory plants are released to grow and potential forage is increased. As the new timber stands grow and reoccupy the land, this "transition" forage gradually decreases. Because of tree thinning and relatively early re-entry for timber harvest, the potential forage production never falls back to unmanaged levels.

The potential future transition forage production differences between alternatives are not large because over 50 percent of the land suitable for grazing is nontimbered and many of the gains due to transition forage resulting from timber harvest are a part of the current situation Analysis indicates a range of less than 4 percent between Alternatives B and F over the Forest as a whole at the end of the first decade. However, the range is 13 percent when calculated only on the forested area

Riparian Riparian areas are directly affected by timber management activities, recreation, livestock grazing, mining, and roads

Timber management effects include disturbance and compaction of riparian soils, loss of shade-producing trees, and damage to herbaceous and shrubby vegetation Indirect effects may include higher stream temperatures and higher turbidity and sediment levels (also see sections of this chapter dealing with Soil and Water, and Fish). Timber harvest activities also reduce the amount of large woody debris available for nutrient recycling and for retaining stream channel stability

The significance of these effects varies by alternative, with those alternatives having more riparian timber management activity also having higher risk of riparian damage. Those alternatives with high first-decade total harvest levels (such as B-departure and C-departure) have relatively high amounts of riparian timber management activity. Alternative A, which manages timber-producing lands at a high intensity level, also includes substantial first-decade activity within riparian areas Alternatives B, C, D, E, F, G, and H have substantially lower levels of riparian timber management in the first decade Alternative NC has the highest potential for timber-related riparian damage since it assumes full timber yield from these areas

Livestock Grazing, which may be the single greatest impactor to riparian areas, has contributed locally to streambank instability, channel cutting, sedimentation of fish spawning gravels and reduction of deciduous stream shade. The risk of grazing-related riparian damage will be closely related to total livestock use. Alternatives B and G, at 207 MAUM's per year have the highest risk. Alternative B-departure is next at 204 MAUM's followed by Alternative D at 191 MAUM's, and Alternatives NC, A, C, C-departure, and H at 186 MAUM's. Alternatives E and F show relatively low risk at 163 MAUM's and 143 MAUM's, respectively.

Placer mining operations, even with reasonable care taken, increase sediment in streams They often remove riparian vegetation, thereby removing the shade and other benefits this vegetation provides These effects will be the same for any given mining operation regardless of the land management alternative selected.

Roads adversely affect riparian areas where they parallel closely or cross streams Alternatives with higher levels of road construction activities, such as NC, C-departure, or B-departure provide higher risk than Alternatives F, G, or H, which have low levels of timber management Alternatives A, B, C, D, and E would be intermediate in risk

Recreation activities such as fishing, boating, swimming, and camping may affect riparian areas by compacting soil and trampling riparian vegetation. These effects are localized, and are of very limited magnitude compared to timber harvest, mining, and roads They will not vary by alternative.

Threatened, Endangered, and Sensitive Plants. On the Wallowa-Whitman National Forest, there are no known threatened plants; endangered plant species, the MacFarlane's Four-o'clock (*Mirabilis macfarlanei*) and 50 other sensitive species. No adverse effect on any species is anticipated in any alternative. See Chapter III of this EIS for additional information.

Although the intent is to protect sensitive species in all alternatives, the likelihood of damage to sensitive species is greater in those alternatives with higher levels of timber activity and road construction (such as NC, B-departure, and C-departure) and in Alternatives F, G, and H, which have relatively low levels of these activities The remaining alternatives would be intermediate in risk.

Soil and Water

Soil. Timber harvest and road construction are the two major management activities that affect the soil resource Timber harvest activities will result in some soil compaction and soil displacement in all alternatives, mostly as a result of log yarding. Since tractor yarding impacts soils more than other yarding techniques, alternatives with high levels of tractor yarding would have greater effects than alternatives with less tractor yarding

Lesser effects on soils occur as a result of slash treatments such as piling (which results in compaction) and burning which may cause nutrient loss, and in the form of erosion from disturbed sites Standards and guidelines (from Chapter 4 of the Forest Plan) limit soil compaction and displacement to 20 percent of the land area and identify methods for assuring that this is met

Road construction affects soil primarily by taking land out of production. It may also increase the risk of mass soil movement. Road construction is generally considered an irretrievable commitment of resources

In comparing alternatives, all of these impacting activities occur at levels directly related to the level of timber harvest -- more timber harvest necessitates more road construction, more timber yarding, and more slash treatment. Alternative NC, with the highest timber harvest level, would be expected to have the greatest effect on soils The other alternatives, in decreasing order of effect are, Alternatives B-Departure, C-Departure, B, D, E, C, A, H, G, and F.

Water. Water-related concerns include water quality and streamflow. Although management activities may have a variety of effects on water quality, the greatest concerns are sedimentation and stream temperatures. Streamflows are of concern because of possible effects of increased peak flows on stream channel stability, and potential effects on low flows used for irrigation and as fish habitat.

Major causes of increased sediment production are road construction, livestock grazing, and timber harvesting. The effects of roads are greatest where streams are either crossed by roads, or where roads parallel streams and are close enough to the streams so that sediment-laden road runoff enters the stream. Proper design, location, and maintenance of roads can do much to mitigate these effects, but some increase in sediment production is inevitable if it is necessary to cross streams.

Timber harvesting may directly increase sediment production if erosion occurs from the treatment area and the area is in close proximity to a stream channel, or if harvest activity causes mass soil movement (such as a landslide).

Risk of sediment production from roads and timber harvesting is directly related to level of timber management activity Alternative NC, with the highest timber harvest level and no allowance for reduced harvest in riparian areas, offers the greatest risk of sediment production The other alternatives, in decreasing order of risk are, Alternatives B-Departure, C-Departure, B, D, E, C, A, G, H, and F.

Livestock grazing causes sediment increases as a result of streambank trampling, removal of soil-protecting vegetation, and through disturbance of surface soils. These effects are mitigated by controlling livestock numbers, limiting season of use, setting utilization standards, and by providing for dispersal of animals across the range Many of these mitigation measures are described in Chapter 4 of the Forest Plan, including utilization standards and guidelines which were developed after the DEIS was published. Risk of livestock-related sediment production is directly related to livestock numbers, with Alternatives B and G presenting the highest risk (at 207,000 AUM's); B-Departure the next greatest risk (at 204,000 AUM's), Alternative D (at 191,000 AUM's); Alternatives NC, A, C, C-Departure, and H (at 186,000 AUM's); Alternative E (at 163,000 AUM's); and Alternative F (at 143,000 AUM's).

Since all alternatives (except Alternative NC) include standards and guidelines for maintaining or improving stream shade, no stream-temperature differences among these alternatives are expected. Stream temperature standards would probably not be met in Alternative NC.

Road construction, timber harvesting, and livestock grazing are all activities which may affect streamflows. Of particular concern is the possibility that management activities will concentrate peak streamflows, causing accelerated stream channel erosion Timber harvesting may increase peak flows if harvest units cause changes in snowmelt timing, concentrating snowmelt into a shorter time period Roads may contribute to peak flows by trapping and concentrating surface and subsurface flows. Soil compaction from livestock grazing may also increase peak flow levels by reducing the rate of water infiltration into the soil

Since these relationships are very site-specific (dependent upon the unique characteristics of each individual watershed) quantitative streamflow comparisons of the alternatives are not possible. In general, those alternatives with high levels of road construction, timber harvest, and livestock grazing provide the greatest risk of adverse peakflow effects Preventing adverse effects depends upon the site-specific analysis called for in the Standards and Guidelines (Plan Chapter 4)

Public concern has been expressed over the effects of management activities on low flows (summer stream flows) which are particularly important for irrigation and fish habitat. Two aspects of this concern are that summer flows may be lower as a result of timber harvesting activities and that the low summer flows may occur earlier as a result of timber harvesting Analyses of data from northeast Oregon do not indicate that either of these effects are likely to occur (Fedora, unpublished). Summer flows are expected to be slightly higher as a result of harvest activities and are not expected to occur earlier.

Appropriate best management practices (see Appendix O) will be used in design and implementation of all projects Monitoring (Plan, Chapter 5) will be designed to assure that best management practices are used and are effective in sediment prevention and in avoiding adverse streamflow changes.

Domestic Supply Watersheds Protection of domestic supply watersheds is an overriding objective of all alternatives as reflected in the Standards and Guidelines (Plan Chapter 4). Different alternatives,

however, provide lesser or greater risks to watershed values depending on the intensity of management proposed.

For the Baker and La Grande domestic supply watersheds the least amount of risk would be under Alternative E, which would keep both in an undeveloped condition. (This alternative minimizes risk associated with management activities such as timber harvesting and road building, but would also make protection of the watersheds from naturally-occurring fires more difficult). For the Sumpter and Wallowa watersheds the least risk is associated with Alternative F, as in that alternative the watersheds would be managed for timber production but at a reduced rate of harvest.

Alternatives B, B-Departure, D, G, and NC provide the greatest risk to watershed values because, under these alternatives, the watersheds would all be managed dominantly under Management Area 1 which would include a high rate of timber management activity. Alternatives A, C, C-Departure, and H provide a moderate risk to watershed values, as compared to the other alternatives, with the Baker City and La Grande domestic supply watersheds managed at a reduce rate of timber harvest and with the Sumpter and Wallowa watersheds managed dominantly under Management Area 1.

Regardless of the alternative chosen, project-level analysis and project design will center on the need to protect or improve water quality and streamflows

Fish

Fish populations are expected to increase as a result of improved riparian condition and other investments in habitat improvement Since improving riparian condition is high priority in all alternatives, populations will be most dependent upon investment

Timber management activities directly affect the availability of large trees and woody material. Large trees and woody material are very important to fish habitat. Tree canopies provide shade in the summer and insulation in winter, moderating changes in stream temperature. Trees and their root systems help stabilize unstable slopes reducing the frequency of mass soil movement Trees and other vegetation also protect surface soils from eroding, and filter surface runoff, reducing sediment input to channels. Stream channel stability also is often dependent upon trees and their root systems to anchor banks.

Livestock grazing can produce impacts on fish habitat by reducing cover for fish, altering stream temperature, altering stream chemistry, trampling banks, and increasing sediment deposition Riparian habitat standards, designed to protect fish habitat, would apply to grazing allotments under all alternatives except Alternative NC Fishery budgets for all alternatives also include monies to monitor riparian habitat in allotments and coordinate with the range program. As with other land management activities though, generally the greater the grazing use, the greater the potential for fishery impacts

Mining operations directly affect fish habitat. Placer operations, even with reasonable care taken, are likely to increase sediment in streams They often remove riparian vegetation, thereby removing the shade and other benefits this vegetation provides

Recreation has little effect on fish habitat, although in some areas, fish numbers may be depleted by fishermen. Also, sediment or vegetation loss resulting from ORV use, may directly affect fish habitat by reducing the effectiveness of spawning gravel or increasing stream temperatures. These effects are not expected to vary by alternative.

Overall, the potential for adverse effect on fish and fish habitat is greatest in those alternatives having relatively high timber harvest levels, high livestock grazing, and road construction Other effects such as those associated with mining and recreation are not expected to vary significantly by alternative Alternative NC presents the highest risk to fish habitat since it has the highest total level of timber

harvest and does not provide for special treatment of riparian areas Alternatives B, B-departure, and C-departure have high levels of harvest and grazing These constitute a high risk to fish habitat relative to the other alternatives. Alternatives C, D, E, and A are intermediate in overall risk having moderate levels of both timber harvest and livestock use. Alternative G has a moderate overall risk with a relatively low level of timber harvest, but a high level of livestock use. Alternatives F and H present relatively low risk to fish habitat

Wildlife and Wildlife Habitat

Table S-5 displays the management indicator species used for comparing alternatives Derivation of these indicators is discussed in Appendix G. Also shown in Table S-5 is the primary type of habitat associated with each indicator species

Table S-5
MANAGEMENT INDICATOR SPECIES AND THEIR PRIMARY HABITATS

Species	Primary Habitat
Pileated woodpecker	Old-growth and mature forest
Primary cavity excavators	Snags
Goshawk	Old-growth and mature forest
Rocky mountain elk	Cover/forage
Pine marten	Old-growth and mature forest
Resident trout	Riparian/Aquatic
Steelhead trout	Riparian/Aquatic

Several of the indicator species show preference for (and indicate the quality of) old growth and mature forest habitat. Since a level of old growth reduction is planned in nearly all alternatives it is expected that some drop in the numbers of these animals will also occur. Based on long-term old growth levels, Alternative F is expected to have the greatest amount of habitat for species dependent on old growth and mature forest, with decreasing numbers, by alternative, as follows: Alternative E, Alternative C, Alternative H, Alternative D, Alternative C-Departure, Alternative G, Alternative A, Alternative B, Alternative B-Departure, and Alternative NC See Table S-1

Primary cavity excavators are expected to be directly affected by the numbers of snags available for nesting sites Forest lands managed for timber production will generally have sufficient habitat to provide for 40 percent of potential cavity-excavator populations for those species dependent on snags 10-20 inches in diameter. Riparian areas will be managed to provide snags of all sizes at the 60 percent level. Portions of the forest not managed for timber production are expected to provide habitat for cavity-nesting species at approximately the 100 percent level. Large-diameter snags (those 20 inches in diameter and greater) will initially be found throughout the Forest, but as timber stands are harvested and new stands are managed under shorter rotations, large-diameter snags will generally be limited to riparian areas and to old growth patches and other areas not managed for timber production. Alternative F is expected to have the greatest populations of snag-dependent species The other alternatives, in decreasing order of projected populations, follow Alternative E, Alternative H, Alternative C, Alternative D, Alternative C-Departure, Alternative G, Alternative A, Alternative B, Alternative B-Departure, and Alternative NC.

The Oregon Department of Fish and Wildlife objective level for elk on the Wallowa-Whitman is 21,000 animals Table S-1 displays projected elk numbers by alternative In making these projections it was assumed that elk numbers would vary directly with changes in the elk habitat effectiveness index (HEI). HEI is an index of habitat quality which takes into consideration cover needs, forage needs, and likely harassment from road use (open road density). Projected first-decade HEI (as a percent of potential) by alternative is as follows· Alternative F (84 percent), Alternative A (77 percent), Alternatives C, D, E, and H (76 percent), Alternatives B, B-Departure, and G (75 percent), and Alternative C-Departure (74 percent). Alternative NC could not be reasonably estimated, although it would be most like Alternative B-Departure. By the end of the fifth decade these are expected to be as follows Alternative F (79 percent), Alternative A (71 percent), Alternatives C, C-Departure and H (69 percent), Alternative D (68 percent), Alternative E (67 percent), Alternatives B and G (66 percent), and Alternative B-Departure (63 percent).

Threatened and Endangered Species. All alternatives must meet the requirements of the Endangered Species Act. Biological assessments of the effects of the preferred alternative on threatened and endangered species were sent to the U.S Fish and Wildlife Service prior to completion of this FEIS. The biological assessments concluded that the Forest Plan would result in no adverse effects to any threatened or endangered species and that it would be beneficial to populations of bald eagles and peregrine falcons since the plan calls for cooperation in recovery plans for these species. The response from the U.S.Fish and Wildlife Service is found in Appendix N

Landscape Appearance

All alternatives will affect landscape appearance This change will be most noticeable in areas where timber harvest occurs, with timber management activities normally being evident, additional roads being constructed, and fewer large trees being present

All alternatives provide protection of landscape appearance along major travel routes, but to varying levels. Alternatives A, C-Departure, D, F and H include "retention" and "partial retention" visual quality objectives (VQO's) along all major travel routes. Alternatives B, B-Departure, NC, E, and G incorporate substantially reduced visual quality objectives, meaning that management activities would be more visible.

Alternative C reduces visual quality objectives to a level in between, with approximately an 18 percent reduction in area managed as "retention" and "partial retention" from what is found in Alternatives A, C-Departure, D, F, and H. This reduction in emphasis in Alternative C was made following public comment on the DEIS, in an effort to mitigate reductions in timber availability.

Air Quality

On-Forest sources of air quality degradation can be smoke from burning logging slash, prescribed burning for other resource purposes such as range management, wildfire, and dust from roads. It is unlikely that differences among the alternatives would be evident to most observers in most years, although there are likely to be differences in the levels of particulates produced by slash burning. These levels are closely tied to timber harvest In the first decade, Alternative NC with the highest timber harvest level, would be expected to have the greatest particulate production The other alternatives, in decreasing order of risk are; Alternatives B-Departure, C-Departure, B, D, E, C, A, H, G, and F

There are many off-Forest sources of pollution such as agricultural field burning, industrial smoke, and slash burning on other forest lands that affect air quality on and off the Forest These are not within control of Forest managers

Roadless Areas

Most alternatives would reduce the amount of nonwilderness roadless area outside the Hells Canyon National Recreation area. Only Alternative E would keep all roadless area in a roadless condition Effects of roadless area development include those described for timber management and road construction, plus the loss of the semiprimitive recreational opportunities associated with their undeveloped nature In addition, development of roadless area precludes further consideration for wilderness designation Table S-6 displays acres of roadless area projected to remain following Decades 1, 2, and 5 for the various alternatives

Table S-6
PROJECTED UNDEVELOPED AREA IN DECADES 1, 2, AND 5
(Thousands of Acres)

ALTERNATIVE	DECADE 1	DECADE 2	DECADE 5
A, NC	400	380	362
B	400	380	337
B-dep	400	380	337
C (Preferred)	410	390	380
C-dep	390	360	360
D	400	360	357
E	484	484	484
F	470	450	402
G	400	390	352
H	390	360	360

* Figures include acres of roadless area in management areas which permit development for timber harvest but, due to economic considerations, are unlikely to be developed. Included are portions of roadless areas such as Tope Creek and Deadhorse.

Minerals

New mineral entry is prohibited within the four wilderness areas on the Forest, certain recreational and administrative sites, and within the Hells Canyon NRA. These closed areas include 193,600 acres with mineral potential As research natural areas (RNA's) are established they will also be withdrawn from mineral entry However, since the proposed RNA's include little mineralized area not already withdrawn from mineral entry, there is little effect from them on mineral availability

The Forest includes a total of 423,000 acres with known mineral potential

Differences among the alternatives regarding mineral availability are primarily the result of differences in roading. Alternatives which maintain less roadless area in a roadless condition make mineral exploration easier and less costly Alternatives which keep most or all of the roadless area in a roadless condition do not preclude mineral entry in these areas, but a lack of roads will complicate such actions

Alternatives B, B-Departure, and G have the fewest acres where mineral entry is restricted by roadless objectives (24,000 acres). The other alternatives, in increasing order of restriction are: Alternatives C,

C-Departure, D and H (34,400 acres), Alternative F (39,200 acres), Alternatives A and NC (40,000 acres), and Alternative E (46,200 acres).

Wetlands and Floodplains

With the exception Alternative NC, all alternatives protect wetlands and floodplains through the implementation of standards and guidelines described in Chapter 4 of the Plan. For this reason the differences among the alternatives would not be noticeable. Alternative NC makes no allowance for reduced timber yields in these areas and thus presents a somewhat greater risk of damage.

Cultural Resources

Historical and archeological resources will be protected and managed in compliance with the National Historic Preservation Act of 1966 and Executive Order 11593 of 1971 Important cultural sites will be protected in all alternatives. Whenever there are ground disturbing activities, however, there is risk that significant (but unknown) sites will be accidentally impacted. This risk is tied directly to the amount of ground-disturbing activity likely to occur within any alternative. In the first decade, Alternative NC with the highest timber harvest level, would be expected to have the greatest risk of affecting cultural resources. The other alternatives, in decreasing order of risk are, Alternatives B-Departure, C-Departure, B, D, E, C, A, H, G, and F.

Wild and Scenic Rivers

All alternatives include management direction to preserve the wild, scenic, and recreational values of those rivers or river segments (meaning the river plus its associated corridor) which are a part of the National Wild and Scenic Rivers System. Under all alternatives, plans would be developed for managing these rivers, as specified in the Wild and Scenic Rivers Act (Public Law 90-542), as amended.

Social and Economic Effects

The key variable in assessing social and economic effects is timber production. Other aspects of forest management also change but they change little (as in the case of recreation use) or they have little impact because they do not comprise a large percentage of the available local supply (as in forage available for livestock).

The alternatives can reasonably be portrayed in terms of their local economic effects by simply ranking them according to their annual Decade 1 million board foot allowable sale quantity (ASQ) as shown below. The higher the rank, the greater the local economic benefit.

Rank	Alternative	Annual ASQ (MMBF)
1	NC	183
2	C-Departure	169
3	B-Departure	167
4	B	151
5	C	144
6	D	143
7	E	136
8	A	134
9	H	118
10	G	117
11	F	98

The ASQ rankings can be used to estimate social effects as well Those whose sense of control, sense of self-sufficiency, lifestyles, job, or belief set revolve around consumptive use of the timber resource through harvesting will find themselves accommodated by those alternatives that harvest more timber Those who do not share that orientation will find themselves better served by the other end of the spectrum. Selecting an alternative from either end of the spectrum will tend to lessen any sense of community cohesion

Except for their members who recognize an interest in timber harvesting, recreationists and American Indians generally would favor lower levels of timber production Women, racial minorities, and cultural minorities would have more of a chance to improve their economic well-being with higher levels of timber production.

The above information reflects how the Forest affects the local economic area -- Baker, Union and Wallowa Counties in northeastern Oregon

In terms of economic efficiency, viewed from a nationwide standpoint and looking only at those costs and benefits that have been dollar-quantified, the alternatives would be ranked as follows:

Rank	Alternative	PNV (1982 Million $)
1	G	624
2	H	593
3	B	583
4	E	575
5	D	562
6	C	551
7	C-Departure	545
8	F	543
9	A	498
10	B-Departure	406
11	NC	399

Developed Recreation. At present, the capacity of developed recreation sites (583,000 RVD's) exceeds the developed recreation use (366,700 RVD's) although popular sites are fully occupied on some weekends Projected use indicates that capacity will continue to exceed demand for many years. However, there are some areas on the Forest (most notably in the Hells Canyon NRA) where there is substantial unmet demand for developed recreational facilities. Except for Alternatives A and

NC, additional recreation site construction is planned to meet this demand, increasing total capacity to 661,000 RVD's

Dispersed Recreation. Total dispersed recreation opportunities are expected to far exceed demand in all alternatives for at least the next 50 years, but shortages are expected for some types of dispersed recreation. (For a more complete discussion of the recreation opportunity spectrum see Chapter III and the Glossary).

The demand for roaded natural and roaded modified recreation opportunities will be easily met regardless of alternative. Demand for wilderness recreation is expected to increase as population increases but it is projected that this demand can be met by the existing wilderness areas well into the next century.

The situation is different for nonwilderness semiprimitive types of recreation opportunity Semiprimitive motorized and semiprimitive nonmotorized recreation demand is expected to exceed capacity regardless of the alternative selected. In those alternatives which would develop much of the roadless area, capacity will be exceeded much sooner

Adverse Environmental Effects Which Cannot Be Avoided Should the Proposal Be Implemented

Timber harvesting and related road building will cause changes in the Forest appearance which cannot be avoided Soil will be impacted through compaction or displacement Old-growth timber will be reduced and undeveloped areas will shrink These are effects which cannot be totally avoided or mitigated and will be considered adverse by many Forest users

Relationship Between Short-term Uses of Man's Environment and Enhancement of Long-term Productivity

Livestock grazing, timber harvesting, and road building may affect long-term soil productivity. Roads remove land from productivity in the long-term

Irreversible and Irretrievable Commitments of Resources

The proposal will allow mineral removal It also involves net loss in energy consumption. Many roadless areas will be roaded, which will make them ineligible for wilderness consideration. The vegetation production potential of lands committed to permanent roads is considered irretrievably lost. These are the prominent examples of irreversible and irretrievable uses or changes

CHAPTER 1

Purpose and Need

CHAPTER I

PURPOSE AND NEED

SUMMARY OF CHAPTER I CHANGES DRAFT TO FINAL

1 A new issue was added dealing with fish habitat and water quality This was the result of public and agency comment on the DEIS.

2. The timber harvest issue was expanded to better reflect concerns over ponderosa pine harvest levels

3. The discussion of the livestock grazing issue was expanded to emphasize options for improving range condition.

INTRODUCTION

The purpose of the Forest Land and Resource Management Plan is to provide for multiple use and sustained yield of goods and services from the National Forest in a way that maximizes long-term public benefits in an environmentally sound manner This environmental impact statement discloses the environmental effects of the plan and the alternatives considered Addressing public issues and management concerns is key to accomplishing this purpose

This Final Environmental Impact Statement (FEIS) discloses 11 alternatives, including an alternative identified as the preferred alternative, (which is the "proposed action"). These 11 alternatives are alternative ways of managing the land and resources of the Wallowa-Whitman National Forest. This FEIS also describes the environment which would be affected, and the environmental consequences of implementing each of the alternatives The 11 alternatives are developed and evaluated against the 50-year Resource Planning Act horizon, with effects of timber management assessed through a 150-year horizon to ensure long-term feasibility of proposed programs

Each alternative furnishes a different way to address local, regional, and National public issues and management concerns, provides for use and protection of resources, and fulfills legislative requirements Every alternative generates a different mix of goods and services from the Forest Each alternative was evaluated to determine its potential to provide a sustained yield of goods and services in a way that maximizes long-term benefits in an environmentally sound manner. The preferred alternative is the alternative which, in the considered opinion of the Forest Service, provides for a level of multiple uses, goods, and services that maximizes long-term net public benefits

The preferred alternative is the basis for the accompanying "Wallowa-Whitman National Forest Land and Resource Management Plan" (Forest Plan) document The purpose of the Forest Plan is to direct and guide all natural resource management activities on the Wallowa-Whitman National Forest Preparation of the proposed Forest Plan is required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended

by the National Forest Management Act of 1976 (NFMA), plus the associated National Forest System Land and Resource Planning Regulations (36 CFR 219)

The preparation of an environmental impact statement disclosing a preferred alternative and alternatives to it is required by the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality NEPA regulations (40 CFR 1500), and the implementing regulations of NFMA (36 CFR 219)

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

Prior to completion of the FEIS, a draft environmental impact statement was published The draft, entitled "Draft Environmental Impact Statement, Proposed Land and Resource Management Plan, Wallowa-Whitman National Forest," was published and distributed for public review in March 1986 In August 1988, a Supplement to the DEIS was published, incorporating analyses of (1) a new alternative (the No Change Alternative), (2) alternative ways of meeting the management requirements from 36 CFR 219 27, and (3) discussing two roadless areas which were not discussed in the DEIS

During the public review periods for the DEIS and Supplement, written correspondence from 6,500 people was received and analyzed Appendix N to this FEIS summarizes the public participation activities, including a summary of comments received, photocopies of comment letters received from elected officials, local, state, and federal agencies, and tribal governments, and a list of DEIS commentors and Forest Service responses to the comments.

The Regional Forester used this FEIS to make a decision regarding approval of the Forest Plan This decision is documented in the Record of Decision which accompanies this FEIS and Forest Plan. The approved plan will not become effective until at least 30 days after publication of the notice of availability of the FEIS in the Federal Register

The Forest Plan supersedes all previous land management plans prepared for the Wallowa-Whitman National Forest with the exception of the Comprehensive Management Plan for the Hells Canyon National Recreation Area which is adopted and incorporated (36 CFR 219.2). Those plans superseded are the Wallowa Valley, Elgin, Grande Ronde, Burnt Powder, and Desolation Unit Plans Upon implementation, all subsequent plans and activities affecting the Forest, including budget proposals, will comply with the Forest Plan. In addition, all permits, contracts, and other instruments for the use and occupancy of National Forest System lands and resource uses must be consistent with the Forest Plan. When changes are necessary, they will be made as soon as practicable, subject to existing rights.

NATIONAL, REGIONAL, AND FOREST PLANNING

As required by RPA, NFMA, and the related implementation regulations cited, the Forest Service has a three-level, integrated planning process At the National level, the RPA

Program establishes long-range resource objectives based on the present and anticipated supply of and demand for various resources. A portion of each National resource objective included in the RPA Program is distributed to each of the nine Forest Service Regions in the Nation.

At the Regional level, a Regional Guide is developed which presents the distribution of its portion of the National objective of each Forest In addition, the Regional Guide establishes Regional management standards and guidelines. The Pacific Northwest Regional Guide of May 1984, as amended in December 1988, provides this direction for the Wallowa-Whitman National Forest

At the National Forest level, a Forest Plan is prepared A range of resource objectives is considered, providing the basis for a spectrum of alternatives; one or more of these alternatives incorporates the tentative RPA Program resource objectives displayed in the Regional Guide.

The planning process is continually repeating in that the information from the Forest level flows up to the National level, is incorporated in the RPA Program, and then flows back to the Forest level. The RPA Program and Regional Guide are updated every five years The Forest Plan is reviewed every five years, and is ordinarily revised on a ten-year cycle It is revised at least every 15 years. It also may be revised whenever conditions or demands in the area covered by the Forest Plan change significantly. This process ensures that the Forest Plan is responsive to changing conditions.

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

1 Identification of purpose and need
2. Planning criteria
3. Inventory data and information collection
4. Analysis of the Management Situation
5. Formulation of alternatives
6. Estimated effects of alternatives
7. Evaluation of alternatives
8 Preferred alternative recommendation
9. Plan approval
10. Monitoring and evaluation

PLANNING RECORDS

All of the documents and files that chronicle the Forest planning process, including the environmental analysis of the Wallowa-Whitman National Forest, are available for review at the Supervisor's Office, Federal Building, 1550 Dewey Street, Baker City, Oregon 97814 These documents and files, known as planning records, contain the detailed information and decisions used in developing this FEIS and the Forest Plan. The planning records are incorporated at appropriate points in the text and appendices of this FEIS and in the Forest Plan.

OTHER MANAGEMENT PLANS

The link between the Forest Plan and on-the-ground accomplishment is provided through functional plans or project plans that are tiered to the Forest Plan Functional plans may include the Forest Travel Plan, Forest Transportation Plan, Fire Management Plans, etc Project plans will be tiered directly to the Forest Plan or to the functional plans Projects include such things as recreational developments, road construction projects, timber sales; any on-the-ground action. Most functional and project plans are subject to NEPA requirements and utilize an environmental analysis approach similar to that of the Forest Plan They may or may not include an environmental report such as an environmental impact statement or environmental assessment Planning for projects of a routine nature or with only minimal effects, may be excluded from documentation

The Forest Plan, therefore, may be considered an umbrella plan to which all other plans are tiered Tiering means that the environmental documents for subsequent narrower (more site-specific) environmental analyses may incorporate the more general information from the Forest Plan Environmental Impact Statement by reference and concentrate more directly on the issues specific to the document being prepared (40 CFR 1508.28)

A glossary defining terms, units, and abbreviations is located in the back of this document, preceding the index A list of references cited in the FEIS is provided The reader will find it useful to consult the land management allocation map for each alternative when reviewing this FEIS The maps are in a separate envelope accompanying this FEIS.

OVERVIEW OF THE FOREST'S LOCATION

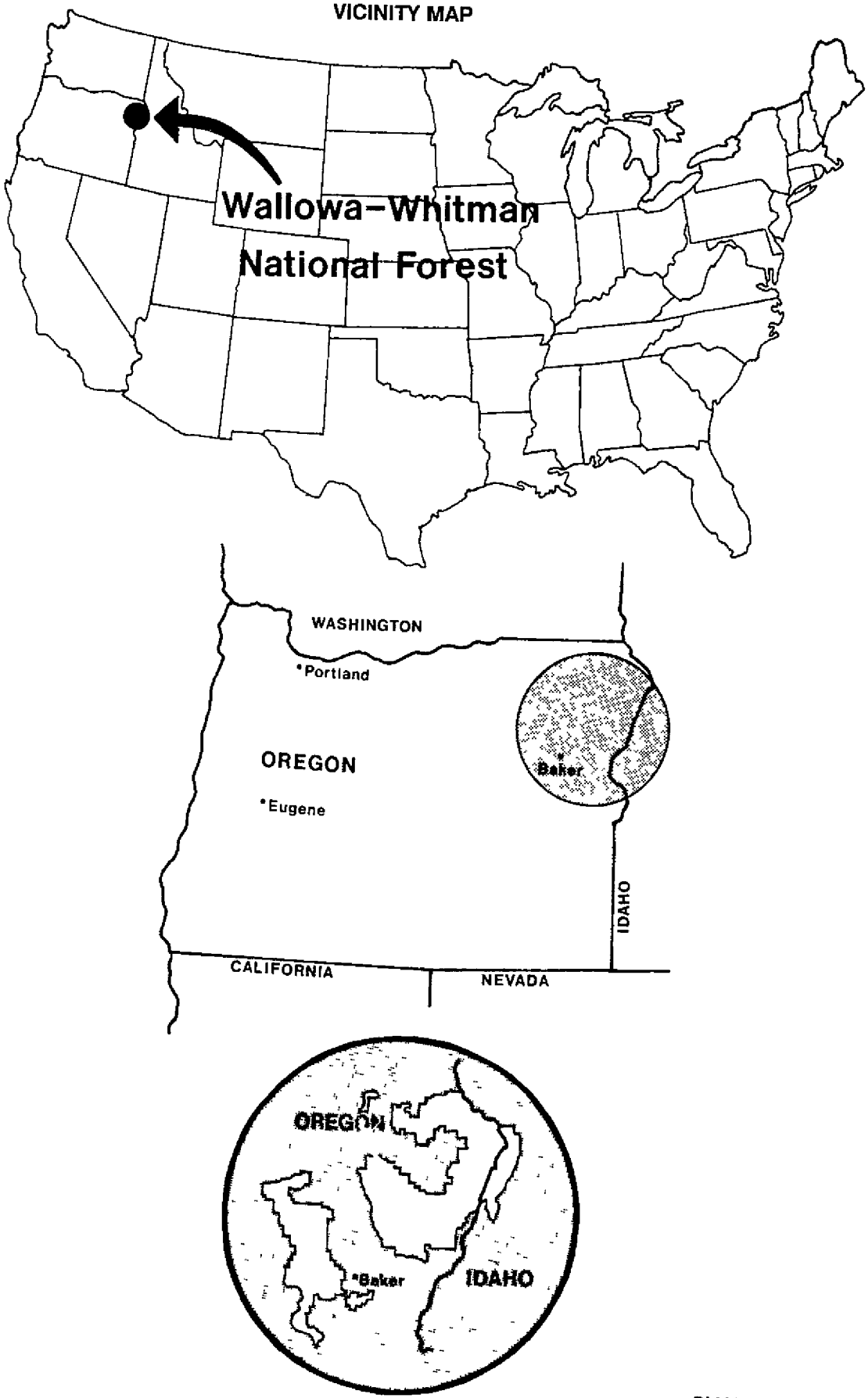
The administrative area of the Forest* includes approximately 2 3 million acres in Oregon and Idaho Neighboring National Forests are the Umatilla and Malheur in Oregon and the Nez Perce and Payette in Idaho.

Interstate Highway 84 bisects the Forest, providing rapid access from population centers of Portland (300 miles to the west) and Boise (150 miles to the east). A major east-west railway also passes through the Forest

The Forest contains nearly 600,000 acres of wilderness including the Eagle Cap Wilderness which, at 346,000 acres, is the largest in Oregon The Forest also contains the Hells Canyon National Recreation Area, with the famous Hells Canyon of the Snake River, which, at over a mile in depth, is the deepest canyon on the North American continent

*Throughout this document, the terms "Forest" and "Wallowa-Whitman" are used to reference the area administered by the Wallowa-Whitman Forest Supervisor. It includes the Wallowa, the Whitman, and portions of the Nez Perce and Payette National Forests

FIGURE I-1
VICINITY MAP



Prominent geographic features within the Forest are the Wallowa, Elkhorn, and Seven Devils Mountain Ranges, Hells Canyon and Snake River. A dozen important streams originate on the Forest including the Grande Ronde, Imnaha, and North Fork John Day Rivers Numerous communities lie adjacent to the Forest with La Grande, Enterprise, and Baker City being the larger population centers Timber and agriculture are significant components of the local economies. A more complete description of the Forest and surrounding area may be found in Chapter III

ISSUES, CONCERNS, AND OPPORTUNITIES

An important step in the planning process is the identification of major public issues and management concerns. This was accomplished through an extensive scoping process involving the public, other agencies, and a panel of non-Forest Service citizens representing a cross-section of State and local governments, local industry, conservation groups, and Native Americans. The citizens' panel also reviewed and contributed to the planning effort at other stages, including development of alternatives. Separate meetings with several individual agencies were held There was special effort to ensure coordination with county land use plans In addition, the 1,460 private landowners who own land adjacent to or within the National Forest were contacted by mail, informed of the planning effort, and asked to notify the Forest with their concerns Many of them accepted this invitation

Prior to publishing the DEIS, the 1,100 people on the Forest Plan mailing list were contacted by mail on two occasions in order to identify issues and determine which were most significant. The response from these mailings and the evaluation of the public comments are available for review at the Forest Supervisor's office.

Based on comments received on the DEIS and the Supplement, an additional issue has been identified. This issue relates to anadromous and resident fish habitat, and water quality.

Following are discussions of the major issues identified, the related concerns, and opportunities. In reviewing the remaining sections of this statement, the reader should keep these issues and concerns in mind An important test of any alternative action is how well it deals with or resolves these key issues and concerns. The process of identifying issues, concerns, and opportunities is described in more detail in Appendix A

Transportation

Approximately 9,300 miles of roads in various conditions exist on the Wallowa-Whitman, at densities ranging from less than one to more than ten miles of road per square mile of land. A dominant theme in public response on the issue of transportation system management has been a concern over the miles of road on the Forest, and the standards to which these roads are built Environmental groups and individuals express concern that impacts of road construction on fisheries, wildlife, and other resources are directly related to the miles of roads and the number of roads open or closed to motor vehicle use Timber purchasers are concerned that unnecessary roads and excessively high road standards not only take land out of production, but also increase logging costs.

The construction, use, and maintenance of roads affect many other Forest resources including visual quality, backcountry recreation, riparian habitat, water quality, wildlife habitat, soils, range, and timber Proper location, design, construction, and management can mitigate many of the adverse impacts, but the construction of a road or trail is a long-term resource commitment and a physical feature which is not easily returned to a natural state. Many of the possible mitigative actions (e.g., lower standards, closures, reduced road densities) limit public access. Some actions (such as lower standards) may reduce logging costs while others may increase costs (closures or reduced road densities). The character of many roadless areas will be irretrievably altered by the decision to access them for timber management, but without the additional roads timber production will be reduced

In summary, to deal with the transportation issues, the following questions must be addressed:

1. How much road access do people want, are the roads needed, and are they economically efficient?

2 How do we best provide the access needed for timber management while minimizing the impact of these roads?

3 How do we most efficiently satisfy recreation and wildlife objectives considering road systems already in place and those which are determined to be necessary for the development of the timber resource?

Timber Production

The Forest contains large amounts of softwood timber, providing about one-half of the volume processed locally. Mill capacity is substantially greater than supply. The primary timber-producing species are ponderosa pine, Douglas-fir, lodgepole pine, true firs, western larch, and Englemann spruce Ponderosa pine has generally been in greater demand, has been more accessible, and through history has been harvested at a more rapid rate than the other species Lodgepole pine, for example, was virtually ignored until the 1970's As a result, ponderosa pine comprised 35 percent of the standing timber inventory in 1958, but now comprises only approximately 23 percent of the inventory.

This is particularly significant, since this reduction in the standing inventory of ponderosa pine will result in a substantial reduction in the ponderosa pine component of the allowable sale quantity (ASQ) regardless of which alternative is chosen. Historical harvest of ponderosa pine has averaged about 65 million board feet per year. Sustainable levels of ponderosa pine range from 25-40 million board feet per year, depending on management alternative.

The average size of trees harvested has declined as more lodgepole pine has entered the mix. As timber stands are brought under management, trees of all species will be harvested at relatively young ages (50 to 100 years) if wood fiber production is to be maximized. This will also contribute to the production of smaller log sizes than have been available in the past *

*Longer rotation ages could be used to sustain a larger product size, but would require the Forest to ration large sawtimber over a longer period, reducing harvest levels

Many local mills are best suited for the processing of larger logs Most would benefit from maintaining or increasing the sale of larger, more valuable species in the short-term. This would allow for fuller utilization of present equipment and more time for conversion to equipment suitable for smaller materials Maintaining or increasing sales of larger trees now would maintain or increase short-term returns to the U. S and local governments, but would also result in reduced future returns

Timber harvesting and management have direct and indirect effects on other resources. Forage production is frequently increased, but wildlife cover is often reduced, especially in the short run. Old-growth habitat is reduced Recreational opportunities are changed and visual qualities are altered. The location and scheduling of future timber harvest units have significant short- and long-term implications on the abundance and distribution of cover and forage areas for wildlife, the visual quality and recreational settings provided, and the returns to the U S. and local treasuries.

The Forest has been assigned an annual timber sale target of 220 million board feet as its share of the projected National need for the next decade (Regional Guide 1984) This is known as the Forest's share of the Resource Planning Act (RPA) target * Recent offerings have averaged 210 MMBF of which 159 MMBF was sawtimber, the rest being material unsuited for use as sawtimber such as chippable material. Achieving the RPA target would require a 5 percent increase in sell volume

Another management concern is the incidence of below-cost timber sales on the Forest The Forest is attempting to respond to the issue through a program of rigorous project-level economic analyses. The ability to recover costs on individual sales was a specific criterion only in Alternative G. It was not a criterion for any other alternative. Economic efficiency and attainment of nonpriced benefits in response to issues and concerns are criteria in selecting a preferred alternative. See more detailed discussion in Chapters II and III

The Oregon Department of Forestry has identified a potential shortfall in future timber supplies in Oregon, and through its "Forestry Program For Oregon" has suggested targets for the Wallowa-Whitman National Forest which would help avoid this shortfall These targets exceed the assigned RPA timber production targets for the Forest by approximately 20 percent and would require a marked departure from nondeclining flow and greater tradeoffs in other resources.

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*The RPA timber target is based on the total amount of wood fiber material offered for sale, converted to board feet See discussion under timber management in Chapter IV

In summary, questions that must be answered are.

1. How much timber should be harvested from the Wallowa-Whitman?

2 What species mix?

3. What size trees?

4. What should the harvest schedule be?

5 Should there be a departure from nondeclining flow?

6 What is the cost to other Forest resources of maintaining certain timber production levels?

Local Economy

The economies of Baker, Union, and Wallowa Counties of northeastern Oregon are affected significantly by the activities and outputs of the Wallowa-Whitman National Forest Forest activities also affect other area counties but to much less an extent than these three In terms of providing employment (jobs, personal income) and payments to local governments, timber sale offerings are by far the most important consideration. The Forest provides about half of all the timber processed locally Employment related to the harvest, processing, and cultivation of the area timber resource accounts for some 12 percent of the total labor force. Local school and road budgets rely on National Forest receipts for a significant part of their income

Other Forest outputs such as forage, water, minerals, and recreation are also important to the local economy. It is estimated that the Forest provides about eight percent of total domestic livestock forage consumed This forage is important to some 144 livestock permittees The Forest is important in affording recreational opportunities for people from throughout the Northwest. The grazing contribution to the local economy is relatively low in comparison to the contribution of timber harvest.

Many feel the Forest should be managed to boost the local economy, others feel that economic factors are no more important than amenity considerations for a National Forest However, there seems little doubt that the effects on the local economy are important in developing a plan for managing the Forest. The question becomes:

> What should the Forest's contribution to the local economy be in terms of personal income, jobs and payments to counties?

Management of Nonwilderness Roadless Areas

Some people enjoy the recreational experiences available in areas which have many of the undeveloped characteristics of wilderness but where there are fewer restrictions Such areas can be characterized as providing semiprimitive nonmotorized or motorized recreational opportunities Maintaining the undeveloped character would mean excluding such areas from regulated timber harvest and road construction. Off-road vehicle use could

continue, as could mineral exploration and extraction (recognizing that high timber or mineral values influence whether an area would be designated for undeveloped recreation).

If the Forest is to provide a broad range of recreation experiences, it will be necessary to provide a range of conditions that includes such undeveloped areas. The issues become questions of:

1. How much nonwilderness, and which roadless areas, should be retained in an undeveloped state for opportunities they offer and for future wilderness consideration?

2. What resources will benefit and what will be the costs in resource production?

Old-Growth Forest

Old-growth tree stands, and their related undisturbed environments including snags and fallen trees, are of ecological importance to society in that they represent a stage in ecological succession which provides unique habitats for certain species of plants and wildlife. People using the Forest for recreational purposes enjoy old-growth trees for their aesthetic values There is general agreement that some representation of old-growth timber should be maintained but wide disparity emerges when levels of representation are discussed. Conflicts arise because the existing old-growth stands contain high volumes of timber which could be made available for harvest in the near future.

The minimum levels of old-growth and mature forest necessary to satisfy NFMA requirements for viable populations of wildlife have been established for the Wallowa-Whitman National Forest (see Appendix G). They assume a high rate of habitat occupancy which depends in part on our ability to precisely recognize and manage for those features of habitat essential to wildlife, and to distribute those stands in such a way that they remain accessible to wildlife.

The questions to be resolved are

1. What amount of old-growth is necessary to provide an acceptable level of risk in ensuring viable wildlife populations?

2. What effect will maintaining old-growth ecosystems have on local timber supplies?

3. What level of old-growth is necessary to satisfy the recreational and aesthetic desires of forest users?

Wildlife Habitat - Deer and Elk

The Wallowa-Whitman National Forest provides habitat for more than 20,000 Rocky Mountain elk, and is widely recognized for the elk hunting it provides Elk numbers have increased in response to favorable habitat conditions since their populations were supplemented in the 1920's. Timber harvest has "opened up" areas which were dominantly forest, providing significant increases in forage available to elk. Available cover has been surplus to elk habitat needs so that much of the past timber harvest activity has, by design or

accident, improved habitat. However, significant shortages of cover exist naturally or have been caused by timber harvest on portions of the Forest. Deer and elk generally share common ranges throughout the Forest Deer have habitat requirements similar to elk but are generally more tolerant of human activity (Thomas, et al. 1979). For this reason, it is assumed that elk will serve as an adequate indicator of habitat for deer in evaluating alternative response to this issue. Current populations of deer are substantially below State objectives in both Idaho and Oregon as the result of recent severe winters.

Cover and forage relationships affect the quality of food, shelter, and security for elk (Thomas, et al 1979) Continued timber harvest may maintain or enhance these cover/ forage relationships if rates of harvest can be limited to allow proper distribution of harvest units Limiting the rate of harvest reduces the amount of timber available to local mills in the early decades

The issue is complicated by the introduction of roads. The combination of forage, cover, and road access may ultimately influence the number of elk hunting opportunities provided on the Wallowa-Whitman National Forest.

The questions to be resolved are:

1 What mix of thermal/hiding cover and forage is desired for elk on the Wallowa-Whitman and at what cost in potential timber production?

2 What level of road access will satisfy public needs and desires while protecting elk and elk hunting opportunities?

Recreation Diversity

A variety of conditions currently exists on the Forest ranging from wilderness to lands which have been intensively managed for timber Each of these conditions provides a different recreational opportunity. The recreation opportunities they provide are described within the "recreation opportunity spectrum" (ROS) as: primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, roaded modified, rural, and urban

While there is a surplus of capacity of most ROS classes for the foreseeable future, it appears that the demand for the semiprimitive motorized class will exceed capacity by the year 2000. This is because much of the current capacity for semiprimitive motorized is within the remaining roadless areas.

There are a variety of management choices which will change the recreation diversity within the Forest At the heart of the issue is the question:

> What mix of Forest conditions would best satisfy projected demands for a broad range of recreation opportunities and the expressed needs and desires of the users of the Wallowa-Whitman National Forest?

Livestock Grazing

The National Forest has long provided forage for local livestock, thereby contributing to community stability and the Nation's need for cattle and sheep products. Approximately

eight percent of the forage consumed by livestock in Baker, Union, and Wallowa Counties is provided by the Wallowa-Whitman National Forest Overall, range vegetative and soil conditions, which were poor in the early part of this century have improved significantly Some problem areas still exist, particularly those associated with riparian resource conflicts. Particular concern is expressed over the impacts of grazing on riparian areas with regard to soil loss and disturbance to fish and wildlife habitat Other concerns expressed involve damage to soils, water pollution, and conflicts with reforestation.

The potential exists to resolve many of these conflicts through the development of Allotment Management Plans that will implement more intensive utilization standards and grazing systems based on the needs of riparian systems These plans will be developed on an allotment specific basis and may result in intensified management, changes in class of livestock, reductions in permitted numbers, increased investments in range improvements, or a combination of the above.

Opportunities exist on many allotments to improve range vegetative conditions Some of these improvements will result in increases in available forage production and may result in allotment specific increases in permitted numbers.

The questions to be resolved are

1 What level of investment in range management on the Wallowa-Whitman National Forest *is appropriate considering local community needs, National objectives for* increased emphasis on range vegetation management, National objectives for *livestock production, and returns to the U S Treasury?*

2 *Within the proposed investment levels, what levels of management are appropriate* to achieve satisfactory resource conditions within a reasonable period of time.

3 Are such management levels consistent with other multiple-use objectives, including timber production and recreation?

Minerals

A variety of minerals including gold, silver, molybdenum, copper, and limestone underlie portions of the Forest. Gold in particular is responsible for the rich mining history of the area and is responsible for the establishment of several towns. Extraction of these minerals can benefit the local economy and provide materials needed nationally Extraction of minerals from National Forests is recognized in law and Forest Service policy as a legitimate resource use. As with most uses, there are sometimes conflicts with other resources Mineral deposits are, for example, often located in visually sensitive areas where landscapes may be adversely altered, or near or within stream courses where water quality can be affected There are many ways of mitigating mining-related impacts; in most cases the impacts are still noticeable but acceptable. When such uses are not acceptable, lands are sometimes withdrawn from mineral entry. Examples are sensitive recreation or administrative sites

In the case of wilderness, new mining claims are considered incompatible, just as is timber harvesting, because of the noticeable effects of the activities. The wilderness character is lost when such activities occur. Incompatibility with wilderness is the most important facet of the minerals issue in land management planning for public lands.

During this Forest planning process, the Oregon Wilderness Act was passed making minerals less of an issue than before the 1984 Act. Convenience of mineral exploration and extraction varies with management area. Minerals is retained as an issue in order that these differences can be explained and displayed in this EIS The question becomes.

> What, if any, restrictions should there be on new mineral exploration and mining beyond normal coordination requirements?

Fish Habitat/Water Quality

There are 130 lakes and reservoirs, totalling 5,400 acres, and 9,600 miles of streams on the Wallowa-Whitman. Nearly all of the lakes (most are within wilderness) and approximately 1,300 miles of streams contain significant populations of fish Rainbow and eastern brook trout are the dominant resident species in most streams although other species are present locally Chinook salmon and steelhead trout are the more common anadromous species in the 680 miles of streams providing spawning and rearing habitat for anadromous fish

Responses to the DEIS and supplement, along with comments received on project level analysis while the FEIS was being developed, indicate that fish habitat is a major issue on the Wallowa-Whitman. This prompted the addition of fish habitat and water quality as an issue to be considered in this EIS. The two are treated in the same issue because they are so closely related in the context of land management.

Most concerns over fish habitat and water quality were expressed by State agencies concerned with the fish and water resources (Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, and the Oregon Department of Water Resources), the Environmental Protection Agency, Indian tribes, and conservation groups These concerns centered on habitat and water quality protection, primarily as they can be affected by activities such as logging, road construction, and grazing by domestic livestock Cited were concerns over siltation, loss of streambank stability, increased stream temperature, bacterial and chemical pollution, and loss of large organic debris needed to maintain quality habitat

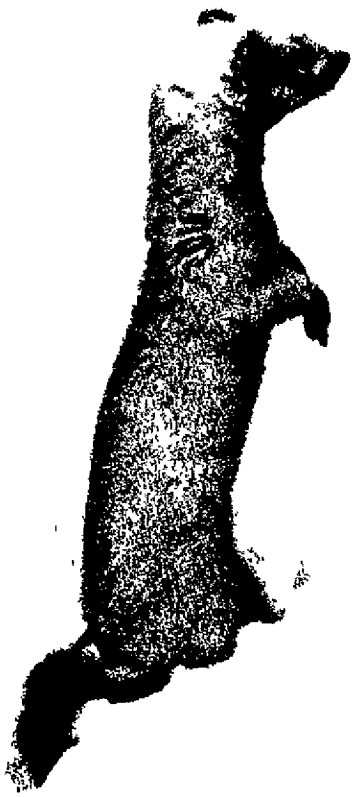
The question surrounding fish habitat and water quality is

1. What kinds of protection and rehabilitation are needed to protect water quality and fish habitat and provide for improvement of areas currently in a less-than-satisfactory condition?

2. What direction is needed to ensure protection and provide needed rehabilitation of fish habitat at the project level?

CHAPTER II

Alternatives, Including The Proposed Action



CHAPTER II

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Summary of Chapter II Changes
Draft to Final

1. As a result of public input and management concern over protection of the water resource and its related soils and fisheries resources, management practices designed to protect and enhance water quality have been highlighted under "Best Management Practices" in Elements Common to All Alternatives.

2. The Draft "State of Oregon Alternative" (submitted by the Governor of Oregon) is described and compared to the proposed alternative.

3. A timber industry alternative, and alternatives developed by the Friends of Lake Fork, and the Wallowa Alliance have been added as alternatives not considered in detail.

4. All alternatives considered in detail (except Alternative NC) have been adjusted to reflect the addition of wild and scenic rivers by the Omnibus Oregon Wild and Scenic Rivers Act of 1988.

5. All alternatives have been tiered to the Regional final environmental statement titled "Managing Competing and Unwanted Vegetation" (December 1988).

6 Under "Elements Common to All Alternatives" six vacant range allotments are closed to grazing by domestic livestock.

7. Projected livestock grazing in all alternatives was reduced to reflect the effects of new standards and guidelines for forage utilization

8. All alternatives (except Alternative NC) have been adjusted to reflect maintenance of small-diameter (less than 20 inches) snags to provide habitat for dependent species.

9. In all alternatives, lodgepole pine trees less than seven inches in diameter have been removed from the calculation of sawtimber volume

10 Results of benchmark analyses have been moved from Chapter II to Appendix B.

11. Changes to Alternative C, made as a result of public and management concerns are as follows

   - Miles of road corridor to be managed for visual quality objectives of foreground retention and partial retention have been reduced by 18 percent

   - Ponderosa pine harvest levels in the first decade of plan implementation have been increased from 29 MMBF per year to 34 MMBF per year

- Seven new research natural area recommendations have been added and two areas which appeared in the DEIS have been dropped

INTRODUCTION

This chapter is the heart of the Environmental Impact Statement In this chapter alternate ways of managing the National Forest (the alternatives) are presented and their resource outputs and probable environmental effects are displayed There are also discussions of how these alternatives were developed and how they compare to each other and to the way the Forest is currently being managed.

This chapter draws on material from other chapters Chapter III which describes the Affected Environment and Chapter IV which presents the Environmental Consequences. It also compares the alternatives to the issues discussed in Chapter I.

OVERVIEW OF CHAPTER II

There are four main parts to this chapter First, there is a summary of the analysis that was conducted in the process of developing the alternatives. (A more detailed presentation of this analysis is presented in Appendix B, Description of the Analysis Process) Second, there is a discussion of other alternatives which were considered but were not developed in detail or presented as full alternatives Third, each alternative is described in terms of its purpose and management emphasis Fourth, the alternatives are compared to each other and to other information This comparison shows the response to issues, the emphasized land uses, the resource outputs, the environmental effects, and economic costs and benefits which will occur with each alternative

ALTERNATIVES

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

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

An even distribution of reasonable alternatives covering a broad range of possible actions was formulated by the interdisciplinary team. The alternatives are designed to explore a variety of ways to respond to the public issues, management concerns, and resource use and development opportunities identified throughout the planning process

The planning regulations (36 CFR 219.12(e) and (f)) require an analytic process, which includes an inspection of various minimum and maximum production levels and economic factors. In addition, the collection of alternatives must respond to management concerns, and include alternatives which reflect current and National programs, such as RPA

Some alternatives would manage the National Forest to maximize the production of priced commodities such as timber and forage, whereas other alternatives would emphasize unpriced amenities, such as dispersed recreation, wildlife, and scenic qualities. One alternative (the no action alternative) reflects current management direction while another (the RPA Alternative) reflects the objectives of the Forest Service National Program. Some alternatives (departure alternatives) have an altered timber harvesting schedule to meet specific needs From this broad range of alternatives, the Regional Forester had a basis for identifying the alternative (the Preferred Alternative) which comes nearest to maximizing the net benefits to the public.

The maximization of net public benefits is the goal of the Forest planning process. The net public benefit is the overall value to the Nation of all outputs and positive effects (benefits) less all the associated Forest Service inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits cannot be expressed numerically because they include both quantitatively evaluated priced outputs and qualitatively valued nonpriced outputs.

Priced outputs are those that have been assigned dollar values. Their quantitative values are determined by actual market transactions or by estimation methods that produce prices which approximate those determined by market transactions Timber, forage, and minerals are examples of commodities which are bought and sold in the market Recreation visitor days (RVD's), by comparison, are not normally exchanged via market transactions. Their market values are estimated by using some market transaction data in combination with various theoretical techniques Conceptually, these assigned values should be consistent and comparable to those values which were actually derived via market transactions (Rosenthal, Brown, and others, 1985) Therefore, both assigned and market values are appropriate for calculating quantitative measures of efficiency such as present net value. All benefits and costs are tracked in real terms, i e , exclusive of inflationary effects

Nonpriced outputs are those for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value comparable to market values associated with the priced outputs Nonpriced outputs may be either qualitative or quantitative Qualitative nonpriced outputs include things such as scenic quality or clean air which are both difficult to quantify and difficult to impossible to put dollar values on. Quantitative nonpriced outputs include things which can be quantified (counted) but which do not have an identified dollar value. These include such things as threatened and endangered species or historical and cultural sites.

"Benchmarks" are presented and discussed several times in the chapter. Benchmarks are analytic bases which were used to estimate the potential ranges of various resources, outputs and other activities. Although not necessarily implementable, they serve to define the decision space within which implementable alternatives can be developed They were used to analyze certain relationships under special economic and resource production assumptions Their character and use will be discussed in the next section and in Appendix B.

Alternative Development Process

Formulating a broad range of reasonable management alternatives for a National Forest is an extensive and complex process Each alternative is a combination of land uses, Forest management activities, and schedules Alternatives must consider the resource capabilities (both the limitations and the potentials) of the many different areas of the Forest Each alternative is designed to manage the land to achieve specific goals and objectives. Some of these objectives, such as maintaining air and water quality, are common to all alternatives, other objectives, such as the mix and amount of resource outputs, vary among the alternatives.

By managing the Forest lands and resources in different ways, varied objectives can be achieved which respond to the issues differently, providing different combinations of public benefits Forest management can vary by what is done, where it is done, and when it is done These varying

combinations of management activities and schedules will result in different resource outputs and environmental conditions, thus meeting the unique objectives of the alternatives

An alternative is formulated to address issues, concerns and opportunities (process more fully described in Appendix B) by considering all of these factors

- The resources available on different areas of the Forest;
- The public's need or demand for different combinations of commodities and amenities,
- The combination of management actions which are planned for different areas,
- The schedule of those activities;
- The interrelationships of capabilities, management actions, and schedules which result in resource outputs and environmental conditions which are consistent with the objectives of that alternative.

Alternative formulation was an iterative process in which the goals and objectives of an alternative were identified, the alternative was modeled using FORPLAN (see following section) the outputs from the model were compared to the goals and objectives of the alternative, and the effects on other resources were estimated When the goals and objectives of the alternatives were not met or the effects considered too severe, the model formulation was changed, the FORPLAN model was run again, and a new analysis completed Using this process, a full range of Forest Plan alternatives was developed.

The starting point for detailed alternatives was Benchmark 7. Benchmark 7 (also see Appendix B) is a FORPLAN run which estimates the maximum present net value that could be achieved while meeting law and regulations and while providing for nondeclining flow. This was used because it contains the basic information needed to meet the management requirements from 36 CFR 219 27 Once the goals and objectives for a particular alternative were identified, the data set from Benchmark 7 was altered to reflect those goals and objectives. These alterations, depending on the objectives of a particular alternative, included. limiting the amount of land that FORPLAN could allocate to a given use, limiting the rate at which specific resource activities could occur, limiting the types of activities which could occur, setting minimum or maximum output levels for specific resources, and limiting the budget available to carry out Forest management activities (budget limits were applied only in Alternative A).

Given the goals, objectives, and limits for a specific alternative, the FORPLAN model selected the combination of management intensities and the activity schedule which maximized present net value.

The No Change Alternative (NC) was developed in a different manner than were the other alternatives. It reflects the direction found in the 1962 Timber Management Plan for the Wallowa-Whitman National Forest, as amended. Estimates of outputs and effects associated with the No Change Alternative are those specifically addressed in the 1962 Timber Management Plan and those which can reasonably be estimated based on the direction found in that plan. Major differences between the formulation of the No Change Alternative and the other alternatives include

- Alternative NC emphasizes timber production over other resource uses, whereas the other alternatives are based on integrated resource management.

- It was developed using modeling techniques other than FORPLAN.
- Development of the alternative did not include an economic analysis
- Projected timber harvests are based on potential yield rather than integrated resource management.
- Some of the requirements of the National Forest Management Act and implementing regulations are not incorporated into this alternative (specific items are identified in the description of the alternative and in Chapter IV)
- It does not use the latest information regarding timber yields, suitable lands, or silvicultural practices.

FORPLAN

A computerized, mathematical optimization model of the Forest is used to help analyze physical and economic factors and their interactions This model, called FORPLAN, assists in selecting that particular combination of lands, management prescriptions, and activity schedules that will best meet the objectives of each alternative Virtually every National Forest uses FORPLAN in land management planning

FORPLAN, which is a linear program model, also simulates the actions of the different resources, management, and environmental conditions on the Forest. The FORPLAN model is structured to seek the greatest economic efficiency (the most return for an investment) This is represented in its function of maximizing PNV. PNV, or present net value, is the value of the present and future monetary benefits after subtracting present and future monetary costs FORPLAN also predicts monetary costs and benefits under the conditions specified to achieve the objectives of a particular alternative.

The interdisciplinary (ID) team is directly involved with the design, operation, and interpretation of the FORPLAN model. The land and resource base is stratified into land units or classes (analysis areas). Alternative management activities are developed for each of these units The FORPLAN model examines these data and estimates the schedule of outputs and activities associated with the alternative Since the FORPLAN model is not large enough to simultaneously analyze all of the quantifiable data associated with management of a Forest and is not capable of analyzing qualitative data, much additional analysis is completed using other analytical tools The ID team must then assure that each alternative is correctly modeled and that the results are feasible and implementable.

Prior to the formulation of the FORPLAN model, other analytical techniques were used to specify the parameters and the constraints required to use or supplement the FORPLAN model In some cases, the FORPLAN model will report that the Forest cannot be managed to meet some combination of objectives--the limitations of land and resources, an impact on an environmental quality, or the practical limits of budgets will result in an infeasibility. Then the interdisciplinary team must modify the objectives and make other computer runs to find the particular combination of lands, activities, and schedules which will best meet the goals of that alternative. Other analytic techniques are employed following a FORPLAN solution to validate that solution and to develop additional economic and other information about its implementation.

Role of Economics Within Alternative Formulations -- Stage II Analysis

Economic analysis played an important role in selecting the mix of timber management intensities available within each alternative. In advance of FORPLAN runs an exhaustive review was made of alternative silvicultural practices considering the many possible combinations of reforestation methods, precommercial thinning, commercial thinning and rotation length. In this review the number of

silvicultural intensities was reduced from over 100 to 16 which were included in the FORPLAN model. These figures are exclusive of the great number of permutations which result from the various possible rotation lengths. Cost efficiency was considered including and excluding existing inventories; for both single rotations and perpetual rotations, with and without real price increases; with and without thinning slash treatment; and for a wide range of rotation lengths. Potential for producing timber volume was also considered. The option of unevenaged management was also included. This process is more completely described in Appendix B

All 16 management intensities were allowed in all benchmark and alternative runs. Issue-related constraints describing the desired Forest conditions were specified for each alternative. The possibility of a decision to not manage for timber production was also included Therefore, FORPLAN solutions provide the most cost-efficient means of achieving the desired future conditions within each alternative

Translating these desired conditions into FORPLAN constraints allowed for the coordination of many Forest resources as an integrated mix (Appendix B). There are additional outputs and costs, however, which were not included in the FORPLAN model They were included in a computer program, INTEGER. This program incorporated all benefits and costs into a single economic efficiency analysis, and provided the overall present net value for each alternative following FORPLAN analysis

Description of the Analysis Process

Appendix B of this FEIS describes the entire analysis process in detail. Readers are encouraged to refer to that appendix for technical information not found in the more general description presented here.

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

The first step in the analysis is to inventory the resources of the Forest. Areas with similar characteristics are combined into classes called analysis areas These are the basic units used in modeling. They are subdivisions of the Forest based on similar characteristics of costs and natural responses to Forest management activities

Much of the timber related data used in the analysis for this EIS came from a timber inventory completed in 1979. To reflect changes to that inventory through time, data have been adjusted for timber harvest through 1984 and growth on existing stands through 1991.

Analysis areas used in the analysis on the Wallowa-Whitman National Forest consisted of areas of similar characteristics which were not contiguous. When the analysis indicated a reasonable and implementable alternative had been formulated, the combination of analysis areas to be managed under a given management direction formed the basis for management areas

In conjunction with the creation of analysis areas and management areas, the interdisciplinary team generated management standards and guidelines which apply to specific management areas They consist of direction for managing the resources of the management areas to which they apply (Appendix D identifies the standards and guidelines, and where they can be found.) Mathematical estimates of their direct economic costs and resource yields were generated for use in the FORPLAN model. There are 18 management areas identified in the alternatives

Management areas are identified on the map for each alternative which accompanies this EIS The management areas are described later in this chapter, and their acreages are shown in Table II-3

Having identified areas for analysis and management, and having prescribed the appropriate management practices and their mathematical expressions for use in the FORPLAN model, the interdisciplinary team proceeded with the benchmark analysis in the formulation of alternatives.

Benchmark Analysis

The first step in the analysis following the building of the FORPLAN model involved the creation of benchmarks, and the inspection of their outputs, costs, and assumptions Benchmarks are similar to alternatives in that they are a combination of land capability, management practices, and schedules to achieve certain objectives. But unlike alternatives, they are usually not capable of actually being implemented because they lack a consideration of likely budgets, specific geographic locations, environmental effects, compliance with management regulations, legal requirements, and other factors. They do provide significant information about the maximum biological and economic production opportunities. They assist in evaluating the compatibilities and conflicts among market and nonmarket objectives, and they define the range within which integrated alternatives will be developed

Some benchmarks are economically based, while others indicate the maximum physical productivity of land for various resources Benchmarks are described further in the section entitled "Alternatives Considered but Eliminated from Detailed Study" and in Appendix B Their outputs are displayed in Appendix B

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

- Minimum Level: This benchmark specifies the minimum level of management which would be needed to maintain the Wallowa-Whitman National Forest as part of the National Forest System.

- Maximum Present Net Value Based on Established Market Price: This benchmark specifies the management of the Forest which will maximize the present net value of those outputs that have an established market price

- Maximum Present Net Value Including Assigned Values: This benchmark specifies the management which will maximize the present net value of those outputs that have either an established market price or assigned monetary value.

- Current Level. This benchmark specifies the management of the National Forest most likely to be implemented in the future if current direction is followed This benchmark forms the basis for the "No Action" Alternative.

In these benchmark analyses, each option must include meeting management requirements (MR's) of 36 CFR 219 27, such as protecting the productivity of the land and meeting air and water quality standards and must reflect land allocation decisions already made, such as existing wilderness and the Hells Canyon National Recreation Area

Other benchmark analysis is conducted to determine the effect of various management requirements, discretionary constraints, and the effect of restricting timber harvest rotations to the culmination of mean annual increment (CMAI) and of nondeclining flow (NDF) of timber harvest Benchmark analysis was also used to assess the effects of the Hells Canyon Comprehensive Management Plan

Supply and Demand Situation

The Environmental Impact Statement for the 1985 Resources Planning Act program and the Regional Guide for the Pacific Northwest Region estimate that total national demand will rise for all outputs of the National Forests. At the same time, there is a strong demand to protect and enhance the quality of the environment.

Recreation use is expected to increase as the population increases and its characteristics change, with the bulk of recreation use coming from residents of the region.

Demand for wilderness recreation is expected to exceed the supply within the Region's Wilderness Preservation System Demand could be met, in the near future at least, by using undeveloped lands outside wilderness Development of these lands would intensify pressure on the designated wilderness.

Demand for hunting and sport fishing is expected to increase by one-third between 1985 and 2000 Nonconsumptive uses of wildlife and fish are also expected to increase.

The national demand for timber is expected to rise faster than timber supply over the next fifty years As demand nears or exceeds supply levels, stumpage prices are expected to increase

The National Forests of the Pacific Northwest are the National Forest System's primary timber producer, with almost one-half of the current National Forest harvest coming from this Region The *quantity of timber demanded regionally in 2000 is expected to be about one percent greater than the* 1976 demand level. The stumpage price of timber is expected to rise significantly.

The local situation is similar to that of the Region Local demand for wilderness is strong; however, population pressures from outside the local area have not created and are not expected to create demand which would exceed supply for that resource assuming undeveloped areas will contribute to supply.

The supply of dispersed and developed recreation opportunities is expected to exceed demand throughout the planning period in all alternatives, primarily due to the Forest's distance from population centers. Some movement of recreationists among other Recreation Opportunity Spectrum categories is also expected as the Forest changes gradually over time and public's perception of desirable recreation experiences change

The local demand for Forest timber is expected to be strong throughout the planning period because of the Forest's dominant supply position in the area's timber inventory picture (Fox 1988) The area's installed mill capacity is well in excess of the area's ability to provide timber on a sustained basis.

Current employment patterns are expected to change gradually over time Timber production has become increasingly mechanized over the decades so that much less labor is involved in processing the material locally than was previously the case. This trend is well recognized locally

The reduction in the number of people employed could be mitigated or even reversed by the further vertical development of the industry locally Such vertical development occurs when processed lumber products are further processed locally into other materials before being exported from the local area

The area has had its ups and downs in its efforts to diversify its economy. Some retail and wholesale *activities have been lost, some light manufacturing has been gained Efforts are well underway to* establish an Oregon Trail National Monument and a regional prison facility

Substantial timber-based employment will continue under all alternatives Forest actions are not expected to significantly alter recreation-related employment. Some employment changes would likely occur in area livestock operation, but the amount of employment associated with Forest grazing is quite small and the Forest provides a relatively small part of total area forage consumption. Table II-1 provides a summary of projected supply and anticipated demand for a number of Forest resources.

The Role of Management Requirements (MR's)

Each alternative (except Alternative NC) and most benchmarks meet the management requirements (MR's) of 36 CFR 219.17 Because meeting these MR's constrains timber management and some other activities, their application can reduce timber outputs, jobs, and efficiency. These costs, however, vary from one alternative to another, depending upon the degree to which the MR's are constraining within a particular alternative.

Since the MR's are based on limited research and incorporate substantial professional judgment, some of the public has expressed concern over their adequacy Appendix M contains an analysis of the opportunity costs associated with meeting the management requirements. It also reviews the literature used in identifying the means of meeting the management requirements, discusses alternative means considered in the analysis, and provides the rationale for the selected approach.

Most of the management requirements from the NFMA regulations are procedural requirements or were dealt with in developing the Regional Guide EIS Several, however, remained to be analyzed as a part of the planning process on each National Forest. The management requirements which have not been fully dealt with elsewhere include, timber harvest dispersion, viable populations of existing native vertebrate species, and protection of riparian/water quality. Of these, only harvest dispersion and maintaining viable populations of native vertebrate species significantly affect allowable sale quantity or present net value. ("Significantly" is defined in this analysis as a two percent change or more.)

Table II-2 displays the opportunity costs for allowable timber sale quantity (ASQ) and present net value (PNV) associated with the proposed means of meeting the management requirements The proposed means, in each case, is the approach which showed the lowest opportunity cost These opportunity costs are displayed for the Maximum PNV Benchmark

Required Alternatives

The next task faced by the interdisciplinary team is the development of implementable alternatives Among the alternatives it formulated are several alternatives that are required by regulation and National and Regional direction. The required alternatives are listed and briefly described here.

- No Change (NC) This alternative is developed to display the current timber management plan Since the plan was completed in 1962, it has been amended nine times These amendments reflect wilderness additions, recognition of the Starkey Experimental Forest and Range, dispersed recreation areas from the Unit Plans, and the land allocations from the Hells Canyon Comprehensive Management Plan. It does not make allowance for land allocations where harvest is reduced for such things as big-game habitat, old growth, or water quality protection Adjustments for these factors were to take place through the Forest Plan which was to have been published in the first part of this decade. Consequently, harvest levels and existing land allocations are not fully integrated.

Table 1
SUMMARY OF PROJECTED SUPPLY AND ANTICIPATED DEMAND

		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Recreation						
Developed Recreation						
Including Visitor Information Service (MRVD's & WFUD's)						
Projected Supply						
Current Direction		587	595	603	610	618
Maximum Developed Recreation 1/		661	661	661	661	661
Forest Plan		661	661	661	661	661
Anticipated Demand 2/		399	464	523	571	621
Dispersed Recreation Including Wildlife and Fish Use (MRVD's & WFUD's)						
Projected Supply						
Current Direction		7,067	7,379	7,621	7,614	7,606
Maximum Dispersed Recreation 3/		6,957	7,213	7,380	7,380	7,380
Forest Plan		6,995	7,183	7,304	7,304	7,304
Anticipated Demand 2/		1,427	1,577	1,819	2,037	2,189
Projected Supply of Roaded Recreation 4/						
Current Direction		6,492	6,983	7,351	7,351	7,351
Maximum Roaded Recreation 5/		6,553	7,228	7,657	7,657	7,657
Forest Plan		6,492	6,860	7,105	7,105	7,105
Anticipated Demand 2/		1,141	1,275	1,463	1,630	1,755
Projected Supply of Nonroaded Recreation 4/						
Current Direction		575	396	270	263	255
Maximum Nonroaded Recreation 3/		1,188	1,075	997	997	997
Forest Plan		503	323	199	199	199
Anticipated Demand 2/		286	302	356	407	434
Timber						
Sawtimber (MMCF, MMBF in parentheses)						
Projected Supply						
Current Direction	134	27 1	27 3	27.6	27 0	27 2
Maximum Timber Benchmark	184	39 1	39 1	39 1	39 1	39 1
Forest Plan	(144)	27 7	27.3	28 1	27 5	27 3
Anticipated Demand 6/	(250)	50 0	50 0	50 0	50 0	50.0
Roundwood (MMCF)						
Projected Supply						
Current Direction		7 8	6 5	5 2	5 2	5 2
Maximum Timber Benchmark		10 9	9 1	7 2	7 2	7 2
Forest Plan		7 9	6 6	5 2	5 2	5 2
Anticipated Demand 7/		12	12	12	12	12

SEE END OF TABLE FOR FOOTNOTES

Table II-1 (Continued)
SUMMARY OF PROJECTED SUPPLY AND ANTICIPATED DEMAND

	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Livestock Grazing (MAUM's)					
Projected Supply					
Current Direction	186	186	186	186	186
Maximum Livestock Benchmark	227	227	227	227	227
Forest Plan	186	160	160	160	160
Anticipated Demand	227	227	227	227	227

1/ All alternatives except A, which is a budget-constrained alternative
2/ Based on recent historical experience, OBERS population projections for the State of Oregon, and Forest recreational opportunities
3/ Alternative E
4/ Inclusive of WFUD's and recreational experience occurring in wilderness Roaded recreation is the sum of rural, roaded natural, and roaded modified recreation Nonroaded recreation is all other ROS categories
5/ Alternative B
6/ Based on mill capacity depicted on pp 25 and 53 of James O Howard's Oregon's Forest Products Industry 1982, Resource Bulletin PNW-118, October 1984, USDA Forest Service Projections of demand entail projections of a myriad of interconnected factors–some of which can reasonably be estimated (population, for instance) and some of which cannot (technological breakthrough, shifts in appraisal methods, etc) It is reasonable to assume that installed mill capacity could be maintained for 2 decades, and that mill capacity beyond that time would be sufficient to process Forest offerings Cubic foot figures were generated using a 5 1 ratio
7/ Anticipated demand levels are basically an expression of mill capacity continued into the future. Arguments might be made that population pressures would tend to increase overall National demand, assuming a relatively stable price structures No increase was shown however because of the opportunities available to substitute other products for wood and because, as an expression of local demand, expanded mill capacity would be contrary logic when raw material supply levels are not expected to increase e

Table II-2

APPROXIMATE CHANGE (OPPORTUNITY COST)
ASSOCIATED WITH MEETING THE MANAGEMENT REQUIREMENTS
WITH SELECTED OPTIMUM IMPLEMENTATION METHOD

	First-Decade Allowable Sale Quantity MMCF/YR (MMBF/YR)	Percent Change in Allowable Sale Quantity 1/	Present Net Value MM$	Percent Change in Present Net Value
Maximum PNV Benchmark as Displayed in the DEIS	27 1 (136.1)	---	249 7	---
	OPPORTUNITY COST (MMCF/YR, MMBF/YR, MILLIONS OF DOLLARS OF PNV, AND PERCENT)			
Total Opportunity Cost of Meeting All Selected Management Requirements	3 8 2/ (18 6)	12 3%	73 9	22 8%
Opportunity Cost of Meeting Harvest Dispersion MR	1 5 (7 5)	5 2	53 1	17 5
Opportunity Cost of Meeting Viable Populations MR	1 0 (4 1)	3 6	7 1	2 8
Opportunity Cost of Meeting Riparian/Water Quality MR	0 3 (1 6)	1 1	4 4	1.7
Opportunity Cost of Meeting the Primary Cavity Excavator MR	1 0 (5 4)	3 6	9.3	3 6

MMCF/YR = Millions of cubic feet per year
MMBF/YR = Millions of board feet per year
MM$ = Millions of dollars
1/ Percent change calculated on cubic foot basis
2/ Although the potential effects of meeting the four MR's are displayed as if they were additive, there is actually overlap not reflected in the analysis

- The No Action Alternative. This is the alternative of "No Action" required by the Council on Environmental Quality (CEQ) regulations (40 CFR 1502 14) and by the NFMA planning regulations (36 CFR 219 12(f)). This alternative would continue the management of the Wallowa-Whitman National Forest as defined by existing direction in approved management unit plans; continuation of existing policies, standards, and guidelines, current budget updated for changing costs over time; and, to the extent possible, production of current levels and mixes of resources outputs. The "No Action" alternative serves as the base against which all other alternatives are compared (Council on Environmental Quality -- 40 Questions -- March 16, 1981). Alternative A is the "No Action" alternative

- Emphasis on Market Opportunities Alternative B is the alternative in this EIS which emphasizes market opportunities for the Wallowa-Whitman National Forest This alternative has an emphasis on outputs that have an established market price (timber, livestock forage, commercial fish, and minerals) Management for other resources is at economically and environmentally feasible levels consistent with the emphasis on market-oriented outputs It is also the RPA alternative. This alternative determines how the RPA Program, distributed to the Forests through the Pacific Northwest Regional Guide, can best be implemented

- Emphasis on Nonmarket Opportunities: Alternative F is the alternative in this EIS which emphasizes nonmarket opportunities. This alternative puts an emphasis on water, fish and wildlife, recreation and other amenity values Management for other resources is at economically and environmentally feasible levels consistent with the emphasis on amenity values

- Emphasis on Nondevelopment and Intensified Management Alternative E is the alternative which emphasizes wilderness, retention of roadless area, and intensified management in this EIS. This alternative retains all of the roadless areas on the Forest as undeveloped while increasing commodity production on those areas already roaded. Its purpose is to balance the economic effects of not beginning commodity production in roadless areas.

"Departure" Alternatives

A departure alternative is one in which the rate of timber harvest is accelerated in one or more decades to achieve a specific purpose, and then reduced in later decades.

The rationale for formulating and considering a departure alternative is provided by National Forest Management Act regulations [36 CFR 219.16(g)(3)]. Conditions, any of which may trigger a departure formulation, include:

- None of the other alternatives considered provides a timber sale schedule that achieves the assigned goals of the RPA Program as provided in Section 219.4 (b).

- High mortality losses from any cause can be significantly reduced or prevented or forest age class distribution can be improved, thereby facilitating future sustained yield management;

- Implementation of the corresponding base sales schedule would cause a substantial adverse impact upon a community in the economic area in which the Forest is located.

Two alternatives are departure alternatives in this FEIS They have a similar land allocation and resource management prescriptions as the alternative that they are based upon However, in each case the timber harvest schedule has been modified from one which would result in a nondeclining flow of timber. Management under these alternatives would result in higher volumes of harvested timber in the near future, but have lower volumes of timber available in later decades.

Alternative B-departure was formulated to provide timber outputs in the first five decades to make up for a projected shortfall from private lands This requires an accelerated harvest in decades one through five and a reduced level of timber harvest in succeeding decades

Alternative C-departure was developed to provide first decade sawtimber volume at recent historical levels while continuing a high level of harvest in lodgepole pine The base sale schedules and departure schedules for these alternatives are shown in Figure II-1

Other Alternatives

Additional alternatives, including those necessary to respond to the full range of public issues, management concerns, and resource use and development opportunities, were formulated to reflect a broad range of resource outputs and expenditure levels. Additional alternatives respond to 36 CFR 219 12(f)(1) which requires alternatives to be distributed between the minimum resource potential and the maximum resource potential to display the full range that a Forest could produce

Each alternative includes modeling constraints intended to represent the management requirements (discussed elsewhere in this chapter and in Appendix M) In addition, modeling constraints were added to the FORPLAN formulation for each alternative to approximate the management activities which would be required to meet the objectives of the alternative For example, in alternatives such as Alternative C, E, or F, which retain all or portions of certain roadless areas in a roadless condition to provide semiprimitive recreational opportunities, the FORPLAN model is constrained to assure that these areas are not scheduled for road construction or timber harvest In those alternatives which have the objective of providing thermal cover on big-game winter ranges, timber harvest is constrained in the FORPLAN model to approximate the reduced rate of harvest necessary to assure that cover is provided For a complete discussion of the individual constraints applied to each alternative, see Appendix B

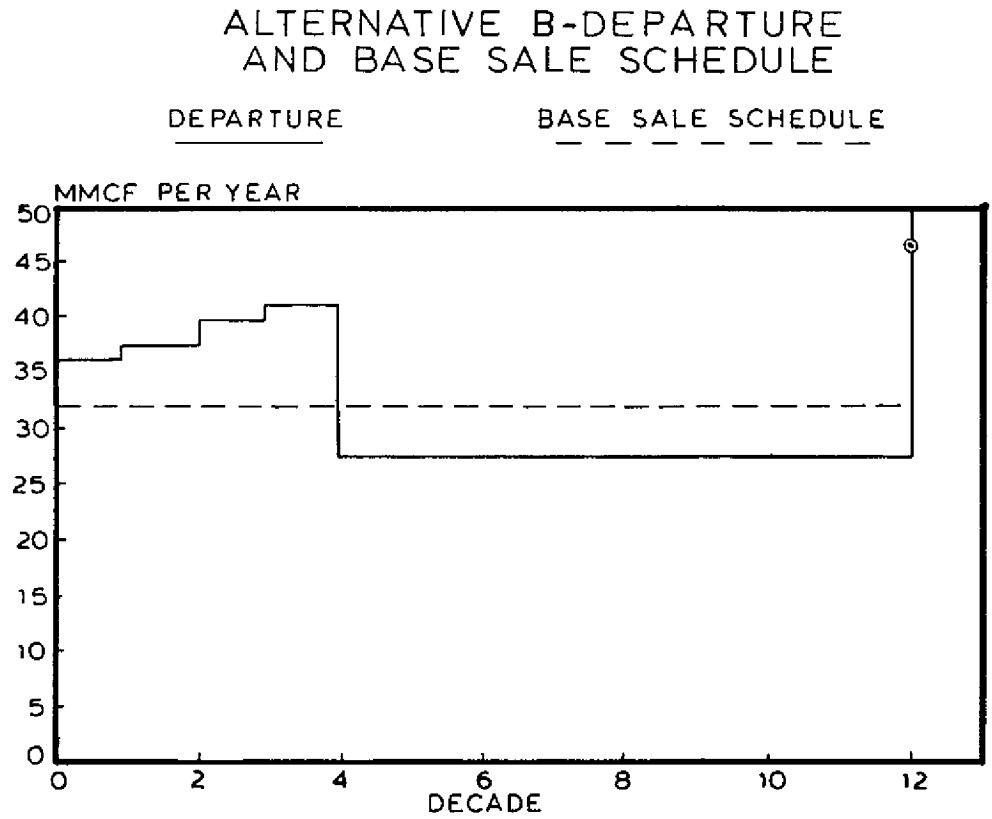
The specific modeling constraints used in this FEIS are not different from those used in the DEIS (although they may be applied to different acres) with two exceptions. First, the timber yield tables for all alternatives have been adjusted to reflect the need to provide small-diameter snags for wildlife species dependent on that type of habitat (also see discussion in Appendix M) Second, the DEIS included a management requirement for thermal cover on big-game winter ranges which is not included in the FEIS. In reviewing this management requirement, it was determined that losing the viability of big-game herds was unlikely in any Forest Plan alternative, and no MR for big game was necessary.

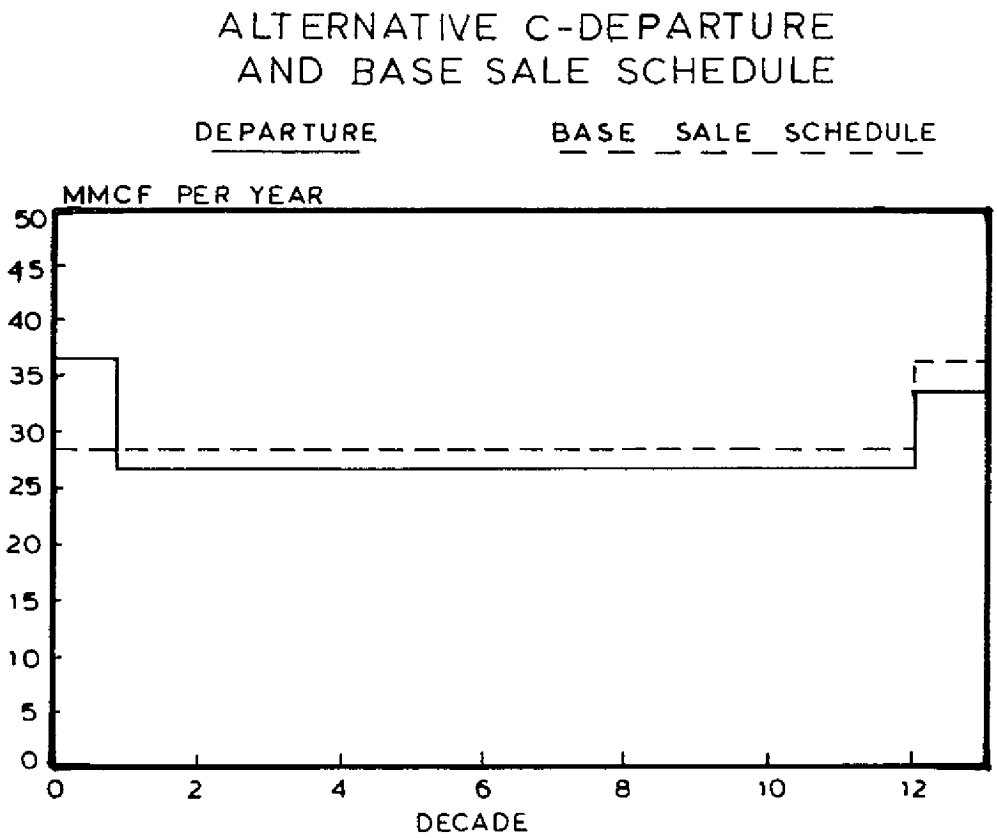
The Preferred Alternative (Alternative C)

Throughout this document Alternative C is identified as the preferred alternative It has been modified somewhat from the alternative identified as Alternative C in the DEIS

The identification of the Preferred Alternative was made only after careful comparison of all the alternatives on the basis of resource outputs, environmental effects, implementation costs, and the "trade-offs" among them The Preferred Alternative is that alternative which was selected from all those formulated as the one which best maximized the net public benefits in an environmentally sound manner. After the Forest Supervisor reviewed the interdisciplinary team's evaluation, and after the Regional Forester and his staff had reviewed the alternatives, this alternative was selected as the Preferred Alternative in this FEIS. The rationale for this selection is discussed in the Record of Decision accompanying this FEIS

FIGURE II-1
BASE SALE SCHEDULES AND DEPARTURE SALE SCHEDULES





ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Several additional alternatives were considered but eliminated from detailed study These are alternatives which were considered for full development but which were not developed in detail, either because they closely resembled other alternatives which were developed in detail or because they were determined not to be implementable

Benchmarks

Benchmarks were developed to estimate resource and economic potentials (see discussion in Appendix B) with little or no consideration given to multiple-use objectives or resolution of Forest management issues While the benchmarks provided much useful information for the development of detailed alternatives, the formulation of the benchmarks themselves often precluded their consideration as alternatives The outputs and activities associated with the benchmarks are portrayed in Appendix B

The Minimum Level of Management benchmark was constructed only as a reference point Its purpose was to identify the minimum cost associated with keeping the Wallowa-Whitman National Forest in Federal ownership. Activities such as timber harvest, livestock grazing, recreation at developed sites, and most road maintenance would cease It would turn the Forest into an area of general nonuse. Because its implementation is inconsistent with NFMA requirements that the Forest be managed for multiple-use, it was not developed into a complete alternative

The Maximize PNV benchmark, valuing market benefits only, is designated in the Pacific Northwest Region as Run 11. It was constructed as a basis for comparison to Run 7 (described below) and thus was not itself developed into an alternative Its purpose is served in providing information to technical reviewers. Because it fails to quantify many Forest benefits (big-game hunting, for instance) it does not portray the Forest situation accurately.

Run 7 is the Maximize PNV benchmark, the benchmark which most closely approximates an alternative. It was not studied in detail as an alternative because it ignores the needs of big game; it gives no consideration to landscape appearance; and because its forcing of all noneconomic considerations to their respective minima is inconsistent with 36 CFR 219.27(b)(3) which states that management prescriptions shall" (3) Not be chosen primarily because they will give the greatest dollar return...." This benchmark provided the basis for Alternative G.

Run 4 shows what happens when Run 7 is formulated without a requirement to harvest timber on a nondeclining flow basis and without complying with NFMA's stipulation that stands shall generally have achieved culmination of mean annual increment (CMAI) prior to harvesting These shortcomings are in addition to those noted for Run 7 above, therefore it was not developed into an alternative.

Run 8, like Run 11, values market benefits only and was constructed to provide a basis for comparison to Run 4. Its purpose is served in providing information for technical reviewers--not in providing an accurate description of the situation (e g it does not recognize the economic value of some major Forest uses such as recreation) Therefore, it was not developed into an alternative

The Maximize Timber benchmark was constructed in two formulations, one with management requirements and one without. Neither exhibited any potential for development into alternatives. With their lack of multiple-use considerations, they are at variance with 36 CFR 219 27(b)(3) which states that management prescriptions shall "(3) Not be chosen primarily because they will give the greatest output of timber...." Also, they are not consistent with the stricture of 36 CFR 219.27(b)(1) that management prescriptions shall "(1) be best suited to the multiple-use goals established for the

area .." As formulated, they regard timber as being homogeneous (a cubic foot of lodgepole being the equivalent of a cubic foot of Douglas-fir, a cubic foot of 50-year old ponderosa pine being the equivalent of 100-year old ponderosa pine) and costs as being irrelevant Developed with and without management requirements, these benchmarks provide some indication of the amount of timber volume lost as a result of applying management requirements They do not give an accurate portrayal of that loss because economic criteria are ignored in both instances Whereas benchmarks run with "maximize present net value" objective functions are designed to maximize efficiency over 150 years, "Maximize Timber" objective function benchmarks were run to maximize timber production over ten years. There is little comparability between Maximize Timber objective function benchmarks and other benchmarks. Economic data from Maximize Timber benchmarks are irrelevant

The Maximize Livestock benchmark was used in the development of Alternative B-departure Its high levels of livestock grazing, while less economically efficient than other levels, were felt to be appropriate to the maximum commodity emphasis of Alternative B-departure The benchmark itself is not portrayed as an alternative because of the problems cited for Run 7, whose FORPLAN run it shares

The Maximize Elk benchmark imposed restrictions on road construction and roads open to vehicular traffic which were believed to be too extreme for implementation. From this benchmark Alternative F was developed which emphasize elk production and was studied in detail

For purposes of clarity it is important to note that the Current Direction benchmark is also presented as an alternative (Alternative A)

Other Alternatives Eliminated from Detailed Study

In order to determine the costs of several constraints, an alternative was formulated without constraints for timber harvest dispersion, old-growth distribution or visual requirements. It also did not retain any nonwilderness lands in a roadless condition. This alternative was not considered further because harvest dispersion and old-growth distribution constraints are necessary to allow for recognizable maximum regeneration harvest units (less than 40 acres, shaped and blended to the extent practicable), and to maintain viable populations of native vertebrate wildlife. Also, it is felt that some minimum acknowledgement of visual resources is necessary to provide a viable alternative. As formulated, this alternative would have provided approximately 7 percent more cubic volume of timber in the first decade than Alternative B.

An alternative similar to Alternative B was formulated which ignored the land allocation of the Hells Canyon NRA Comprehensive Management Plan, but maintained the assumption of selection harvest only (including shelterwood harvest) This alternative would have provided an approximate 5 7 percent increase in volume of timber in the first decade as compared to Alternative B (about 9 MMBF annually). This would have required a reanalysis of all major resources of the area pursuant to guidelines found in Public Law 94-199, the act which created the NRA

Public Law 94-199 required that a separate plan be developed for the Hells Canyon National Recreation Area Such a plan was developed and was approved on April 30, 1982 The regulations guiding the development of Forest Plans state that "(if), in a particular case, special area authorities require the preparation of a separate special area plan, the direction of any such plan may be incorporated without modification in plans prepared under (these regulations)." (36 CFR 219 2(b)) For the following reasons the Hells Canyon Comprehensive Management Plan is being incorporated into all the alternatives for the Forest Plan: (1) the analysis completed during development of the Hells Canyon Comprehensive Management Plan is still valid, i.e , the issues and concerns identified as being important in management of the area along with the preferred alternative for resolving those issues are unchanged, (2) the process for amending or revising the Hells Canyon Comprehensive Management Plan was established by the Assistant Secretary of Agriculture's appeal decision of April 27, 1984 (see further discussion below), and (3) the National Forest Management Act implement-

ing regulations require that "a Forest Plan shall ordinarily be revised on a 10-year cycle or at least every 15 years. It may also be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the plan have changed significantly or when changes in RPA policies, goals, or objectives would have a significant effect on Forest level programs " Revision of the Forest Plan will include new planning for the Hells Canyon NRA If the Forest Plan is amended this may include replanning for the NRA.

In his decision of April 27, 1984, the Assistant Secretary of Agriculture for Natural Resources directed that

> "The plan shall be revised or amended whenever (1) the Forest Supervisor determines that conditions or demands of the public in the area covered by the plan have changed significantly or (2) when any Forest Plan or Forest Plans adopted for the Wallowa-Whitman, Nez Perce or Payette National Forests sets a timber harvest level or any other output level which alone or in combination with the Forest Plan for one or more of those Forests might have a significantly adverse effect on the economy of Wallowa County or Baker County in Oregon or Adams County, Idaho County, or Nez Perce County in Idaho If revision or amendment occurs because of the second of the above-described conditions, every reasonable effort will be made to eliminate or mitigate the significantly adverse effect on the economy of the affected county or counties by revising or amending the Comprehensive Management Plan."

There is no indication that the first condition has occurred. Following implementation of Forest plans for the Nez Perce, Payette, and Wallowa-Whitman National Forests an analysis of the combined economic effects of these Forests on Baker, Wallowa, Adams, and Nez Perce counties will be made. If it is determined that a significantly adverse effect will result, the Hells Canyon Comprehensive Management Plan will be revised or amended

Alternatives Proposed by Other Groups

During development of the Forest Plan alternatives much input was received from interested groups and individuals Prior to publishing the DEIS, two groups, the Powder River Sportsmen's Club and the Oregon Natural Resources Council (ONRC), working with the interdisciplinary team, submitted their own Forest Plan alternatives and suggested numerous improvements for the Forest-wide standards and guidelines and the management area direction. In response to the DEIS and Supplement, three other groups submitted alternatives for consideration These include an alternative submitted by the Committee for a Stable Community (the Timber Industry Alternative), an alternative submitted by the Friends of Lake Fork, and an alternative submitted by the Wallowa Alliance After in-depth consideration by the interdisciplinary team and the Forest Supervisor, and comparison with the other Forest Plan alternatives, none of these were developed into an alternative considered in detail. This does not mean that the information wasn't used or that the substantial effort made by the groups in developing the alternatives was wasted Many of the facets of the submitted alternatives had been considered in the benchmarks or other alternatives and some were integrated with other Forest Plan alternatives considered in detail. Following is a summary of the major facets of the alternatives submitted by these groups and their disposition

In addition to the alternatives described here, a number of responses received included suggested variations to the alternatives presented in the DEIS. If implemented, these variations would have created new alternatives These suggestions were each considered in reviewing and analyzing public and agency comments Some of the suggestions were wholly incorporated into one or more of the alternatives developed in detail or resulted in changes to the standards and guidelines Those which were not incorporated are discussed in Appendix N, including the rationale for not incorporating them

Powder River Sportsmen's Club Alternative

(The starting point for this alternative was Alternative C (DEIS) and many of its features were retained)

Major Facet	Disposition
- Retain 5 percent of nonwilderness forest lands in an old-growth condition.	- Alternatives C, C-departure, D, F, and H provide this level of old-growth, or more
- Limit open road density (on a Forest-wide basis) to 2.5 miles per square mile	- All alternatives include a maximum open road density of 2.5 miles per square mile or less
- Manage big-game winter ranges and selected summer ranges at the highest possible habitat effectiveness for elk (80-100 percent of potential)	- The maximum elk benchmark provides elk habitat effectiveness at more than 80 percent of potential across the Forest
- Limit open road density to 0 75 miles per square mile and total road density to 3 0 miles per square mile on big-game winter ranges and selected summer ranges	- A 0.75 mile per square mile open road density was considered in the maximum elk benchmark Total road density is normally dictated by the specific characteristics of the area being roaded. A 3.0 mile per square mile total road density would require longer log skidding distances and increased fording of streams with logging equipment producing increased soil and water damage. These were considered unacceptable and are not considered in any alternative.

Major Facet	Disposition
- Within Management Area 3, preclude a 100-foot wide strip around wetlands and meadows and along each side of nonfish-producing streams and in a 200-foot wide strip along each side of fish-producing streams.	- While this may provide the maximum streamcourse protection, it would severely complicate transportation and logging system design considering the thousands of miles of streamcourses on the Forest. A reduced rate of timber harvest along many streamcourses, restricted to maintain or enhance water quality, is provided in all alternatives This reduction amounts to approximately 40 percent within the riparian zones. These zones vary from 60 to 120 feet in width depending on the importance of the stream.

Powder River Sportsmen's Club Alternative

- Assume constant real stumpage prices.	- Although no benchmark or alternative is displayed with a constant real stumpage price (a 1 percent real price assumed in all FORPLAN runs) the sensitivity of the FORPLAN model to real price increases was tested during benchmark analysis No change in acreage managed for timber production occurred when varying the projected real stumpage price increase from 0 to 2 percent.
- Exclude the Baker and La Grande domestic supply watersheds from commercial timber harvest.	- The Baker and La Grande watersheds are left undeveloped in Alternative E.
- Lake Fork, Joseph Canyon, Catherine Creek, Monument Rock, and Twin Mountain Roadless Areas and a portion of Squaw roadless area would be retained in a roadless condition.	- These roadless areas remain undeveloped in their entirety in Alternative E and are developed to varying degrees in the other alternatives (see Appendix C).

Major Facet	**Disposition**
- Portions of Bear Creek, North Fork John Day, Catherine Creek and Grande Ronde drainages would be managed emphasizing anadromous fish habitat.	- These drainages, and others, are managed emphasizing fish habitat in Alternative F. The North Fork John Day Drainage is also managed emphasizing anadromous fish in Alternatives C, C-departure and H.
- In big-game winter ranges, selected summer ranges, and in areas where anadromous fish habitat is emphasized, timber harvest would be limited to stands having a positive present net value	- No alternative or benchmark was developed which limited harvest to stands with a positive PNV in only these specific areas. However, Alternative G limits harvest to stands with a positive PNV across the entire Forest

Oregon Natural Resource Council (ONRC) Alternative

- Recommend for addition to the National Wilderness Preservation System the Grande Ronde, Lake Fork, Huckleberry, Catherine Creek, Reservoir, and Joseph Canyon Roadless Areas	- These areas were considered for wilderness designation during the Roadless Area Review and Evaluation Process (RARE, RARE II) and again by Congress prior to the Oregon Wilderness Act of

	1984 (P. L. 98-328). Under P. L 98-328 a review of roadless areas for wilderness consideration is required when the Forest Plans being developed now are revised (within 15 years) but such a review is not required for this plan. Under Alternative E, all roadless areas would be kept undeveloped, thus retaining the option for future designation as wilderness In other alternatives some or parts of these areas are left undeveloped (see Appendix C)
- Manage to retain an undeveloped condition (nonwilderness) in the Twin Mountain, Marble Point, Upper Grande Ronde, and Greenhorn roadless areas and portions of the North Mount Emily Roadless Area.	- All of these areas are retained in an undeveloped condition in Alternative E and to varying degrees in several other alternatives (see Appendix C).
- Exclude Baker and La Grande domestic supply watershed from scheduled timber harvest.	- Both watersheds would remain undeveloped in Alternative E.
- Recommend for addition to the National Rivers System portions of North Fork John Day, North Powder, North Fork Burnt, South Fork Burnt, Imnaha, and Grande Ronde Rivers, and Lake Fork, Eagle, Elk, and Joseph Creeks.	- Segments of the North Fork John Day River, Imnaha River, Grande Ronde River, North Powder River, Eagle Creek, and Joseph Creek were added to the National Wild and Scenic Rivers System by the Omnibus Oregon Wild and Scenic Rivers Act of 1988. The North and South Forks of Burnt River and Lake Fork and Elk Creeks, while being scenic and important for dispersed recreation, were determined to lack any specific "outstandingly remarkable" features as required for eligibility and were not considered in any alternative.
- Manage old-growth timber at the MR level plus 60,000 evenly distributed acres outside wilderness	- Alternative F includes some 43,000 acres of old-growth above the MR level outside wilderness and the HCNRA This represents the highest possible level of old-growth retention, given the amount of old-growth existing and the amount currently under timber sale contracts

Oregon Natural Resource Council Alternative (ONRC)

Major Facet	Disposition
- *Preclude new power transmission corridors.*	- *All alternatives identify areas on the Forest where additional utility corridors are to be avoided or excluded. New utility corridor construction is excluded from wilderness areas while areas to be managed in an undeveloped condition are identified for avoidance In no alternative is the entire Forest excluded from new development*
- *No timber harvest would be permitted* around seeps, bogs, meadows, within 200 feet of fish-producing streams or within 100 feet of other streams (a separate management area would be developed).	- *See discussion on the same subject under the Powder River Sportsmen's Club alternative*
- All potential research natural areas would be recommended.	- This occurs in Alternatives C, C-departure, D, F, and H.
- All existing administrative and recreational *sites would be retained as would the* Starkey Experimental Forest and Range.	- This is true of all Forest Plan alternatives *developed in detail*

Timber Industry Alternative (Committee for a Stable Community)

The starting point for this alternative was Alternative B and many of its features were retained. Facets which were significantly different are described in the following section along with their disposition

Major Facet	Disposition
- Manage big-game winter ranges under Management Area 1, reducing open road density to 1.5 miles per square mile to mitigate effects on elk and deer.	- Given the importance of the elk habitat issue on the Forest, the option of not assuring some measure of big-game cover on winter ranges is not considered reasonable. Consequently, managing big-game winter range under MA 1 was not a part of any alternative considered in detail It was, however, analyzed in several benchmark runs
- Eliminate Management Area 6 (roadless recreation) and do not intentionally provide for semiprimitive recreational opportunities outside of wilderness or the Hells Canyon National Recreation Area	- There is large and growing demand for semiprimitive motorized and semiprimitive nonmotorized recreational opportunities Alternatives B and B-departure access all of the suitable forest land in these high elevation areas, and would manage the remaining lands for semiprimitive recreation

- Provides for no wild, scenic, or recreational rivers except for the Snake River within the HCNRA.	- The timber industry alternative was developed prior to passage of the Oregon Omnibus Wild and Scenic Rivers Act of 1988. To be implemented would require that the alternative be modified or the act be amended.
- Calls for a total allowable sale quantity (ASQ) of 47.1 MMCF/yr (183 MMBF/yr.) of which 48 MMBF* is to be ponderosa pine The proponents recognized that 48 MMBF was not a sustainable level of ponderosa pine, consequently would be reduced in later decades	- Alternative B-departure provides a total ASQ similar to that of the Timber Industry Alternative. Alternative C (the preferred alternative) has been adjusted to increase ponderosa pine offerings to 34 MMBF/yr. in the first decade in response to this industry concern

* This alternative, when run through FORPLAN yielded an ASQ of 35.0 MMCF/yr and 194 MMBF/yr. in the first decade, of which 49 MMBF would be ponderosa pine

Friends of Lake Fork Alternative

This alternative is based on Alternative C with some Forest-wide adjustments proposed and numerous adjustments proposed for the Pine District Major differences between the Friends of Lake Fork Alternative and Alternative C are discussed in the following section.

Major Facet	Disposition
- Maintain all old growth patches over 250 acres in size (Forest-wide)	- This is done in Alternative F, except for stands under timber sale contract
- Eliminate catastrophic salvage within Management Area 6 (Forest-wide).	- Standards and guidelines now limit salvage to catastrophic situations where harvest will maintain or improve recreational or visual values
- Place the following areas in Management Area 6: Lake Fork Roadless Area, Little Eagle Meadows Roadless Area, the portion of the Boulder Park Roadless Area which drains into the East Fork of Eagle Creek, the Panter Creek assessment area, and the North Boulder assessment area.	- Alternative E would maintain all roadless areas in a roadless condition Alternative C has been revised to retain portions of Lake Fork and the East Eagle areas, roadless and undeveloped
- The remaining portion of Pine District having scheduled timber harvest would be managed under a new management area which is similar to Management Area 3 except.	
a Open road density would be limited to 0.75 miles per square mile.	- A 0 75 mile per square mile open road density was considered in maximum elk benchmark It is not considered reasonable for management needs

b Stream shade would be managed at not less than the 80% level (or 85% of potential if potential is 80% or less).	- This standard has been added to the standards and guidelines applicable to all alternatives.
c Snags (all sizes would be maintained at the 60% level except in riparian areas where the 100% level would be maintained	- Alternative F maintains the 40% snag level (all sizes) across the Forest, and the 60% level in riparian areas
d Elk licks, wallows and major elk travel routes would be buffered by uncut strips of timber two sight distances in width	- In all alternatives decisions on these activities are made during project-level analysis. In general, permanent uncut strips will be uncommon, although deferred or adjusted harvest will be used to protect habitat values.
e Periods of timber sale activity would be restricted to assure that big game are not disturbed.	- In all alternatives, decisions on these activities are made during project-level analysis
f Numerous travel routes in the Pine Valley area would be managed with higher visual quality objectives, including "Preservation" on Sensitive Level 1 travel areas.	- Visual quality objectives are based on use levels and the sensitivity of the areas being protected This standardized process is designed so that areas of similar sensitivity across the National Forests in the Pacific Northwest Region receive similar levels of visual protection. Visual quality objectives in the alternatives reflect the use and sensitivity of the viewsheds involved, tempered by the objectives of each individual alternative

Wallowa Alliance Alternative

The starting point for this alternative was Alternative E and many of its features were retained Facets which were significantly different are described in the following section along with their disposition

Major Facet	Disposition
- The total area of soil compaction or displacement within a project area would be limited to 10% rather than the 20% specified in the Forest-wide standards and guidelines	- The 20% level is current R-6 Regional Policy. As new research is completed it is possible that different standards will be set.
- Streamside management units (SMU's) would be 1/2 mile wide on each side of perennial and intermittent streams	- This would place essentially all of the Forest in an SMU and greatly reduce timber harvest. Considering that timber harvest level is a key issue, this was not considered reasonable.
- The domestic-supply watersheds would not contribute to the ASQ Use of pesticides and fertilizers would be prohibited	- Alternative E would remove the Baker and La Grande Domestic supply watersheds from the suited base (i.e., no harvest would be scheduled). Although standards and guidelines do not preclude use of pesticides and fertilizers it is intended that such use will be rare, occurring when protection of water quality can be assured.
- Open road density would be limited to 1.5 miles per square mile.	- This open road density was considered in Alternative F and would be applied to more than 400,000 acres in the Alternative C.
- Area providing semiprimitive motorized and non motorized recreational opportunities would be closed to timber harvest.	- The standards and guidelines for Management Area 6 have been changed to state that timber harvest will occur only when recreational or visual values will be maintained or improved, or when not harvesting would result in significant damage to adjacent timber stands in other management areas. Total exclusion of harvest was only considered in the "Minimum Level" benchmark
- Areas providing semiprimitive motorized and nonmotorized recreational opportunities would be closed to mineral entry.	- Because these areas are generally unroaded, access for mineral exploration and development is more difficult thanin other parts of the Forest. Complete closure of these areas to mineral-related activity would be contrary to existing mining laws and the Forest Service policy of multiple use It was not considered in any benchmark or alternative

- The volume remaining following a shelterwood or seed tree harvest would not be removed until the next commercial entry	- This decision is normally made at the project level. Meeting snag levels may in some instances make leaving shelter or seed trees a desirable option, but an across-the-Forest rule was not considered reasonable
- Timber would be managed on a long rotation basis Uneven-aged management techniques would be emphasized.	- Long rotations and uneven-aged management will normally be used in the Hells Canyon NRA, in visual foreground retention and partial retention areas and in riparian areas. Long rotations were generally not selected for other areas of the Forest because they result in substantially reduced harvest levels. Uneven-aged management may be used anywhere on the Forest where doing so will better meet management area objectives
- Old growth areas 300 acres and larger would be designated as old growth natural areas and would be withdrawn from mineral entry.	- All major old growth areas would be maintained in Alternative F Although standards and guidelines do not specify withdrawal from mineral entry, they do call for replacement of any designated old growth stands lost due to mining activities. We do not believe the risk of losing old growth to mining is significant
- Herbicides would not be used	- This alternative was considered in the *Region 6 programmatic EIS regarding* Managing Competing and Unwanted Vegetation (December 1988) It was not the selected alternative.
- Management Area 18 would not contribute to the ASQ.	- Removing Management Area 18 from the suited base was considered in development of the management area, but was not carried into any alternative It is felt that timber harvest at a reduced rate is compatible with the primary objective for the area -- quality fish habitat
- Pine District would be established as an experimental forest	- The Starkey Experimental Forest and Range (near La Grande) is intended to partially meet research needs of the Wallowa-Whitman National Forest, including Pine District

THE STATE OF OREGON ALTERNATIVE

On January 11, 1988, Governor Goldschmidt released, for public comment, a draft alternative for management of the Wallowa-Whitman National Forest This alternative was based on Alternative C from the DEIS and incorporated many of its features Many of the changes suggested by the Governor have been adopted in the modified Alternative C. A final State of Oregon Alternative has not been released Following are those major facets of the State's Alternative which differed from the Alternative C as displayed in the DEIS, and their disposition in this FEIS.

Major Facet	Disposition
- The riparian management requirements for Management Area 18 would be extended to all anadromous streams on the Forest	- Standards similar to those for Management Area 18 have been added as Forest-wide standards and guidelines
- The area of elk/timber allocation would be condensed by about 20-25%.	- 62,000 acres proposed for management emphasizing big-game habitat in Alternative C are now proposed for management emphasizing timber production This amounts to 17% of the identified winter ranges.
- Expand the Elkhorn Management 6 area to include Downie Lake.	- This change has been made to Alternative C in the FEIS
- Four roadless areas; Grande Ronde, Hurricane Creek, Mt. Howard, and Little Sheep would be managed emphasizing scenic quality, watershed, and wildlife habitat There would be no scheduled timber harvest.	- In Alternative C, these areas would all be a part of Management Area 6. The standards and guidelines for Management Area 6 have been changed to state that timber harvest will occur only when recreational or visual values will be maintained or improved, or when not harvesting would result in significant damage to adjacent timber stands in other management areas.
- Reservoir and part of Lake Fork Roadless Areas would be managed emphasizing scenic quality, wildlife habitat, and wildlife migration routes. There would be no scheduled timber harvest	- The portion of the Lake Fork Roadless Area recommended for nondevelopment has been added to Management Area 6 In Alternative C, 86% of the Reservoir Roadless Area would be undeveloped
- Joseph Canyon Roadless Area would have any additional timber harvest delayed for several decades	- Under the preferred alternative, and all other alternatives, no significant harvest will occur in Joseph Canyon roadless area.

- All other roadless areas outside the HCNRA would be available for timber harvest and road construction	- Alternatives B, B-departure, and G would include road building and timber harvest in all of these areas In Alternative C, portions of Boulder Park, Castle Ridge, Dunns Bluff, Huckleberry, Monument Rock, Little Eagle Meadows, Little Sheep, and Upper Catherine Creek would be retained in an undeveloped condition.
- Designated old-growth forest would be reduced by 7,000 acres from the 38,000 shown in the DEIS.	- Alternative B, B-departure, E, and G have fewer than 38,000 acres of designated old growth Alternative C retains approximately 38,000 acres in the FEIS
- Fewer roads and trails would be managed emphasizing visual quality. Roads and trails of less visual sensitivity would be more heavily impacted (from a visual standpoint) by management activities.	- This change has been made in Alternative C in the FEIS
- Total volume of sawtimber offered for sale would be 160 to 162 MMBF/year of which 40 MMBF would be ponderosa pine This would be accomplished through the previously discussed land allocations, increasing first-decade ponderosa pine levels and harvesting more from "economically marginal" lands	- Alternative C provides for total sawtimber offerings of 144 MMBF per year in the first decade. Alternative C has been adjusted to increase ponderosa pine offerings to 34 MMBF/year in the first decade.

Following publication of the DEIS and Supplement, meetings were held with the Oregon Natural Resource Council, the Comittee for a Stable Community, Powder River Sportsmen, Friends of Lake Fork, and the State of Oregon to further clarify their proposed alternatives and to discuss differences between their alternatives and the alternative proposed by the Forest Service

ALTERNATIVES CONSIDERED IN DETAIL

The alternatives considered in detail demonstrate different ways of managing the land and resources of the Wallowa-Whitman National Forest Each is an implementable combination of land uses, management practices, and activity schedules which results in a unique combination of resource outputs, land uses, and environmental conditions. Alternative B-departure cannot be implemented without change to Federal legislation It conflicts with NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting

Many considerations went into the development and formulation of alternatives considered in detail The issues and concerns (described in Chapter I and Appendix A) were the major factors driving the alternative formulation process, but the interrelationships among resources (Chapter III) and the information gained during benchmark analysis also played important roles.

Alternative A was developed with a budget constraint equaling the average actual budget during the period 1980 to 1983. In running the FORPLAN model, this budget level did not prove constraining

A detailed description of how FORPLAN computer runs were formulated and their constraints is found in Appendix B. All alternatives considered in detail (except Alternative NC) were modeled in FORPLAN All alternatives (except Alternative NC) were developed within the decision space identified through benchmark analysis

Each alternative was then reviewed by the interdisciplinary team and the Forest management team to assure that it was a reasonable and implementable alternative Maps of the alternatives accompany this FEIS

Range of Alternatives

The alternatives together represent a broad range of reasonable management alternatives. This is displayed in Figure II-2 which compares, by several major resources, the range of alternatives with the potential range determined during benchmark analysis.

Mitigation Measures

An important part of each alternative is its associated mitigation measures. Mitigation measures serve to reduce the potentially adverse effects of the alternatives by avoiding, minimizing, rectifying, or reducing them (or in some cases compensating for them) Most of the mitigation measures for any alternative can be found in the form of management standards and guidelines. Standards and guidelines for the preferred alternative are found in Chapter 4 of the Forest Plan accompanying this FEIS In some instances, standards and guidelines for other alternatives differ from those for the preferred alternative. These differences are described in Appendix D to this FEIS Mitigation measures are an integral part of each alternative and may be included in the alternative descriptions found elsewhere in Chapter II. Some mitigation measures are also described in Chapter IV of this FEIS to give the reader a better understanding of the environmental consequences of the alternatives.

Mitigation measures directed by the No Change Alternative are limited to those discussed or referenced in the Timber Management Plan The standards and guidelines from the Forest Plan and Appendix D to the Forest Plan EIS would only apply to the degree that they can be implemented while still meeting the timber outputs from the timber management plan

Although not specifically addressed in the 1962 Timber Management Plan, such things as protection of cultural resources, soils, air quality, and sensitive species would be expected to occur during implementation of the alternative. Likewise, laws such as NEPA, mining laws, and Indian rights which are not in conflict with the alternative would continue to be followed.

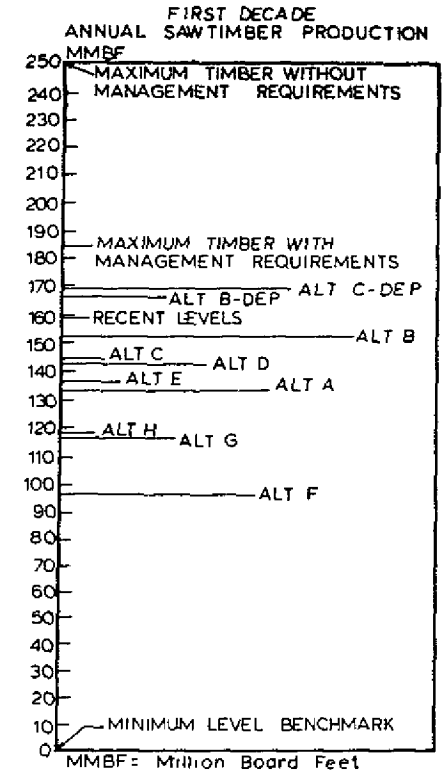
Elements Common to All Alternatives

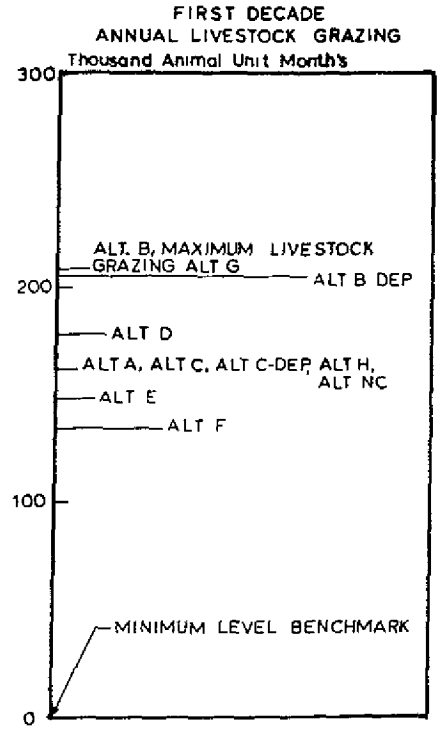
A number of factors are common to all alternatives considered in detail. They are described below:

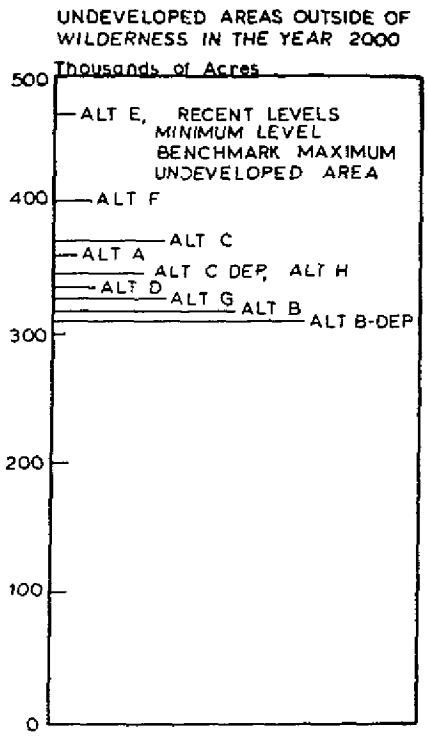
Management activities in all alternatives would be governed by Standards and Guidelines, including Best Management Practices (Also see EIS, Appendix O and Plan, Chapter 4) Best Management Practices are specifically designed to protect water quality, as required by Section 208 of the Clean Water Act General BMP's will be selected and tailored for site-specific conditions to arrive at project-level BMP's for the protection of water quality

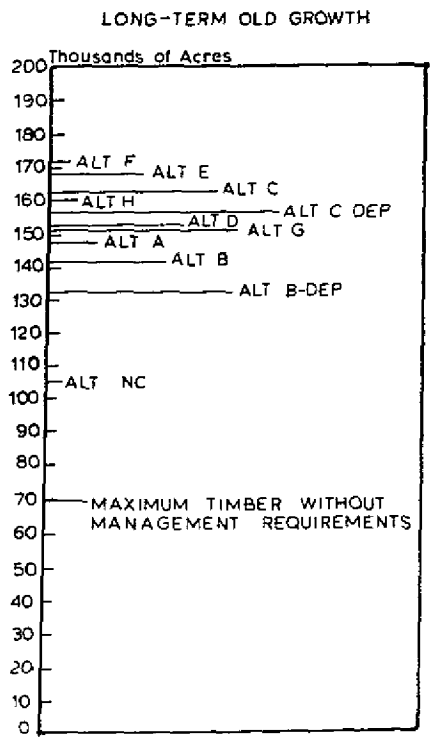
The livestock grazing numbers shown for each alternative are estimates for the Forest as a whole, based on available forage and reasonable investments by livestock permittees and the Forest Service. The levels for individual allotments will depend on allotment-specific analysis.

FIGURE II-2
RANGE OF ALTERNATIVES









The land allocations and direction for the Hells Canyon National Recreation Area, including the Hells Canyon Wilderness, are as identified in the HCNRA Final Environmental Impact Statement, Comprehensive Management Plan, the Record of Decision of April 30, 1982, and the Secretary's (of Agriculture) decisions of April 21 and June 27, 1983 and April 27, 1984.

All existing wilderness is retained and managed within the framework of the Wilderness Act of 1964.

Direction for management of the North Fork John Day and Monument Rock Wildernesses will be described in the Umatilla and the Malheur National Forest Land and Resource Management Plans, respectively In each instance the Wallowa-Whitman portion of the wilderness is small and the primary responsibility for the analysis rests with the Forest having the larger portion.

The Eagle Cap Wilderness is retained The environmental analysis described in "An Environmental Assessment for Interim Management of the Eagle Cap Wilderness" (approved March 31, 1982) is incorporated, by reference, into this analysis. Each Forest Plan alternative incorporates one alternative discussed in the 1982 assessment (Copies of this environmental assessment are available from the Wallowa-Whitman National Forest Headquarters in Baker City, Oregon)

The 269 miles of wild, scenic and recreational river, as established on the Forest by Congress, are retained Management plans for each river segment and final river corridor boundaries will be determined in separate NEPA analyses tiered to the Forest Plan No additional rivers are recommended for wild and scenic designation in any alternative

The Homestead Further Planning Area is retained in an undeveloped condition in all alternatives, pending completion of a study by the USDI Bureau of Land Management (BLM) The BLM, which manages the bulk of the further planning area, is studying its wilderness potential and will make a recommendation either for or against wilderness designation The BLM recommendation will become a part of any Forest Plan alternative selected. In the event that wilderness designation is not recommended, land use will be as shown on the map for the preferred Forest Plan alternative accompanying this FEIS.

In December 1988 the Pacific Northwest Region of the Forest Service issued a final programmatic environmental impact statement titled "Managing Competing and Unwanted Vegetation" Major issues in the Regional EIS were human health, public participation in project-level planning, social and economic effects' costs and benefits; effectiveness of techniques, environmental effects, and interagency coordination The EIS considered a number of alternatives ranging from no use of herbicides or fire to permitting herbicide and fire use under most situations where resource production increases could be achieved In the selected alternative all methods of managing unwanted vegetation are available, but the theme of the alternative is to reduce reliance on herbicides, reduce the use of fire for treating slash, and protect rural communities from the effects of smoke It also calls for early involvement of the public to help set project goals, assist in environmental analysis, observe project implementation and to monitor the results of projects All Forest Plan alternatives assume implementation of the selected alternative from the Regional EIS.

If use of herbicides is not allowed or if use is further restricted from what is permitted in the EIS, it is likely that a reduction in ASQ would be necessary and that management costs will rise In the regional EIS, it was estimated that prohibition of herbicide use on the Wallowa-Whitman would result in an ASQ reduction of three million board feet per year in the first decade

The Indian Creek Research Natural Area is retained.

All existing developed recreation sites are retained This includes existing developments at Anthony Lakes, Phillips Lake, Mt Howard, and numerous other sites across the Forest. The Reservoir Area

Management Plan of March 1971 (the plan for managing the Phillips Lake area) is incorporated, by reference, into all alternatives

The Baker and La Grande domestic supply watersheds are managed in accord with existing Secretary of Agriculture agreements.

Items specific to the La Grande domestic supply watershed which are the same in all alternatives include:

- Grazing of domestic livestock is limited to pack stock associated with recreation
- The watershed is closed to off-road vehicle use except for over-snow vehicles operating on four or more inches of snow.
- An area adjacent to the Beaver Creek Reservoir and the domestic supply intakes, sufficient in size to protect water quality, is closed to camping.
- *The entire watershed is open to nonmotorized types of dispersed recreation including hunting,* hiking and backpacking
- The Beaver Creek Reservoir and intakes are closed to fishing, swimming, wading, or other activities which require substantial contact with the water.
- Roads constructed within the watershed will normally remain closed although some may be left open for fuelwood cutters or other purposes if their use would not create soil or water damage.

Items specific to the Baker domestic supply watershed which are the same in all alternatives include:

- Grazing of domestic livestock is limited to pack stock associated with recreation. Use of recreational livestock will be limited to National Forest System Trails.
- Marble Creek Road (Road 6510) will normally remain open to public use Signs may be installed by the city instructing users that they are on a domestic supply watershed and specifying any special restrictions
- Public hunting and fishing within the watershed and use of the pipeline road are permitted with approval from Baker City
- All roads constructed for timber harvest will be stabilized at completion of timber sale contracts, unless otherwise agreed to with Baker City. Selected roads may be gated to provide access for wildfire control and other administrative purposes

Within the Sumpter domestic supply watershed, Road 7300900 (McCully Fork Road) will be closed to public motorized vehicle use within the watershed but will remain open to administrative use by the Forest Service and the city officials

Within the Wallowa domestic supply watershed, increased grazing of domestic livestock will occur only if a site-specific environmental analysis demonstrates that adverse impacts on the domestic water supply will not result

The following allotments are closed to livestock grazing in order to allocate the land areas involved to higher value uses. All of these allotments are currently vacant and are difficult or impossible to manage under either legal or proper resource constraints. The allotments to be closed are. Jordan-Mellon, Fly Ridge, Aurelia, Mt. Emily, Wild Sheep, and Phillips Lake.

The rights retained on ceded lands by the Walla Walla, Cayuse, Umatilla and Nez Perce Indians, as specified in existing treaties, will be recognized and provided for in Forest activities

All alternatives utilize a variety of silvicultural practices and harvest methods. Although evenaged management will be the most common approach to timber management regardless of the alternative, unevenaged management will normally be practiced within the Hells Canyon NRA, will be common in visual foreground areas and riparian areas, and is a suitable technique wherever site-specific analysis indicated that this approach will meet management area objectives as well as, or better than, evenaged techniques. See Appendix B for additional discussion and rationale

Several alternatives include recommendations for addition to the network of research natural areas. Although the number of areas to be recommended varies among the alternatives, the fact that they are only recommendations applies regardless of alternative The decision to actually create a research natural area will be based on the site-specific establishment report and will be made by the Chief of the Forest Service

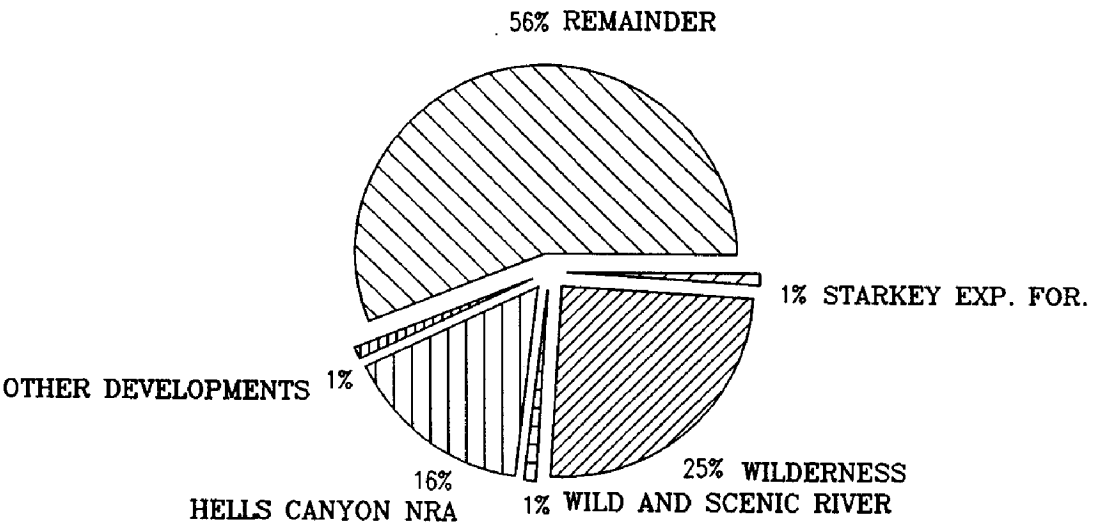
A consequence of some of these common elements is that 44 percent of the Forest is currently allocated to some use or uses and the opportunity for analyzing alternate uses within this FEIS is foregone The range of all outputs and effects, summarized on a Forest-wide basis, is also narrowed This is particularly true of roadless areas. Although the Forest includes some 484,443 acres of roadless area in total, 232,463 of these (48 percent) are previously allocated within the Hells Canyon Comprehensive Management Plan, leaving 251,980 acres available to consider in the analysis of Forest Plan alternatives.

Following is a summary of these allocations, totalling 1,028,866 acres or 44 percent of the Forest This is further displayed in Figure II-3

Descriptor	Acres
Wilderness	582,700
Phillips Lake Area	4,967
Wild and Scenic Rivers	26,909
Snake River Corridor (HCNRA)	14,355
Disp. Recreation/Native Vegetation (HCNRA)	161,078
Forage (HCNRA)	123,029
Disp. Recreation/Timber Management (HCNRA)	70,706
Homestead Further Planning Area	*5,733
Starkey Experimental Forest and Range	27,051
Administrative and Recreation Sites	5,744
Utility Corridors	6,594

* This area is currently being analyzed for wilderness potential by the USDI Bureau of Land Management. If the Homestead Further Planning Area does not become wilderness 3,708 acres would become part of Management Area 10 with the remaining acres being within Management Areas 1, 2, or 3, depending on the alternative selected through this Forest planning effort

FIGURE II-3
LAND ALLOCATIONS COMMON TO ALL ALTERNATIVES



Items discussed above which are different for the No Change Alternative follow:

- The NC Alternative recognizes areas within the Hells Canyon National Recreation Area which are not subject to regulated timber harvest, but does not recognize areas where management constraints reduce harvest to less than full yield Management direction for resources other than timber is not included.

- Existence of the four wilderness areas on the Forest is recognized, but direction for their management is not included.

- Wild and scenic rivers established in 1988 are not recognized

- No tie is made to the programmatic Regional Final Environmental Impact Statement for Methods of Managing Competing and Unwanted Vegetation (December 1988)

- The Indian Creek Research Natural Area is not recognized

- The Secretary of Agriculture agreements for managing the La Grande and Baker domestic supply watershed are not recognized.

- Special management direction for the Sumpter and Wallowa domestic supply watersheds is not included.

Alternative NC (No Change)

The "No Change" alternative was formulated to maximize timber production It has been developed in response to decisions made regarding Appeal Number 1588, brought by the Northwest Forest Resource Council on May 19, 1986 The appeal centered on a decision by Regional Forester James F Torrence to require inclusion of management requirements (MR's) in the Current Direction Alternative for each Forest Plan The substance of the appeal was that a true no-action alternative representing current management plans was not included in Forest Plan EIS's. Although the appeal was dismissed, the points raised were important In response to this, we have developed a "No Change" alternative that represents the existing timber management plan, and consequently does not incorporate all provisions of the National Forest Management Act (NFMA) and regulations promulgated by the Secretary of Agriculture to implement NFMA

Many of these regulations are procedural in nature. That is, they set forth a process for developing, adopting, and revising land and resource management plans for National Forests However, other regulations (such as 36 CFR 219.19 which requires management of habitat to maintain viable populations of fish and wildlife species), if implemented, could have an effect on the environment and resource outputs and opportunities

Pertinent regulations with which the NC Alternative would not comply, and which are significant in terms of outputs or effects on other resources, are described in Chapter IV

The No Change Alternative could not be implemented or used in future management of the Forest without changes in the law and to its implementing regulations.

Roadless Areas Of the 251,980 acres of inventoried roadless areas outside the Hells Canyon National Recreation Area, none are recommended for wilderness, 111,469 acres are retained in a roadless condition (dispersed recreation emphasis), and 140,511 acres are available to development

Soil and Water. Although not specifically addressed, it is likely that watershed restoration work would occur at historical levels

Timber. Timber harvest is scheduled from 1,238,000 forested acres. Timberlands not available for scheduled timber harvest include Congressionally designated areas such as wilderness, and alpine and subalpine areas around the perimeter of the Eagle Cap Wilderness and in the Elkhorn Mountains.

Timber harvest in the Timber Management Plan was intended to result in an average annual harvest of 155 million board feet (MMBF) from standard and special components and up to an additional 28 MMBF from the marginal component In combination, these make up the potential yield under the timber management plan

Range Not addressed, but likely to occur at historical levels (186,000 animal unit months).

Recreation. Primitive and semiprimitive recreation opportunities are provided within wilderness, portions of the Hells Canyon National Recreation Area, and within alpine and subalpine areas in the Elkhorn and Wallowa Mountains Dispersed recreation in a managed setting is provided elsewhere

Developed Recreation This is not specifically addressed in the timber management plan, but the level of site development is likely to remain approximately unchanged

Wilderness. Existing wilderness is recognized, but management direction is not provided. Implementation of existing wilderness legislation and regulations would continue

Landscapes. Visual quality is retained in foreground areas

Transportation. A relatively high level of road construction would be required to provide projected timber harvest levels

Research. Not addressed, although Research Natural Areas could be established in wilderness or other areas where timber harvest is not scheduled

Fish and Wildlife. Not addressed, although habitat for some species would decrease significantly in quality.

Municipal Watersheds. Full timber yield would occur in municipal watersheds.

Minerals Minerals management would continue unchanged

Alternative A
(No Action)

Description

This alternative represents continued implementation of the management direction provided by the six existing land management (unit) plans including the management plan for the Hells Canyon NRA The intent of this alternative is to provide an estimate of the activities and outputs likely to occur if management were to continue under the direction found in these plans It also serves as a standard of comparison for evaluating the other alternatives. To make this alternative consistent and comparable with the other alternatives, resource yield tables are based on the most recent inventory information This includes current timber inventory information and improved data on the suitability of land for timber production. National Forest Management Act requirements are incorporated into this alternative.

The total Forest budget is constrained to the average budget during the period 1980-1983, updated to 1982 dollars and adjusted for inflation in future years The proportion of the Forest budget expended for various purposes (such as timber, range, or recreation) varies depending upon the level of outputs being provided. Within this budget, output and activity levels projected by the unit plans and resource management plans are met as closely as possible A description of this alternative by resource follows.

Roadless Areas. Of the 251,780 acres of inventoried roadless area outside the Hells Canyon National Recreation Area, none are recommended for wilderness, 111,469 acres are retained in a roadless condition (dispersed recreation emphasis) and 140,511 acres are available for development

Soil and Water Soil and watershed restoration occur at historical levels.

Timber Timber harvest is scheduled from 866,000 acres Available timberlands not scheduled for timber harvest include alpine and subalpine areas around the perimeter of the Eagle Cap Wilderness and in the Elkhorn Mountains. Timber management emphasizes big-game habitat on winter ranges and on many summer ranges. Some less productive forest areas are managed under a low investment timber management strategy. Timber harvest is scheduled on a nondeclining flow basis The sawtimber volume to be sold in the first decade is 27.1 MMCF annually.

Range Range management emphasizes implementation of Forest Plan standards and guidelines, including more stringent utilization standards, through development and implementation of allotment management plans (AMP's). Permitted annual domestic livestock use is a 186,000 AUM's, the recent historical level. As AMP's are implemented, AUM's are adjusted on an allotment specific basis to comply with utilization standards and to resolve resource conflicts This alternative includes an increased level of range investment to correct existing resource problems.

Recreation. Primitive and semiprimitive recreation opportunities are provided within wilderness, portions of the Hells Canyon National Recreation Area, and within alpine and subalpine areas in the Elkhorn and Wallowa Mountains. Dispersed recreation in a managed setting is provided on the remainder of the Forest. Recreation site construction and reconstruction are at the rate of 100 PAOT* capacity per year throughout the planning period. The recreation site development directed in the Hells Canyon Comprehensive Management Plan will not be completed during the life of the Forest Plan.

Wilderness. The Eagle Cap Wilderness continues to be managed under the current interim direction (Alternative C of the Eagle Cap Environmental Assessment)

Landscapes. This alternative retains a high level of visual quality within visually sensitive travel routes

Transportation Twenty-nine percent of the total existing roadless area of the Forest is accessed for timber harvest under this alternative. Other portions of the Forest are currently roaded but do not provide access to some areas. Entering these areas will require 1,970 miles of new road to complete the Forest road system. Under current management direction the objective for road management is to limit miles of open road (open on a year-round basis) to 2.5 miles per square mile. To achieve these open road densities, approximately 1,730 miles of existing roads need to be closed.

It is estimated that road construction in areas which are currently roadless will total 279 miles in the first decade, 186 miles in the second decade, and 38 miles in the third decade An additional 139 miles of temporary road will be built during the same time period No significant additions to the road system are anticipated after the third decade.

*Persons at one time

Research. The Indian Creek Research Natural Area is retained No additional Research Natural Areas are recommended although areas could be added following separate environmental analyses.

Fish and Wildlife. The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon. These are the recovery objective levels described in Chapter III.

Current old-growth allocations total 76,919 acres This allocation is a managed old-growth allocation of which only 27,260 acres are currently in an old-growth condition. The remaining acres are in earlier successional stages being managed with the objective of attaining old-growth sometime in the future (with existing stands to be cut as replacement stands achieve old-growth characteristics) The total acreage of old-growth forest provided by this alternative is similar to other alternatives, but its distribution does not satisfy management requirements for pileated woodpecker, pine marten, and three-toed woodpecker (see Appendix G). This distribution of old-growth is expected to marginally satisfy needs of goshawk and Townsend's warbler. Fourteen thousand acres of unsuited subalpine forest and 41,000 acres of uneconomic lodgepole pine augment this old-growth habitat for pine marten and three-toed woodpeckers. This alternative will provide over the long term approximately 147,000 acres of old-growth habitat, including large reserves of old-growth in wilderness, the HCNRA, and unsuited lands.

Timber managed without thinnings (356,000 acres) ensures the future development of pole thickets, and dense young-to-mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands Habitat effectiveness for all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout the Hells Canyon National Recreation Area High snag levels on 537,000 acres of unsuitable lands (including wilderness and old-growth) will occur to the benefit of all primary cavity excavators

Elk (big-game) winter ranges were mapped differently during development of the unit plans than during the most recent inventory As a consequence, some boundary differences are found The unit plans, in general, provide a high level of habitat protection on elk (big-game) winter ranges Unit plan direction provides for a variety of management intensities on summer ranges, from a high level of habitat protection to a minimum level.

Management of fish habitat continues under current direction which calls for meeting State water quality standards and improving deteriorated riparian conditions. Riparian habitat will be maintained or enhanced through improved range management techniques to the benefit of the yellow warbler and salmonid fishes. This alternative provides approximately 19 acres per year in anadromous fish habitat improvement.

Municipal Watersheds. The La Grande domestic supply watershed is managed under the low investment timber management strategy (14,045 acres) and old-growth management (1,586 acres) as described in the Grande Ronde Unit Plan The low investment timber management strategy permits scheduled timber harvest, with timber management at a low intensity level Harvest is infrequent and intensive timber management practices such as precommercial thinning do not occur

The Baker domestic supply watershed (8,740 acres) is managed under the Baker Watershed Management Strategy from the Burnt Powder Land Management Plan. This strategy emphasizes maintenance and improvement of water quality and streamflow timing.

The Sumpter domestic supply watershed (6,687 acres) is managed under the following management strategies from the Burnt Powder Land Management Plan:

Management Strategy	Acres
Dispersed recreation emphasis	975
Intensive wood forage management	3,056
Low investment timber management	2,388
Old-growth	32
Optimum wood/big-game	236
Total acres	6,687

Minerals. Of the areas of known mineral potential, 189,400 acres are open to mineral entry with normal coordination requirements, 40,000 acres have restricted entry, and 193,600 acres are closed to new mineral entry.

Following are the land allocations summarized from the unit plans.

Management Strategy	Acres	Percent
Intensive Wood/Forage*	399,660	17 0
Optimum Wood/Big-game*	419,511	17.9
Low Investment Timber Management*	286,613	12 2
Dispersed Recreation Emphasis*	134,790	5.7
Wild and Scenic Rivers*	26,909	1.2
Old-growth	76,919	3 3
Baker Watershed	8,740	0 4
Starkey Experimental Forest and Range	27,051	1 2
Research Natural Area	974	0
NRA Dispersed Recreation/Timber Management*	71,206	3 0
NRA Forage Production	128,009	5 4
NRA Dispersed Recreation/Native Vegetation	161,078	6 9
NRA Snake River Corridor	14,355	0.6
Further Planning	5,733	0.2
Wilderness	582,700	24.8
Phillips Lake Area	4,967	0 2
	2,349,215	100%

Alternative B (RPA)

Description

This alternative was formulated with primary emphasis on the timber, livestock forage, and local economy issues This alternative is the RPA alternative and attempts to provide outputs and activities as assigned to the Forest through National and Regional planning RPA targets for recreation, timber, livestock, anadromous fisheries, and forage are met. This is also the alternative which emphasizes market opportunities

* Acres revised to reflect passage of Omnibus Wild and Scenic Rivers Act 1988.

Roadless Areas Of the 251,980 acres of inventoried roadless areas outside the Hells Canyon National Recreation Area, none are recommended for wilderness, 65,746 acres are retained in a roadless condition and 186,234 acres are available for development.

Soil and Water. Soil and water improvement is at a level substantially higher (1,000 acres/year) than recent historical levels.

Timber. Timber harvest is scheduled from 880,000 acres. All tentatively suitable forest lands are available for timber harvest except for those lands needed to meet the old-growth objectives of this alternative and lands allocated to other uses in the Hells Canyon Comprehensive Management Plan. Areas not scheduled for timber harvest include alpine areas near the Eagle Cap Wilderness and in the Elkhorn Mountains These are limited to nonforest lands or lands which are otherwise unsuited for timber management Timber harvest is scheduled on a nondeclining flow basis. The sawtimber volume to be sold in the first decade is 30.1 MMCF annually.

Range Range Management emphasizes implementation of Forest Plan standards and guidelines, including more stringent utilization standards, through development and implementation of allotment management plans. Permitted annual domestic livestock use is at 207,000 AUM's which approximates the RPA target level. However, with implementation of the utilization standards, it is likely that the RPA outputs cannot be met. It is more likely that outputs will be approximately 186,000 AUM's As AMP's are implemented, AUM's are adjusted on an allotment specific basis to comply with utilization standards and to resolve resource conflicts. This alternative includes an increased level of range investment to correct existing resource problems

Recreation Wilderness portions of the Hells Canyon National Recreation Area and alpine areas in the Elkhorn and Wallowa Mountains are managed to provide primitive and semiprimitive recreation opportunities. Dispersed recreation in a managed forest setting is emphasized elsewhere. Recreation site construction and reconstruction are at a rate of 550 PAOT capacity per year for the first decade, completing the development directed in the Hells Canyon National Recreation Area Comprehensive Management Plan. Reconstruction continues at a rate of 50 PAOT per year for the remainder of the plan period.

Wilderness. The Eagle Cap Wilderness is managed under Alternative B of the Eagle Cap Wilderness Environmental Assessment which emphasizes prevention of future resource damage

Landscapes. This alternative substantially reduces visual quality along visually sensitive travel routes.

Transportation Thirty-eight percent of the total existing roadless area of the Forest is accessed for timber harvest under this alternative The remaining 62 percent is nonforested or allocated to other uses in the Hells Canyon NRA and not available for entry The high level of development required in this alternative requires a high level of new road construction. Other portions of the Forest are currently roaded but do not provide access to some timbered stands Entering these areas will require additions to the Forest road system totalling some 2,320 miles Under this alternative, the Forest-wide objective for road management is to limit miles of open road (open on a year-round basis) to 2.5 miles per square mile. In addition, motorized use on winter ranges is restricted to 1.5 miles of open travelway per square mile during the period of time when the big-game animals are using the winter range. Achieving these open road densities will require closing 1,730 miles of existing roads

It is estimated that road construction in areas which are currently roadless will total 341 miles in the first decade, 251 miles in the second decade, and 49 miles in the third decade. An additional 178 miles of temporary roads will be constructed during the same time period. No significant additions to the road system are anticipated after the third decade

Research *Eleven research natural areas are proposed in addition to the one existing RNA*

Lightning Creek
Bills Creek
Alum Beds
Little Granite
Boner Flat
Craig Mountain Lake
Indian Creek (existing RNA)
West Razz Pond and Razz Lake
Mt Joseph
Duck Lake
Vance Knoll
Glacier Lake

(See Appendix H for detailed descriptions of proposed research natural areas, including approximate acreages and vegetation characteristics.)

Fish and Wildlife. The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon. These are the recovery objective levels described in Chapter III.

Old-growth forest is provided at a level slightly higher than necessary to satisfy the management requirements (MR's) for pileated woodpecker, pine marten and three-toed woodpecker on available, capable forest lands (see Appendix G). This represents a level slightly above the minimum area and distribution of mature and old-growth forest required to provide viable populations of dependent wildlife species "well distributed in the planning area" (36 CFR 219 19) This distribution of old-growth is expected to minimally satisfy needs of goshawk and Townsend's warbler. Fourteen thousand acres of unsuited subalpine forest and 44,000 acres of uneconomic lodgepole pine augment this old-growth habitat for pine marten and three-toed woodpeckers This alternative will provide, over the long term, approximately 142,000 acres of old-growth habitat, including large reserves of old-growth in wilderness, the HCNRA, and unsuited lands.

Timber managed without thinnings (327,000 acres) ensure the future development of pole thickets and dense young-to-mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks.

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands. Habitat effectiveness for all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout the Hells Canyon National Recreation Area. High snag levels on 524,000 acres of unsuitable lands (including wilderness and old-growth) will occur to the benefit of all primary cavity excavators

Summer ranges are managed emphasizing timber and other commodity production, although a minimal level of elk (big-game) habitat protection is provided through the application of Regional timber harvest dispersion constraints Timber harvest and road management are constrained to *provide a moderate level of elk (big-game) habitat protection on winter ranges*

State water quality goals will be met Riparian habitat will be maintained or enhanced through more stringent livestock management requirements to the benefit of the yellow warbler and salmonid fishes. High emphasis is placed on anadromous fish habitat improvement, with about 250 acres per year of habitat improvement targeted.

Municipal Watersheds. The domestic supply watersheds are managed emphasizing timber production within the overall objective of providing high quality water for domestic use

Minerals. Of the areas of known mineral potential 205,400 are open to mineral entry with normal coordination requirements, 24,000 have restricted entry, and 193,600 are closed to new mineral entry.

Alternative B-Departure

Description

This alternative was formulated with primary emphasis on the timber, forage and local economy issues This alternative provides for high levels of timber outputs for five decades to mitigate a projected shortfall in timber harvest from private lands It also provides approximately the level of timber called for in the Oregon Department of Forestry, "Forestry Program for Oregon". In order to achieve these output levels, it is necessary to depart from nondeclining flow (i.e , harvest timber at a high level for the first five decades and substantially reduce harvests in subsequent decades) It is also necessary to harvest many timber stands significantly earlier than culmination of mean annual increment (CMAI) CMAI is the age at which the average annual increment of growth in a timber stand reaches its maximum Since the National Forest Management Act requires that CMAI be generally reached before harvest occurs, this alternative cannot be implemented without a change in law. This is a distinct alternative If Alternative B were selected, it would not be possible to convert to Alternative B-departure during the life of the plan

This alternative also places higher emphasis on range improvements and increased levels of livestock grazing than does Alternative B.

Land uses are the same as for Alternative B

Roadless Areas Of the 251,780 acres of inventoried roadless area outside the Hells Canyon National Recreation area none are recommended for wilderness, 65,746 acres are retained in a roadless condition, and 186,234 acres are available for development

Soil and Water. This alternative provides the highest level of investments in soil and watershed improvements (1,500 acres per year).

Timber Timber harvest is scheduled from 940,000 acres. All tentatively suitable forest lands are available for timber harvest except those lands needed to meet old-growth objectives of this alternative and lands allocated to other uses in the Hells Canyon Comprehensive Management Plan. Areas not scheduled for timber harvest include alpine areas around the perimeter of the Eagle Cap Wilderness and in the Elkhorns. These are limited to nonforest lands or lands which are otherwise unsuited for timber management. Timber harvest is accelerated during the first five decades of implementation and falls significantly in succeeding decades The sawtimber volume to be sold in the first decade is 34 4 MMCF annually

Range Range management emphasizes implementation of Forest Plan standards and guidelines, including more stringent utilization standards, through development and implementation of allotment management plans. Permitted annual domestic livestock use is projected to be 204,000 AUM's, an increase of 10 percent over recent levels. This is accomplished by managing each range allotment at the most intensive level for which it is suited. This requires substantial investment in range improvements and the application of more sophisticated allotment management plans. On a number of allotments, the level of investment exceeds the benefits received In addition, even with the increased investments, it may not be possible to meet the utilization standards and to resolve riparian and other resource conflicts while maintaining the increased AUM outputs. AUM's will need to be adjusted on an allotment specific basis

Recreation Primitive and semiprimitive recreation opportunities are provided within wilderness, portions of the Hells Canyon National Recreation Area and within alpine areas in the Elkhorn and Wallowa Mountains Dispersed recreation in a managed forest setting is emphasized elsewhere

Recreation site construction and reconstruction are at a rate of 550 PAOT capacity per year for the first decade, completing the development directed in the Hells Canyon National Recreation Area Comprehensive Management Plan Reconstruction continues at a rate of 50 PAOT per year for the remainder of the plan period

Wilderness. The Eagle Cap Wilderness is managed under Alternative B of the Eagle Cap Wilderness Environmental Assessment which emphasizes prevention of future resource damage.

Landscapes This alternative substantially reduces visual quality along visually sensitive routes.

Transportation. Thirty-eight percent of the total existing roadless area of the Forest is accessed for timber harvest under this alternative. The remaining 62 percent is nonforested or allocated to other uses within the Hells Canyon NRA and is not available for entry The level of development required in this alternative results in the highest level of new road construction of any alternative Entering these areas will require additions to the Forest road system totalling an estimated 2,398 miles The objective for road management is to limit miles of open road (open on a year-round basis) to 2 5 miles per square mile. In addition, motorized use on winter ranges is restricted to 1 5 miles of open travelway per square mile during the period of time when the big-game animals are using the winter range Achievement of these open road densities will require closure of approximately 1,730 miles of existing roads

It is estimated that road construction in areas which are currently roadless will total 341 miles in the first decade, 251 miles in the second decade, and 49 miles in the third decade. An additional 178 miles of temporary roads will be built during the same time period. No significant additions to the road system are anticipated after the third decade

Research. Eleven research natural areas are proposed in addition to the one existing RNA

Lightning Creek	Bills Creek
Alum Beds	Little Granite
Boner Flat	Craig Mountain Lake
West Razz Pond and Razz Lake	Mt. Joseph
Duck Lake	Vance Knoll
Glacier Lake	Indian Creek (existing RNA)

(See Appendix H for detailed descriptions of proposed research natural areas, including acreages and vegetation characteristics.)

Fish and Wildlife. The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon. These are the recovery objective levels described in Chapter III

Old-growth forest is managed to meet the management requirements (MR's) for pileated woodpecker, pine marten and three-toed woodpecker on available, capable Forest lands (see Appendix G). This represents the minimum area and distribution of mature and old-growth Forest required to provide viable populations of dependent wildlife species "well distributed in the planning area" (36 CFR 219 19) This distribution of old-growth is expected to minimally satisfy needs of goshawk and Townsend's warbler Fourteen thousand acres of unsuited subalpine Forest and 11,000 acres of uneconomic lodgepole pine augment this old-growth habitat for pine marten and three-toed woodpeckers. This alternative will provide, over the long term, approximately 133,000 acres of old-growth habitat, including large reserves of old-growth in wilderness, the HCNRA, and unsuited lands

Timber managed without thinnings (300,000 acres) ensure the future development of pole thickets and dense young to mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks.

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands. Habitat effectiveness for all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout the Hells Canyon National Recreation Area. High snag levels on 462,000 acres of unsuitable lands (including wilderness and old-growth) will occur to the benefit of all primary cavity excavators

Summer ranges are managed emphasizing timber and other commodity production, although a minimal level of elk (big-game) habitat protection is provided through the application of Regional timber harvest dispersion constraints. Timber harvest and road management are constrained to provide a moderate level of elk (big-game) habitat protection on winter ranges

State water quality goals will be met Riparian habitat will be maintained or enhanced through more stringent livestock management requirements to the benefit of the yellow warbler and salmonid fishes High emphasis is placed on anadromous fish habitat improvement, with about 250 acres per year of habitat improvement targeted

Municipal Watersheds. The domestic supply watersheds are managed emphasizing commodity production within the overall objective of providing quality water for domestic use.

Minerals Of the areas of known mineral potential, 205,400 acres are open to mineral entry with normal coordination requirements, 24,000 acres have restricted entry, and 193,600 acres are closed to new mineral entry.

Alternative C
(Preferred Alternative)

Description

This alternative was formulated to deal with the issues for timber and range by maintaining moderately high outputs of timber and forage for livestock but with greater emphasis on deer and elk habitat than in Alternatives B, B-departure, or D. Emphasis is also placed on the transportation management and recreation diversity issues.

It provides near-optimum hiding cover, thermal cover and forage conditions on big-game winter ranges and on selected summer ranges. Use of roads within big-game habitat emphasis areas is restricted to reduce harassment of big game

Nonwilderness portions of the North Fork John Day watershed are managed emphasizing anadromous fish habitat protection.

Alpine and subalpine areas in the Elkhorn Mountains and around the perimeter of the Wallowa Mountains remain in a roadless condition to provide additional semiprimitive recreation opportunities. A high level of visual quality is retained Following is a description by resource

Roadless Areas Of the 251,980 acres of inventoried roadless area outside the Hells Canyon National Recreation area none are recommended for wilderness, 121,470 acres are retained in a roadless condition and 130,510 acres are available for development

Although timber harvesting will occur within the Joseph Canyon roadless area in this alternative, the area will be managed to retain its essentially roadless condition. Logging systems will be utilized which will not require significant new road construction.

Soil and Water. Soil and water restoration work is at significantly higher levels (1,000 acres per year) than has occurred in recent years

Timber. Timber harvest is scheduled from 837,000 acres Areas not scheduled for timber harvest include alpine and subalpine areas around the perimeter of the Eagle Cap Wilderness and in the Elkhorn Mountains. Timber management is constrained on winter ranges and some summer ranges to provide better big-game habitat. Timber harvest is scheduled on a nondeclining flow basis The sawtimber volume to be sold in the first decade is 27.7 MMCF annually.

Range. Range management emphasizes implementation of Forest Plan standards and guidelines, including more stringent utilization standards, through development and implementation of allotment management plans. Permitted annual domestic livestock use projected to be 186,000 AUM's which is the current level However, with implementation of the utilization standards and resolution of resource (primarily riparian) conflicts, it is likely that some allotments will require adjustments in permitted numbers This alternative includes an increased level of range investment to correct existing resource problems and to apply the standards and guidelines to ensure that Plan objectives are met

Recreation Primitive and semiprimitive recreation opportunities are provided in wilderness, portions of the Hells Canyon National Recreation Area and in alpine and subalpine areas in the Elkhorn and Wallowa Mountains Portions of the Monument Rock and Grande Ronde roadless areas also provide semiprimitive recreation opportunities. The remainder of the Forest is managed to provide recreation opportunities in a managed forest setting. Some big-game summer ranges (selected primarily because of their importance to big-game hunters) are managed to provide a quality hunting experience and high quality habitat.

Recreation site construction and reconstruction are at a rate of 550 PAOT capacity per year for the first decade, completing the development directed in the Hells Canyon National Recreation Area Comprehensive Management Plan Reconstruction continues at a rate of 50 PAOT per year for the remainder of the plan period.

Wilderness The Eagle Cap Wilderness is managed under Alternative C of the Eagle Cap Environmental Assessment which emphasizes rehabilitation, enhancement of opportunities for solitude, and provides a wide range of primitive and unconfined recreation opportunities

Landscapes This alternative maintains high visual quality in visually sensitive travel routes. Some travel routes have reduced visual quality objectives (VQO's) from those displayed in the DEIS This amounts to about an 18 percent reduction in the miles of travel routes afforded foreground retention and partial retention VQO's for individual travel routes are shown in a map in the map packet accompanying this EIS.

Transportation Twenty-seven percent of the total existing roadless area of the Forest is accessed for timber harvest under this alternative. Other portions of the Forest are currently roaded but do not provide access to some timber stands Completion of the Forest's road system will require an additional 1,980 miles of road. The use of the transportation system on winter ranges is restricted so that only 1 5 miles of road per square mile are open to motorized use. In areas where undeveloped dispersed recreation is emphasized, road density is maintained at current levels. Elsewhere on the Forest the goal for road density is not to exceed 2.5 miles per square mile To achieve the specified open road densities will require closure of 1,745 miles of existing road.

In this alternative, the Five Points drainage will not be made more accessible for motorized use than it is at present, except as necessary to carry out timber sale projects All new roads will be closed to motorized use

It is estimated that road construction in areas which are currently roadless will total 265 miles in the first decade, 186 miles in the second decade, and 22 miles in the third decade An additional 151 miles of temporary road are expected to be built during the same time period No significant additions to the road system are anticipated after the third decade

Research In addition to the one existing research natural area, 18 areas are recommended for inclusion into the Research Natural Area System·

Lightning Creek
Alum Beds
Bob Creek
West Razz Pond and Razz Lake
Bills Creek
Duck Lake
Government Draw
Indian Creek (existing RNA)
Horse Pasture Ridge
Lake Fork
Pleasant Valley
Little Granite
Craig Mountain Lake
Mt. Joseph
Vance Knoll
Pt Prominence
Basin Creek
Haystack Rock
Cougar Meadow

(See Appendix H for detailed descriptions of proposed research natural areas, including approximate acreages and vegetation characteristics)

Fish and Wildlife The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon These are the recovery objective levels described in Chapter III

Old-growth forest is provided at a level higher than necessary to satisfy the management requirements (MR's) for pileated woodpecker, pine marten and three-toed woodpecker on available, capable Forest lands (see Appendix G). This represents a level substantially above the minimum area and distribution of mature and old-growth Forest required to provide viable populations of dependent wildlife species "well distributed in the planning area" (36 CFR 219.19). This distribution of old-growth is expected to satisfy needs of goshawk and Townsend's warbler, with many existing goshawk territories included in the old-growth allocation. Fourteen thousand acres of unsuited subalpine Forest and 53,000 acres of uneconomic lodgepole pine augment this old-growth habitat for pine marten and three-toed woodpeckers This alternative will provide, over the long-term, approximately 161,000 acres of old-growth habitat, including large reserves of old-growth in wilderness, the HCNRA, and unsuited lands.

Timber managed without thinnings (333,000) ensures the future development of pole thickets and dense young to mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands. Habitat effectiveness for all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout the Hells Canyon National Recreation Area High snag levels on 568,000 acres of unsuitable lands (including wilderness and old-growth) will occur to the benefit of all primary cavity excavators

Most elk (big-game) winter ranges are managed to provide high quality cover and forage conditions (Approximately 18 percent are managed emphasizing wood fiber production.) Some summer ranges, because of their importance to elk, are also managed to provide high quality habitat. The remaining summer ranges are managed emphasizing production of commodities, although a minimum level of

elk (big-game) habitat protection is provided through application of Regional harvest dispersion constraints

State water quality goals will be met Riparian habitat will be maintained or enhanced through more stringent livestock management requirements to the benefit of the yellow warbler and salmonid fishes. High emphasis is placed on anadromous fish habitat improvement, with about 250 acres per year of habitat improvement targeted.

Municipal Watersheds Timber harvest occurs at a reduced level within the Baker and La Grande domestic supply watersheds Within the overall objective of providing quality water, management within the Sumpter and Wallowa watersheds emphasizes timber production.

Minerals. Of the areas of known mineral potential 195,000 acres are open to mineral entry with normal coordination requirements, 40,000 acres have restricted entry, and 193,600 acres are closed to new mineral entry.

Alternative C-Departure

Description

This alternative was formulated to emphasize timber, forage and the local economy issues Emphasis is also placed on deer and elk habitat on selected summer ranges and on recreation diversity and transportation system management. The land allocation for this alternative is identical to that of Alternative C (as displayed in the DEIS). The timber harvest schedule is adjusted to provide higher harvest levels in the first decade (a departure from nondeclining flow) This is a distinct alternative If Alternative C were selected, it would not be possible to convert to Alternative C-departure during the life of the plan.

The objective of the timber harvest schedule of this alternative is to continue to provide recent historical volumes of nonlodgepole pine sawtimber during the first decade. Local mills are designed principally for board production rather than the total utilization that the cubic foot measure most effectively represents The scheduling of large volumes of lodgepole pine in the first decade is necessary to capture mortality, existing and potential Most lodgepole pine on the Forest is dead, or overmature and highly susceptible to beetle attack.

Alternative C-departure provides near-optimum hiding cover, thermal cover and forage conditions on big-game winter ranges and on selected summer ranges Use of roads within big-game habitat emphasis areas is restricted to reduce harassment of big game. Nonwilderness portions of the North Fork John Day watershed are managed emphasizing anadromous fish habitat protection Alpine, subalpine areas within the Elkhorn Mountains and Wallowa Mountains remain in a roadless condition to provide additional semiprimitive recreation opportunities. A high level of visual quality is retained Following is a description of this alternative by resource.

Roadless Areas. Of the 251,980 acres of inventoried roadless area outside the Hells Canyon National Recreation Area none are recommended for wilderness, 104,357 acres are retained in a roadless condition and 147,623 acres are available for development

Although timber harvesting will occur within the Joseph Canyon roadless area in this alternative, the area will be managed to retain its essentially roadless condition. Logging systems will be utilized which will not require significant new road construction

Soil and Water Soil and water restoration work occurs at significantly higher levels (1,000 acres per year) than has occurred in recent years

Timber. Timber harvest is scheduled from 846,000 acres. This is a somewhat larger acreage than in Alternative C, indicating that in order to achieve the higher level harvest to this alternative it is necessary to harvest from some lands which are economically less efficient for timber management. Timber harvest is constrained on winter ranges and on some summer ranges to provide hiding and thermal cover for big game. Harvest is precluded on alpine and subalpine areas in the Elkhorn and Wallowa Mountains to retain some semiprimitive recreation opportunities. Unlike Alternative B-departure it is possible to implement this departure schedule without harvesting prior to culmination of mean annual increment because the harvest schedule departs from nondeclining flow only in the first decade. The sawtimber volume sold in the first decade is 34 4 MMCF annually

Range. Range management emphasizes implementation of Forest Plan standards and guidelines, including more stringent utilization standards, through development and implementation of allotment management plans. Permitted annual domestic livestock use is projected to be 186,000 AUM's which is the current level. However, with implementation of the utilization standards and resolution of resource (primarily riparian) conflicts, it is likely that some allotments will require adjustments in permitted numbers This alternative includes an increased level of range investment to correct existing resource problems and to apply the standards and guidelines to ensure that Plan objectives are met

Recreation. Primitive and semiprimitive recreation opportunities are provided both in alpine and subalpine areas in the Wallowa and Elkhorn Mountains, the Monument Rock area, and in the Grande Ronde roadless area The remainder of the Forest is managed to provide recreation opportunities in a managed forest setting Some big-game summer ranges (selected primarily because of their importance to big-game hunters) are managed to provide a quality hunting experience and high quality habitat.

Recreation site construction and reconstruction are at a rate of 550 PAOT capacity per year for the first decade, completing the development directed in the Hells Canyon National Recreation Area Comprehensive Management Plan. Reconstruction continues at a rate of 50 PAOT per year for the remainder of the plan period

Wilderness The Eagle Cap Wilderness is managed under Alternative C of the Eagle Cap Environmental Assessment which emphasizes rehabilitation, enhancement of opportunities for solitude, and provides a wide range of primitive and unconfined recreation opportunities

Landscapes. This alternative maintains high visual quality in visually sensitive travel routes

Transportation Thirty percent of the total existing roadless area of the Forest is accessed for timber harvest under this alternative. Completion of the Forest's road system will require an additional 2,190 miles of road. The use of the transportation system on winter ranges is restricted so that only 1 5 miles of road per square mile would be open to motorized use. In areas managed for roadless recreation, road density is maintained at current levels Elsewhere on the Forest the goal for open road density is to not exceed 2.5 miles per square mile. To achieve the specified open road densities, will require closure of 1,745 miles of existing road

In this alternative, the Five Points drainage will not be made more accessible for motorized use than it is at present, except as necessary to carry out timber sale projects.

It is estimated that road construction in areas which are currently roadless will total 298 miles in the first decade, 193 miles in the second decade, and 22 miles in the third decade An additional 154 miles of temporary roads are expected to be built during the same time period No significant additions to the road system are anticipated after the third decade

Research. In addition to the one existing research natural area, 13 areas are recommended for inclusion into the Research Natural Area System:

Lightning Creek
Alum Beds
Boner Flat
West Razz Pond and Razz Lake
Bills Creek
Duck Lake
Government Draw
Indian Creek (existing RNA)
Pleasant Valley
Little Granite
Craig Mountain Lake
Mt Joseph
Vance Knoll
Glacier Lake

(See Appendix H for detailed descriptions of proposed research natural areas, including approximate acreages and vegetation characteristics.)

Fish and Wildlife The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon These are the recovery objective levels described in Chapter III

Old-growth forest is provided at a level higher than necessary to satisfy the management requirements (MR's) for pileated woodpecker, pine marten and three-toed woodpecker on available, capable forest lands (see Appendix G). This represents a level substantially above the minimum area and distribution of mature and old-growth forest required to provide viable populations of dependent wildlife species "well distributed in the planning area" (36 CFR 219.19). This distribution of old-growth is expected to satisfy needs of goshawk and Townsend's warbler, with many existing goshawk territories included in the old-growth allocation Fourteen thousand acres of unsuited subalpine forest and 51,000 acres of uneconomic lodgepole pine augment this old-growth habitat for pine marten and three-toed woodpeckers. This alternative will provide, over the long-term, approximately 156,000 acres of old-growth habitat, including large reserves of old-growth in wilderness, the HCNRA, and unsuited lands

Timber managed without thinnings (380,000 acres) ensure the future development of pole thickets and dense young to mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands Habitat effectiveness for all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout the Hells Canyon National Recreation Area High snag levels on 556,000 acres of unsuitable lands (including wilderness and old-growth) will occur to the benefit of all primary cavity excavators

Elk (big-game) winter ranges are managed to provide high quality cover and forage conditions. Some summer ranges, because of their importance to elk, are also managed to provide high quality habitat. The remaining summer ranges are managed emphasizing production of commodities, although a minimum level of elk (big game) habitat protection is provided through application of Regional harvest dispersion constraints.

State water quality goals will be met Riparian habitat will be maintained or enhanced through more stringent livestock management requirements to the benefit of the yellow warbler and salmonid fishes High emphasis is placed on anadromous fish habitat improvement, with about 250 acres per year of habitat improvement targeted.

Municipal Watersheds. The Baker and La Grande domestic supply watersheds are managed with a reduced rate of timber harvest Within the overall objective of providing quality water, management within the Sumpter and Wallowa watersheds emphasizes timber production.

Minerals. Of the areas of known mineral potential, 195,000 acres are open to mineral entry with normal coordination requirements, 34,400 acres have restricted entry, and 193,600 acres are closed to new mineral entry

Alternative D

Description

This alternative was formulated to deal with the issues for timber and range by maintaining moderately high outputs of timber and forage for livestock but with greater emphasis on deer and elk habitat than in Alternatives B or B-departure though less than in Alternatives C or C-departure Emphasis is also placed on the transportation management and recreation diversity issues. It provides near-optimum hiding cover, thermal cover and forage conditions on big-game winter ranges. Use of roads within big-game habitat emphasis areas is restricted to reduce harrassment of big game Nonwilderness portions of the North Fork John Day watershed are managed to protect anadromous fish habitat but with more emphasis on commodity production than in Alternative C. Alpine and subalpine areas in the Elkhorn Mountains and around the perimeter of the Wallowa Mountains remain in a roadless condition to provide additional semiprimitive recreation opportunities. A high level of visual quality is retained Following is a description by resource.

Roadless Areas Of the 251,980 acres of inventoried roadless area outside the Hells Canyon National Recreation Area none are recommended for wilderness, 100,878 acres are retained in a roadless condition and 151,102 acres are available for development.

Soil and Water. Soil and water restoration work is at significantly higher levels (1,000 acres per year) than has occurred in recent years.

Timber. Timber harvest is scheduled from 857,000 acres Areas not scheduled for timber harvest include alpine and subalpine areas around the perimeter of the Eagle Cap Wilderness and in the Elkhorn Mountains Timber management is constrained on winter ranges to provide better big-game habitat. Timber harvest is scheduled on a nondeclining flow basis. The sawtimber volume to be sold in the first decade is 28.6 MMCF annually.

Range. Range management emphasizes implementation of Forest Plan standards and guidelines, including more stringent utilization standards, through development and implementation of allotment management plans. Permitted annual domestic livestock use is at 191,000 AUM's, an increase of 3 percent over recent levels This is accomplished by managing each range allotment at the most intensive level for which it is suited. On 11 allotments, the management is at a higher intensity than in Alternative C. This requires increased investment in range improvements and the application of more sophisticated allotment management plans On some allotments, the level of investment exceeds the benefits received. In addition, even with the increased investments, it may not be possible to meet the utilization standards and to resolve riparian and other resource conflicts while maintaining the increased AUM outputs AUM's will need to be adjusted on an allotment-specific basis

Recreation. Primitive and semiprimitive recreation opportunities are provided in wilderness, portions of the Hells Canyon National Recreation Area and in alpine and subalpine areas in the Elkhorn and Wallowa Mountains. The Grande Ronde roadless area also provides semiprimitive recreation opportunities. The remainder of the Forest is managed to provide recreation opportunities in a managed forest setting

Recreation site construction and reconstruction are at a rate of 550 PAOT capacity per year for the first decade, completing the development directed in the Hells Canyon National Recreation Area

Comprehensive Management Plan. Reconstruction continues at a rate of 50 PAOT per year for the remainder of the plan period.

Wilderness. The Eagle Cap Wilderness is managed under Alternative C of the Eagle Cap Environmental Assessment which emphasizes rehabilitation, enhancement of opportunities for solitude, and provides a wide range of primitive and unconfined recreation opportunities

Landscapes This alternative maintains high visual quality in visually sensitive travel routes.

Transportation. Thirty-one percent of the total existing roadless area of the Forest is accessed for timber harvest under this alternative Completion of the Forest's road system will require an additional 2,130 miles of road The use of the transportation system on winter ranges is restricted so that only 1.5 miles of road per square mile are open to motorized use. In areas where undeveloped recreation is emphasized, road density is maintained at current levels. Elsewhere on the Forest the goal for road density is to not exceed 2.5 miles per square mile. To achieve the specified open road densities will require closure of 1,725 miles of existing road

In this alternative, the Five Points drainage will not be made more accessible for motorized use than it is at present, except as necessary to carry out timber sale projects. New roads will be closed to motorized use. It is estimated that road construction in areas which are currently roadless will total 295 miles in the first decade, 203 miles in the second decade, and 22 miles in the third decade An additional 156 miles of temporary roads are expected to be built during the same time period No significant additions to the road system are anticipated after the third decade

Research. In addition to the one existing research natural area, 13 areas are recommended for inclusion into the Research Natural Area System

Lightning Creek
Alum Beds
Boner Flat
West Razz Pond and Razz Lake
Bills Creek
Duck Lake
Government Draw
Indian Creek (existing RNA)
Pleasant Valley
Little Granite
Craig Mountain Lake
Vance Knoll
Glacier Lake
Mount Joseph

(See Appendix H for detailed descriptions of proposed research natural areas, including approximate acreages and vegetation characteristics.)

Fish and Wildlife. The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon These are the recovery objective levels described in Chapter III.

Old-growth forest is provided at a level higher than necessary to satisfy the management requirements (MR's) for pileated woodpecker, pine marten and three-toed woodpecker on available, capable forest lands (see Appendix G). This represents a level substantially above the minimum area and distribution of mature and old-growth forest required to provide viable populations of dependent wildlife species "well distributed in the planning area" (36 CFR 219.19) This distribution of old-growth is expected to satisfy needs of goshawk and Townsend's warbler, with many existing goshawk territories included in the old-growth allocation. Fourteen thousand acres of unsuited subalpine forest and 48,000 acres of uneconomic lodgepole pine augment this old-growth habitat for pine marten and three-toed woodpeckers. This alternative will provide over the long term approximately 153,000 acres of old-growth habitat, including large reserves of old-growth in wilderness, the HCNRA, and unsuited lands.

Timber managed without thinnings (306,000 acres) ensure the future development of pole thickets and dense young to mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands. Habitat effectiveness for all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout the Hells Canyon National Recreation Area High snag levels on 556,000 acres of unsuitable lands (including wilderness and old-growth) will occur to the benefit of all primary cavity excavators.

Elk (big-game) winter ranges are managed to provide high quality cover and forage conditions Summer ranges are managed emphasizing timber and other commodity production, although a minimal level of elk (big-game) habitat protection is provided through the application of Regional timber harvest dispersion constraints.

State water quality goals will be met Riparian habitat will be maintained or enhanced through more stringent livestock management requirements to the benefit of the yellow warbler and salmonid fishes Moderate emphasis is placed on anadromous fish habitat improvement, with about 73 acres per year of habitat improvement targeted.

Municipal Watersheds Within the overall objective of providing quality water the domestic supply watersheds are managed emphasizing timber production.

Minerals. Of the areas of known mineral potential 195,000 acres are open to mineral entry with normal coordination requirements, 34,400 acres have restricted entry because of the strategy under which they are managed in this alternative, and 193,600 acres are closed to new mineral entry

Alternative E

Description

This alternative was formulated emphasizing issues related to undeveloped areas, transportation system management, recreation diversity, and timber management All existing roadless areas are retained in a roadless condition This serves to retain the existing opportunities for semiprimitive and primitive types of recreation Outside of the existing roadless areas production of commodity outputs is emphasized. A low level of habitat protection is provided on big-game winter ranges. Use of roads on winter ranges is restricted to reduce harrassment of big game Visual quality is substantially reduced outside of roadless areas. Following is a description of this alternative by resource.

Roadless Areas. Of the 251,980 acres of inventoried roadless area outside the Hells Canyon National Recreation Area 1,013 acres are recommended for wilderness (the Dunns Bluff Roadless Area which was not considered during RARE or the Oregon Wilderness Act of 1984), and 250,967 acres are retained in a roadless condition No roadless lands would be developed.

Soil and Water This alternative provides a low level of soil and water resource improvement (500 acres per year) compared to most other alternatives, but higher than recent historical levels

Timber. Timber harvest is scheduled from 789,000 acres All roadless lands outside the Hells Canyon National Recreation Area are excluded from timber harvest Timber management is constrained on winter ranges to provide better big-game habitat. Timber harvest is scheduled on a nondeclining flow basis The sawtimber volume to be sold in the first decade is 26 9 MMCF annually.

Range Range management emphasizes implementation of Forest Plan standards and guidelines, including more stringent utilization standards, through development and implementation of allotment

management plans. Permitted annual domestic livestock use is projected to be 163,000 AUM's, a decrease of 12 percent over recent levels. All allotments are managed at their most economically efficient level except that grazing is eliminated or reduced on ranges where soil or other resource damage is occurring within roadless areas.

Recreation Primitive and semiprimitive recreation opportunities are provided in wilderness, portions of the Hells Canyon National Recreation Area and in most roadless areas. The remainder of the Forest is managed to provide recreation opportunities in a managed forest setting

Recreation site construction and reconstruction are at a rate of 550 PAOT capacity per year for the first decade, completing the development directed in the Hells Canyon National Recreation Area Comprehensive Management Plan. Reconstruction continues at a rate of 50 PAOT per year for the remainder of the plan period.

Wilderness. The Eagle Cap Wilderness is managed under Alternative C of the Eagle Cap Environmental Assessment which emphasizes rehabilitation, enhancement of opportunities for solitude, and provides a wide range of primitive and unconfined recreation opportunities

Landscapes. This alternative reduces visual quality in visually sensitive travel routes.

Transportation. None of the existing roadless areas of the Forest are accessed for timber harvest under this alternative. Some portions of the Forest are currently roaded but need additional access Completion of the Forest's road system will require an additional 2,070 miles of road. The use of the transportation system on winter ranges is restricted so that only 1.5 miles of road per square mile are open to motorized use In areas where undeveloped recreation is emphasized, road density is maintained at current levels Elsewhere on the Forest the goal for road density is not to exceed 2 5 miles per square mile To achieve the specified open road densities will require closure of 1,725 miles of existing road. No road construction within roadless areas is expected.

Research In addition to the one existing research natural area, 13 areas are recommended for inclusion into the Research Natural Area System:

Lightning Creek
Alum Beds
Boner Flat
West Razz Pond and Razz Lake
Bills Creek
Duck Lake
Government Draw
Indian Creek (existing RNA)
Pleasant Valley
Little Granite
Craig Mountain Lake
Vance Knoll
Glacier Lake
Mount Joseph

(See Appendix H for detailed descriptions of proposed research natural areas, including approximate acreages and vegetation characteristics.)

Fish and Wildlife. The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon These are the recovery objective levels described in Chapter III.

Old-growth forest is provided at a level slightly higher than necessary to satisfy the management requirements (MR's) for pileated woodpecker, pine marten and three-toed woodpecker on available, capable Forest lands (see Appendix G). This represents a level slightly above the minimum area and distribution of mature and old-growth Forest required to provide viable populations of dependent wildlife species "well distributed in the planning area" (36 CFR 219.19). This distribution of old-growth is expected to minimally satisfy needs of goshawk and Townsend's warbler. Fourteen thousand acres

of unsuited subalpine Forest and 58,000 acres of uneconomic lodgepole pine augment this old-growth habitat for pine marten and three-toed woodpeckers This alternative will provide, over the long-term, approximately 167,000 acres of old-growth habitat, including large reserves of old growth in wilderness, the HCNRA, and unsuited lands

Timber managed without thinnings (263,000 acres) ensure the future development of pole thickets and dense young to mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks.

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands. Habitat effectiveness for all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout the Hells Canyon National Recreation Area. High snag levels on 598,000 acres of unsuitable lands (including wilderness and old-growth) will occur to the benefit of all primary cavity excavators

Summer ranges are managed emphasizing timber and other commodity production, although a minimal level of elk (big-game) habitat protection is provided through the application of Regional timber harvest dispersion constraints. Timber harvest and road management are constrained to provide a moderate level of elk (big-game) habitat protection on winter ranges

State water quality goals will be met Riparian habitat will be maintained or enhanced through more stringent livestock management requirements to the benefit of the yellow warbler and salmonid fishes. High emphasis is placed on anadromous fish habitat improvement, with about 250 acres per year of habitat improvement targeted

Municipal Watersheds. Within the overall objective of providing quality water, the Baker and La Grande domestic supply watersheds are managed emphasizing nondevelopment (no scheduled timber harvest) while the other watersheds are managed emphasizing timber production

Minerals. Of the areas of known mineral potential 183,200 acres are open to mineral entry with normal coordination requirements, 46,200 acres have restricted entry, and 193,600 acres are closed to new mineral entry.

Alternative F

Description

This alternative was formulated emphasizing the wildlife habitat, recreation diversity, old-growth forest, and transportation system management issues. It also provides a high level of protection and enhancement of anadromous fisheries Approximately 67 percent of the roadless area outside the Hells Canyon National Recreation Area remains in a roadless condition Timber is managed to provide snags for wildlife at not less than the 40 percent level across the Forest Both winter and summer big game ranges provide high quality big game habitat. A description of this alternative, by resource, follows.

Roadless Areas Of the 251,980 acres of inventoried roadless area outside the Hells Canyon National Recreation Area 1,013 acres are recommended for wilderness, 145,347 acres are retained in a roadless condition and 105,620 acres are available for development.

Although timber harvesting will occur within the Joseph Canyon roadless area in this alternative, the area will be managed to retain its essentially roadless condition Logging systems will be utilized which will not require significant new road construction

Soil and Water. Soil and water restoration work is at significantly higher levels (500 acres per year) than has occurred in recent years but is at a lower level than most other alternatives

Timber Timber harvest is scheduled from 798,000 acres. Areas not scheduled for timber harvest include alpine and subalpine areas around the Elkhorn Mountains Also not scheduled are part of the Monument Rock Roadless Area, The Mount Emily Roadless Area, all roadless areas around the Eagle Cap Wilderness and the Grande Ronde roadless area Timber management is constrained on winter ranges and summer ranges to meet wildlife and fisheries objectives Timber harvest is scheduled on a nondeclining flow basis The sawtimber volume to be sold in the first decade is 20 6 MMCF annually

Range. Range management emphasizes reducing costs of management while maintaining a responsible level of resource protection and management. Permitted annual domestic livestock use is projected to be 143,000 AUM's This is a decrease of 23 percent over current levels On allotments where soil and resource damage cannot be corrected in a cost effective manner in the presence of permitted livestock, grazing by domestic livestock is reduced or eliminated

Recreation. Primitive and semiprimitive recreation opportunities are provided in wilderness, portions of the Hells Canyon National Recreation Area and in alpine and subalpine areas in the Elkhorn and in numerous areas around the Eagle Cap Wilderness. Portions of the Monument Rock, Grande Ronde, and Mount Emily roadless areas also provide semiprimitive recreation opportunities. The remainder of the Forest is managed to provide recreation opportunities in a managed forest setting. Both summer and winter ranges are managed emphasizing wildlife and fisheries, providing a high quality recreation experience.

Recreation site construction and reconstruction is at a rate of 550 PAOT capacity per year for the first decade, completing the development directed in the Hells Canyon National Recreation Area Comprehensive Management Plan. Reconstruction continues at a rate of 50 PAOT per year for the remainder of the plan period

Wilderness. The Eagle Cap Wilderness is managed under Alternative D of the Eagle Cap Environmental Assessment with emphasis on maintaining pristine conditions, letting natural processes operate with as little evidence of man as possible

Landscapes. This alternative maintains high visual quality in visually sensitive travel routes.

Transportation. Twenty-two percent of the total existing roadless area of the Forest is accessed for timber harvest under this alternative Completion of the Forest's road system will require an additional 1,430 miles of road The use of the transportation system is restricted so that only 1 5 miles of road per square mile across the Forest are open to motorized use On winter ranges this restriction applies during the period of time when big game are using the range On summer ranges the 1.5 mile road density applies year long. In areas emphasizing undeveloped recreation, road density is maintained at current levels. To achieve the specified open road densities will require closure of 2,670 miles of existing road

It is estimated that road construction in areas which are currently roadless will total 131 miles in the first decade, 83 miles in the second decade, and 13 miles in the third decade. An additional 58 miles of temporary roads are expected to be built during the same time period No significant additions to the road system are anticipated after the third decade.

Research. In addition to the one existing research natural area, 13 areas are recommended for *inclusion into the Research Natural Area System:*

Lightning Creek
Alum Beds
Boner Flat
West Razz Pond & Razz Lake
Bills Creek
Duck Lake
Government Draw
Indian Creek (existing RNA)
Pleasant Valley
Little Granite
Craig Mountain Lake
Vance Knoll
Glacier Lake
Mount Joseph

(See Appendix H for detailed descriptions of proposed research natural areas, including approximate acreages and vegetation characteristics)

Fish and Wildlife. The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon. These are the recovery objective levels described in Chapter III.

Old-growth forest is provided at a level nearly double that necessary to satisfy the management requirements (MR's) for pileated woodpecker, pine marten and three-toed woodpecker on available, capable forest lands (see Appendix G) This is the best distribution of old-growth of any alternative and represents a level substantially above the minimum area and distribution of mature and old-growth forest required to provide viable populations of dependent wildlife species "well distributed in the planning area" (36 CFR 219.19). This distribution of old-growth is expected to well satisfy needs of goshawk and Townsend's warbler, with most existing goshawk territories included in old-growth allocations. Fourteen thousand acres of unsuited subalpine forest and 68,000 acres of uneconomic lodgepole pine augment this old-growth habitat for pine marten and three-toed woodpeckers. This alternative will provide, over the long-term, approximately 172,000 acres of old-growth habitat, including large reserves of old-growth in wilderness, the HCNRA, and unsuited lands

Timber managed without thinnings (476,000 acres) ensure the future development of pole thickets and dense young to mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands Habitat effectiveness for *all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout* the Hells Canyon National Recreation Area. High snag levels on 611,000 acres of unsuitable lands (including wilderness and old-growth) will occur to the benefit of all primary cavity excavators.

Elk (big-game) winter ranges and summer ranges are managed to provide high quality cover and forage conditions.

State water quality goals will be met. Riparian habitat will be maintained or enhanced through more stringent livestock management requirements to the benefit of the yellow warbler and salmonid fishes. High emphasis is placed on anadromous fish habitat improvement, with about 250 acres per year of habitat improvement targeted

Municipal Watersheds All domestic supply watersheds are managed with a reduced rate of timber harvest

Minerals. Of the areas of known mineral potential, 190,200 acres are open to mineral entry with normal coordination requirements, 39,200 acres have restricted entry, and 193,600 acres are closed to new mineral entry

Alternative G

Description

Alternative G was formulated in a manner identical to Alternative B except that timber harvest is limited to stands and practices having a positive present net value (meaning the monetary benefits of managing the existing and future stands of timber on a particular piece of land are greater than the monetary costs -- also see Glossary) This alternative reflects the National concern over timber sales which are sold below cost.* Under this alternative few, if any, below-cost timber sales are expected

This results in a substantial reduction in timber outputs from Alternative B and an increase in present net value Other differences include reduced economic stability in local communities and reduced adverse impacts on other resources such as wildlife In this alternative the Lake Fork Roadless Area is economically unsuited for development, hence the only difference in land allocations between Alternatives B and G.

This alternative was formulated with primary emphasis on issue goals for timber, livestock forage, and local economy issues. Timber harvest and road management activities on winter ranges are restricted to better meet big-game needs Visual quality is reduced

Roadless Areas. Of the 251,980 acres of inventoried roadless areas outside the Hells Canyon National Recreation Area, none are recommended for wilderness, 80,644 acres are retained in a roadless condition and 171,336 acres are available for development

Soil and Water. Soil and water improvement is at a level substantially higher (500 acres per year) than recent historical levels but is lower than most other alternatives

Timber. Timber harvest is scheduled from 801,000 acres. All tentatively suitable forest lands are available for timber harvest except for those lands needed to meet the old-growth objectives of this alternative and for lands allocated to other uses in the Hells Canyon Comprehensive Management Plan Areas not scheduled for timber harvest include alpine areas near the Eagle Cap Wilderness and in the Elkhorn Mountains. These are limited to nonforest lands or lands which are otherwise unsuited for timber management. Timber harvest is scheduled on a nondeclining flow basis. The sawtimber volume to be offered in the first decade is 23.7 MMCF annually.

Range Range Management emphasizes implementation of Forest Plan standards and guidelines, including more stringent utilization standards, through development and implementation of allotment management plans As in Alternative B, permitted annual domestic livestock use would be projected at 207,000 AUM's which approximates the RPA target level. However, with implementation of the utilization standards, it is probable that the RPA outputs cannot be met. As AMP's are implemented, AUM's are adjusted on an allotment specific basis to comply with utilization standards and to resolve resource conflicts. This alternative includes an increased level of range investment to correct existing resource problems.

Recreation. Wilderness, portions of the Hells Canyon National Recreation Area, alpine areas and the Lake Fork roadless area are managed to provide primitive and semiprimitive recreation opportunities Dispersed recreation in a managed forest setting is emphasized elsewhere.

*Below-cost sales are those which cost more to prepare than they return in revenue. These are not necessarily the same as deficit sales Deficit sales are those from which an average purchaser would not expect at least an average profit.

Recreation site construction and reconstruction are at a rate of 550 PAOT capacity per year for the first decade, completing the development directed in the Hells Canyon National Recreation Area Comprehensive Management Plan Reconstruction continues at a rate of 50 PAOT per year for the remainder of the plan period.

Wilderness. The Eagle Cap Wilderness is managed under Alternative B of the Eagle Cap Wilderness Environmental Assessment which emphasizes prevention of future resource damage

Landscapes *This alternative substantially reduces visual quality along visually sensitive travel* routes.

Transportation. Thirty-five percent of the total existing roadless area of the Forest is accessed for timber harvest under this alternative The remaining 65 percent are nonforested or are allocated to other uses in the Hells Canyon NRA and are not available for entry or are economically inefficient given the objectives of this alternative. The high level of development required in this alternative would result in a relatively high level of new road construction Entering these areas will require additions to the Forest road system totalling some 1,920 miles of new road. The objective for road management is to limit miles of open road (open on a year-round basis) to 2 5 miles per square mile In addition, motorized use on winter ranges is restricted to 1.5 miles of open travelway per square mile during the period of time when the big-game animals are using the winter range. Achieving these open road densities will require closing 1,730 miles of existing road

It is estimated that road construction in areas which are currently roadless will total 301 miles in the first decade, 227 miles in the second decade, and 46 miles in the third decade. An additional 155 miles of temporary roads are expected to be built during the same time period No significant additions to the road system are anticipated after the third decade.

Research. Eleven research natural areas are proposed in addition to the one existing RNA:

Lightning Creek
Bills Creek
Alum Beds
Little Granite
Boner Flat
Craig Mountain Lake
Indian Creek (existing RNA)
West Razz Pond and Razz Lake
Mt. Joseph
Duck Lake
Vance Knoll
Glacier Lake

(See Appendix H for detailed descriptions of proposed research natural areas, including acreages and vegetation characteristics)

Fish and Wildlife The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon. These are the recovery objective levels described in Chapter III

Old-growth forest is provided at a level slightly higher than necessary to satisfy the management requirements (MR's) for pileated woodpecker, pine marten and three-toed woodpecker on available, capable forest lands (see Appendix G) This represents a level slightly above the minimum area and distribution of mature and old-growth forest required to provide viable populations of dependent wildlife species "well distributed in the planning area" (36 CFR 219 19) This distribution of old-growth is expected to minimally satisfy needs of goshawk and Townsend's warbler. Fourteen thousand acres *of unsuited subalpine forest and 107,000 acres of uneconomic lodgepole pine augment this old-*growth habitat for pine marten and three-toed woodpeckers This alternative will provide, over the

long-term, approximately 152,000 acres of old growth habitat, including large reserves of old growth in wilderness, the HCNRA, and unsuited lands.

Timber managed without thinnings (479,000 acres) ensure the future development of pole thickets and dense young to mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands Habitat effectiveness for all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout the Hells Canyon National Recreation Area High snag levels on 599,000 acres of unsuitable lands (including wilderness and old growth) will occur to the benefit of all primary cavity excavators.

Summer ranges are managed emphasizing timber and other commodity production, although a minimal level of elk (big-game) habitat protection is provided through the application of Regional timber harvest dispersion constraints Timber harvest and road management are constrained to provide a moderate level of elk (big-game) habitat protection on winter ranges

State water quality goals will be met Riparian habitat will be maintained or enhanced through more stringent livestock management requirements to the benefit of the yellow warbler and salmonid fishes Less emphasis is placed on anadromous fish habitat improvement compared to other alternatives, with about 35 acres per year of habitat improvement targeted

Municipal Watersheds. The domestic supply watersheds are managed emphasizing timber production within the overall objective of providing quality water

Minerals. Of the areas of known mineral potential 205,400 acres are open to mineral entry with normal coordination requirements, 24,000 acres have restricted entry because of the strategy they are managed under in this alternative, and 193,600 acres are closed to new mineral entry.

Alternative H

Description

This alternative was formulated to deal with the issues for timber and range by maintaining moderately high outputs of timber and forage for livestock but with greater emphasis on deer and elk habitat than in Alternatives B, B-departure, or E It has land allocations which are identical to Alternative C as identified in the DEIS. Alternative H emphasizes economic efficiency in timber management more than C does. This tends to reduce such activities as tree planting, site preparation, and precommercial thinning Like Alternative C, emphasis is also placed on the transportation management and recreation diversity issues. It provides near-optimum hiding cover, thermal cover and forage conditions on big-game winter ranges and on selected summer ranges Use of roads within big-game habitat emphasis areas is restricted to reduce harrassment of big game Nonwilderness portions of the North Fork John Day watershed are managed emphasizing anadromous fish habitat protection Alpine and subalpine areas in the Elkhorn Mountains and around the perimeter of the Wallowa Mountains remain in a roadless condition to provide additional semiprimitive recreation opportunities. A high level of visual quality is retained Following is a description by resource

Roadless Areas Of the 251,980 acres of inventoried roadless area outside the Hells Canyon National Recreation Area, none are recommended for wilderness, 104,357 acres are retained in a roadless condition and 147,623 acres are available for development. Although timber harvesting will occur within the Joseph Canyon roadless area in this alternative, the area will be managed to retain its essentially roadless condition. Logging systems will be utilized which will not require significant new road construction.

Soil and Water. Soil and water restoration work is at significantly higher levels (1,000 acres per year) than has occurred in recent years.

Timber Timber harvest is scheduled from 806,000 acres. Areas not scheduled for timber harvest include alpine and subalpine areas around the perimeter of the Eagle Cap Wilderness and in the Elkhorn Mountains Timber management is limited on winter ranges and some summer ranges to provide better big-game habitat. Timber harvest is scheduled on a nondeclining flow basis The sawtimber volume to be sold in the first decade is 24 0 MMCF annually

Range. Range management emphasizes implementation of Forest Plan standards and guidelines, including more stringent utilization standards, through development and implementation of allotment management plans Permitted annual domestic livestock use is at 186,000 AUM's which is the current level. However, with implementation of the utilization standards and resolution of resource (primarily riparian) conflicts, it is likely that some allotments will require adjustments in permitted numbers. This alternative includes an increased level of range investment to correct existing resource problems and to apply the standards and guidelines to ensure that Plan objectives are met.

Recreation. Primitive and semiprimitive recreation opportunities are provided in wilderness, portions of the Hells Canyon National Recreation Area and in alpine and subalpine areas in the Elkhorn and Wallowa Mountains. Portions of the Monument Rock and Grande Ronde Roadless Areas also provide semiprimitive recreation opportunities The remainder of the Forest is managed to provide recreation opportunities in a managed forest setting Some big-game summer ranges (selected primarily because of their importance to big-game hunters) are managed to provide a quality hunting experience and high quality habitat.

Recreation site construction and reconstruction are at a rate of 550 PAOT capacity per year for the *first decade, completing the development directed in the Hells Canyon National Recreation Area* Comprehensive Management Plan. Reconstruction continues at a rate of 50 PAOT per year for the remainder of the plan period

Wilderness. The Eagle Cap Wilderness is managed under Alternative C of the Eagle Cap Environmental Assessment which emphasizes rehabilitation, enhancement of opportunities for solitude, and provides a wide range of primitive and unconfined recreation opportunities

Landscapes. This alternative maintains high visual quality in visually sensitive travel routes

Transportation. Thirty percent of the total existing roadless area of the Forest is accessed for timber harvest under this alternative Completion of the Forest's road system will require an additional 1,800 miles of road, the lowest level of any alternative. The use of the transportation system on winter ranges is restricted so that only 1.5 miles of road per square mile would be open to motorized use In areas managed to emphasize undeveloped recreation, road density will be maintained at current levels

Elsewhere on the Forest the goal for road density is to not exceed 2 5 miles per square mile. To achieve the specified open road densities will require closure of 1,745 miles of existing road

In this alternative, the Five Points drainage will not be made more accessible for motorized use than it is at present, except as necessary to carry out timber sale projects All new roads will be closed to motorized use

It is estimated that road construction in areas which are currently roadless will total 293 miles in the first decade, 184 miles in the second decade, and 17 miles in the third decade An additional 156 miles of temporary road are expected to be built during the same time period. No significant additions to the road system are anticipated after the third decade

Research. In addition to the one existing research natural area, 13 areas are recommended for inclusion into the Research Natural Area System

Lightning Creek
Alum Beds
Boner Flat
West Razz Pond and Razz Lake
Bills Creek
Duck Lake
Government Draw
Indian Creek (existing RNA)
Pleasant Valley
Little Granite
Craig Mountain Lake
Mt. Joseph
Vance Knoll
Glacier Lake

(See Appendix H for detailed descriptions of proposed research natural areas, including acreages and vegetation characteristics)

Fish and Wildlife The Forest will participate in reestablishing eight pairs of bald eagle and four pairs of peregrine falcon These are the recovery objective levels described in Chapter III.

Old-growth forest is provided at a level higher than necessary to satisfy the management requirements (MR's) for pileated woodpecker, pine marten and three-toed woodpecker on available, capable forest lands (see Appendix G). This represents a level substantially above the minimum area and distribution of mature and old-growth forest required to provide viable populations of dependent wildlife species "well distributed in the planning area" (36 CFR 219 19). This distribution of old-growth is expected to satisfy needs of goshawk and Townsend's warbler, with many existing goshawk territories included in the old growth allocation. Fourteen thousand acres of unsuited subalpine forest and 72,000 acres of uneconomic lodgepole pine augment this old growth habitat for pine marten and three-toed woodpeckers. This alternative will provide, over the long-term, approximately 160,000 acres of old growth habitat, including large reserves of old-growth in wilderness, the HCNRA, and unsuited lands.

Timber managed without thinnings (409,000 acres) ensure the future development of pole thickets and dense young to mature forest stands to the benefit of sharp-shinned hawks and Cooper's hawks

Habitat for those primary cavity excavators relying on smaller snags is expected to exceed the 40 percent level of effectiveness through natural mortality in managed stands. Habitat effectiveness for all cavity nesters will be managed at or above the 60 percent level in riparian zones and throughout the Hells Canyon National Recreation Area High snag levels on 615,000 acres of unsuitable lands (including wilderness and old-growth) will occur to the benefit of all primary cavity excavators

Elk (big-game) winter ranges are managed to provide high quality cover and forage conditions Some summer ranges, because of their importance to elk, are also managed to provide high quality habitat. The remaining summer ranges are managed emphasizing production of commodities, although a minimum level of elk (big-game) habitat protection is provided through application of Regional harvest dispersion constraints.

State water quality goals will be met. Riparian habitat will be maintained or enhanced through more stringent livestock management requirements to the benefit of the yellow warbler and salmonid fishes. High emphasis is placed on anadromous fish habitat improvement, with about 600 acres per year of habitat improvement targeted.

Municipal Watersheds. The Baker and La Grande domestic supply watersheds are managed with a reduced rate of timber harvest.

Minerals Of the areas of known mineral potential 195,000 acres are open to mineral entry with normal coordination requirements, 34,400 acres have restricted entry, and 193,600 acres are closed to new mineral entry

Management Areas (MA's)

Each alternative distributes the lands of the Forest to different management areas managed under different management goals and objectives Acreages in the different management areas vary from one alternative to another (see Table II-3)

On each management area a cost-effective combination of management practices and intensities are selected and scheduled to attain certain goals and objectives The management area locations can be found on the alternative maps accompanying this Final Environmental Impact Statement. In essence, the management area is a unit of land to be managed for certain goals and objectives, to achieve a desired condition in the future. While the number of acres in each management area may vary by alternative, the management actions applied in each management area remains constant

Although certain renewable resources are emphasized in each of the following descriptions, each management area provides for a combination of Forest uses All management areas provide water, wildlife, forage, protection of riparian habitat and many forms of recreation, many provide timber yields. *Management direction identifies the renewable resource use which has highest priority and* therefore tends to limit the output levels of other resources which may be competing on the same land.

The following are brief descriptions of the management areas for the Wallowa-Whitman National Forest. Detailed descriptions of MA's for the preferred alternative are found in the Forest Land and Resource Management Plan (Chapter 4); other MA's are found in Appendix D of this EIS

Management Area 1 (Timber Production Emphasis)

Management emphasizes wood fiber production while providing relatively high levels of forage and recreational opportunities. Temporary forage increases result from silvicultural activities. Timber is managed according to standards and guidelines common to all management areas. Timber management provides a mixture of even-aged stands (up to 40 acres in size) and uneven-aged stands These stands are to be managed at intensities promoting vigorous, healthy trees commensurate with the productive potential of the sites. Regeneration harvest units will be separated by uncut stands containing one or more logical logging units. Regeneration harvest of units adjacent to an existing regenerated unit will not be initiated until the desired crop tree stocking on the existing unit reaches 4 5 feet in height This mixture of stand ages and sizes provides a degree of diversity for aesthetics, wildlife and a high level of wood fiber and forage production Open roads are normally limited to 2 5 miles per square mile

Existing snags and green trees are managed to assure that habitat is provided at not less than the 20 percent level for wildlife species dependent upon snags smaller than 20 inches in diameter (DBH). During those times in a stand's rotation where the site is occupied by trees larger than 10 inches in diameter, naturally-occurring dead trees will be managed to maintain at least the 40 percent habitat level for these same species

Management Area 2 (Timber/Wildlife)

Management Area 2 emphasizes wood fiber and forage production although timber harvest scheduling is constrained to provide greater recreational variety (especially hunting experiences) and wildlife diversity than is found in Management Area 1

Both even-aged and uneven-aged techniques are appropriate Where even-aged management is applied, timbered areas consist of timber stands (40 acres or less) of a variety of ages Regeneration harvest of units adjacent to an existing regenerated unit is not to be initiated until adequate crop tree stocking on the existing unit reaches ten feet in height. Open road density is generally not more than 1 5 miles per square mile.

Existing snags and green trees are managed to assure that habitat is provided at not less than the 20 percent level for wildlife species dependent upon snags smaller than 20 inches in diameter (DBH). During those times in a stand's rotation where the site is occupied by trees larger than 10 inches in diameter, naturally-occurring dead trees will be managed to maintain at least the 40 percent habitat level for these same species

Management Area 3 (Wildlife/Timber)

Management of this area emphasizes big-game habitat while providing relatively high levels of timber production Like Management Areas 1 and 2, this management area provides a broad array of Forest uses and outputs. However, management emphasizes maintenance of high quality big game (particularly elk) habitat and more challenging hunting opportunities

Timber harvest is the primary tool for managing big-game habitat Both even-aged and uneven-aged management are appropriate When in a managed condition, timbered areas are a mosaic of even-aged stands, 40 acres or less in size and uneven-aged stands. These stands are of different ages and are dispersed to provide a mixture of forage areas, thermal cover, and hiding cover As in Management Area 2, regenerated trees must be ten feet tall before harvesting adjacent units, but in Management Area 3 additional restrictions apply to any harvest which reduces hiding or thermal cover, in order to better achieve optimum distributions of cover for elk. Open public road access during critical periods of big-game use is generally not more than 1 5 miles per square mile

Existing snags and green trees are managed to assure that habitat is provided at not less than the 20 percent level for wildlife species dependent upon snags smaller than 20 inches in diameter (DBH). During those times in a stand's rotation where the site is occupied by trees larger than 10 inches in diameter, naturally-occurring dead trees will be managed to maintain at least the 40 percent habitat level for these same species.

Management Area 4 (Wilderness)

The intent is to preserve the wilderness resource of these areas These areas are managed in accordance with the Wilderness Act of 1964, P. L 94-199 (establishing the Hells Canyon Wilderness) and the 2320 section of the Forest Service Manual The existing 582,700 acres of wilderness are common to all alternatives.

The intent of the Wilderness Act is to preserve and protect the natural condition and characteristics of designated lands and to provide for current and future public enjoyment of these areas and their wilderness character. These areas remain essentially unaltered and undisturbed by man, with natural ecological processes (including the natural role of fire) permitted to operate with a minimum of human interference.

Management Area 5 (Phillips Lake Area)

This area includes Mason Dam, Phillips Lake and surrounding lands, as described in the Reservoir Area Management Plan of March 1971 The area is to be managed recognizing a variety of resource values with emphasis on recreation opportunities.

Timber resources are managed to provide an aesthetically pleasing forest for public enjoyment Timber stands are maintained in a thrifty condition with tree spacing providing a park-like appearance at least at some periods during a stand's life.

Management Area 6 (Backcountry)

Management emphasizes opportunities for those dispersed recreation activities usually recognized within relatively large undeveloped areas outside wilderness. The recreation activities usually involve combinations of viewing scenery, hunting, fishing, rock hunting, observing wildlife, snow-shoeing, cross-country skiing, camping, hiking, backpacking and harvesting of minor products such as mushrooms and berries

These areas are to remain relatively natural and undeveloped A road density level similar to 1985 levels will be maintained Although recreational site development is not precluded in this management area, the intent is to emphasize primitive and semiprimitive recreation opportunities These areas will be accessed largely by trail with some trails or primitive roads open to motorized use. Timber harvest is permitted in the event of catastrophic tree mortality, consistent with visual and recreation objectives.

Management Area 7 (Wild and Scenic Rivers)

Management is intended to preserve the wild, scenic, and recreational values of those rivers or river segments and their associated corridors added to the National Rivers System by the Omnibus Oregon Wild and Scenic Rivers Act of 1988 Rivers or river sections will be managed to maintain those characteristics which contributed to their classification. A Management Plan for each river will be developed, tiered to the Forest Plan (Also see Wild and Scenic Rivers Act, Public Law 90-542)

Management Area 8 (HCNRA Snake River Corridor)

This area includes the wild and scenic river corridor along the Snake River within the Hells Canyon National Recreation Area and is common to all alternatives. The primary emphasis is on maintaining the recreation experiences available at the time the area was established Maintenance of visual qualities is especially important as is the management of people Management of this area is detailed in the Comprehensive Management Plan for the Hells Canyon National Recreation Area

Management Area 9 (HCNRA Dispersed Recreation/Native Vegetation)

In these areas all activities will be managed to provide opportunities for dispersed recreation and to enhance native vegetation. It is envisioned that these areas will eventually be almost entirely occupied by native plant species Range vegetation will be managed to maintain high seral or climax conditions This will be achieved primarily through the use of grazing/browsing and nonstructural improvements. These areas will provide a mix of primitive, semiprimitive nonmotorized and semiprimitive motorized recreation opportunities Management of this area is detailed in the Comprehensive Management Plan for the Hells Canyon National Recreation Area

Management Area 10 (HCNRA Forage Emphasis)

This management area includes grasslands interwoven with timbered stringers in the Hells Canyon National Recreation Area and is common to all alternatives. It is intended that the grassland portions of these areas will be managed to maintain a high seral stage commensurate with high forage production levels This will be achieved through grazing management, nonstructural improvements and structural improvements that are rustic in nature and that blend with the environment Timbered portions will provide old-growth habitat at approximately current levels. Management of this area is detailed in the Comprehensive Management Plan for the Hells Canyon National Recreation Area.

Management Area 11 (HCNRA Dispersed Recreation/Timber Management)

These areas combine dispersed recreation with timber management on the more productive timber growing sites within the NRA. Management Area 11 is constant throughout all alternatives

The overriding objective is, through timber management, to provide a variety of tree species and a diversity of healthy timber stands, conducive to dispersed types of recreation Management of this area is detailed in the Comprehensive Management Plan for the Hells Canyon National Recreation Area.

Management Area 12 (Research Natural Areas)

Research natural areas (RNA's) are intended to promote and protect natural diversity RNA's typify important forest, shrubland, grassland, alpine, aquatic and geologic types and other natural situations that have special and unique characteristics of scientific interest and importance. Activities in RNA's are limited to research, study, observations, monitoring, and kinds of educational activities that are nondestructive and nonmanipulative

Management Area 13 (Homestead Further Planning Area)

This area includes that portion of the Homestead Further Planning Area under Forest Service management and is common to all alternatives. The USDI Bureau of Land Management, which manages the largest share of the further planning area, is responsible for preparing a recommendation to Congress either for wilderness or nonwilderness use This area will be managed to preserve wilderness characteristics until the detailed study can be completed and Congress determines whether or not wilderness is the most suited allocation. If allocated to nonwilderness, this largely nontimbered area will be managed as illustrated on the alternative maps.

Management Area 14 (Starkey Experimental Forest and Range)

This area includes the 27,100-acre Starkey Experimental Forest and Range and is common to all alternatives

The area is allocated to research use and will be managed to protect existing research projects and provide for future research needs. In addition to its research contribution the experimental forest is expected to provide a variety of other benefits including timber and livestock forage when compatible with research uses

Management Area 15 (Old Growth Preservation)

This area consists of mature and old-growth forest Although there is no wildlife species know to rely solely on old-growth habitat, there are 20 animal species on the Wallowa-Whitman which indicate definite preference for mature or old-growth forest Examples of these are the goshawk, barred owl, pileated woodpecker, and Townsend's warbler. Old-growth forest habitat represents the best habitat

for these species. It is not known whether other habitats are sufficient to maintain viable populations of these species without an available reservoir of old-growth These areas include timber stands at widely ranging elevations and aspects, and in a variety of plant communities It is intended that these stands will continue to provide the quality habitat needed by those wildlife species dependent upon mature and old-growth timber.

Management Area 16 (Administrative and Recreation Site Retention)

This management area applies to all administrative sites such as work centers, fire lookouts, campgrounds and other areas which are occupied by facilities for administration, public recreation or features of cultural significance Included are two summer home tracts and two ski areas

Management Area 17 (Power Transportation Facility Retention)

This area includes areas which are currently in use or are proposed for the transport of gas, oil, or electricity.

Management Area 18 (Anadromous Fish Emphasis)

This area is intended to provide optimum habitat for anadromous fish through management of stream shade and channel conditions and high quality habitat for big game. It also provides good habitat for resident trout.

The dispersion of hiding cover, thermal cover, and forage is managed to provide near-optimum conditions.

Existing snags and green trees are managed to assure that habitat is provided at not less than the 20 percent level for wildlife species dependent upon snags smaller than 20 inches in diameter (DBH) During those times in a stand's rotation where the site is occupied by trees larger than 10 inches in diameter, naturally-occurring dead trees will be managed to maintain at least the 40 percent habitat level for these same species.

COMPARISON OF ALTERNATIVES CONSIDERED IN DETAIL

The following tables present the resource outputs, the environmental effects, the activities, timeframes, acres available for management, benefits, and the costs of all the alternatives Direct, indirect, and cumulative outputs and effects are presented. Outputs and effects are estimates and projections based on available inventory data and assumptions, subject to the annual budget.

The issues provided the basis for formulating all alternatives except the No Action (NEPA) and the No Change alternatives Table II-4 displays the responsiveness, in narrative terms, of each alternative to the issues using selected indicators of responsiveness. Each of the issues also has a set of quantitative indicators of responsiveness that are presented later in table form

By comparing the alternatives' response to issues and concerns and to outputs and effects (Tables II-5 and II-6), the tie between issues and environmental effects will be seen. These tables have been rearranged between the DEIS and this FEIS The alternatives are now arranged by acres of land suitable for timber production, with the alternative having the most suited land (Alternative NC) on the left, and the alternative having the least suited land (Alternative H) on the right This ordering is considered a logical progression of all outputs due to the close tie of many outputs and effects to the level of vegetation management.

Table II-3 Management Area Acreages by Alternative

	Management	NC	A (No Action) 1/	B (RPA), B-dep	C (Preferred)	C-dep, H	D	E	F	G
1	Timber Emphasis	1,269,631	399,660	872,975	716,245	647,347	826,098	736,495	0	858,077
2	Timber/Wildlife	0	0	350,167	0	0	0	306,240	0	350,167
3	Wildlife/Timber	0	706,124	0	382,113	459,749	343,681	0	422,339	0
4	Wilderness 6/	582,700	582,700	582,700	582,700	582,700	582,700	583,713	583,713	582,700
5	Phillips Lake Area*	0	4,967	4,967	4,967	4,967	4,967	4,967	4,967	4,967
6	Roadless Recreation	62,543	134,790	62,543	122,788	108,654	106,194	247,126	150,442	77,441
7	Wild and Scenic River	26,909	26,909	26,909	26,909	26,909	26,909	26,909	26,909	26,909
8	HCNRA Snake River Corridor*	14,355	14,355	14,355	14,355	14,355	14,355	14,355	14,355	14,355
9	HCNRA Disp Rec /Nat Veg *	161,078	161,078	161,078	161,078	161,078	161,078	161,078	161,078	161,078
10	HCNRA Forage*	128,009	128,009	128,009	123,029	128,009	128,009	128,009	128,009	128,009
11	HCNRA Dsp Rec /Tmbr Mgt *	71,206 5/	71,206	71,206	70,706	70,706	70,706	70,706	70,706	71,206
12	Research Natural Areas 2/	0	974	12,960 (11,960)	15,160 (12,450)	14,560 (13,360)	14,560 (13,360)	14,560 (13,360)	14,560 (13,360)	12,960 (11,960)
13	Homestead Further Planning Area 3/*	5,733	5,733	5,733	5,733	5,733	5,733	5,733	5,733	5,733
14	Starkey Exp. For & Range*	27,051	27,051	27,051	27,051	27,051	27,051	27,051	27,051	27,051
15	Old-Growth 4/	0	76,919	28,184	36,750	38,196	38,196	23,295	40,312	28,184
16	Administrative and Recreation Sites	0	0	5,744	5,744	5,744	5,744	5,744	5,744	5,744
17	Utility Corridors	0	0	6,594	6,594	6,594	6,594	6,594	6,594	6,594
18	Anadromous Fish Emph	0	0	0	59,743	60,223	0	0	680,063	0
	Baker City Watershed	0	8,740							
	Total	2,349,215								

* Denotes management areas which, because of Congressional or administrative designation, do not vary among alternatives except as needed to provide research natural areas

1/ Alternative A is the No Action Alternative Since this alternative is made up of numerous allocations from six unit plans, the summary and comparison of acres allocated are necessarily approximate

2/ Figures in parentheses indicate acres within wilderness, Snake River Corridor, Dispersed Recreation/Native Vegetation, or further planning allocations

3/ If the Homestead Further Planning Area does not become wilderness 3,708 acres would become part of Management Area 10 with the remaining acres being within Management Areas 1, 2, or 3, depending on the alternative

4/ Old growth in Alternative A is managed with about 28,000 acres currently in an old-growth condition All other alternatives show dedicated old-growth, nearly all representing old-growth condition

5/ The dispersed recreation/timber management allocation is recognized in the timber management plan but full yields are assumed to accrue from forested lands within that allocation

6/ Includes 23,760 acres within wilderness that have been designated as wild rivers in the Omnibus Oregon Wild and Scenic Rivers Act of 1988

Table II-4
COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

	Issues and Concerns	Outputs or Effects To Be Measured	NC (No Change)	A (No Action)	B (RPA)	B-dep
1	Timber Production	Maintain or increase sawtimber production/projected annual timber production in the first decade.	Sawtimber available at 115% of recent historical level	Sawtimber available at 84% of recent historical level	Maintains 95% of recent historical sawtimber availability.	Sawtimber available at 105% of recent historical level
2	Transportation System Management	Minimize new road construction/miles of road existing in Decade 5	Not estimated, but likely to be similar to Alternative C-departure	All alternatives access previously unharvested stands and thus rely on new road construction The amount of difference among the alternatives ranges from increases of 15-27% as shown in Table II-5. The significance of individual roads is portrayed under Management of Undeveloped Areas below		
		Miles of road open to public use	NE	Reduces mileage open for public use by about 24% for all alternatives except F which has open road mileage reduced by about 37%		
3	Management of Undeveloped Areas	Retain existing undeveloped area/acres of undeveloped area remaining after two decades (excludes wilderness).	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan Permits access of 56% of roadless areas outside the NRA	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan Permits access of 56% of roadless areas outside the NRA	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan Permits access of 74% of roadless areas outside the NRA	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan. Permits access of 74% of roadless areas outside the NRA
4	Local Economy	Maintain economic stability of local communities in the first decade	Moderate increases in jobs and personal income Payments to counties not estimated	Slight reductions in both jobs and personal income though with substantial increases in payments to local governments	Slight increases in jobs and personal income with very large increases in payments to local governments	Moderate increases in jobs and personal income with substantial increases in payments to local governments
5	Livestock Grazing	Maintain or increase forage available to domestic livestock animal unit months	No change in livestock grazing	No change in livestock grazing	Moderate increases in short-term livestock grazing	Substantial increases in livestock grazing

NE - Not estimated

Table II-4
COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

	Issues and Concerns	Outputs or Effects To Be Measured	C Preferred	C-Dep	D	E
1	Timber Production	Maintain or increase sawtimber production/projected annual timber production in the first decade	Sawtimber available at 91% of recent historical level	Sawtimber available at 106% of recent historical level	Sawtimber available at 90% of recent historical level.	Sawtimber available at 86% of recent historical level
2	Transportation System Management	Minimize new road construction/miles of road existing in Decade 5	All alternatives access previously unharvested stands and thus rely on new road construction The amount of difference among the alternatives ranges from increases of 15-27% as shown in Table II-5 The significance of individual roads is portrayed under Management of Undeveloped Areas below			
		Miles of road open to public use	Reduces mileage open for public use by about 24% for all alternatives except F which has open road mileage reduced by about 37%			
3	Management of Undeveloped Areas	Retain existing undeveloped area/acres of undeveloped area remaining after two decades (excludes wilderness)	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan Permits access of 52% of roadless areas outside the NRA	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan Permits access of 59% of roadless areas outside the NRA	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan Permits access of 60% of roadless areas outside the NRA	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan All other roadless areas remain roadless
4	Local Economy	Maintain economic stability of local communities in the first decade	Essentially no change in the total number of jobs Slight reductions in personal income and substantial increases in payments to local governments	Moderate increases in jobs and personal income in the first decade Very large increase in payments to local governments in the first decade	Essentially no change in jobs or personal income Very large increases in payments to local governments.	Slight reduction in the total number of jobs Slight reduction in personal income Substantial increases in payments to local governments
5	Livestock Grazing	Maintain or increase forage available to domestic livestock animal unit months.	No change in short-term livestock grazing	No change in short-term livestock grazing	Moderate increases in livestock grazing.	Moderate decrease in livestock grazing

Table II-4
COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

	Issues and Concerns	Outputs or Effects To Be Measured	F	G	H
1	Timber Production	Maintain or increase timber production/projected annual timber production in the first decade	Sawtimber available at 61% of recent historical level	Sawtimber available at 74% of recent historical level	Sawtimber available at 74% of recent historical level
2	Transportation System Management	*Minimize new road* construction/miles of road existing in Decade 5	*All alternatives access previously unharvested stands and thus rely on new road construction* The amount of difference among the alternatives ranges from increases of 15-27% as shown in Table II-5. The significance of individual roads is portrayed under Management of Undeveloped Areas below		
		Miles of road open to public use	Reduces mileage open for public use by about 24% for all alternatives except F which has open road mileage reduced by about 37%		
3	Management of Undeveloped Areas	Retain existing undeveloped area/acres of undeveloped area remaining after two decades (excludes wilderness)	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan Permits access of 42% of roadless areas outside the NRA	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan Permits access of 68% of roadless areas outside the NRA	Retains Homestead Further Planning area and all roadless areas within the Hells Canyon National Recreation Area as identified in the Comprehensive Management Plan Permits access of 59% of roadless areas outside the NRA
4	Local Economy	Maintain economic stability of local communities in the first decade	Substantial reductions in jobs and personal income Moderate reductions in payments to local governments	Moderate reductions in jobs and personal income Substantial increases in payments to local governments	Moderate reductions in jobs and personal income Moderate increases in payments to local governments
5	Livestock Grazing	Maintain or increase forage *available to domestic livestock* animal unit months	Moderate decrease in *livestock grazing*	Moderate increase in *short-term livestock grazing*	No change in livestock grazing

Table II-4 (Continued)
COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

	Issues and Concerns	Outputs or Effects To Be Measured	NC (No Change)	A (No Action)	B (RPA)	B-dep
6	Old-Growth Timber	Maintain existing old-growth timber meeting Regional old-growth definition (long-term)	Essentially no old growth would remain outside of wilderness and the Hells Canyon National Recreation Area	Moderate reduction in total remaining old growth Poor distribution in some areas	Substantial reduction in total remaining old growth Adequate distribution across the Forest	Substantial reduction in total remaining old growth Adequate distribution across the Forest
7	Minerals	Maximize opportunities for mineral exploration and extraction/acres of known mineral potential available for mineral entry with normal entry with normal coordination requirements	No change in available acres	No change in available acres	Moderate increase in available acres	Moderate increase in available acres
8	Wildlife Production, Deer and Elk	Potential number of animals	NE	Would vary from a very small decrease in decade 1 of about 1% to a decrease in decade 3 of about 4% Thereafter approximating recent levels more closely	Essentially no change in the first or second decades, to a third decade decrease of 9% Fifth decade levels are 7% lower than today.	Big-game production follows a 3-decade downward trend with this alternative to a low point about 10% below recent levels
9	Recreation Diversity	Change in the recreation opportunity spectrum (Wilderness)	---------- No alternative changes wilderness classification significantly ----------			
		(Nonwilderness)				
		Diversity of Forest conditions	Would result in a substantial decrease in diversity of conditions and of recreation opportunity as large areas are managed according to MA 1	Would result in moderate decrease in diversity	Substantial decrease in diversity of conditions but less than with NC or B-dep	Similar to Alternative NC
10	Fish Habitat/Water Quality	Maintain or enhance riparian and aquatic conditions and water quality	This alternative assumes full timber yield within riparian areas, a very high overall level of timber activity, and provides for a low level of fish habitat improvement relative to the other alternatives, resulting in the highest risk to riparian values of any alternative	Reduced timber yields within riparian areas, in combination with a low level of fish habitat improvement relative to the other alternatives and substantial acreages left undeveloped results in a moderate risk to riparian and fishery values	Reduced timber yields within riparian areas, a high level of fish habitat improvement, but a high level of overall timber management activity result in a moderate risk to riparian and fishery values	Reduced timber yields within riparian areas, a high level of fish habitat improvement, but a very high level of overall timber management activity result in a relatively high risk to riparian and fishery values

NE - Not estimated

Table II-4 (Continued)
COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

	Issues and Concerns	Outputs or Effects To Be Measured	C Preferred	C-Dep	D	E
6	Old-Growth Timber	Maintain existing old-growth timber meeting Regional old-growth definition (long-term)	Moderate reduction in total remaining old growth Good distribution across the Forest	Moderate reduction in total remaining old growth Good distribution across the Forest	Moderate reduction in total remaining old growth Good distribution across the Forest	Slight reduction in total remaining old growth Adequate distribution across the Forest
7	Minerals	Maximize opportunities for mineral exploration and extraction/acres of known mineral potential available for mineral entry with normal entry with normal coordination requirements	Slight increase in available acres	Slight increase in available acres	Slight increase in available acres	No change in available acres
8	Wildlife Production, Deer and Elk	Potential number of animals	5% decrease in decade 2 to a 9% decrease in decade 3, with output levels thereafter approximating 95% of recent levels	Trends downward to a maximum decrease of 7% in decade 3 with subsequent resurgence to a level 95% that of recent times	A 4% decade 1 decrease would be followed by downward movement to a decrease of 9% in decade 3 with subsequent increase to a 6% reduction in decade 5	A 4% decade 1 decrease would be followed by downward movement to a decrease of 8% in decade 3 with subsequent increase to a 6% reduction in decade 5
9	Recreation Diversity	Change in the recreation opportunity spectrum (Wilderness)	-------- No alternative changes wilderness classification significantly --------			
		(Nonwilderness)				
		Diversity of Forest conditions	Slight to moderate reduction in diversity	Moderate reduction in diversity	Similar to C-dep.	Moderate reduction in diversity
10	Fish Habitat/Water Quality	Maintain or enhance riparian and aquatic conditions and water quality	Reduced timber yields within riparian areas, in combination with a high level of fish habitat improvement relative to the other alternatives and substantial acreages left undeveloped results in a low risk to riparian and fishery values	Similar to Alternative C	Similar to Alternative A	Reduced timber yields within riparian areas, a high level of fish habitat improvement, a moderate level of overall timber management activity and large acreages left undeveloped result in a relatively low risk to riparian and fishery values

Table II-4 (Continued)
COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

	Issues and Concerns	Outputs or Effects To Be Measured	F	G	H
6	Old-Growth Timber	Maintain existing old-growth timber meeting Regional old-growth definition (long-term)	Essentially no change in total remaining old growth Good distribution across the Forest	Slight decrease in total remaining old growth Adequate distribution across the Forest	Moderate decrease in total remaining old growth Adequate distribution across the Forest
7	Minerals	Maximize opportunities for mineral exploration and extraction/acres of known mineral potential available for mineral entry with normal entry with normal coordination requirements	No change in available acres	Moderate increase in available acres	Slight increase in available acres
8	Wildlife Production, Deer and Elk	Potential number of animals	7% increase in decade 1 and remaining about 5% higher than present thereafter.	A 5% decade 2 decrease would be followed by downward movement to a decrease of 10% in decade 3 with subsequent increase to a 7% reduction in decade 5	A 3% decade 2 decrease would be followed by downward movement to a decrease of 7% in decade 3 with subsequent increase to a 5% reduction in decade 5
9	Recreation Diversity	Change in the recreation opportunity spectrum (Wilderness)	-------- No alternative changes wilderness classification significantly --------		
		(Nonwilderness)			
		Diversity of Forest conditions	Would maintain or slightly improve present variety of conditions and recreational opportunities	Slight decrease in diversity	Slight reduction in diversity
10	Fish Habitat/Water Quality	Maintain or enhance riparian and aquatic conditions and water quality	Reduced timber yields within riparian areas, a high level of fish habitat improvement, a low level of overall timber management activity and large acreages left undeveloped result in a lower risk to riparian and fishery values than any other alternative	Similar to Alternative A	Similar to Alternative C

Table II-5
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- TIMBER -

Outputs/Effects	Unit of Measure	ALTERNATIVE										
		NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Lands Tentatively Suitable for Timber Production	M Acres	NE 1/	1,090 1	1,090 1	1,090.1	1,090 1	1,090 1	1,090 1	1,090 1	1,090 1	1,090 1	1,090.1
Lands Suitable for Timber Production 2/	M Acres	1,238 3/	866 5	880 4	940 0	836 8	846 1	857 4	788 6	797.6	800 8	806 0
Total	M Acres											
Full Yield	M Acres	1,238	273 0	288 2	528.1	296 4	240 6	263 8	312 7	120 0	122 7	164 3
50-90% of Full Yield	M Acres	0	535 3	572 0	353 5	505 5	533 4	567 3	456 3	565 2	594 8	568 0
1-49% of Full Yield	M Acres	0	58 2	20 2	58 4	34 9	72 1	26 4	19 5	112 4	83 3	73 8
Timber Harvest Prescriptions												
Clearcut	M Acres	NE	333	360	396	331	331	307	309	309	302	307
Shelterwood	M Acres	NE	381	435	438	399	397	426	390	382	429	400
Selection	M Acres	NE	153	85	106	107	118	124	90	106	70	103
Allowable Sale Quantity												
Sawlog Volume 6/ (Recent levels 28 6)	Million CF/Year											
Decade 1		35 1 4/	27 1	30 1	34 4	27 7	34 4	28 6	26 9	20 6	23 7	24 0
Decade 2		35 1 4/	27 3	30 2	36 5	27 3	25 2	28 7	27 1	30 0	24 4	24 2
Decade 5		35 1 4/	27 2	30 2	39 0	27 3	25 1	28 4	26 8	21 3	24 0	24.6
Sawlog Volume (Recent levels 159)	Million BF/Year											
Decade 1		183 5/	134	151	167	144	169	143	136	98	117	118
Long-Term Sustained Yield Timber Supply	Million CF/Year	NE	40 1	46 2	41 3	42 3	45 6	43.6	41 1	34 8	43 1	39 4
Timber Growth in Decade 5	Million CF/Year	NE	28 1	31.3	31.6	30 6	27 7	31 7	29 1	18 2	21 4	23 7

Figures shown indicate levels of output and activities expected with full funding
NE Not estimated, M = thousand, CF = cubic feet, BF = board feet
1/ A land suitability determination, as discussed in 36 CFR 219 14(a), was not made
2/ Suitable for timber production given the multiple use objectives of the alternative (36 CFR 219 14(d)).
3/ Includes all productive forest land not specifically allocated to a nontimber use in the Timber Management Plan
4/ Estimate based on a comparison with Alternative B-departure Although projected for five decades, in all likelihood future harvests would have to be reduced due to insufficient available timber volume Board foot/cubic conversion ratio estimated as the average conversion ratio from Alternative B-departure for the three decades shown.
5/ Potential yield Actual sawtimber harvest during the decade 1977-1986 was 152 MMBF or 83% of the identified potential yield Not directly comparable to allowable sale quantity
6/ All alternatives except B-Dep and C-Dep were formulated on a nondeclining flow basis Fluctuations between decades are the result of adjustments to lodgepole pine utilization made outside the model

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- TIMBER -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Unregulated Timber 1/ Roundwood Volume Only (Recent Levels 9 6)	Million CF/Year											
Decade 1		101 2/	7.8	87	100	79	99	82	77	60	69	69
Decade 2		78 2/	65	73	86	66	61	69	65	50	57	58
Decade 5		75 2/	52	57	75	52	48	55	51	40	45	46
Personal-Use Fuelwood Decade 1	Million CF/Year	50	50	50	50	50	50	50	50	50	50	50
Fuel Treatment	M Acres/Year											
Decade 1		257 2/	192	188	227	224	265	192	174	143	141	150
Decade 2		249 2/	223	216	312	192	178	230	218	201	208	209
Decade 5		360 2/	282	249	332	227	234	252	225	210	207	240
Reforestation 3/ (Recent levels 3 3)	M Acres/Year											
Decade 1		NE	133	148	206	143	167	150	143	106	114	130
Decade 2		NE	129	132	114	127	133	124	111	81	88	103
Decade 5		NE	69	94	131	76	68	74	74	85	85	57
Timber Stand Improvement (Recent levels 3 9	M Acres/Year											
Decade 1		104 2/	92	77	120	74	66	74	82	20	48	54
Decade 2		129 2/	77	122	158	9.1	94	109	116	17	45	65
Decade 5		101 2/	35	85	80	66	28	87	92	29	41	32

Figures shown indicate levels of outputs and activities expected with full funding
NE Not estimated,, M = thousand, CF = cubic feet, BF = board feet
1/ Salvage of cull, dead lodgepole pine, and small diameter (less than 5 inches) material
2/ This item is not addressed in the 1962 Timber Management Plan The figure was estimated based on the proportion of Alternative NC's board foot volume to Alternative B-departure's board foot volume
3/ Includes all acres where activities aiding the reestablishment of tree cover are employed Includes planting and other reforestation measures

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- FIRE, RECREATION -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Fire Management Effectiveness Index	$/M protected Acres/Year											
Decade 1		NE	943	987	1,053	948	1,050	965	939	851	895	899
Decade 2		NE	929	971	1,051	934	901	950	925	840	883	886
Decade 5		NE	914	955	1,081	918	887	934	910	829	869	873
Developed Recreation Use	M RVD's/Year											
(Recent Levels 367)												
Decade 1		399	399	399	399	399	399	399	399	399	399	399
Decade 2		464	464	464	464	464	464	464	464	464	464	464
Decade 5		621	621	621	621	621	621	621	621	621	621	621
Nonwilderness Dispersed Recreation Use 1/												
Roaded 2/	M RVD's/Year											
(Recent Levels 343)												
Decade 1		373	373	373	373	373	373	373	373	373	373	373
Decade 2		433	433	433	433	433	433	433	433	433	433	433
Decade 5		505	505	463	463	507	499	499	541	531	484	499
Unroaded 3/	M RVD's/Year											
(Recent Levels 389)												
Decade 1		423	423	423	423	423	423	423	423	423	423	423
Decade 2		491	491	491	491	491	491	491	491	491	491	491
Decade 5		572	572	525	525	575	566	566	613	602	549	566

NE Not Estimated, M = thousand, RVD's = Recreation Visitor Days
1/ Figures are exclusive of wildlife and fish recreation user days (WFUD's)
2/ Includes roaded natural, roaded modified, rural, and urban recreation opportunity spectrum classes
3/ Includes primitive, semiprimitive nonmotorized, and semiprimitive motorized recreation opportunity spectrum classes

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- RECREATION -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Wilderness Use 1/	M RVD's/Year											
(Recent Levels 72)												
Decade 1		78	78	78	78	78	78	78	78	78	78	78
Decade 2		91	91	91	91	91	91	91	91	91	91	91
Decade 5		106	106	98	98	107	105	105	114	112	102	105
Wildlife and Fish Recreation Use	M WFUD's/ Year											
(Recent Levels 340)												
Decade 1		370	370	370	370	370	370	370	370	370	370	370
Decade 2		430	430	430	430	430	430	430	430	430	430	430
Decade 5		537	537	537	537	537	537	537	537	537	537	537
Hunting Use	M WFUD's/											
(Recent Levels: 234)	Year											
Decade 1		254	254	254	254	254	254	254	254	254	254	254
Decade 2		295	295	295	295	295	295	295	295	295	295	295
Decade 5		368	368	368	368	368	368	368	368	368	368	368
Fishing Use	M WFUD's/											
(Recent Levels: 85)	Year											
Decade 1		92	92	92	92	92	92	92	92	92	92	92
Decade 2		107	107	107	107	107	107	107	107	107	107	107
Decade 5		134	134	134	134	134	134	134	134	134	134	134
Other Fish and Wildlife Use	M WFUD's/ Year											
(Recent Levels 22)												
Decade 1		24	24	24	24	24	24	24	24	24	24	24
Decade 2		28	28	28	28	28	28	28	28	28	28	28
Decade 5		35	35	35	35	35	35	35	35	35	35	35

NE Not Estimated; M = thousand, RVD's = Recreation Visitor Days, WFUD's = Wildlife and Fish User Days.
1/ Figures are exclusive of wildlife and fish recreation user days (WFUD's).
2/ Wildlife and fish user days (hunting and fishing)

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- RECREATION -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Trail Construction and Reconstruction	Miles/Year											
(Recent Levels 1)												
Decade 1		4	4	4	4	4	4	4	4	4	4	4
Decade 2		5	5	5	5	5	5	5	5	5	5	5
Decade 5		5	5	5	5	5	5	5	5	5	5	5
Developed Site Construction and Reconstruction	PAOT/Year											
(Recent Levels 100)												
Decade 1		100	100	550	550	550	550	550	550	550	550	550
Decade 2		100	100	50	50	50	50	50	50	50	50	50
Decade 5		100	100	50	50	50	50	50	50	50	50	50
Demand for Wilderness Primitive Recreation	M RVD's/Year											
(Recent Levels 169)												
Decade 1		222	222	222	222	222	222	222	222	222	222	222
Decade 2		248	248	248	248	248	248	248	248	248	248	248
Decade 5		341	341	341	341	341	341	341	341	341	341	341
Demand for Wilderness Semi-Primitive Recreation	M RVD's/Year											
(Recent Levels 31)												
Decade 1		8	8	8	8	8	8	8	8	8	8	8
Decade 2		9	9	9	9	9	9	9	9	9	9	9
Decade 5		13	13	13	13	13	13	13	13	13	13	13

Figures shown indicate levels of outputs and activities expected with full funding
NE Not Estimated, PAOT = persons at one time
M RVD One thousand recreation visitor days The equivalent of 12,000 hours of recreation
M WFUD One thousand wildlife and fish user days The equivalent of 12,000 hours of recreation involving the use of wildlife or fish

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- RECREATION -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B Dep	C Preferred	C-Dep	D	E	F	G	H
Demand for Non-Wilderness Primitive Recreation	M RVD's/Year											
(Recent Levels 6)												
Decade 1		7	7	7	7	7	7	7	7	7	7	7
Decade 2		8	8	8	8	8	8	8	8	8	8	8
Decade 5		11	11	11	11	11	11	11	11	11	11	11
Demand for Non-Wilderness Semi-Primitive Non-Motorized Recreation	M RVD's/Year											
(Recent Levels 122)												
Decade 1		140	140	140	140	140	140	140	140	140	140	140
Decade 2		157	157	157	157	157	157	157	157	157	157	157
Decade 5		216	216	216	216	216	216	216	216	216	216	216
Demand for Developed Recreation Use	M RVD's/Year											
(Recent Levels 367)												
Decade 1		399	399	399	399	399	399	399	399	399	399	399
Decade 2		464	464	464	464	464	464	464	464	464	464	464
Decade 5		621	621	621	621	621	621	621	621	621	621	621

Figures shown indicate levels of outputs and activities expected with full funding
NE Not Estimated
M RVD One thousand recreation visitor days The equivalent of 12,000 hours of recreation
M WFUD One thousand wildlife and fish user days The equivalent of 12,000 hours of recreation involving the use of wildlife or fish

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- RECREATION -

Outputs/Effects	Unit of Measure	ALTERNATIVE										
		NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Demand for Non-Wilderness Semi-Primitive Motorized Recreation	M RVD's/Year											
(Recent Levels 268)												
Decade 1		308	308	308	308	308	308	308	308	308	308	308
Decade 2		344	344	344	344	344	344	344	344	344	344	344
Decade 5		474	474	474	474	474	474	474	474	474	474	474
Demand for Non-Wilderness Roaded Natural and Modified Recreation	M RVD's/Year											
(Recent Levels 887)												
Decade 1		1,019	1,019	1,019	1,019	1,019	1,019	1,019	1,019	1,019	1,019	1,019
Decade 2		1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Decade 5		1,568	1,568	1,568	1,568	1,568	1,568	1,568	1,568	1,568	1,568	1,568
Demand for Non-Wilderness Rural Recreation	M RVD's/Year											
(Recent Levels 106)												
Decade 1		122	122	122	122	122	122	122	122	122	122	122
Decade 2		136	136	136	136	136	136	136	136	136	136	136
Decade 5		187	187	187	187	187	187	187	187	187	187	187

Figures shown indicate levels of outputs and activities expected with full funding
NE Not Estimated
M RVD One thousand recreation visitor days The equivalent of 12,000 hours of recreation
M WFUD One thousand wildlife and fish user days The equivalent of 12,000 hours of recreation involving the use of wildlife or fish

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- RECREATION -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Capacity for Wilderness Primitive Recreation	M RVD's/Year											
(Recent Levels 276												
Decade 1		300	300	300	300	300	300	300	300	300	300	300
Decade 2		300	300	300	300	300	300	300	300	300	300	300
Decade 5		300	300	300	300	300	300	300	300	300	300	300
Capacity for Wilderness Semi-Primitive Recreation	M RVD's/Year											
(Recent Levels 56												
Decade 1		33	33	33	33	33	33	33	33	33	33	33
Decade 2		33	33	33	33	33	33	33	34	34	33	33
Decade 5		33	33	33	33	33	33	33	34	34	33	33
Capacity for Non-Wilderness Primitive Recreation	M RVD's/Year											
(Recent Levels 7)												
Decade 1		7	7	7	7	7	7	7	7	7	7	7
Decade 2		7	7	7	7	7	7	7	7	7	7	7
Decade 5		7	7	7	7	7	7	7	7	7	7	7
Capacity for Non-Wilderness Semi-Primitive Non-Motorized Recreation	M RVD's/Year											
(Recent Levels 323												
Decade 1		300	300	290	290	297	297	297	309	306	290	297
Decade 2		245	245	210	210	232	232	232	280	270	210	232
Decade 5		206	206	155	155	200	187	187	261	245	174	187

Figures shown indicate levels of outputs and activities expected with full funding
NE Not Estimated
M RVD. One thousand recreation visitor days The equivalent of 12,000 hours of recreation
M WFUD One thousand wildlife and fish user days The equivalent of 12,000 hours of recreation involving the use of wildlife or fish

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- RECREATION -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Capacity for Developed Recreation Use	M RVD's/Year											
(Recent Levels 583)												
Decade 1		587	587	661	661	661	661	661	661	661	661	661
Decade 2		595	595	661	661	661	661	661	661	661	661	661
Decade 5		618	618	661	661	661	661	661	661	661	661	661
Capacity for Non-Wilderness Semi-Primitive Motorized Recreation	M RVD's/Year											
(Recent Levels 574)												
Decade 1		522	522	516	516	528	528	528	539	534	522	528
Decade 2		407	407	379	379	413	413	413	453	442	396	413
Decade 5		327	327	281	281	339	333	333	402	379	310	333
Capacity for Non-Wilderness Roaded Natural and Modified Recreation	M RVD's/Year											
(Recent Levels 6,135)												
Decade 1		6,319	6,319	6,380	6,380	6,319	6,319	6,380	6,257	3,067	6,380	6,319
Decade 2		6,810	6,810	7,055	6,810	6,687	6,687	6,810	6,626	3,313	6,994	6,687
Decade 5		7,178	7,178	7,484	7,178	6,932	6,932	7,178	6,871	3,435	7,423	6,932
Capacity for Non-Wilderness Rural Recreation	M RVD's/Year											
(Recent Levels 173)												
Decade 1		173	173	173	173	173	173	173	173	173	173	173
Decade 2		173	173	173	173	173	173	173	173	173	173	173
Decade 5		173	173	173	173	173	173	173	173	173	173	173

Figures shown indicate levels of outputs and activities expected with full funding
NE Not Estimated
M RVD One thousand [illegible]

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- RECREATION, WILDLIFE -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Visual Quality Objectives												
Preservation	M Acres	NE	582 7	582 7	582.7	582 7	582 7	582 7	583 7	582 7	582 7	582.7
Retention	M Acres	NE	257 6	185 2	185 6	211 2	257 6	257 6	185 2	257 6	185 2	257 6
Partial Retention	M Acres	NE	397 4	271.9	271 9	325 9	397 4	397 4	271 9	397 4	271 9	397 4
Modification/Max Mod	M Acres	NE	1,111 5	1,309 4	1,309 4	1,229 4	1,111 5	1,111 5	1,308 4	1,110 5	1,309 4	1,111 5
Acres Remaining Unroaded at End of	M Acres											
Decade 1		400	400	400	400	410	390	400	484	470	400	390
Decade 2		380	380	380	380	390	360	360	484	450	390	360
Decade 5		362	362	337	337	380	360	357	484	402	352	360
Unroaded Areas Assigned to Unroaded Management Prescriptions	M Acres	344	344	298	298	354	337	333	484	379	313	337
Old-growth Forest (Recent Levels 173 0)	M Acres											
Decade 1		122	154	150	143	164	160	158	169	172	157	163
Decade 2		112	150	145	137	162	158	155	168	172	154	161
Decade 5 2/		105	147	142	133	161	156	153	167	172	152	160
Management Indicator Species 1/												
Pileated Woodpecker	Pairs											
Decade 1		346	346	346	346	346	346	346	346	346	346	346
Decade 2		260	260	380	295	330	322	323	337	349	313	330
Decade 5		202	202	287	266	323	315	317	334	349	301	324

Figures shown indicate levels of outputs and activities expected with full funding
NE Not estimated, M = thousands
1/ Numbers of management indicator species are index values only based upon acres of available habitat as described in Chapter IV
2/ Also applies to decade 13

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- RECREATION, WILDLIFE, FISH -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Primary Cavity Excavators	Pairs	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/
Pine Marten	Pairs 1/	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/
Goshawk	Pairs	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/
Resident Trout	Number	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/
Steelhead Trout	Numbers	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/
Rocky Mountain Elk	M Elk Summering 4/											
Decade 1		NE	21 0	21 0	21 0	21 0	21 0	21 0	21 0	21 0	21 0	21 0
Decade 2		NE	20 8	19 9	19 9	20 0	20 4	20 1	20 1	22 4	19 9	20 4
Decade 5		NE	20 4	19 5	19 0	19 8	20 0	19 2	19 6	21 7	19 5	20 0
Anadromous Fish Commercial Production	Thousand Pounds Caught											
Decade 1		215	215	215	215	215	215	215	215	215	215	215
Decade 2		1,118	1,118	1,125	1,125	1,125	1,125	1,118	1,125	1,125	1,118	1,125
Decade 5		1,239	1,239	1,247	1,247	1,247	1,247	1,239	1,247	1,247	1,239	1,247
Smolt Habitat Capability	Thousands of Smolt											
Decade 1		168	168	179	179	179	179	171	179	179	171	179
Decade 2		209	209	229	229	229	229	213	229	229	214	229
Decade 5		328	328	378	378	378	378	339	378	378	341	378

Figures shown indicate levels of outputs and activities expected with full funding
NE Not estimated
1/ Population trend not estimated, but expected to parallel pileated woodpecker Actual numbers to be generated during monitoring
2/ Actual numbers to be generated during monitoring
3/ Numbers of spawning fish assuming full escapement of the numbers shown, 38,203 are due to achievement of full escapement--work down by other agencies
4/ Index number of elk summering on the Forest

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- WILDLIFE, WATERSHED -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Wildlife Habitat Improv	Acres											
Decade 1		500	500	2,000	2,000	1,000	1,000	1,000	2,000	2,000	500	1,000
Decade 2		500	500	2,000	2,000	1,000	1,000	1,000	2,000	2,000	500	1,000
Decade 5		500	500	500	500	1,000	1,000	1,000	500	500	500	1,000
Wildlife Habitat Improv	Acre Equiva-lents											
Decade 1		2,500	2,500	10,000	10,000	5,000	5,000	5,000	10,000	10,000	2,500	5,000
Decade 2		2,500	2,500	10,000	10,000	5,000	5,000	5,000	10,000	10,000	2,500	5,000
Decade 5		2,500	2,500	2,500	2,500	5,000	5,000	5,000	2,500	2,500	2,500	5,000
Water Yield	Million Acre Feet											
Decade 1		2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73
Decade 2		2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2,73	2 73	2 73
Decade 5		2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73
Accelerated Sediment (Index)	Thousands of											
Decade 1	tons per	NE	223	224	230	229	237	224	223	217	218	221
Decade 2	decade	NE	233	227	241	227	229	230	228	225	219	222
Decade 5		NE	233	225	248	230	228	233	229	227	227	228
Watershed Improvement Work	Acres/Year											
(Recent Levels 5)												
Decade 1		5	5	1,000	1,500	1,000	1,000	1,000	500	500	500	1,000
Decade 2		5	5	1,000	1,500	1,000	1,000	1,000	500	500	500	1,000
Decade 5		5	5	1,000	0	1,000	1,000	1,000	500	500	500	1,000

Figures shown indicate levels of outputs and activities expected with full funding
NE Not estimated
1/ Estimated sediment (above natural levels) resulting from roads and timber harvest

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- RANGE, TRANSPORTATION -

Outputs/Effects	Unit of Measure	ALTERNATIVE										
		NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Range–Permitted Grazing (Recent Levels 186)	M AUM's/Year											
Decade 1		186	186	207	204	186	186	191	163	143	207	186
Decade 2		186	186	186	204	160	160	191	163	143	186	186
Decade 5		186	186	186	204	160	160	191	163	143	186	186
Arterial and Collector Road Construction and Reconstruction 1/	Miles/Year											
Decade 1		2/	69	77	86	69	88	76	84	54	60	58
Decade 2		2/	64	75	93	59	79	70	87	47	60	54
Decade 5		2/	76	88	111	76	80	86	100	54	66	66
Timber Purchaser Road Construction and Reconstruction 1/ (Recent Levels 180)	Miles/Year											
Decade 1		2/	178	195	232	180	218	187	194	131	153	152
Decade 2		2/	136	148	188	123	140	136	152	94	128	110
Decade 5		2/	131	140	193	128	116	137	128	90	105	107
Roads Suitable for Public (Passenger car)	Miles 3/											
Decade 1		NE	900	900	900	900	900	900	900	900	900	900
Decade 2		NE	930	932	932	930	930	930	910	924	931	930
Decade 5		NE	930	932	932	930	930	930	910	924	931	930

Figures shown indicate levels of outputs and activities expected with full funding
NE Not estimated, M = thousand
1/ Primarily reconstruction in later decades
2/ Not estimated, but probably similar to Alternative C-departure
3/ At end of decade

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- TRANSPORTATION, MINERALS, LOCAL ECONOMY -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Roads Suitable for Public (High Clearance Vehicle)	Miles											
Decade 1		NE	4,630	4,630	4,630	4,630	4,630	4,630	4,630	4,630	4,630	4,630
Decade 2		NE	5,080	5,355	5,370	4,975	5,230	5,280	5,110	3,830	5,060	4,980
Decade 5		NE	5,290	5,595	5,685	5,180	5,420	5,400	5,365	3,985	5,255	5,155
Roads Requiring User Maintenance (High Clearance Vehicle)	Miles											
Decade 1		NE	750	750	750	750	750	750	750	750	750	750
Decade 2		NE	750	750	750	750	750	750	750	750	750	750
Decade 5		NE	750	750	750	750	750	750	750	750	750	750
Energy Minerals Produced	Billion BTU/ Year											
Decade 1		0	0	0	0	0	0	0	0	0	0	0
Decade 2		0	0	0	0	0	0	0	0	0	0	0
Decade 5		0	0	2,100	2,100	0	0	0	0	0	2,100	0
Nonenergy Minerals Produced	Million $/Year											
Decade 1		13 4	13 4	15 0	15 0	13 5	13 5	13 5	13 1	15 0	15 0	13 5
Decade 2		53 3	53 3	60 0	60 0	54 2	54 2	54 2	52 6	60 0	60 0	54 2
Decade 5		121 6	121 6	137 0	137 0	125 0	125 0	125 0	121.2	137 0	137.0	125 0
Mineral Operating Plans	# Active/Year											
Decade 1		352	352	379	379	354	354	354	340	379	379	354
Decade 2		394	394	425	425	397	397	397	381	425	425	354
Decade 5		463	463	499	499	466	466	466	448	499	499	466

Figures shown indicate levels of outputs and activities with full funding
NE Not estimated, BTU = British thermal units

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- MINERALS, LOCAL ECONOMY -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Human Resource Program	Person Years/ Year											
Decade 1		4	4	4	4	4	4	4	4	4	4	4
Decade 2		4	4	4	4	4	4	4	4	4	4	4
Decade 5		4	4	4	4	4	4	4	4	4	4	4
Forest Related Jobs Decade 1	Jobs/Yr											
(Recent Levels)												
Sawtimber (982)		1,123	838	946	1,048	894	1,063	893	850	616	731	742
Roundwood (218)		232 2/	177	197	227	179	225	187	176	136	156	157
Livestock (93)		93	93	104	102	93	93	96	82	72	104	93
Developed Recreation (404)		439	439	439	439	439	439	439	439	439	439	439
Dispersed Recreation (1,258)		1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368
TOTAL (2,955)		3,255	2,915	3,054	3,183	2,974	3,188	2,983	2,914	2,631	2,798	2,800
Forest Related Personal Income - Decade 1	Million $/Yr											
(Recent Levels)												
Sawtimber (18 4)		21 1	15 7	17 8	19 7	16 8	19 9	16 8	15 9	11 6	13 7	13 9
Roundwood (4 4)		4 7 1/	3 6	4 0	4 6	3 6	4 6	3 8	3 6	2 8	3 2	3 2
Livestock (1 1)		1 1	1 1	1 2	1 2	1 1	1 1	1 1	1 0	0 8	1 2	1 1
Developed Recreation (5 0)		5 4	5 4	5 4	5 4	5 4	5 4	5 4	5 4	5 4	5 4	5 4
Dispersed Recreation (15 6)		16 9	16 9	16 9	16 9	16 9	16 9	16 9	16 9	16 9	16 9	16 9
TOTAL (44 5)		49 2	42 8	45 3	47 8	43 9	47 9	44 0	42 8	37 5	40 4	40 6

1/ Proportioned from Alternative B-Departure based on first decade roundwood offerings

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- LOCAL ECONOMY, COSTS, RETURNS -

		ALTERNATIVE										
Outputs/Effects	Unit of Measure	NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Payments to Local Governments - Decade 1 (Recent Levels)												
Sawtimber (3 7 1/)	Million $/Yr	4 0 2/	3 7	4 3	3 9	4 0	4 5	4 0	3 9	2 7	3 7	3 4
Roundwood (1/)		0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Livestock (0 3)		0 3	0 3	0.3	0 3	0 3	0 3	0 3	0 2	0 2	0 3	0 3
Developed Recreation (0 0)		0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Dispersed Recreation (0 0)		0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
TOTAL (4 0)		4 3	4 0	4 7	4 3	4 3	4 9	4 4	4 2	3 0	4 0	3 8
Operational Costs	Million $/Year											
Decade 1		NE	12 4	13 4	14 4	12 8	14 2	12 8	12 6	11 4	11 8	12 1
Decade 2		NE	11 7	12 7	13 9	12 1	11 7	12 2	12 0	10 8	11 1	11 5
Decade 5		NE	11 7	12 5	14 3	12 0	11 6	12 1	11 9	10 8	11 1	11 4
Capital Investment Costs	Million $/Year											
Decade 1		NE	9 2	8 5	13 1	9 4	9 3	8 9	8 1	6 4	6 2	6 6
Decade 2		NE	9.6	8 3	13 1	8 2	8.3	9 0	8.4	6 9	6 9	7 1
Decade 5		NE	8 5	7.6	16 8	7 6	7 6	8 0	7 5	5 8	5 6	6 1

Figures shown indicate levels of outputs and activities expected with full funding
NE Not estimated
1/ Gross Federal receipts including purchaser credit roads

Table II-5 (Continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVE
- COSTS, RETURNS -

Outputs/Effects	Unit of Measure	ALTERNATIVE										
		NC No Change 5/	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Total National Forest Funds												
Allocated	Million $/Year											
Decade 1		NE	70	63	104	73	68	66	62	49	41	47
Decade 2		NE	74	6.2	104	6.3	65	68	64	5.4	50	53
Decade 5		NE	64	55	139	5.7	58	5.9	56	43	37	44
Appropriated	Million $/Year											
Decade 1		NE	146	15.7	171	149	167	15.1	146	130	138	140
Decade 2		NE	139	149	166	14.0	135	144	139	123	131	133
Decade 5		NE	138	146	171	139	134	142	138	123	130	132
Cash Returns to Federal Government	Million $/Year											
Decade 1		NE	121	150	120	128	157	133	133	88	131	119
Decade 2		NE	114	155	171	136	107	140	142	96	136	121
Decade 5		NE	69	181	-54	126	125	131	134	154	180	175
Total Returns to Federal Government 1/	Million $/Year											
Decade 1		NE	152	179	163	164	186	164	160	112	151	142
Decade 2		NE	150	184	21.3	162	13.6	172	172	12.5	165	150
Decade 5		NE	94	204	23	147	148	15.5	156	172	19.6	195

Figures shown indicate levels of outputs and activities expected with full funding
NE Not estimated
1/ Gross Federal receipts including purchaser credit roads

TABLE II-6

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	NC	A	B	B-dep	C	C-dep
		No Action	RPA		Preferred	
Air Quality	Will vary with acres of fuel treatment (see Table II-5) However, differences will be slight and probably not noticeable Off-Forest sources of smoke will have greater effects on air quality than will on-Forest activities, regardless of alternative, except in instances of large on-Forest wildfires					
Landscape Character of the Forest	Forest will appear natural or slightly modified for most important travel routes HCNRA and wildernesses will retain largely unaltered appearance	Forest will appear natural or slightly modified for most important travel routes HCNRA and wildernesses will retain largely unaltered appearance	Visual character will appear significantly altered in most forested areas with exceptions of major travel routes, HCNRA wildernesses, and areas above 6,000 feet elevation Elsewhere, management activities will often dominate	Similar to Alternative B, but landscapes will be more rapidly brought to a managed appearance	Forest will show somewhat more alteration by man than Alternative A, but much less than Alternative B Natural character will be retained, or partially retained along most important travel routes	The effects will be similar to Alternative C, but higher level of industrial activity will be apparent Landscape alteration, where permitted, will come about more rapidly
Changes in Recreational Use Patterns	Very intensive management, harvest of all available old-growth, and managing for full yield within the dispersed recreation/timber management allocation of the HCNRA will substantially change recreation use patterns	Use pattern will change slightly as roadless areas are developed Some hunting use will shift to wilderness Overall use pattern will change little	Use of wilderness and HCNRA will increase as remainder of Forest is developed	Same as Alternative B Shifts in use will occur more rapidly	Similar to Alternative A Fewer roadless areas than present will force some users to wilderness or the HCNRA	Similar to Alternative C, but projected shifts would occur more rapidly
Accessibility for Exploration of Potential Mineralized Area	No change	No change	Moderate increase in accessibility (about 8%)	Moderate increase in accessibility (about 8%)	Slight (3%) increase in accessibility	Slight (3%) increase in accessibility

Table II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	D	E	F	G	H
Air Quality	(See Alternative A)				
Landscape Character of the Forest	The same as Alternative A	Effects would be the same as Alternative B with the exception that over 186,000 fewer acres of roadless areas would be developed, thereby retaining natural character	More natural character of the Forest will be retained over a longer period of time than in any other alternative	Similar to Alternative B, but some steeper lands would not be harvested, resulting in less visual impact in these areas	Similar to Alternative C, but steeper lands where timber harvest is expensive will not be harvested for several decades The impression will be one of the less landscape alteration than Alternative C
Changes in Recreational Use Patterns	Differences between D and C are probably not noticeable on a Forest-wide basis More developed setting in certain areas than in Alternative C	Increased activity and roading will force some users to roadless areas and wilderness Patterns of use will, however, be similar to the present	Will retain patterns of use similar to present	Similar to Alternative B, but changes in patterns of use will be more gradual	No noticeable differences in recreational patterns of use from Alternative C
Accessibility for Exploration of Potential Mineralized Area	Slight (3%) increase in accessibility	Slight (about 3%) reduction in land area readily accessible	Less than 1% increase in land area readily accessible	Moderate increase in accessibility (about 8%)	Slight (3%) increase in accessibility

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	NC	A	B	B-dep	C	C-dep
		No Action	RPA		Preferred	
Fuelwood for Domestic Use Accessibility, Quality, Quantity	Fuelwood supply will remain constant, but will be less available in the form of large dead trees than at present Wood gatherers would be more dependent on logging slash. Quality of wood would be lower than today Would need to travel further	Fuelwood supply will be less available in the form of large dead trees than at present Wood gatherers would have to be more dependent on logging slash Quality of wood would be lower than today Would need to travel further	By second decade, fuelwood will be primarily from logging slash Will generally be lower quality than available at present	Similar to Alternative B	Similar to Alternative A	Similar to Alternative A
Hydroelectric Development	All alternatives include wild, scenic and recreational rivers as established by the Act creating the Hells Canyon National Recreation Area, and by the Omnibus Oregon Wild and Scenic Rivers Act (1988) There are no significant differences among the alternatives in opportunity for hydroelectric development					
Transmission Corridors	NE	Transmission corridors are excluded from wilderness and discouraged in the HCNRA wild, scenic, and recreational rivers and undeveloped dispersed recreation areas (Management Area 6) only Management Area 6 varies among the alternatives, but where it occurs there are no known utility corridor needs Therefore, there is *virtually no difference among all the alternatives* in their effects on power transmission corridors				

NE = Not Estimated

Table II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	D	E	F	G	H
Fuelwood for Domestic Use Accessibility, Quality, Quantity	Similar to Alternative A	Similar to Alternative B	Would have higher quality of wood available longer with less dependence on logging slash than other alternatives. However, lower level of road development may mean difficulty in finding wood, and longer travel distance	Similar to Alternative F	Similar to Alternative A
Hydroelectric Development	All alternatives include wild, scenic and recreational rivers as established by the Act creating the Hells Canyon National Recreation Area, and by the Omnibus Oregon Wild and Scenic Rivers Act (1988) There are no significant differences among the alternatives in opportunity for hydroelectric development				
Transmission Corridors	Transmission corridors are excluded from wilderness and discouraged in the HCNRA, wild, scenic and recreational rivers and undeveloped dispersed recreation areas (Management Area 6) Only Management Area 6 varies among the alternatives, but where it occurs there are no known utility corridor needs Therefore, there is virtually no difference among the alternatives in their effects on power transmission corridors				

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	NC	A	B	B-dep	C	C-dep
		No Action	RPA		Preferred	
Effects on Ongoing Economic Trends						
Changes in Industries	Would increase the well-being of the timber industry, thereby providing increased cash flow which could be used to change its processing capabilities to meet future needs Effects on other industries not estimated	Would contribute to timber industry instability through altered species mix (increased lodgepole pine, reduced ponderosa pine), smaller log sizes and reduced harvest volume Recreation use would increase as population grows No significant effects on the livestock, recreation or minerals industries would occur since this alternative proposes no large changes in those programs	Would provide stability for the timber industry Unavoidable changes in species mix and log sizes would occur as in Alternative A, but total harvest volume would not be reduced There would be no significant effects on other area industries	Would provide stability for the timber industry The changes in species mix would be similar to Alternative A Harvest volume would be higher than recent historical levels The shift to smaller diameter logs would have more impact than in Alternative A since the change would occur more rapidly and log sizes would be less than in any other alternative	Similar to Alternative A, but with significantly higher timber harvest levels This would reduce somewhat the adverse effects on the timber industry No significant effects on other area industries would result	Would provide timber stability through the first decade of implementation Effects in later decades would be similar to Alternative A No significant effects on other area industries would result

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	D	E	F	G	H
Effects on Ongoing Economic Trends					
Changes in Industries	Would affect the timber industry similarly to Alternative A, although the timber harvest volume is somewhat higher No significant effects on other area industries would result	Would affect the timber industry similarly to Alternative A, although the timber harvest volume is somewhat higher No significant effects on other area industries would result	Would tend to destabilize the timber industry more than any other alternative, primarily due to substantially reduced timber harvest volume Effects on species mix would be similar to Alternative A The change to smaller diameter logs would occur more slowly than in most other alternatives No significant effects on other area industries would result though reduction in permitted grazing would greatly impact some local livestock producers	Reduced timber harvest level would tend to destabilize the timber industry, shaking out the least efficient producers Individual timber sales would likely prove to be more profitable once the number of competing mills was reduced Changes in species mix and log size would occur as in Alternative A, but more slowly No significant changes in other area industries would result	Similar to Alternative G

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	NC	A	B	B-dep	C	C-dep
		No Action	RPA		Preferred	
Changes in Occupations and Employment	With its very high levels of timber production, this alternative would serve to actually increase employment levels in the traditionally dominant timber industry Effects on other forms of employment are not estimated *	Changes would occur both in the numbers employed and in the types of employment Reductions in employment are anticipated because of reductions in timber offerings from the Forest Some reductions in timber industry employment might be expected in any event due to technological changes Some increased opportunities will exist for precommercial thinning work and in those sectors related to recreation	This alternative would reduce the impact of reductions in employment in the timber industry, while impacting other forms of employment very little	This alternative would increase employment levels in the timber industry, while impacting other forms of employment very little	Relative to the Current Direction alternative, this alternative would soften the impact of reductions in timber-related employment, while impacting other forms of employment very little	This alternative would increase employment in the timber industry for the first decade, would impact other forms of employment very little
Poverty and Unemployment	This alternative would be a boon to the local area in that it would serve to reduce both unemployment and poverty--providing not only jobs but well-paying jobs This would be an alternative on which the area could grow *	Alternative A would preclude recovery to earlier levels of timber-related employment No significant effects of employment related to the recreation, livestock, or minerals industries are expected as a result of this or any other alternative This alternative will not contribute to a reduction in area poverty	This alternative which approximates recent timber offering levels, would be a marked improvement over that of Alternative A in that it would improve the local situation for poverty and employment	This alternative would allow for long-term reductions in both unemployment and poverty	This alternative shares the problems identified in Alternative A, but to a lesser degree	This alternative would allow for reductions in unemployment and poverty in the first decade It would be less attractive than Alternative C in succeeding decades

* Although the 1962 Timber Management Plan was based on a nondeclining flow of timber, recent data indicate that the potential yield displayed in that plan is not sustainable Social and economic effects displayed in this table are for the first decade only Substantial reductions in employment and population stability would be expected in later decades

Table II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	D	E	F	G	H
Changes in Occupations and Employment	Relative to the No Action alternative, this alternative would soften the impact of reductions in timber-related employment, while impacting other forms of employment very little	Relative to the No Action alternative, this alternative would soften the impact of reductions in timber-related employment, while impacting other forms of employment very little	Area timber-related employment would be expected to decrease substantially Other forms of employment would be affected very little	Timber-related employment would be expected to drop sharply while impacting other forms of employment very little	Timber related employment would be expected to drop sharply while impacting other forms of employment very little
Poverty and Unemployment Patterns	This alternative would cause reductions in unemployment and local poverty, but to a lesser degree than Alternative B	Similar to Alternative C	This alternative would likely increase both area unemployment and poverty because of the sharp reductions it makes in Forest timber offerings	This alternative would likely increase area unemployment and poverty in the long term to a lesser degree than Alternative F	Similar to Alternative G

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	NC	A	B	B-dep	C	C-dep
		No Action	RPA		Preferred	
Social Effects						
Population	Stabilizing Would provide employment opportunities sufficient to maintain or slightly increase the population associated directly and indirectly with the timber industry Area has a surplus labor supply as evidenced in its persistently high unemployment rates Extra work could be handled with overtime These harvest levels have been accommodated in the past *	Moderately destabilizing Area has already experienced substantial unemployment due to the protracted downturn in timber industry employment Would further reduce area population	Stabilizing Would provide employment opportunities sufficient to only decrease somewhat the population associated directly and indirectly with the timber industry	Stabilizing Would provide opportunities sufficient to maintain or slightly increase the population associated directly and indirectly with the timber industry	Moderately destabilizing Area has already experienced substantial employment due to the protracted downturn in the timber industry Would further reduce area population but not to the extent of Alternative A	Stabilizing Would provide employment opportunities sufficient to maintain or slightly increase the population associated directly and indirectly with the timber industry in the first decade Somewhat worse than Alternative C in later decades in these respects
Lifestyles (Work and Leisure)	To the extent individuals focus on timber processing in their lives, this alternative would benefit them It would be difficult to overstate the importance of timber harvesting to those whose livelihoods depend on it	Those whose lifestyles depend on, or are centered around, a mix of timber harvesting and amenity use of the Forest will find their lifestyles accommodated in this alternative The degree of satisfaction will vary depending on their own perception of what constitutes a desirable mix	To the extent individuals focus on timber processing in their lives, this alternative would benefit them To the extent they focus on nonwilderness primitive and semiprimitive recreation or on other amenities, this alternative would be a setback	To the extent individuals focus on timber processing in their lives, this alternative would benefit them To the extent they focus on nonwilderness primitive and semiprimitive recreation or on other amenities, this alternative would be a setback	Those whose lifestyles depend on, or are centered around, a mix of timber harvesting and amenity use of the Forest will find their lifestyles accommodated in this alternative Their degree of satisfaction will vary depending on their own perception of what constitutes a desirable mix	Similar to Alternative C To the extent individuals focus on timber processing in their lives, this alternative would benefit them over the coming decade Thereafter it would be inferior to Alternative C in that regard

* Although the 1962 Timber Management Plan was based on a nondeclining flow of timber, recent data indicate that the potential yield displayed in that plan is not sustainable Social and economic effects displayed in this table are for the first decade only Substantial reductions in employment and population stability would be expected in later decades

Table II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	D	E	F	G	H
Social Effects					
Population	Moderately destabilizing Area has already experienced substantial unemployment due to the protracted downturn in timber industry employment Would further reduce area population but not as much as Alternative A	Moderately destabilizing Area has already experienced substantial unemployment due to the protracted downturn in timber industry employment Would further reduce area population, but not as much as Alternative A	Highly destabilizing Area would experience substantial out-migration	Destabilizing Area would experience significant out-migration	Destabilizing Area would experience significant out-migration
Lifestyles (Work and Leisure)	Those whose lifestyles depend on, or are centered around, a mix of timber harvesting and amenity use of the Forest will find their lifestyles accommodated in this alternative The degree of satisfaction will vary depending on their own perception of what constitutes a desirable mix	Those whose lifestyles depend on, or are centered around, a mix of timber harvesting and amenity use of the Forest will find their lifestyles accommodated in this alternative The degree of satisfaction will vary depending on their own perception of what constitutes a desirable mix This alternative provides the most primitive and semiprimitive recreation opportunities	This alternative would be highly disruptive to a substantial portion of the populous whose livelihood depends, directly or indirectly, on timber harvesting It would generally benefit those recreationists who like less roading, fewer people, and a more primitive setting	With the increased emphasis on efficiency and concomitant reduction in timber harvesting, this alternative would be acceptable to those whose lifestyles could accept significantly lower timber harvests It provides a relatively low quantity of primitive and semiprimitive recreation	With the increased emphasis on efficiency and concomitant reduction in timber harvesting, this alternative would be acceptable to those whose lifestyles could accept significantly lower timber harvests

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	NC	A	B	B-dep	C	C-dep
		No Action	RPA		Preferred	
Attitudes, Beliefs, and Values	Area inhabitants who have come to accept existing FS practices would most likely find this alternative to be acceptable on the whole, but this alternative would generate substantial local resistance to logging certain areas favored for their location, visual character, and habitat Because of their potential for conflict, such areas have generally been passed over in the past	Area inhabitants who have come to accept existing FS practices would most likely find this alternative to be acceptable on the whole, but would not understand or agree with the reduction in timber harvest from those contained in earlier plans	Those who feel the remaining non-wilderness portions of the Forest should be managed to maximize timber production would like this alternative Those who feel that the remaining non-wilderness portions of the Forest should be managed to achieve a balanced emphasis for multiple use would find this alternative distasteful. Otherwise, comments for Alternative NC would also apply here.	Many people feel that the Forest should be managed in such a way as to ensure that its outputs do not decrease over time They would, therefore, be unhappy with this alternative along with those who feel that the level of emphasis on timber in this alternative is too great Those who feel that a lengthy, though temporary (50 year) increase in timber production is acceptable if necessary for the well-being of local economy would find their beliefs reflected in this alternative	Area inhabitants who have come to accept existing Forest Service practices would most likely find this alternative to be acceptable on the whole, though not in every particular	Many people feel that the Forest should be managed in such a way as to ensure that its outputs do not decrease over time They would be unhappy with the departure feature of this alternative Those who feel that a temporary (10 year) increase in timber production is acceptable if necessary for the well-being of local economy would find that belief reflected in this alternative
Community Infrastructure						
Community Cohesion	Unfavorable Would serve to heighten the influence of the traditional, familiar employment institutions Would polarize the communities, commodity (timber) vs amenity special interest groups	Disruptive to the timber processing sector Reduced harvest levels would give recognition to the perceived increased influence of the amenity special interest groups	Would serve to maintain the influence of the traditional, familiar employment institutions Would polarize the communities, commodity (timber) vs amenity special interest groups	Would serve to maintain the influence of the traditional, familiar employment institutions Would polarize the communities, commodity (timber) vs amenity special interest groups	Disruptive to the timber processing sector Reduced harvest levels would give recognition to the perceived increased influence of the amenity special interest groups	Would serve to heighten the influence of the traditional, familiar employment institutions. Would polarize the communities, commodity (timber) vs amenity special interest groups

Table II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	D	E	F	G	H
Attitudes, Beliefs, and Values	Area inhabitants who have come to accept existing FS practices would most likely find this alternative to be acceptable on the whole, but would likely be confused by the falldown in timber harvesting	This alternative was tailored to produce substantial amounts of timber on areas which have already been roaded and to leave the remaining roadless areas roadless This alternative should reinforce the beliefs of the local area inhabitants who requested it Failure to log the material would be offensive to those who feel that all the Forest's resources should be used by the human population	This alternative would satisfy many who feel the Forest is being harvested too aggressively and/or that the Forest's highest value lies in its ability to offer amenity values	Because efficiency was highlighted in this alternative, it should best satisfy those who call for increased Forest efficiency With its lower timber harvest levels, it would conflict with those who believe more commodity emphasis is indicated Some would be offended because the alternative is given free rein to harvest timber, sharing the same land allocation as Alternative B, even though it harvests significantly fewer of those acres due to economic considerations	This alternative sacrifices significant timber volumes for the sake of efficiency in operation As such, it would displease those who feel a greater commodity emphasis is indicated, while satisfying those who press for increased economic efficiency Otherwise, area inhabitants who have come to accept existing Forest Service practices would most likely find this alternative to be acceptable on the whole
Community Infrastructure					
Community Cohesion	Disruptive to the timber processing sector. Reduced harvest levels would give recognition to the perceived increased influence of the amenity-oriented special interest groups	Disruptive to the timber processing sector Reduced harvest levels would give recognition to the perceived increased influence of the amenity-oriented special interest groups.	Significant losses in employment would greatly exacerbate friction among special interest groups	Would heighten antipathy between those whose livelihoods depend on timber processing and those whose livelihoods depend on amenities	Would heighten antipathy between those whose livelihoods depend on timber processing and those whose livelihoods depend on amenities

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	NC	A	B	B-dep	C	C-dep
		No Action	RPA		Preferred	
Civil Rights	Various Civil Rights, Affirmative Action, and Equal Opportunity Acts require that Forest Service hiring, supervisory and contracting practices be conducted in a manner conducive to meeting established Regional and nation-wide goals in these areas The Wallowa-Whitman National Forest will maintain these practices regardless of the management alternative that is selected The Forest will continue to take positive steps to ensure that facilities, sites, activities, and employment will not be denied to any individual based on race, color, creed, sex, age, handicap, religion, or national origin					
American Indians						
Social and Economic	Because of their relatively low dependence on the Forest for their economic livelihoods, there will be only small differences among the alternatives Those tribal members employed in the lumber industry would tend to benefit from more commodity-oriented alternatives such as NC, B, B-dep, C, C-dep, D, or E as compared with lower timber producing alternatives such as F, G, or H Other tribal members benefit from nontimber forest activities which are not likely to be affected by differences among the alternatives Social considerations relate more to the use of the Forest for collecting foods and medicines, for spiritual renewal, and for individual or collective outings For these considerations, Alternative F would probably look best because it would tend to disturb potential sites for these areas less than others Alternatives E and H would also be attractive, as would G The remainder of the alternatives would look less attractive directly in relation to increasing timber harvest levels in Decade 1					
Subsistence	NE	Slightly lower levels of anadromous fish production and long-term reduction in elk and deer habitat would make Alternative A less desirable than other alternatives	Increased levels of anadromous fish have a favorable effect, but poor big-game habitat effects would be undesirable	Increased levels of anadromous fish production would be favorable Increased grazing and timber harvesting could adversely affect root-gathering, berrypicking, and hunting Poorer big-game habitat would be undesirable	Increased salmon and steelhead production would benefit Indian tribes Reduced grazing and timber harvest levels (compared to present) will reduce potential impacts on berrypicking and root gathering sites Reduction in long-term quality of elk habitat would be undesirable.	Effects similar to Alternative C, but slightly greater adverse impacts Reduction in long-term elk quality would be considered undesirable
Religious Freedom and Practice	These rights are recognized and protected by law However, the potential for disturbance of religious sites and conflict with religious practices is higher with commodity-oriented alternatives such as B, G, B-departure, C-departure, and NC Alternative F would have the least impact The other alternatives would lie on a continuum between the two groupings based on their expected level of Decade 1 timber harvest, however					
Other Racial and Cultural Minorities	The small non-Indian minority population (approximately 1 4 percent) is not identified with any particular special interest group and is therefore not expected to be affected as a group by any alternative's implementation					

NE = Not Estimated

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	D	E	F	G	H
Civil Rights	Various Civil Rights, Affirmative Action, and Equal Opportunity Acts require that Forest Service hiring, supervisory and contracting practices be conducted in a manner conducive to meeting established Regional and nation-wide goals in these areas The Wallowa-Whitman National Forest will maintain these practices regardless of the management alternative that is selected The Forest will continue to take positive steps to ensure that facilities, sites, activities, and employment will not be denied to any individual based on race, color, creed, sex, age, handicap, religion, or national origin				
American Indians					
Social and Economic	Because of their relatively low dependence on the Forest for their economic livelihoods, there will be only small differences among the alternatives Those tribal members employed in the lumber industry would tend to benefit from more commodity-oriented alternatives such as NC, B, B-dep, C, C-dep, D, or E as compared with lower timber producing alternatives such as F, G, or H Other tribal members benefit from nontimber forest activities which are not likely to be affected by differences among the alternatives Social considerations relate more to the use of the Forest for collecting foods and medicines, for spiritual renewal, and for individual or collective outings For these considerations, Alternative F would probably look best because it would tend to disturb potential sites for these areas less than others Alternatives E and H would also be attractive, as would G The remainder of the alternatives would look less attractive directly in relation to increasing timber harvest levels in Decade 1				
Subsistence	Similar to Alternative A, but higher grazing levels may cause greater adverse impacts on root gathering potential Poor elk habitat would be undesirable	Similar to Alternative A	Having high fish production and high wildlife levels, this is the most favorable alternative from American Indian subsistence standpoint High quality elk habitat would be considered desirable	Similar to Alternative B, but slightly less impacting overall Poorer quality elk habitat would be considered undesirable	Similar to Alternative C
Religious Freedom and Practice	These rights are recognized and protected by law However, the potential for disturbance of religious sites and conflict with religious practices is higher with commodity-oriented alternatives such as B, G, B-departure, C-departure, and NC Alternative F would have the least impact The other alternatives would lie on a continuum between the two groupings based on their expected level of Decade 1 timber harvest				
Other Racial and Cultural Minorities	The small non-Indian minority population (approximately 1 4 percent) is not identified with any particular special interest group and is therefore not expected to be affected as a group by any alternative's implementation				

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	NC	A	B	B-dep	C	C-dep
		No Action	RPA		Preferred	
Land Use Changes						
Prime Farmlands, Rangelands, and Forest Land	All alternatives fully satisfy the objectives for management of prime farmlands, rangelands, and forest lands, as identified in the USDA Secretary's Memorandum No 1827 The mix of commodity and/or amenity values derived from these lands will vary in the same way as on the rest of the Forest					
Wetlands and Floodplains	There will be few differences among the alternatives in treatment of, or effects on, floodplains and wetlands All alternatives fully meet the goals and objectives for wetlands and floodplains as identified in Executive Orders 11988 and 11990 The risk of adversely affecting wetlands or floodplains is somewhat higher in commodity-oriented alternatives than in amenity-oriented alternatives because the extent and intensity of such activities as timber harvest, road construction, and livestock grazing are greater					
Threatened and Endangered Species	No change is expected from implementing any alternative with respect to the peregrine falcon and McFarlane's four o'clock The historical sitings and potential area for recovery of these populations lie largely within wilderness Standards and guidelines provide for maintenance of sufficient habitat to meet the recovery objective levels for northern bald eagle in all alternatives Opportunity for expansion beyond these levels after the first decade will tend to vary inversely with the allowable sale quantity calculated for each of the alternatives The higher the timber production level, the more likely it is that potential roost and/or nest trees will be harvested					
Elk Populations and Distributions	NE	Elk population will tend to remain at or near current levels with little displacement of these populations from any portion of the Forest	Elk populations potentially reduced with significant displacement of summering elk from gentle (tractor loggable) ground because of shortages of cover and increased roading Some displacement may also accompany increased livestock numbers Limited displacement of elk from portions of the winter range may occur as a result of less than optimum habitat conditions	Elk populations may be significantly reduced Displacement of summering elk from the gentle (tractor loggable) and short-span skyline grounds because of shortages of cover and the greatly increased level of roading Significant displacement of elk may also accompany the increased numbers of livestock planned for this alternative. Deer will be less dramatically affected by these changes. Displacement of elk from portions of the winter range is possible due to less than optimum habitat conditions	Slight reduction in elk populations may occur Elk may be displaced from gentle grounds on portions of their summer ranges Some ranges have optimum cover objectives which will tend to improve distribution of elk over those portions Some displacement of elk due to increased numbers of cattle Near optimum habitat may allow improved distribution of elk across big game winter ranges	Elk populations may be reduced due to displacement of elk from portions of their summer ranges as in Alternative C Displacement may be accelerated because of the accelerated harvest levels in first decade Near optimum habitat may allow better distribution of elk across big game winter ranges

NE = Not Estimated

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	D	E	F	G	H
Land Use Changes					
Prime Farmlands, Rangelands, and Forest Land	All alternatives fully satisfy the objectives for management of prime farmlands, rangelands, and forest lands, as identified in the USDA Secretary's Memorandum No 1827. The mix of commodity and/or amenity values derived from these lands will vary in the same way as on the rest of the Forest				
Wetlands and Floodplains	There will be few differences among the alternatives in treatment of, or effects on, floodplains and wetlands All alternatives fully meet the goals and objectives for wetlands and floodplains as identified in Executive Orders 11988 and 11990 The risk of adversely affecting wetlands or floodplains is somewhat higher in commodity-oriented alternatives than in amenity-oriented alternatives because the extent and intensity of such activities as timber harvest, road construction, and livestock grazing are greater				
Threatened and Endangered Species	No change is expected from implementing any alternative with respect to the peregrine falcon and McFarlane's four o'clock The historical sitings and potential area for recovery of these populations lie largely within wilderness Standards and guidelines provide for maintenance of sufficient habitat to meet the recovery objective levels for northern bald eagle in all alternatives Opportunity for expansion beyond these levels after the first decade will tend to vary inversely with the allowable sale quantity calculated for each of the alternatives The higher the timber production level, the more likely it is that potential roost and/or nest trees will be harvested				
Elk Populations and Distributions	Elk populations may be reduced as a result of displacement of elk from major portions of their summer ranges Some displacement may accompany increased cattle numbers Near optimum habitat may allow improved distribution of elk across big game winter ranges	Elk numbers may be reduced Displacement of elk across much of their gentle grounds on their summer ranges may accompany timber harvest Existing cover in roadless areas maintained Little displacement from social interactions with livestock Some displacement of elk from portions of big game winter range due to less optimal habitat conditions	Potential for elk populations to increase over the planning horizon as optimum cover/forage objectives are achieved Distribution of elk may be improved over most of the Forest Reduced displacement of elk arising from social interactions with cattle. Near optimum habitat may allow better distribution of elk across big game winter ranges	Some reduction in elk populations may be expected Significant displacement of elk from gentle grounds across most of their summer range following logging More cover will be left on steep slopes in the early decades in this alternative than would be expected in Alternative B. Little or no change in displacement of elk due to interaction with cattle Some displacement of elk from portions of big-game winter range due to less optimum habitat conditions	Elk populations may be slightly reduced Displacement of elk from gentle lands across portions of summer ranges may be expected similar to Alternative C, but with more substantial cover on steep slopes Little displacement due to interactions with livestock Near-optimum habitat conditions may allow improved distribution of elk across big-game winter ranges

NE = Not Estimated

TABLE II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	NC	A	B	B-dep	C	C-dep
		No Action	RPA		Preferred	
Small Game and Non-game Species, Populations, Distributions	Species Associated with early forest successional stages will increase in all alternatives Those associated with snags or mature and old-growth forest successional stages will decrease in all alternatives Population decreases of snag, mature or old-growth associated species will be greatest in the alternatives providing the highest levels of timber outputs Distributions of these species will be best in alternatives with the most limited timber harvest					
Pest Management	Similar to Alternative B, but even more so due to the accelerated rate of timber harvest	Bark beetles, dwarf mistletoe, and tree and root heartrots will present less serious problems as more stands are intensively managed for timber production However, defoliators such as the spruce budworm and Douglas-fir tussock moth will continue to cause problems Control through the use of insecticides will depend on cost-benefit considerations This makes it likely that there will be periodic outbreaks and resultant brown-colored trees over extensive areas.	Similar to Alternative A except that with many more acres intensively managed, there will be better control of many pest species	Similar to Alternative B, but even more so due to the accelerated rate of timber harvest	Similar to Alternative A.	Similar to Alternative A
Plant Diversity	Some increases in incidence of lodgepole pine, ponderosa pine, Douglas-fir, and western larch in all alternatives Greatest in Alternatives B-departure, B, and D Strongest representation of white fir, subalpine fir and spruce in Alternatives F and H Shade intolerant (e g , huckleberry, many grasses) understory species will be favored in all alternatives					
Wild and Scenic River Eligibility	The existing 269 miles of wild, scenic, and recreational river would be retained in all alternatives It is unlikely that the remarkable characteristics of remaining eligible streams will be affected during the life of the Plan					

Table II-6 (Continued)

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

Resource Outputs and Environmental Effects	D	E	F	G	H
Small Game and Non-game Species, Populations, Distributions	Species Associated with early forest successional stages will increase in all alternatives. Those associated with snags or mature and old-growth forest successional stages will decrease in all alternatives Population decreases of snag, mature, or old-growth associated species will be greatest in the alternatives providing the highest levels of timber outputs Distributions of these species will be best in alternatives with the most limited timber harvest				
Pest Management	Similar to Alternative A	Similar to Alternative B except that greater amount of roadless area will result in more mature tree stands that are more susceptible to insects and disease.	Likely to have greater incidence of insects and disease than other alternatives due to greater amounts of susceptible (mature and over-mature) trees Will be somewhat offset by correspondingly higher levels of insect predators such as woodpeckers Otherwise similar to Alternative A	Similar to Alternative B	Similar to Alternative A
Plant Diversity	Some increases in incidence of lodgepole pine, ponderosa pine, Douglas-fir, and western larch in all alternatives Greatest in Alternatives B-departure, B, and D Strongest representation of white fir, subalpine fir and spruce in Alternatives F and H Shade intolerant (e g , huckleberry, many grasses) understory species will be favored in all alternatives				
Wild and Scenic River Eligibility	The existing 269 miles of wild, scenic, and recreational river would be retained in all alternatives It is unlikely that the remarkable characteristics of remaining eligible streams will be affected during the life of the Plan				

SUMMARY COMPARISON OF ALTERNATIVES BY MAJOR RESOURCE

Introduction

This section summarizes the differences among the alternatives in their probable effects on the major resources Additional details along with some other effects are discussed in Chapter IV of this FEIS Many of the effects are displayed or discussed in Tables II-4, II-5, II-6, and elsewhere in this document.

Soil

Timber harvest and road construction are the two major management activities that affect the soil resource. Timber harvest activities will result in some soil compaction and soil displacement in all alternatives, mostly as a result of log yarding Since tractor yarding impacts soils more than other yarding techniques, alternatives with high levels of tractor yarding would have greater effects than alternatives with less tractor yarding

Lesser effects on soils occur as a result of slash treatments such as piling and burning and in the form of erosion from disturbed sites Standards and guidelines (from Chapter 4 of the Forest Plan) limit soil compaction and displacement to 20 percent of the land area and identify methods for assuring that this is met.

Road construction affects soil primarily by taking land out of production It may also increase the risk of mass soil movement. Road construction is generally considered an irretrievable commitment of resources

In comparing alternatives, all of these impacting activities occur at levels directly related to the level of timber harvest -- more timber harvest necessitates more road construction, more timber yarding, and more slash treatment Alternative NC, with the highest timber harvest level, would be expected to have the greatest effect on soils The other alternatives, in decreasing order of effect are, Alternatives B-Departure, C-Departure, B, D, E, C, A, H, G, and F.

Water

Water-related concerns include water quality and streamflow Although management activities may have a variety of effects on water quality, the greatest concerns are sedimentation and stream temperatures Streamflows are of concern for several reasons, including possible effects of increased peak flows on stream channel stability, and potential effects on low flows used for irrigation and as fish habitat.

Major causes of increased sediment production are road construction, livestock grazing, and timber harvesting. The effects of roads are greatest where streams are either crossed by roads, or where roads parallel streams and are close enough to the streams so that sediment-laden road runoff enters the stream. Proper design, location, and maintenance of roads can do much to mitigate these effects, but some increase in sediment production is inevitable if it is necessary to cross streams

Timber harvesting may directly increase sediment production if erosion occurs from the treatment area and the area is in close proximity to a stream channel, or if harvest activity causes mass soil movement (such as a landslide)

Risk of sediment production from roads and timber harvesting is directly related to level of timber management activity. A sediment production index is shown, by alternative, in Table II-5 Alternative NC, with the highest timber harvest level and no allowance for reduced harvest in riparian areas, offers

the greatest risk of sediment production. The other alternatives, in decreasing order of risk are; Alternatives B-Departure, C-Departure, B, D, E, C, A, G, H, and F

Livestock grazing causes sediment increases as a result of streambank trampling, removal of soil-protecting vegetation, and through disturbance of surface soils These effects are mitigated by controlling livestock numbers, limiting season of use, setting utilization standards, and by providing for dispersal of animals across the range Many of these mitigation measures are described in Chapter 4 of the Forest Plan, including utilization standards and guidelines which were developed after the DEIS was published Risk of livestock-related sediment production is directly related to livestock numbers, with Alternatives B and G presenting the highest risk (at 207,000 AUM's); B-Departure the next greatest risk (at 204,000 AUM's), Alternative D (at 191,000 AUM's); Alternatives NC, A, C, C-Departure, and H (at 186,000 AUM's), Alternative E (at 163,000 AUM's), and Alternative F (at 143,000 AUM's).

Since all alternatives include standards and guidelines for maintaining or improving stream shade, no stream-temperature differences among the alternatives are expected All alternatives require that stream shade be retained at high levels and that where shade is currently inadequate efforts will be made to improve it.

Road construction, timber harvesting, and livestock grazing are all activities which may affect stream-flows. Of particular concern is the possibility that management activities will concentrate peak streamflows, causing accelerated stream channel erosion Timber harvesting may increase peak flows if harvest units cause changes in snowmelt timing, concentrating snowmelt into a shorter time period Roads may contribute to peak flows by trapping and concentrating surface and subsurface flows. Soil compaction from livestock grazing may also increase peak flow levels by reducing the rate of water infiltration into the soil.

Since these relationships are very site-specific (dependent upon the unique characteristics of each individual watershed) quantitative streamflow comparisons of the alternatives are not possible. In general, those alternatives with high levels of road construction, timber harvest, and livestock grazing provide the greatest risk of adverse peakflow effects Preventing adverse effects depends upon the site-specific analysis called for in the Standards and Guidelines (Plan Chapter 4)

Public concern has been expressed over the effects of management activities on low flows (summer stream flows) which are particularly important for irrigation and fish habitat Two aspects of this concern are that summer flows may be lower as a result of timber harvesting activities and that the low summer flows may occur earlier as a result of timber harvesting Analyses of data from northeast Oregon do not indicate that either of these effects are likely to occur (Fedora, unpublished). Summer flows are expected to be slightly higher as a result of harvest activities and are not expected to occur earlier.

Approprate best management practices (see Appendix O) will be used in design and implementation of all projects Monitoring (Plan, Chapter 5) will be designed to assure that best management practices are used and are effective in sediment prevention and in avoiding adverse streamflow changes.

Wildlife and Fish

Table II-7 displays the management indicator species used for comparing alternatives Derivation of these indicators is discussed in Appendix G Also shown in Table II-7 is the primary type of habitat associated with each indicator species

Table II-7
MANAGEMENT INDICATOR SPECIES AND THEIR PRIMARY HABITATS

Species	Primary Habitat
Pileated woodpecker	Old-growth and mature forest
Primary cavity excavators	Snags
Goshawk	Old-growth and mature forest
Rocky mountain elk	Cover/forage
Pine marten	Old-growth and mature forest
Resident trout	Riparian/Aquatic
Steelhead trout	Riparian/Aquatic

Several of the indicator species show preference for (and indicate the quality of) old growth and mature forest habitat. Since a level of old growth reduction is planned in nearly all alternatives it is expected that some drop in the numbers of these animals will also occur Based on long-term old growth levels, Alternative F is expected to have the greatest amount of habitat for species dependent on old growth and mature forest, with decreasing numbers, by alternative, as follows Alternative E, Alternative C, Alternative H, Alternative D, Alternative C-Departure, Alternative G, Alternative A, Alternative B, Alternative B-Departure, and Alternative NC See Table II-8

Primary cavity excavators are expected to be directly affected by the numbers of snags available for nesting sites. Forest lands managed for timber production will generally have sufficient habitat to provide for 40 percent of potential cavity-excavator populations for those species dependent on snags 10-20 inches in diameter. Riparian areas will be managed to provide snags of all sizes at the 60 percent level. Portions of the forest not managed for timber production are expected to provide habitat for cavity-nesting species at approximately the 100 percent level Large-diameter snags (those 20 inches in diameter and greater) will initially be found throughout the Forest, but as timber stands are harvested and new stands are managed under shorter rotations, large-diameter snags will generally be limited to riparian areas and to old growth patches and other areas not managed for timber production. Alternative F is expected to have the greatest populations of snag-dependent species The other alternatives, in decreasing order projected populations, follow: Alternative E, Alternative H, Alternative C, Alternative D, Alternative C-Departure, Alternative G, Alternative A, Alternative B, Alternative B-Departure, and Alternative NC

The Oregon Department of Fish and Wildlife objective level for elk on the Wallowa-Whitman is 21,000 animals. Table II-5 displays projected elk numbers by alternative In making these projections it was assumed that elk numbers would vary directly with changes in the elk habitat effectiveness index (HEI) HEI is an index of habitat quality which takes into consideration cover needs, forage needs, and likely harassment from road use (open road density) Projected first-decade HEI (as a percent of potential) by alternative is as follows Alternative F (84 percent), Alternative A (77 percent), Alternatives C, D, E, and H (76 percent), Alternatives B, B-Departure, and G (75 percent), and Alternative C-Departure (74 percent) Alternative NC could not be reasonably estimated, although it would be most like Alternative B-Departure. By the end of the fifth decade these are expected to be as follows: Alternative F (79 percent), Alternative A (71 percent), Alternatives C, C-Departure and H (69 percent), Alternative D (68 percent), Alternative E (67 percent), Alternatives B and G (66 percent), and Alternative B-Departure (63 percent).

Table II - 8
CURRENT AND PROJECTED OLD-GROWTH FOREST

Old-Growth Meeting Regional Definition
(Thousands of Acres)

	ALTERNATIVE										
	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
DECADE 1 (Current)											
Wilderness	67	67	67	67	67	67	67	67	67	67	67
Designated Old Growth	0	27	28	28	37	38	38	24	40	28	38
Lands Unsuited Due to Other Resource Objectives	38	42	38	38	42	41	41	59	46	38	41
Unsuited Lands in Timber Management Areas	0	11	9	0	15	10	7	17	19	19	14
Suited Lands in Timber Management Areas	17	7	8	10	3	4	5	2	0	5	3
TOTAL	122	154	150	143	164	160	158	169	172	157	163
DECADE 2											
Wilderness	67	67	67	67	67	67	67	67	67	67	67
Designated Old Growth	0	27	28	28	37	38	38	24	40	28	38
Lands Unsuited Due to Other Resource Objectives	38	42	38	38	42	41	41	59	46	38	41
Unsuited Lands in Timber Management Areas	0	11	9	0	15	10	7	17	19	19	14
Suited Lands in Timber Management Areas	7	3	3	4	1	2	2	1	0	2	1
TOTAL	112	150	145	137	162	158	155	168	172	154	161
DECADE 5											
Wilderness	67	67	67	67	67	67	67	67	67	67	67
Designated Old Growth	0	27	28	28	37	38	38	24	40	28	38
Lands Unsuited Due to Other Resource Objectives	38	42	38	38	42	41	41	59	46	38	41
Unsuited Lands in Timber Management Areas	0	11	9	0	15	10	7	17	19	19	14
Suited Lands in Timber Management Areas	0	0	0	0	0	0	0	0	0	0	0
TOTAL	105	147	142	133	161	156	153	167	172	152	160

Fish populations are expected to increase as a result of improved riparian condition and other investments in habitat improvement Since improving riparian condition is high priority in all alternatives, populations will be most dependent upon investment

Threatened and Endangered Species

All alternatives must meet the requirements of the Endangered Species Act. Biological assessments of the effects of the preferred alternative on threatened and endangered species were sent to the U.S Fish and Wildlife Service prior to completion of this FEIS The biological assessments concluded that the Forest Plan would result in no adverse effects to any threatened or endangered species and that it would be beneficial to populations of bald eagles and peregrine falcons since the plan calls for cooperation in recovery plans for these species The response from the U S Fish and Wildlife Service is found in Appendix N.

Minerals

New mineral entry is prohibited within the four wilderness areas on the Forest, certain recreational and administrative sites, and within the Hells Canyon NRA These closed areas include 193,600 acres with mineral potential As research natural areas (RNA's) are established they will also be withdrawn from mineral entry However, since the proposed RNA's include little mineralized area not already withdrawn from mineral entry, there is little effect from them on mineral availability.

The Forest includes a total of 423,000 acres with known mineral potential

Differences among the alternatives regarding mineral availability are primarily the result of differences in roading. Alternatives which maintain less roadless area in a roadless condition make mineral exploration easier and less costly. Alternatives which keep most or all of the roadless area in a roadless condition do not preclude mineral entry in these areas, but a lack of roads will complicate such actions.

Alternatives B, B-Departure, and G have the fewest acres where mineral entry is restricted by roadless objectives (24,000 acres). The other alternatives, in increasing order of restriction are: Alternatives C, C-Departure, D and H (34,400 acres), Alternative F (39,200 acres), Alternatives A and NC (40,000 acres), and Alternative E (46,200 acres). (See Chapter IV for additional detail.)

Cultural Resources

Historical and archeological resources will be protected and managed in compliance with the National Historic Preservation Act of 1966 and Executive Order 11593 of 1971. Important cultural sites will be protected in all alternatives Whenever there are ground disturbing activities, however, there is risk that significant (but unknown) sites will be accidentally impacted This risk is tied directly to the amount of ground-disturbing activity likely to occur within any alternative. In the first decade, Alternative NC with the highest timber harvest level, would be expected to have the greatest risk of affecting cultural resources The other alternatives, in decreasing order of risk are; Alternatives B-Departure, C-Departure, B, D, E, C, A, H, G, and F.

Wetlands and Floodplains

With the exception Alternative NC, all alternatives protect wetlands and floodplains through the implementation of standards and guidelines described in Chapter 4 of the Proposed Plan For this reason the differences among the alternatives would not be noticeable. Alternative NC makes no allowance for reduced timber yields in these areas and thus presents a somewhat greater risk of damage.

Dispersed Recreation

Total dispersed recreation opportunities are expected to far exceed demand in all alternatives for at least the next 50 years, but shortages are expected for some types of dispersed recreation (For a *more complete discussion of the recreation opportunity spectrum see Chapter III and the Glossary*).

The demand for roaded natural and roaded modified recreation opportunities will be easily met regardless of alternative. Demand for wilderness recreation is expected to increase as population increases but it is projected that this demand can be met by the existing wilderness areas well into the next century

The situation is different for nonwilderness semiprimitive types of recreation opportunity Semiprimitive motorized and semiprimitive nonmotorized recreation demand is expected to exceed capacity regardless of the alternative selected. In those alternatives which would develop much of the roadless area, capacity will be exceeded much sooner. Semiprimitive motorized and nonmotorized capacities are displayed, by alternative, in Table II-5

Developed Recreation

At present, the capacity of developed recreation sites (583,000 RVD's) exceeds the developed recreation use (366,700 RVD's) although popular sites are fully occupied on some weekends Projected use indicates that capacity will continue to exceed demand for many years However, there are some areas on the Forest (most notably in the Hells Canyon NRA) where there is substantial unmet demand for developed recreational facilities. Except for Alternatives A and NC, additional recreation site construction is planned to meet this demand, increasing total capacity to 661,000 RVD's

Landscape Appearance

All alternatives will affect landscape appearance This change will be most noticeable in areas where timber harvest occurs, with timber management activities normally being evident, additional roads being constructed, and fewer large trees being present

All alternatives provide protection of landscape appearance along major travel routes, but to varying levels. Alternatives A, C-Departure, D, F and H include "retention" and "partial retention" visual quality objectives (VQO's) along all major travel routes. Alternatives B, B-Departure, NC, E, and G incorporate substantially reduced visual quality objectives, meaning that management activities would be more visible.

Alternative C reduces visual quality objectives to a level in between, with approximately an 18 percent reduction in area managed as "retention" and "partial retention" from what is found in Alternatives A, C-Departure, D, F, and H This reduction in emphasis in Alternative C was made following public comment on the DEIS, in an effort to mitigate reductions in timber availability.

Air Quality

On-Forest sources of air quality degradation can be smoke from burning logging slash, prescribed burning for other resource purposes such as range management, wildfire, and dust from roads It is unlikely that differences among the alternatives would be evident to most observers in most years, although there are likely to be differences in the levels of particulates produced by slash burning These levels are closely tied to timber harvest In the first decade, Alternative NC with the highest timber harvest level, would be expected to have the greatest particulate production The other alternatives, in decreasing order of risk are, Alternatives B-Departure, C-Departure, B, D, E, C, A, H, G, and F.

There are many off-Forest sources of pollution such as agricultural field burning, industrial smoke, and slash burning on other forest lands that affect air quality on and off the Forest These are not within control of Forest managers

Wild and Scenic Rivers

All alternatives include management direction to preserve the wild, scenic, and recreational values of those rivers or river segments (meaning the river plus its associated corridor) which are a part of the National Wild and Scenic Rivers System Under all alternatives, plans would be developed for managing these rivers, as specified in the Wild and Scenic Rivers Act (Public Law 90-542), as amended

Roadless Areas

Most alternatives would reduce the amount of nonwilderness roadless area outside the Hells Canyon National Recreation area Only Alternative E would keep all roadless area in a roadless condition Effects of roadless area development include those described for timber management and road construction, plus the loss of the semiprimitive recreational opportunities associated with their undeveloped nature. In addition, development of roadless area precludes further consideration for wilderness designation Table II-5 displays the amount of roadless area which would be developed under each of the alternatives.

Range Management

All alternatives include management direction for improving range conditions where needed, with particular emphasis on riparian areas Most alternatives reflect a general reduction in AUM's from what was projected in the DEIS. This is due, in part, to the public response calling for increased emphasis on riparian protection. Projected livestock grazing varies from a high of 207 thousand animal unit months (MAUM's) to a low of 143 MAUM's within the various alternatives (specific projections by alternative are found in Table II-5). These variations generally reflect different investment levels in livestock management and range restoration Alternatives calling for higher livestock use include greater environmental risks such as streambank trampling, sediment production, bacterial water pollution and soil compaction

Domestic Supply Watersheds

Protection of domestic supply watersheds is an overriding objective of all alternatives as reflected in the Standards and Guidelines (Plan Chapter 4). Different alternatives, however, provide lesser or greater risks to watershed values depending on the intensity of management proposed.

For the Baker and La Grande domestic supply watersheds the least amount of risk would be under Alternative E, which would keep both in an undeveloped condition (This alternative minimizes risk associated with management activities such as timber harvesting and road building, but would also make protection of the watersheds from naturally-occurring fires more difficult) For the Sumpter and Wallowa watersheds the least risk is associated with Alternative F, as in that alternative the watersheds would be managed for timber production but at a reduced rate of harvest.

Alternatives B, B-Departure, D, G, and NC provide the greatest risk to watershed values because, under these alternatives, the watersheds would all be managed dominantly under Management Area 1 which would include a high rate of timber management activity. Alternatives A, C, C-Departure, and H provide a moderate risk to watershed values, as compared to the other alternatives, with the Baker City and La Grande domestic supply watersheds managed at a reduce rate of timber harvest and with the Sumpter and Wallowa watersheds managed dominantly under Management Area 1.

Regardless of the alternative chosen, project-level analysis and project design will center on the need to protect or improve water quality and streamflows.

Social and Economic Effects

The key variable in assessing social and economic effects is timber production. Other aspects of forest management also change but they change little (as in the case of recreation use) or they have little impact because they do not comprise a large percentage of the available local supply (as in forage available for livestock).

The alternatives can reasonably be portrayed in terms of their local economic effects by simply ranking them according to their annual Decade 1 million board foot allowable sale quantity (ASQ) as shown below. The higher the rank, the greater the local economic benefit

Rank	*Alternative*	*Annual ASQ (MMBF)*
1	NC	183
2	C-Departure	169
3	B-Departure	167
4	B	151
5	C	144
6	D	143
7	E	136
8	A	134
9	H	118
10	G	117
11	F	98

The ASQ rankings can be used to estimate social effects as well. Those whose sense of control, sense of self-sufficiency, lifestyles, job, or belief set revolve around consumptive use of the timber resource through harvesting will find themselves accommodated by those alternatives that harvest more timber Those who do not share that orientation will find themselves better served by the other end of the spectrum. Selecting an alternative from either end of the spectrum will tend to lessen any sense of community cohesion

Except for their members who recognize an interest in timber harvesting, recreationists and American Indians generally would favor lower levels of timber production Women, racial minorities, and cultural minorities would have more of a chance to improve their economic well-being with higher levels of timber production

The above information reflects how the Forest affects the local economic area -- Baker, Union and Wallowa Counties in northeastern Oregon.

In terms of economic efficiency, viewed from a nationwide standpoint and looking only at those costs and benefits that have been dollar-quantified, the alternatives would be ranked as follows

Rank	Alternative	PNV (1982 Million $)
1	G	624
2	H	593
3	B	583
4	E	575
5	D	562
6	C	551
7	C-Departure	545
8	F	543
9	A	498
10	B-Departure	406
11	NC	399

Utility and Transportation Corridors

No new full corridors (see glossary) are proposed in any of the alternatives. All alternatives propose to establish one existing utility corridor This is the corridor northwest of La Grande which includes Interstate Highway 84, a railway, and several underground petroleum product pipelines and above-ground power transmission facilities

Because corridors usually require a cleared strip of land and often the erection of structures, virtually every Forest resource may be affected The effects include those on landscape appearance, timber production, mineral extraction, wildlife, livestock grazing and recreational uses. Since no new corridors are anticipated within the life of this plan, most of the impacts are from ongoing maintenance Maintenance may mean control of vegetation, especially trees, through the use herbicides, mechanical means, or other techniques

TRADEOFFS AMONG ALTERNATIVES

Overview

Forest management affects a wide range of people, a range that varies geographically as well as philosophically Some are primarily concerned about the Wallowa-Whitman National Forest because it is their closest National Forest, the Forest which therefore best meets their needs for local recreation. Others, overwhelmingly Oregon residents, see the Forest as their venue for big-game hunting Still others see the Wallowa-Whitman as the basis for their livelihoods, whether it be logging, guiding, livestock grazing, or mining. Every individual's perspective is different and is itself a combination of perspectives--work-related and recreational.

At other levels, people are concerned about how Wallowa-Whitman outputs affect the State economy or the National recreation picture In this array of considerations, no one individual fits into a single slot, no one is unaffected by the needs and aspirations of others.

Present net value and net cash flow are indicators of national interest They give the American people an idea as to how efficiently the Forest will be run and how the Forest's cash receipts compare to its cash expenditure

Local area inhabitants are affected by Forest activities directly (as in the case of millworkers), indirectly (as in the case of a saw repair shop), and through their expenditures in the local economy (grocery stores, service stations, etc) The Forest's influence pervades the local area Its activities determine how much money the federal treasury will remit the local governments from the "25 percent fund," an important part of area road and school budgets

Briefly, those whose main interest in the Forest arises from its ability to generate commodities over the next decade would be well served by Alternatives NC, C-departure, and B-departure Alternative B would be right behind them Timber production in Alternatives C and D is virtually identical, but Alternative D with its significantly higher permitted grazing levels would be ranked higher. Down another step from C and D are A and E Alternative A has slightly lower levels of timber harvesting, but significantly higher grazing levels

Alternatives A, E, C, and D are separated at most by 10 MMBF annually in Decade 1. Alternatives G and H represent a sizeable falldown from the preceding alternatives, though they have similar levels of timber sale offerings Alternative G would probably be viewed as somewhat more commodity-intensive due to its higher level of permitted livestock grazing.

Alternative F has the lowest levels of timber sale offerings and the lowest levels of permitted livestock grazing of any alternative considered.

Amenity interests appear to be best served by Alternatives F, E, A, and H in about that order. They all tend to limit commodity production in favor of amenities. Alternatives C and G would follow but their placing is arguable Those whose amenity inclination centers on overall land usage would likely place C in front of G Those whose interests in amenities combine with a concern for efficiency might place Alternative G first

Alternatives C-departure, D, B, B-departure, and NC complete the field, becoming progressively less satisfying to amenity interests Those who are strongly opposed to departures from the policy of nondeclining flow for harvesting timber would likely rank Alternative D as being more amenity-oriented than Alternative C-departure

Differences in Economic Values Among Alternatives

As shown in the following tables, Alternative G generates the highest present net value, the primary criterion for measuring economic efficiency. It achieved this standing because it was restricted less than any other alternative in the management of the timber resource. It most closely approximated a maximum efficiency alternative Because Alternative G precludes timber harvesting on any stand which would not generate a positive present net value independently, it actually generates a lower present net value than is possible under a strict maximum efficiency scenario

All alternatives other than G were assigned timber targets (harvest floors) The allowable sale quantities for Alternatives A, B, B-departure, C, C-departure, D, E, and NC, are all higher than that generated (25 5 MMCF per year) for the maximum PNV benchmark The model therefore sacrificed efficiency in order to meet the timber targets which were in excess of what would be achieved under an efficiency maximization (maximize PNV) formulation These targets were assigned to respond to the need for employment opportunities in the local area, one of the Forest's issues

Present Net Value (PNV) is the primary measure of economic efficiency used in the analysis It is calculated by subtracting discounted dollar-quantified costs from discounted dollar-quantified benefits

Table II-9 displays the PNV's of the Maximum PNV benchmark and the alternatives The alternatives are arrayed in order of decreasing PNV The analysis however was not conducted incrementally--moving from one alternative to the next, adding constraints.

Alternatives were formulated discreetly with each alternative designed to respond to a mixture of issues, concerns, and opportunities The Maximum PNV benchmark is provided as a reference point. It is not a viable alternative as it was not designed to respond to the issues and concerns.

Alternative G

Alternative G generated the highest present net value for any alternative because its land allocation constrainted timber production least and because it was not required to harvest uneconomical timber stands It forms the true base of comparison for the alternatives because it comprises a fully implementable alternative Summary information on present net values by alternative is shown in Table II-9.

Alternative H

Moving from Alternative G to Alternative H entails loss of some $31 million in present net value Discounted costs increased $15 million and discounted benefits fell $16 million. Significant benefit decreases occurred in timber ($22 million) and range ($1 million) outputs. The range improvements necessary to accommodate livestock at Alternative H's levels were more economically efficient than those associated with G's higher levels, but this small increase to present net value was greatly overshadowed by increased costs in timber ($11 million) and roads ($1 million) and reduced timber benefits ($22 million) As would be expected, the benefit/cost ratio declined from Alternative G's 2 42 to Alternative H's 2 31

The reason Alternative H has a lower present net value and a lower benefit/cost ratio than Alternative G is that Alternative H offers more timber than is economically efficient for its land allocation and that land allocation is itself more restrictive in terms of management flexibility than is Alternative G's This is reflected in a higher first decade incidence of logging on short-span, long-span and helicopter lands The timber harvest floors were established to make Alternative H more responsive to the timber and local economy issues.

Table II-9

DIFFERENCES IN ECONOMIC EFFICIENCY CRITERIA BY ALTERNATIVE
1982 MILLION DOLLARS
4% DISCOUNT RATE FOR 150 YEARS
(Ranked in Order of Decreasing Present Net Value)

Benchmark or Alternative	MAX PNV BM 1/	G	H	B	E	D	C	C-dep	F	A	B-dep 2/	NC 3/
	ALTERNATIVE											
Present Net Value	627	624	593	583	575	562	551	545	543	498	406	399 4/
Incremental Differences in Present Net Value		-3	-31	-10	-8	-13	-11	-6	-2	-45	-92	-7
Discounted Economic Benefits	1,089	1,062	1,046	1,108	1,076	1,063	1,068	1,067	976	1,019	1,083	NE
Incremental Differences in Discounted Economic Benefits		-27	-16	+62	-32	+7	-15	-1	-91	+43	+64	NE
Discounted Economic Costs	462	439	453	524	502	522	518	522	433	520	676	NE
Incremental Differences in Discounted Economic Costs		-23	+14	+71	-22	+20	-4	+4	-89	+87	+156	NE
Benefit/Cost Ratio	2.36	2.42	2.31	2.11	2.15	2.08	2.06	2.04	2.25	1.96	1.60	NE

NE = Not estimated

1/ Pacific Northwest Region FORPLAN Run 7, Benchmark 1

2/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting

3/ Because it does not meet management requirements, this alternative cannot be implemented without a change to federal legislation

4/ PNV estimated as follows (Alternative B-Dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-dep's PNV

Alternative B

Selecting Alternative B rather than Alternative H would mean moving to a different land allocation, one significantly more attuned to commodity production. Making this move would mean losing benefits in recreation ($12 million) due to reductions in scarce nonmotorized recreational opportunities The cost increases associated with the timber program ($45 million) and with timber-related activities in roads ($16 million) were about equal to the $72 million increase in timber benefits

Had both of these alternatives been run with identical timber targets (in terms of percent of alternative-respective maximum possible first-decade offerings), the spread between the two would widen appreciably. As stated, Alternative B's timber target was 85 percent of its maximum possible first-decade offering, while Alternative H (with a more restrictive land allocation) was assigned a target of 80 percent.

Alternative H's less intensive range program offers no obvious advantage over Alternative B's in terms of present net value though it would look more attractive in times of austere budgets. Alternative H manages to increase recreation-related benefits and decrease recreation-related costs relative to Alternative B by spreading out some of the program's investments over time

Alternative E

Alternative E has, in the balance, a more restrictive land allocation than does Alternative B This can be deduced from the fact that it generates a lower level of timber sale offerings than does Alternative B.

Alternative E's reduction is present net value of $8 million occurs because its $22 million decrease in costs causes a disproportionately large decrease in benefits ($32 million). Thus, while timber (minus $49 million), range (minus $5 million) and other programs (minus $2 million) benefits decreased, recreation (plus $25 million) benefits increased. The reductions in range costs ($2 million) were offset by even greater reductions in range benefits ($5 million)

Alternative D

Alternative D is ranked next in terms of present net value Significant increases in timber harvest benefits ($13 million) and range benefits ($5 million) are offset by a $13 million falldown in recreation benefits and cost increases of $12 million in timber and $5 million in timber-related roads. A small reduction in costs for recreation ($3 million) is matched by a similar increase in range costs

Alternative C (Preferred)

Next in line in terms of overall efficiency is Alternative C with a present net value reduction of $11 million, though its benefit/cost ratio, at 2.06 is only a hair lower than D's 2 08 Costs fall by some $5 million, but the benefits fall even further, by $15 million. The reduction in benefits comes about from a lower value of timber offerings (minus $13 million) along with a reduction ($4 million) in the range program These reductions were offset to a small extent by increased recreation benefits (plus $3 million) and by cost reductions in timber-related road work of $3 million and in range program costs (down $3 million)

Alternative C-Departure

Put basically, Alternative C-departure generates a lower present net value than does Alternative C because it has a higher timber target and thus forces the harvest of timber in a less economical manner. These timber targets cause a $6 million reduction in present net value--the result of a $1 million decrease in benefits and a $3 million increase in costs.

Benefits fall and costs rise because, with its somewhat restrictive land allocation and elevated first decade timber harvest, the Forest is forced to harvest much more low dollar-valued lodgepole sawtimber in the first decade (2 7 MMCF compared to 1.4 MMCF) and also to move very heavily into difficult-to-log lands even in the first decade--harvesting about 7,000 acres of short-span ground compared to Alternative C's 6,000 acres and harvesting about twice as much helicopter long-span acreage.

Another effect of this elevated first decade timber harvest is that the average volume removed per acre falls from 5.13 MBF per acre to 4 86 MBF per acre based on sawtimber offering and acres needing reforestation The effect on the benefit side of the equation is that total timber benefits increase some $1 million and recreation benefits decrease some $3 million

Alternative F

Alternative F provides the sharpest drop in timber benefits between any successively ranked alternatives ($94 million). Range benefits are also reduced ($5 million) but recreation benefits increase $10 million. A long string of cost reductions contribute to the total $89 million cost reduction timber ($54 million), roads ($20 million), and range ($3 million) The primary reason for the decline in overall present net value is that this land allocation is the most restrictive in terms of timber harvesting This coupled with a higher timber target, 90 percent of its maximum possible for the first decade on a nondeclining flow basis, to generate the lower present net value

Alternative A (No Action)

No other nondeparture alternative has a higher first-decade timber target expressed as a percentage of its maximum possible first-decade offerings--99 percent. This target was assigned to enable the alternative to approximate to the fullest extent possible the management philosophy of the alternative and recent historical timber offerings Coupled with the second most restrictive land allocation, this resulted in a low present net value ($498 million) This was the net result of the $43 million increase in benefits being overshadowed by a $87 million increase in costs The benefits themselves were the net result of a $47 million increase in timber, a $9 million decrease in recreation, and a $8 million increase in range

Alternative B-Departure

The largest incremental increase in discounted economic costs $156 million, and the sharpest falldown in incremental present net value ($92 million) are recorded by Alternative B-departure It also manages the largest incremental increase in discounted economic benefits ($64 million)

Benefits also increase in the range program by $3 million The timber program increased its benefits by $68 million, the result of operating with the least constrained timber land allocation Recreation benefits fell by $13 million because this alternative is arguably the most disruptive to big game habitat Costs increase for timber ($109 million), roads ($22 million), recreation ($4 million), and range ($7 million).

Alternative NC

This alternative's present net value was estimated to be some $7 million lower than Alternative B-Departure's Because it fails to meet management requirements, the alternative cannot be implemented without change to federal legislation

Table II-10 provides a breakout of discounted costs and benefits by alternative for the major cost and benefit groups. Direct comparisons of benefits and costs displayed for individual resource outputs provide general indications of relationships but they may be misleading because many outputs in multiple-use forestry have common costs of production that are difficult to attribute to individual resources

The table shows that the biggest benefit category for the Forest is recreation. It is also the largest source of net benefits. Timber benefits and costs vary more by alternative than do the other categories Much of the Forest's recreation use is not expected to vary by alternative whereas timber production will. This is because management can vary the level of timber harvests quite rapidly Recreation use, on the other hand, is largely a function of the kinds of recreation available on the Forest and the people's desire to use them.

Forest management activities change the face of the Forest slowly and in much the same way that they have done so for decades. Changes in recreation that do occur occur gradually and are largely those related to relocating the recreational experience. Recreationists move around the Forest using different spots depending on their recreational needs The Forest has a surplus of recreational opportunities and is expected to continue this surplus for quite some time

Range outputs and those associated with anadromous fishery production and others do change but their relative size is quite small. The tables do not include speculative benefits and costs, such as those which would be associated with developing Forest mineral resources

The salient characteristic of the table is that those alternatives that constrain timber production most (by reducing available acres, by forcing harvest on inefficient lands, or by increasing use of expensive management techniques), also generate the lowest present net value This is because the costs and benefits associated with timber production are quite large and because they vary a great deal by alternative.

Net Cash Flow

Table II-12 displays the Forest's net cash flow over time by alternative. This information is presented to answer the recurring question of how the Forest's cash receipts compare with its cash expenditures. Because the timber program accounts for over 95 percent of all Forest receipts, the discussion here will focus on their variation over time by alternative Variations were made in Forest outputs for range levels and attendant grazing receipts No changes are projected between alternatives for miscellaneous receipts.

Receipts

The primary factors that affect timber receipts are the amount of timber cut, the species, its quality, and its accessibility As long as the costs of harvesting and management investments do not exceed the timber value, increased harvest volumes result in increased timber receipts. Timber sales may blend a certain portion of stands with dollar costs in excess of dollar benefits with stands whose dollar benefits exceed their dollar costs and still provide attractive sale packages All Forest alternatives except G (which allows harvest only on those stands which can generate positive present net values independently) adopt this practice.

Table II-10
PRESENT NET VALUE, DISCOUNTED BENEFITS, AND DISCOUNTED COSTS BY RESOURCE GROUPS 1/
1982 MILLION DOLLARS
(Ranked in Order of Decreasing PNV)

Alternative	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 2/	NC 3/
Present Net Value	624	593	583	575	562	551	545	543	498	406	399
Discounted Benefits											
Timber	410	388	460	411	424	411	412	318	365	433	NE
Recreation	571	576	564	589	576	579	576	586	577	564	NE
Range	36	35	36	31	36	32	32	27	35	38	NE
Other 4/	45	47	47	45	47	47	47	45	42	47	NE
Total	1,062	1,046	1,108	1,076	1,083	1,068	1,067	976	1,019	1,083	NE
Discounted Costs											
Timber 5/	153	164	209	202	214	215	215	161	223	332	NE
Roads 6/	99	100	116	107	112	109	112	92	108	130	NE
Recreation 7/	36	40	41	41	38	40	41	41	37	41	NE
Range 8/	21	19	20	18	21	18	18	15	21	28	NE
Other 9/	129	130	138	134	136	135	136	125	132	146	NE
Total	438	453	524	502	522	517	522	433	520	676	NE

NE = Not estimated

1/ Direct comparisons of benefits and costs displayed for individual resource outputs provide general indications of relationships but they may be misleading because many outputs in multiple use have common costs of production that cannot be reliably separated and attributed to individual resources Displayed in order of decreasing present net value

2/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting

3/ PNV estimated as follows (Alternative B-Dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-dep's PNV Since this alternative does not meet management requirements, it cannot be implemented without a change to federal legislation

4/ Primarily water, but also anadromous fish and miscellaneous collections

5/ Costs shown are for E-prefixed MIH codes As discussed in Appendix B, timber-related costs include many outside the formally designated timber program

6/ Costs shown are those related to the Forest facilities program, the bulk of which is a cost to the timber program

7/ Costs shown are those from the Forest's recreation, wilderness, and fish and wildlife programs costs

8/ Costs shown are those from the livestock grazing program

9/ Costs shown are those from the Forest programs not elsewhere classified The bulk of these costs are associated with the timber program

Table II-11
TIMBER TARGETS ESTABLISHED BY ALTERNATIVE
(Ranked in Order of Decreasing PNV)

	ALTERNATIVE										
	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 1/	NC 2/
FORPLAN Run Identification	616524	616512	616507	616543	616518	616505	616513	616545	616540	616526	NA
Percentage of Maximum Timber Production Possible in Decade 1 (Used as a Timber Target)	No Target--Maximized Efficiency	80	85	90	90	90	116 Departure	90	99	96 Departure	NA
Actual Timber Target Assigned (MMCF/Year in Decade 1) 3/	No Target--Maximum Efficiency Resulted in Output Level of 24 5	24 8	31 0	27 7	29 5	28 3	35 5	21 5	27 9	35 7	NA
Land Suitable for Timber Production (Thousands of Acres)	NE	806	880	789	857	837	846	798	866	940	NE
Land Suitable for Timber Production at Maximum PNV (Thousands of Acres)	801	768	824	716	768	758	768	744	NE	824	NE

NA = Not Appropriate
NE = Not Estimated
1/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
2/ Because it does not meet management requirements, this alternative cannot be implemented without change to federal legislation.
3/ Figures shown are for actual FORPLAN volume, not adjusted for change in lodgepole utilization standards

Table II-12

AVERAGE ANNUAL NET CASH FLOWS, RECEIPTS, AND COSTS BY ALTERNATIVE FOR THE FIRST, SECOND, FIFTH AND SIXTH DECADES, UNDISCOUNTED 1/
1982 MILLION DOLLARS
(Ranked in Order of Decreasing PNV)

Alternative	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 2/	NC
Present Net Value	624	593	583	575	562	551	545	543	498	406	399 7/
Decade 1											
Noncash Benefits 3/	23 1	23 3	24 0	23 6	24 1	24 6	23 9	23 0	24 1	25 3	NE
Cash Receipts 4/	13 1	11 9	15 0	13 3	13 3	12 8	15 7	8 8	12 1	12 0	NE
Costs 5/	15 9	16 3	19 0	18 0	18 6	18 6	20 5	15 5	18 5	23 2	NE
Net Cash Flow 6/	-2 8	-4 4	-4 0	-4 7	-5 3	-5 7	-4 9	-6 7	-6 4	-11 2	NE
Jobs	2,798	2,800	3,054	2,914	2,983	2,974	3,188	2,631	2,915	3,183	3,255
Personal Income (Million 1982 $)	40 4	40 6	45 3	42 8	44 0	43 9	47 9	37 5	42 8	47 8	49 2
Timber Sale Offerings (ASQ) (MMBF)	117	118	151	136	143	144	169	98	134	167	183 8/
Decade 2											
Noncash Benefits 3/	27 9	28 1	28 0	27 9	28 4	27 6	27 9	27 7	28 6	29 5	NE
Cash Receipts 4/	13 6	12 1	15 5	14 2	14 0	13 6	10 7	9 6	11 4	17 1	NE
Costs 5/	15 2	15 6	18 2	17 3	17 9	17 7	17 1	14 8	17 8	22 8	NE
Net Cash Flow 6/	-1 6	-3 5	-2 7	-3 1	-3 9	-4 1	-6 4	-5 3	-6 3	-5 7	NE
Decade 5											
Noncash Benefits 3/	31 0	32 2	31 3	33 3	32 5	32 3	32 2	32 5	32 3	36 8	NE
Cash Receipts 4/	18 0	17 5	18 1	13 4	13 1	12 6	12 5	15 4	6 9	-5 4	NE
Costs 5/	15 1	15 5	17 9	17 2	17 7	17 6	17 0	14 8	17 6	23 3	NE
Net Cash Flow 6/	3 0	2 0	0 3	-3 8	-4 6	-5 0	-4 5	0 7	-10 8	-28 7	NE
Decade 6											
Noncash Benefits 3/	31 6	31 8	30 7	32 6	31 8	31 7	31 6	32 2	31 7	30 9	NE
Cash Receipts 4/	16 4	15 3	16 2	15 2	14 3	14 9	14 3	17 3	9 5	9 8	NE
Costs 5/	15 1	15 5	17 9	17 2	17 7	17 6	17 0	14 8	17 6	20 0	NE
Net Cash Flow 6/	1 3	-0 2	-1 7	-2 1	-3 4	-2 6	-2 6	2 5	-8 1	-10 1	NE

NE = Not Estimated
1/ Costs are limited to agency expenditures Payments to Local Governments are not counted as costs
2/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting by allowing widespread harvesting of stands two or more decades prior to achievement of CMAI
3/ Noncash benefits are benefits not collected as cash receipts
4/ Comprises timber stumpage receipts (statistical high bid), grazing fee receipts, and miscellaneous receipts
5/ All Forest costs except those for purchaser credit roads, co-op road maintenance, and treatment of activity fuels which costs are already reflected in lower statistical high-bid values
6/ The difference between the receipts and the costs shown
7/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-Dep's PNV
8/ Potential yield not directly comparable to allowable sale quantity
9/ Because it does not meet management requirements, this alternative cannot be implemented without a change to federal legislation

Another feature to be considered is the role played by timber targets which were assigned every alternative but G (Table II-11). These targets were assigned the alternatives in response to each alternative's emphasis on issues, concerns, and opportunities Achievement of timber targets in alternatives with highly restrictive land allocations (in terms of timber harvest) is generally more difficult and thus more costly in terms of present net value. The effect of setting minimum timber harvest levels (floors) on present net value in a given land allocation is reflected in Table II-13

These reductions in present net value arise because the mix of objectives requires the model to harvest timber which is economically less desirable due to its species mix, quality, accessibility, and reforestation cost

Species mix affects timber receipts in several ways The obvious implication from a shift in species harvested is that more valuable species bring a greater return than do the lesser-valued species. More subtle effects arise due to differences in timber yield tables, silvicultural practices, and alternative-respective responses to issues, concerns, and opportunities Timber quality relates to such factors as timber size and freedom from defect and knots. Accessibility accounts for differences in the costs of extracting timber due to such site-respective considerations as the logging system required (tractor, shortspan or longspan cable, helicopter); harvest method (thinning, clearcutting, overwood removal); and degree of roading required

Consider the land in timber management as shown in Table II-14. As progressively higher timber targets are assigned any particular land allocation, more acres of timber land are brought into timber production and the present net value declines Alternative G, free from any timber harvest floor, schedules virtually no longspan cable or helicopter ground in decade 1 (Table II-14) and about 9 percent less lodgepole pine sawtimber than does Alternative B (Table II-15).

Alternative B, with a first-decade timber harvest higher than that economically indicated, still manages on the whole to bypass the difficult and costly-to-log helicopter and longspan cable lands However, it must increase its incidence of shortspan cable logging by about 25 percent (in the first decade) over that specified in Alternative G. It must also absorb the costs of accessing the Lake Fork Roadless Area which Alternative G elected to avoid for economic reasons.

With the even higher timber targets contained in B-departure, the model is forced to harvest longspan cable and helicopter lands even in the first decade (Table II-14) to the extent that those expensive logging systems are used on about 4 percent of the acres harvested.

Similar patterns are evident in the timber-amenity blend land allocation used for Alternatives H, C, and C-departure. Alternative H harvests no longspan or helicopter ground in the first decade while Alternative C harvests that land type to the extent that it makes up about 4 percent of its total acres harvested (Table II-14). Likewise, while Alternative H harvests shortspan ground in the first decade on 17 percent of its total area harvested, Alternative C harvests it on 24 percent. Alternative C-departure follows this same trend, moving more heavily into both shortspan cable lands (23 percent) and longspan-helicopter lands (6 percent) in the first decade

Table II-13
EXAMPLES OF PRESENT NET VALUE RESPONSE
TO TIMBER HARVEST MINIMUM LEVELS (FLOORS) 1/

Timber Emphasis Land Allocation Input to FORPLAN

Alternative	G	B	B-dep 2/
Present Net Value (1982 Million $)	624	583	406
Timber Harvest Floor in Decade 1 (MMCF/Year)	3/	31.0	35 7
Land in Timber Management (Thousands of Acres)	801	880	940

Timber-Amenity Blend Land Allocation Input to FORPLAN

Alternative	H	C	C-dep
Present Net Value (1982 Million $)	593	551	545
Timber Harvest Floor in Decade 1 (MMCF/Year)	24 8	28 3	35 5
Land in Timber Management (Thousands of Acres)	806	837	846

1/ Other factors change the present net value, but only to a small extent. They do not mask the effects explained in the narrative
2/ Alternative B-departure cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
3/ Yielded 24.5 MMCF/year in decade 1 without a timber harvest floor

Table II-14
TIMBER OUTPUTS AND ACTIVITIES BY ALTERNATIVE

All figures represent average annual conditions in the first decade except for PNV and BCR which reflect the entire planning horizon.
All dollar figures are in 1982 terms except for those shown for the FY 1985 budget.

	PNV MM$ 1/	BCR 2/	Timber Sale Volume X06 MMCF 3/	X06 MMBF 3/	X07 MMCF 4/	X08 MMCF 5/	SUM MMCF 5/	TMBR MGT M AC 6/	HARVEST METHOD T-SS LSH M AC/YR 7/	PRCHSR CREDIT ROADS MM$ 8/	PLT MAC 9/	ED4 MAC 10/	TSI MAC 11/	TMBR RLDT BDGT MM$ 12/	SUM BDGT MM$ 13/	M JOBS	PRSNL INCM MM$	PMNTS TO CNTS MM$
HISTORICAL LEVELS																		
FY 1985 budget			23	127	9	5	37				24	47	32		194			
Recent Historical			29	159	10	5	44					33	39	89	231	30	445	40
ALTERNATIVES																		
A (No Action)	498	1 96	27	134	8	5	40	866	17 4-1	31	43	133	92	94	216	29	428	40
B (RPA)	583	2 11	30	151	9	5	44	880	18 4-0	29	31	148	77	88	219	31	453	47
B-Departure 14/	406	1 60	34	167	10	5	49	940	17-9-1	42	99	206	120	134	275	32	478	43
C (Preferred)	551	2 06	28	144	8	5	41	837	18-8 1	36	47	143	74	97	222	30	439	43
C-Departure	545	2 04	34	169	10	5	49	846	22-17-2	29	51	167	66	97	234	32	479	49
D	562	2 08	29	143	8	5	42	857	17 5-0	31	44	150	74	91	217	30	440	44
E	575	2 15	27	136	8	5	40	789	16 4-0	27	41	143	82	85	207	29	428	42
F	543	2 25	21	98	6	5	32	798	14-3-1	23	38	106	20	67	179	26	375	30
G	624	2 42	24	117	7	5	36	801	15-2 0	20	18	114	48	82	179	28	404	40
H	593	2 31	24	118	7	5	36	806	15-3-0	23	32	130	54	67	187	28	406	38
NC 15/	399	NE	35	183	10	5	50	NE	NE	NE	60	196	104	NE	284	33	492	46

M = Thousand
MAC = Thousand Acres
MMBF = Million Board Feet
MMCF = Million Cubic Feet
MM$ = Million Dollars
1/ Present net value for 15 decades
2/ Benefit cost ratio for 15 decades
3/ Sawtimber - This is the volume of softwood sawlogs and veneer bolts sold
4/ Roundwood - This is the volume of softwood other than sawtimber and fuelwood
5/ Softwood personal use fuelwood
6/ Thousand acres which come into solution for timber management during the first 15 decades
7/ Harvest method – Tractor Shortspan Cable Longspan Cable and Helicopter
8/ Purchaser credit road expenditures in millions of dollars
9/ Thousand acres planted This figure is also included in the total amount of reforestation activity shown in 10/
10/ Thousand acres of reforestation - Includes all acres where activities aiding the reestablishment of a tree cover are employed, Includes 9/
11/ Precommercial thinning, thousand acres
12/ E - prefixed MIH codes plus purchaser road credits and activity fuels treatment. Excludes many timber support cost centers
13/ Total Forest budget. Includes $1 14 million annually for construction of capital investments as designated in the HCNRA Comprehensive Management Plan in all alternatives except Alternative A. FY 1985 budget included $1 5MM(PCR)
14/ Alternative formulated to make up for protected shortfall from private lands. Not implementable without a change in federal legislation.
15/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC s Decade 1 ASQ in MMBF) x Alternative B-dep's PNV

Table II-15
PROPOSED TIMBER HARVEST PER YEAR BY ALTERNATIVE

Timber Harvest	NC 1/		A		B		B-dep 1/		G Preferred		C-dep		D		E		F		G		H	
Component	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF
Decade 1																						
SAWTIMBER																						
P,D,F,S,L 2/	25 4	155 7/	24 9	129	28 0	146	31 2	159	26 3	141	31 7	162	26 5	138	25 1	131	18 5	93	21 8	112	22 1	113
LP 3/	9 7	28 8/	2 1	5	2 2	5	3 2	8	1 4	3	2 7	7	2 1	5	1 8	5	2 1	5	2 0	5	1 9	5
ROUNDWOOD 4/	10 1 9/		7 8		8 7		10 0		7 9		9 9		8 2		7 7		6 0		6 9		6 9	
FUELWOOD 5/	5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0	
TOTAL 6/	50 2	183 10/	39 8	134	43 9	151	49 4	167	40 6	144	49 3	169	41 8	143	39 6	136	31 6	98	35 7	117	35 9	118
Decade 2																						
SAWTIMBER																						
P,D,F,S,L 2/	25 4		25 7		28 3		35 7		25 1		23 4		27 0		25 9		19 8		24 0		22 7	
LP 3/	9 7		1 6		1 9		0 8		2 2		1 7		1 8		1 2		1 1		0 4		1 5	
ROUNDWOOD 4/	7 8 9/		6 5		7 3		8 8		6 6		6 1		6 9		6 5		5 0		5 7		5 8	
FUELWOOD 5/	5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0	
TOTAL 6/	47 9		38 8		42 5		50 1		38 9		36 2		40 7		38 6		30 9		35 1		35 0	
Decade 3																						
SAWTIMBER																						
P,D,F,S,L 2/	25 4		26 7		30 5		38 1		27 6		25 4		28 9		27 2		19 4		24 2		24 1	
LP 3/	9 7		0 9		0 4		0 8		0 4		0 3		0 4		0 3		1 5		0 3		0 5	
ROUNDWOOD 4/	6 1 9/		5 2		5 7		7 3		5 2		4 8		5 5		5 1		4 0		4 5		4 6	
FUELWOOD 5/	5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0	
TOTAL 6/	46 2		37 8		41 6		51 3		38 2		35 5		39 8		37 6		29 9		34 0		34 2	
Decade 4																						
SAWTIMBER																						
P,D,F,S,L 2/	25 4		24 8		30 2		34 7		25 6		23 9		27 0		25 5		19 4		22 9		23 3	
LP 3/	9 7		2 2		1 0		4 2		1 9		1 4		1 7		1 5		1 5		1 2		1 0	
ROUNDWOOD 4/	7 5 9/		5 2		5 7		7 5		5 2		4 8		5 5		5 1		4 0		4 5		4 6	
FUELWOOD 5/	5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0	
TOTAL 6/	47 6		37 2		41 9		51 4		37 7		35 1		39 2		37 1		29 9		33 6		33 9	
Decade 5																						
SAWTIMBER																						
P,D,F,S,L 2/	25 4		25 4		28 2		35 1		24 8		23 3		28 0		24.5		20 8		22 8		24 1	
LP 3/	9 7		1 8		2 0		3 9		2 4		1 8		2 5		2 2		0 4		1 3		0 5	
ROUNDWOOD 4/	7 5 9/		5 2		5 7		7 5		5 2		4 8		5 5		5 1		4 0		4 5		4 6	
FUELWOOD 5/	5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0		5 0	
TOTAL 6/	47 6		37 4		40 9		51 5		37 4		34 9		39 0		36 8		30 2		33 6		34 2	

Recent Levels (1979 1983)	MMCF	MMBF
P,D,S,L,2/	27 1	155
LP 3/	1 5	4
Roundwood 4/	9 6	
Fuelwood 5/	5 0	
Total	43 2	159

1/ Because this alternative does not meet management requirements, it cannot be implemented without change to federal legislation

2/ Tree species other than lodgepole pine (P - ponderosa pine, D - Douglas-fir, F - true fir, S - Englemann spruce, y - western larch) Regulated volume - included in allowable sale quantity

3/ Lodgepole pine exceeding seven inches in diameter Regulated volume - included in allowable sale quantity

4/ Volume other than fuelwood or sawtimber, includes cull material, small diameter (less than seven inches) material, and dead material Unregulated volume - not included in the allowable sale quantity Not normally sawn into boards

5/ Personal use fuelwood No board foot volume is shown since these products are normally not sawn into boards and are not sold on a board foot basis

6/ The total represents the Timber Sale Program Quantity

7/ Includes standard and special components of the regulated harvest from the Timber Management Plan Does not include commercial thinnings, harvest from slopes greater than 60%, or lodgepole pine

8/ Includes commercial thinnings, harvest from slopes greater than 60%, and lodgepole pine

9/ This item is not addressed in the 1962 Timber Management Plan The figure was estimated based on the proportion of Alternative NC's board foot volume to Alternative B departure's board foot volume

10/ Potential yield from the Timber Management Plan Actual sawtimber volume cut during the period 1977-1986 averaged 152 MMBF/YR

NOTE All alternatives except B dep and C-dep were formulated on a nondeclining flow basis Adjustments to lodgepole pine utilization standards, made outside the FORPLAN model, account for ASQ differences between decades

Timber quality includes consideration of whether the material is suitable for sawing (sawtimber), pulping or chipping (roundwood), or personal use fuelwood Another dimension of quality relates to the conversion ratio or the amount of board feet which can be produced by a single cubic foot of sawtimber. This is primarily a concern in new tree stands which are still growing rapidly and which, therefore, are still experiencing significant changes in conversion ratios over time The earlier a new stand is harvested, the less its value per cubic foot.

These characteristics are included in FORPLAN dollar valuations so the model can consider these changes in value over time, along with other differences, in scheduling harvest. The higher the timber target, the earlier stands are likely to be scheduled for harvest This is illustrated in Table II-17 which shows Forest receipts over time Compare the receipt figures for Alternatives B and B-departure Alternative B-departure was run with its achievement of CMAI constraint relaxed This allowed it to schedule timber harvest at very short rotations--shorter than is permitted under NFMA This helps show, in an exaggerated way, the effects of harvesting early in the rotation cycle Notice that Forest receipts are higher in Alternative B than in Alternative B-departure by the fifth and the sixth decades. A great deal of this effect is caused by Alternative B-departure's early entry into regenerated stands which have achieved neither culmination of mean annual increment nor maximum economic efficiency.

The term accessibility reflects the stand's proximity to the established road system and to the local processors, as well as to the site-specific characteristics which determine to great extent what logging systems may be employed. Timber values are adjusted within FORPLAN to reflect differences in net value which result from using more costly logging systems as opposed to less costly logging systems

Costs

Forest costs are covered in detail in Appendix B. The discussion here relates to differences in costs among alternatives as portrayed in Table II-14.

With the exception of Alternative A, which alone has a budget constraint at recent historical levels, all alternatives provide for constructing all capital improvements specified in the Hells Canyon National Recreation Area Comprehensive Management Plan as close to the specified time frame as possible. Alternative A reflects the historical record of accomplishments and stretches out the completion date for these projects well into the future Thus all other alternatives experience a sharp drop in HCNRA CMP-related expenditures in the second decade

In all land allocations, costs increase as timber targets increase These increased costs are not matched by increased benefits, the net effect being that net cash flow decreases Extra costs resulting from the timber targets largely take the form of increased planting, thinning, road and logging costs.

Benefits: Market Values and Assigned Values

Some Forest outputs, such as stumpage, are normally traded in the market place and have market values Others, such as hiking, are not bought or sold, and therefore have been assigned values. The fact that something is not exchanged in the marketplace does not make it valueless.

Table II-16 displays total Forest benefits by these categories. The most noticeable feature portrayed there is that while total market resource values vary substantially between the alternatives--by as much as 64 percent, total nonmarket resource values vary hardly at all--with a maximum variation of less than one percent The wide range of variability in market values is caused predominantly by timber harvest levels which vary markedly Changes in recreation, water, and other nonmarket valued resources are quite small

Table II-16
UNDISCOUNTED AVERAGE ANNUAL FIRST DECADE ECONOMIC BENEFITS FOR BOTH MARKET AND NONMARKET RESOURCES
1982 MILLION DOLLARS
(Ranked in Order of Decreasing Present Net Value)

Alternatives	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 1/	NC
Present Net Value	624	593	583	575	562	551	545	543	498	406	399 4/
Average Annual Market Resource 2/ Values, Undiscounted, for the First Decade	16 4	15 4	19 2	17 0	17 6	17 6	19 7	12 0	16 3	17 5	NE
Average Annual Non-Market Resource 3/ Values, Undiscounted, for the First Decade	19 8	19 9	19 9	19 8	19 9	19 9	19 9	19 8	19 8	19 9	NE
Total Average Annual Undiscounted Resource Values, for the First Decade	36 2	35 2	39 0	36 8	37 5	37 4	39 6	31.9	36 1	37 4	NE

1/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
2/ High bid stumpage values, grazing receipts, anadromous fish, and miscellaneous receipts
3/ Recreation and water
4/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-dep's PNV Because this alternative does not meet management requirements, it cannot be implemented without a change to federal legislation

Table II-17
UNDISCOUNTED BENFITS, JOBS, AND PERSONAL INCOME
1982 MILLION DOLLARS
(Ranked In Order Of Decreasing Present Net Value)

Alternative	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 1/	NC 2/
Present Net Value	624	593	583	575	562	551	545	543	498	406	399
Decade 1											
Willingness-To-Pay Values for Forest Outputs 3/	36 2	35 2	39 0	36 8	37 5	37 4	39 6	31 9	36 1	37 4	NE
Forest Receipts 4/	13 1	11 9	15 0	13 3	13 3	12 8	15 7	8 8	12 1	12 0	NE
Noncash Benefits 5/	23 1	23 3	24 0	23 6	24 1	24 6	23 9	23 0	24 1	25 3	NE
Thousand Jobs/Year	2 8	2 8	3 1	2 9	3 0	3 0	3 2	2 6	2 9	3 2	NE
Personal Income (Million $/Year)	40 4	40 6	45 3	42 8	44 0	43 9	47 9	37 5	42 8	47 8	3 3
Decade 2											
Willingness-To-Pay Values for Forest Outputs 3/	41 5	40.1	43 5	42 1	42 4	41 2	38 6	37 3	40 0	46 6	NE
Forest Receipts 4/	13 6	12 1	15 5	14 2	14 0	13 6	10 7	9 6	11 4	17 1	NE
Noncash Benefits 5/	27 9	28 1	28 0	27.9	28 4	27 6	27 9	27 7	28 6	29 5	NE
Decade 5											
Willingness-To-Pay Values for Forest Outputs 3/	49 0	49 7	49 4	46 7	45 6	44 9	44 7	47 9	39 2	31 4	NE
Forest Receipts 4/	18 0	17 5	18 1	13 4	13 1	12 6	12 5	15 4	6 9	-5 4	NE
Noncash Benefits 5/	31 0	32 2	31 3	33 3	32 5	32 3	32 2	32 5	32 3	36 8	NE
Decade 6											
Willingness-To-Pay Values for Forest Outputs 3/	47 9	47 1	46 8	47 7	46 2	46 7	46 0	49 5	41.2	40 7	NE
Forest Receipts 4/	16 4	15 3	16 2	15 2	14.3	14 9	14 3	17 3	9 5	9 8	NE
Noncash Benefits 5/	31 6	31 8	30 7	32 6	31 8	31 7	31 6	32 2	31 7	30 9	NE

NE = Not estimated

1/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have acheved culmination of mean annual increment (CMAI) before harvesting

2/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-dep's PNV Because this alternative does not meet management requirements, it cannot by implemented without a change in federal legislation

3/ Undiscounted benefits from all Forest outputs quantified including those in 4/ below as well as benefits accruing from recreation, water, and anadromous fish

4/ Statistical high bid stumpage values, grazing receipts, and miscellaneous receipts

5/ Noncash benefits are not collected as fees because of current laws and policies

Nonmarket resource values change little because Forest Plan alternatives do not change the Forest character to the extent that marked shifts in recreation are expected For instance, all the Forest Plan alternatives call for protection, maintenance, and expansion of developed recreation sites so that no variation in developed recreation site use is attributed to any alternative. Some Forest dispersed recreation use is expected to be lost in certain Recreation Opportunity Spectrum (ROS) classes.

Incremental Differences in Economic Efficiency

The response of each alternative to ICO's or groups of ICO's is summarized in this chapter of the EIS as are the resource output levels The description of how the alternatives affect individual resources and more detailed discussions of the environmental consequences are found in Chapter IV of the EIS Social and Economic effects are displayed in the tables summarizing the responses to ICO's and are discussed in Chapters II and IV of the EIS

As shown in Table II-16, Alternative G generates the highest present net value, the primary decision criterion for economic efficiency It achieved this standing because it was given the least restrictive land allocation (in terms of allowing timber to be harvested) and the alternative was designed to maximize economic efficiency. Alone among the alternatives, Alternative G was modeled to preclude the possibility of harvesting any stand types which would not generate a positive present net value if sold alone

Alternative B gives up $41 million in present net value to Alternative G because it was assigned a very high timber target Achieving this timber target of 151 MMBF in decade one, an increase of 34 MMBF over Alternative G's economically efficient level of 117 MMBF, cost $41 million. While both G and B share the same FORPLAN data input set, Alternative B harvests the Lake Fork Roadless Area outside the HCNRA in order to meet its assigned timber target Alternative G with no such timber target leaves the area unharvested

(Throughout this document reference is made to timber offerings in board foot measure. FORPLAN, however, used cubic foot measure. Therefore, all board foot timber targets have to be converted to cubic foot measure for input to FORPLAN. Because the Forest has a wide range of conversion ratios in different timber stands depending on such considerations as species, age, and condition these efforts are necessarily approximate.)

The effects of extremely high timber targets on economic efficiency are shown in Alternative B-departure which sacrifices $218 million in present net value to generate average annual five-decade timber offerings 68 MMBF higher than Alternative G level Part of that $218 million cost occurs in the sixth and subsequent decades when Alternative B-departure's timber production falls

It is important to note that the true cost of implementing Alternative B-departure would be even higher than the $218 million shown This is because Alternative B-departure was allowed to violate NFMA provisions which require that regeneration harvests shall not occur unless stands shall generally have achieved culmination of mean annual increment In B-departure, stands are generally harvested prior to culmination of mean annual increment If Alternative G were run free of that requirement, as was Alternative B-departure, its present net value would have been even higher. The $218 million is, therefore, an underestimation of the loss in present net value

Alternatives H, and C-departure share the same FORPLAN input land allocation and vary only with respect to meeting timber targets (the same is true for Alternatives G, B, and B-departure) The primary reason this land allocation generates lower present net value figures than the G, B, B-departure family is that this land allocation imposes more restrictions on timber harvest These

restrictions include fewer acres available due to increased emphasis on roadless recreation and old-growth timber; additional constraints added to the rate of timber harvest on big-game winter ranges, some big-game summer ranges and anadromous fisheries emphasis areas; and more acres allocated to visual retention and partial retention.

Moving from Alternative H's five-decade average annual sawtimber harvest level of 129 MMBF to Alternative C's 146 costs about $42 million in present net value. Alternative C-departure, with its even higher first-decade harvest levels, 169 MMBF, is itself $6 million lower in present net value than Alternative C.

Alternative E was formulated in response to the wishes of those who felt the Forest should manage its roaded areas intensively for timber and stay out of the remaining roadless areas. It manages to do this and to still generate a present net value some 93 percent of the maximum present net value alternative Its land allocation is more restrictive than that used for G, B, or B-departure. Compared to the land allocation in H, C, and C-departure, that used in Alternative E is more restrictive in some respects, less restrictive in others. Alternative E designates the roaded sections of the Forest for intensive timber management while the land allocation in Alternatives H, C, and C-departure reserves much of this land for less intensive timber management to help meet other multiple use objectives.

Table II-18 breaks out costs between those which are designed to generate benefits over a long period of time (capital investments) and those which are meant to meet short-term objectives (operational and maintenance costs). Investments "pay off" over a period of years and thus are more properly viewed against a backdrop which includes future benefits as well.

Capital investment costs include costs like reforestation, road construction, and fish habitat construction Operation and maintenance costs include costs for road maintenance, property boundary maintenance, and utilities, among others The topic of costs is discussed in greater detail in Appendix B.

As shown in Table II-11, Alternatives E, C, D, and F all share a common timber target when expressed as a percentage of the maximum possible nondeclining flow first-decade timber harvest on their respective land allocations. The 90 percent target is respective to the individually determined land allocations. The 90 percent target necessarily produces less timber volume in Alternative F because fewer of its lands have been allocated to timber production in this amenity emphasis alternative Alternatives E, C, and D with their similar first decade offerings of 136, 144, and 143 MMBF indicate comparable maximum timber harvest capabilities. The ranking, in terms of present net value, would tend to indicate that achievement of the 90 percent goal was most difficult for Alternative C and least difficult for Alternative E which managed to approximate Alternative C's production level and still maintain a higher present net value.

In the balance then, Alternative E's land allocation would be viewed as being less restrictive to timber harvesting than either Alternative C's or Alternative D's

Alternative F is the alternative which most emphasizes amenities As such, it dedicates extensive areas of the Forest to nonharvest prescriptions with a resulting decrease in timber outputs as well as present net value Assignment of a timber target to an amenity emphasis alternative may seem incongruous to many. The purpose of assigning the timber target was to make the alternative more viable given the dependence of the local economy on timber industry. Without the timber target, first-decade output levels would be much less than the 98 MMBF finally identified for the alternative

The Forest's current management direction is best summarized by Alternative A. It reflects the direction contained in the Forest's various unit plans which were designed to manage different sections of the Forest As such, it is a combination of direction contained in those respective documents.

Table II-18
UNDISCOUNTED AVERAGE ANNUAL FIRST DECADE COSTS BY ALTERNATIVE FOR OPERATIONAL AND MAINTENANCE COSTS (O & M) CAPITAL INVESTMENT COSTS (CI) 1982 MILLION DOLLARS (May Not Sum Due to Rounding) (Ranked in Order of Decreasing PNV)

Alternatives	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 1/	NC 2/
Present Net Value	624	593	583	575	562	551	545	543	498	406	399 2/
Operational and Maintenance Costs	11 8	12 1	13 4	12 6	12 8	12 8	14 2	11 4	12 4	14 4	NE
Capital Investment Costs	6 2	6 6	8 5	8 1	8 9	9 4	9 3	6 4	9 2	13 1	NE
Total Budget Costs Historical Budget Level FY 1980-1983 Averaged $23 1 Million	17 9	18 7	21 9	20 7	21 7	22 2	23 4	17 9	21 6	27 5	NE

NE = Not estimated
1/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
2/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ is MMCF) Because this alternative does not meet management requirements, it cannot be implemented without a change to federal legislation

Table II-19
INCOME TRANSFERS FOR DECADES 1, 2, 5, AND 6
(1982 MILLION DOLLARS, AVERAGE ANNUAL UNDISCOUNTED FIGURES PORTRAYED BY DECADE)
(Ranked In Order of Decreasing Present Net Value)

Alternative	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 1/	NC 2/
Present Net Value	624	593	583	575	562	551	545	543	498	406	399 2/
Decade 1											
Willingness-To-Pay Values for Forest Outputs 3/	36 2	35 2	39 0	36 8	37 5	37 4	39 6	31 9	36 1	37 4	NE
Forest Receipts 4/ and Payments in Kind	16 4	15 4	19 2	17 0	17 6	17 6	19 7	12 0	16 3	17 5	NE
Income Transfers	19 8	19 9	19 9	19 8	19 9	19 9	19 9	19 8	19 8	19 9	NE
Decade 2											
Willingness-To-Pay Values for Forest Outputs 3/	41 5	40 1	43 5	42 1	42 4	41 2	38 6	37 3	40 0	46 6	NE
Forest Receipts 4/ and Payments in Kind	18 6	17 1	20 5	19 2	19 3	18 2	15 5	14 3	17 1	23 5	NE
Income Transfers	23 0	23 0	23 0	23 0	23 0	23 0	23 0	23 0	22 9	23 0	NE
Decade 5											
Willingness-To-Pay Values for Forest Outputs 3/	49 0	49 7	49 4	46 7	45 6	44 9	44 7	47 9	39 2	31 4	NE
Forest Receipts 4/ and Payments in Kind	21 8	21 8	22 6	17.7	17 7	16 8	16 8	19 2	11 6	4 6	NE
Income Transfers	27 2	27 9	26 8	29 0	27 9	28 1	27 9	28 7	27 6	26 8	NE
Decade 6											
Willingness-To-Pay Values for Forest Outputs 3/	47 9	47 1	46 8	47 7	46 2	46 7	46 0	49 5	41 2	40 7	NE
Forest Receipts 4/ and Payments in Kind	20 7	47 1	20 0	18 7	18 2	18 4	18 0	20 8	13.5	13 8	NE
Income Transfers	27 2	28 0	26 9	29 0	28 0	28 2	28 0	28 8	27 6	26 9	NE

NE = Not estimated
1/ Alternative B-dep cannot be implemented without change to Federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
2/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMCF) x Alternative B-dep's PNV Because it does not meet management requirements it cannot be implemented without change to federal legislation
3/ Undiscounted benefits from all Forest outputs quantified including those in 4/ below as well as benefits accruing from recreation, water, and anadromous fish
4/ Undiscounted high bid stumpage values, grazing receipts, and miscellaneous receipts

The historical sawtimber offering level (159 MMBF) cannot be maintained under this alternative's land allocation. Timber output levels are estimated at 134 MMBF in the first decade of implementation

These differences, combined with the unique land allocation based on existing unit plans, make comparison with other alternatives extremely difficult Perhaps most noticeable is the fact that in terms of timber extraction, Alternative A has--except for Alternative F--the most restrictive land allocation Another observation is that the Forest's historical budget levels have not impeded its economic performance in the timber management program The Forest has, in fact, been offering timber sales at a level far in excess of what could be justified from the viewpoint of economic efficiency

Differences in economic efficiency are displayed in Tables II-9, II-10, II-17, II-18, II-19 and II-20. Table II-21 arrays the alternatives in order of increasing discounted costs Alternative G generated the highest present net value of any alternative because of few constraints on timber production and because it was not required to harvest uneconomical timber stands. It forms the true base of comparison for the alternatives because it is a fully implementable alternative

Implications of FORPLAN Runs on Current Management Direction

Certainly the most obvious implication is that the Forest is harvesting timber at rates in excess of those which economic efficiency would indicate Whereas recent offering levels for sawtimber on the Forest have been at 159 MMBF, FORPLAN selected far less for the existing land allocation, 134 MMBF, even when directed to harvest timber at levels far in excess of those indicated by economic efficiency criteria Another observation is that the Forest has moved into more costly logging systems more rapidly than efficiency would indicate was appropriate. This appears to have occurred as management has sought to harvest difficult ground to meet targets for timber production and to meet the intent of unit plans to distribute the harvest

The analysis done for this plan indicates that the local economy and the federal treasury would have been better off had the Forest managed its easily-logged, high-valued stands more intensively rather than moving so quickly into the more difficult-to-log stands. Adopting the practice of more intensive management of easily-logged land in the immediate future would also allow the Forest to benefit from refinements in technology developed elsewhere to log difficult sites. Thus, the Forest could, in the future, reap the benefits of research and development (R & D) done elsewhere.

Other features in the analysis include projection of sizeable increases in precommercial thinning (as new stands reoccupy recent clearcuts of dead and dying lodgepole pine); the increased use of regeneration harvests rather than partial harvests; the reduced incidence of planting as a means to achieve regeneration; the reduction to insignificant levels of the incidence of commercial thinning on regenerated stands; and acceptance of regeneration lags in excess of five years.

Differences Between Current and Projected Timber Harvest Levels

Tables II-22, II-23, and II-24 compare historical and projected timber resource management, timber outputs, and land classification by alternative

All of the alternatives except NC, B-Departure, and C-Departure display a first-decade ASQ less than the historical 159 MMBF/yr (see Table II-22). Of these, only Alternative NC (which is not based on current data) projects production above 159 MMBF/yr on a nondeclining basis. There are a number of reasons why the majority of the alternatives do not project ASQ's at or above the historical level

1 The current timber management plan (the 1962 Timber Management Plan) indicates a potential yield of 183 MMBF/year This plan, which has served as the basis for timber harvest levels since 1962, was developed from 1958 timber inventory data Inventory procedures were

substantially less sophisticated than those used in the most recent (1979) inventory, and resulted in an overestimation of commercial forest land by more than 180,000 acres

2. The 1962 Timber Management Plan does not reflect the management requirements found in the National Forest Management Act and its implementing regulations.

3. The 1962 Timber Management Plan does not include all of the management direction found in the other current land management plans for the Forest (the Unit Plans)

4. The Plan also does not fully reflect passage of the Omnibus Oregon Wild and Scenic Rivers Act, the Act creating the Hells Canyon National Recreation Area, or the Comprehensive Management Plan for the Hells Canyon NRA

Integration of all of these factors, as is done in Alternative A (the "No Action") alternative, results in a projected ASQ of 134 MMBF/year in the first decade.

Table II-22 compares timber inventory, first-decade allowable sale quantity, long term sustained yield capacity, and average annual net growth for the alternatives and for the two benchmarks which maximize present net value and timber production Alternatives are compared in decreasing order of lands suitable for timber management.

As can be seen in comparing columns (1) and (5), allowable sale quantity is closely tied to the number of suitable acres. Some other factors also have significant effects, for example, departures from nondeclining flow which increase the first decade allowable sale quantity from a relatively small acre base

Column (13a) compares (as a percent) the average net growth at year 2030 with the long term sustained yield capacity for the maximum present net value and the maximum timber benchmarks and for each alternative. This is primarily an indicator of management intensity. In looking at the data for the benchmarks, the max timber benchmark projects a very high level of growth at 2030 because the model is forced to schedule very high levels of planting and precommercial thinning to maintain the high timber harvest level Also, there are few other constraints on the model such as those which protect wildlife habitat or visual quality The max PNV benchmark, in maintaining high economic efficiency, avoids scheduling many acres for planting, but also results in a relatively low rate of growth.

These same relationships hold true in the alternatives, although the range is narrower Alternative B-Departure, which calls for a high management intensity, is projected to have a growth rate at 2030 of 77 percent of the long term sustained yield Conversely, Alternative G, which emphasizes economic efficiency is at 50 percent. Alternative C (Preferred) projects growth at year 2030 to be 72 percent of the long term sustained yield. Growth as a percent of long term sustained yield, for any alternative can be increased by increasing management intensity, and by reducing constraints on the model

Achievement of RPA Timber Targets

RPA board foot volume targets are assigned to the Forest through the Regional guide using a 1 5 37 cubic foot.board foot conversion ratio. Calculated on this basis, timber outputs are compared to achievement of RPA targets for the first five decades as follows·

ACHIEVEMENT OF RPA TIMBER TARGETS BY ALTERNATIVE
(Average Annual MMBF for Decades 1-5)*

RPA Target	A	B	B-dep	C	C-dep	D	E	F	G	H
	207	229	278	211	209	219	207	167	187	188

* Includes sawtimber, roundwood, and fuelwood all calculated at 5 37 board feet per cubic foot

Table II-20
PRESENT NET VALUE OF ALTERNATIVES AND RELATED ECONOMIC CRITERIA
1982 MILLION DOLLARS
4% DISCOUNT RATE FOR 150 YEARS
(Ranked in Order of Decreasing Present Net Value)

	ALTERNATIVE											
	MAX PNV BM	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 1/	NC 2/
Present Value of Benefits (PVB)	1,089	1,062	1,046	1,108	1,076	1,083	1,068	1,067	976	1,019	1,083	NE
Present Value of Costs (PVC)	462	439	453	524	502	522	518	522	433	520	676	NE
Present Net Value (PNV)	627	624	593	583	575	562	551	545	543	498	406	399 2/

1/ Alternative B-dep cannot be implemented without change to Federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
2/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-dep's PNV Because this alternative does not meet management requirements, it cannot be implemented without a change to federal legislation

Table II-21
ALTERNATIVES ARRAYED IN ORDER OF INCREASING DISCOUNTED COSTS 1982 MILLION DOLLARS
4% DISCOUNT RATE FOR 150 YEARS

	F	G	H	E	C Preferred	A	D	C-dep	B	B-dep 1/	NC 2/
Discounted Costs (Present Value of Costs)	433	439	453	502	518	520	522	522	524	676	NE
Increment of Discounted Costs from Next Lower Alternative		+6	+14	+49	+16	+2	+2	+1	+2	+152	NE
Discounted Benefits	976	1,062	1,046	1,076	1,068	1,019	1,083	1,067	1,108	1,083	NE
Increment of Discounted Benefits From Next Lower Alternative		+86	-16	+30	-8	-49	+64	+16	+41	-25	NE
Present Net Value	543	624	593	575	551	498	562	545	583	406	399 2/
Incremental Change		+81	-31	-18	-24	-53	+64	-17	+38	-177	-7

NE = Not Estimated
1/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting
2/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-dep's PNV Because this alternative does not meet management requirements, it cannot be implemented without a change to federal legislation

Table II-22 Timber Resource Management by Benchmark and Alternative

Benchmark or Alternative	Suitable Lands (M Acres) (1)	Inventory			First Decade Average Annual ASQ			Long Term Sustained Yield Capacity			Average Annual Net Growth			
		Begin MMCF (2)	Begin CF/AC (3)	End MMCF (4)	MMCF (5)	% of Column (2) (6)	MMBF (7)	MMCF (8)	% of Column (4) (9)	Decade Met (10)	Cubic Ft./Acre Present (11)	Cubic Ft./Acre 2030 (12)	MMCF 2030 (13)	% of Column (B) (13a)
Max PNV Benchmark	859	1,394	1,623	1,854	25 5	1 83	129	48 6	2 62	14	21 1	26 9	23 1	48
Mex Timber Benchmark	950	1,574	1,657	1,550	39.1	2 48	184	45 3	2 92	14	19 5	52 6	50 0	110
1 Alternative NC 1/	1,238	NE	NE	NE	35 1	NE	183	NE	NE	NE	NE	NE	NE	NE
2 Alternative B-Dep 2/	940	1,520	1,617	1,519	34 4	2 26	167	41 3	2 72	13	18 1	33 6	31 6	77
3 Alternative B	880	1,436	1,632	2,761	30 1	2 10	151	46 2	1 67	14	18 6	35 6	31 3	68
4 Alternative A (No Action)	866	1,382	1,596	2,357	27 1	1 95	134	40 1	1 70	14	18 2	32 5	28 1	70
5 Alternative D	857	1,379	1,609	2,371	28 6	2 07	143	43 6	1 84	14	18 1	37 0	31 7	73
6 Alternative C-Dep	846	1,365	1,614	2,264	34 4	2 52	169	45 6	2 01	14	19 7	32 7	27 7	61
7 Alternative C (Preferred)	837	1,338	1,599	2,385	27 7	2 07	144	42 3	1 77	14	19 3	36 5	30 6	72
8 Alternative H	806	1,284	1,593	2,257	24 0	1 87	118	39 4	1 75	14	17 9	29 4	23 7	60
9 Alternative G	801	1,314	1,640	1,836	23 7	1 81	117	43 1	2 35	14	18 9	26 7	21 4	50
10 Alternative F	798	1,263	1,583	1,389	20 6	1 63	98	34 8	2 51	14	18 3	22 8	18 2	52
11 Alternative E	789	1,237	1,568	2,268	26 9	2 17	136	41 1	1 81	13	16 7	36 9	29 1	71

NE = NOT ESTIMATED
1/ Because this alternative does not meet management requirements, it cannot be implemented without a change to federal legislation
2/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting

Table II-22 Timber Resource Management by Benchmark and Alternative (Continued)

	Area of Suitable Land by Yield Level						Harvest Type - Dec. 1			
	Full Yield		50-90% Yield		Under 50% Full Yield		Clearcut	Shelterwood & Seed Tree 1/	Selection	Harvest Total 2/
Benchmark or Alternative	(M Acres) (14)	% Column (1) (15)	(M Acres) (16)	% Column (1) (17)	(M.Acres) (18)	% Column (1) (19)	(M Acres) (20)	(M.Acres) (21)	(M Acres) (22)	(M.Acres) (23)
Max PNV Benchmark	173	20 1	626	72 9	60	7 0	68	90	12	192
Max Timber Benchmark	639	67 3	284	29 9	27	2 8	NE	NE	63	277
1 Alternative NC 3/	1,238	100 0	0	0	0	0	NE	NE	NE	NE
2 Alternative B-Dep 4/	528	56 2	353	37 6	58	6 2	90	83	84	276
3 Alternative B	288	32 7	572	65 0	20	2 3	73	84	41	220
4 Alternative A (No Action)	273	31 5	535	61 8	58	6 7	66	69	72	225
5 Alternative D	264	30 8	567	66 2	26	3 0	69	74	61	224
6 Alternative C-Dep	241	28 5	533	63 0	72	8 5	89	109	79	306
7 Alternative C (Preferred)	296	35 4	505	60 3	35	4 2	57	94	65	244
8 Alternative H	164	20 4	568	70 5	74	9 2	59	68	35	179
9 Alternative G	123	15 4	595	74 3	83	10 4	61	72	20	170
10 Alternative F	120	15 0	565	70 8	122	15 3	56	49	61	176
11 Alternative E	313	39 7	456	57 8	19	2 4	62	74	45	201

NE = NOT ESTIMATED
1/ The actual shelterwood or seed tree regeneration harvest Does not include the overstory removal harvest
2/ The sum of the harvest types does not equal this total because overstory removals and commercial thinnings are not displayed
3/ Because this alternative does not meet management requirements, it cannot be implemented without a change to federal legislation
4/ Alternative B-dep cannot be implemented without change to federal legislation it violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting

TABLE II-23
COMPARISON - PAST, PRESENT, AND ALTERNATIVE TIMBER OUTPUTS
MMBF

			ALTERNATIVES										
	Existing TM Plan 1/	Average Timber Sold (FY80-89)	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
I ALLOWABLE SALE QUANTITY (ASQ) The allowable sale quantity is composed of those volumes resulting from the yield projections of FORPLAN ASQ is obtained from lands designated as suitable for timber production under NFMA standards, and meets the utilization standard in the Regional Guide When sold, the volume is called "chargeable", and is used to determine achievement of planned allowable sale quantity goals	Potential Yield 1/												
A Green	182 8	139 4	182 8	128 4	144 7	160 0	138 0	162 0	137 0	130 3	93 9	112 1	113 1
B Salvage 2/	0	0	0	5 6	6.3	7 0	6 0	7 0	6 0	5 7	4 1	4 9	4 9
Total Allowable Sale Quantity	182 8	139 4	182 8	134 0	151 0	167 0	144 0	169 0	143 0	136 0	98 0	117 0	118 0
II SAWTIMBER FROM LANDS DESIGNATED UNSUITABLE FOR TIMBER PRODUCTION This incidental volume is an estimate of timber that will be sold from lands not designated for timber production These sales are generally associated with vegetation management for other resources. Though meeting Regional Guides utilization standards, this volume is not considered "chargeable" against the planned allowable sale quantity goals 3/													
A Green	1 0 4/	1 1	1 0 4/	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 0
B Salvage	0 1 4/	0	0 1 4/	0 1	0 1	0 1	0.1	0 1	0 1	0 1	0 1	0 1	0 1
Total Sawtimber Volume from Unsuitable Lands	1 1 4/	1 1	1 1 4/	1 1	1.1	1.1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

1/ The assumptions that were used in the existing timber management plan to calculate potential yield differ from those that were used to calculate Allowable Sale Quantity While potential yield represented a level that could be produced, allowable sale quantity represents a timber objective and program for achievement of planned levels However, both the potential yield and allowable sale quantity do represent a ceiling on the amount of chargeable timber volume that could be sold for a given decade in this context, the two terms are comparable Figure shown reflects latest adjustment to the Timber Management Plan (Amendment 9)

2/ Salvage sawtimber is normally sold and logged as part of the green sawtimber component, but is not a part of the ASQ calculations Not separately identifiable from ASQ volume in first three columns

3/ Volumes planned are from the Starkey Experimental Forest No other sales planned from lands designated unsuitable for timber production

4/ None stated Figures inserted here for purposes of comparison

TABLE II-23 (Continued)
COMPARISON - PAST, PRESENT, AND ALTERNATIVE TIMBER OUTPUTS
MMBF

			ALTERNATIVES										
	Existing TM Plan 1/	Average Timber Sold	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
III "SUBMERCHANTABLE" VOLUMES FROM ALL LANDS This consists of the estimated timber volume that does not meet the sawtimber utilization standards in the Regional Guide, but which could be utilized to produce other than sawtimber It is not considered "chargeable" against 1lanned allowable sale quantity goals													
A Fuelwood (MMBF)	25 0 3/	30 7	25 0	25 0	25 0	25 0	25 0	25 0	25 0	25 0	25 0	25 0	25 0
B Other (Including cull) (MMBF)	50 5 4/	42 0	50 5	39 0	43 5	50,0	39 5	49 5	41 0	38 5	30 0	34 5	34 5
Total "Submerchantable" Volume (MMBF)	75 5 4/	72 7	75 5	64 0	68 5	75 0	64 5	74 5	66 0	63 5	55 0	59 5	59 5
TOTAL NET MERCHANTABLE SAWTIMBER (I + II) (MMBF)	182 8	140 5	182 8	135 1	152 1	168 1	145 1	170 1	144.1	137 1	99 1	118.1	119 1
TOTAL NONCHARGEABLE (III) (MMBF)	75 5	72 7	75 5	64 0	68 5	75 0	64 5	74 5	66.0	63 5	55 0	59 5	59 5
IV TIMBER SALE PROGRAM QUANTITY (I + II + III)FOR TIMBER PRODUCTION The timber sale program quantity includes the allowable sale quantity for the first decade and established additional volume planned for sale during the first decade, such as fuelwood (MMBF)	258 3	213 2	258 3	199 1	220 6	243 1	209 6	244 6	210 1	200 6	154 1	177.6	178 6

1/ The assumptions that were used in the existing timber management plan to calculate potential yield differ from those that were used to calculate Allowable Sale Quantity While potential yield represented a level that could be produced, allowable sale quantity represents a timber objective and program for achievement of planned levels However, both the potential yield and allowable sale quantity do represent a ceiling on the amount of chargeable timber volume that could be sold for a given decade in this context, the two terms are comparable Figure shown reflects latest adjustment to the Timber Management Plan (Amendment 9)
2/ Calculated by multiplying the MMCF estimate by five
3/ None stated Figures inserted here for purposes of comparison
4/ Not calculated Used figures from Alternative NC

TABLE II-23 (Continued)
COMPARISON - PAST, PRESENT, AND ALTERNATIVE TIMBER OUTPUTS
MMCF

			ALTERNATIVES										
	Existing TM Plan 1/	Average Timber Sold (FY80-89)	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
I ALLOWABLE SALE QUANTITY (ASQ) The allowable sale quantity is composed of those volumes resulting from the yield projections of FORPLAN ASQ is obtained from lands designated as suitable for timber production under NFMA standards, and meets the utilization standard in the Regional Guide When sold, the volume is called "chargeable", and is used to determine achievement of planned allowable sale quantity goals	Potential Yield 1/												
A Green 4/	35 1	26 7 5/	35 1	26 0	28 8	33 0	26 5	33 0	27 4	25 8	19 7	22 7	23 0
B Salvage 4/	0	0	0	1 1	1 3	1.4	1 2	1 4	1 2	1 1	0 9	1 0	1 0
Total Allowable Sale Quantity 4/	35 1 5/	26 7 5/	35 1	27 1	30 1	34 4	27 7	34 4	28 6	26 9	20 6	23 7	24.0
II SAWTIMBER FROM LANDS DESIGNATED UNSUITABLE FOR TIMBER PRODUCTION This incidental volume is an estimate of timber that will be sold from lands not designated for timber production These sales are generally associated with vegetation management for other resources Though meeting Regional Guides utilization standards, this volume is not considered "chargeable" against the planned allowable sale quantity goals 3/													
A Green 4/	0 2 6/	0 2	0 2 6/	0 2	0 2	0 2	0 2	0 2	0 2	0 2	0 2	0 2	0 2
B Salvage 4/	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Sawtimber Volume from Unsuitable Lands 4/	0 2 6/	0 2	0 2 6/	0 2	0 2	0 2	0 2	0 2	0 2	0 2	0 2	0 2	0 2

1/ The assumptions that were used in the existing timber management plan to calculate potential yield differ from those that were used to calculate Allowable Sale Quantity While potential yield represented a level that could be produced, allowable sale quantity represents a timber objective and program for achievement of planned levels However, both the potential yield and allowable sale quantity do represent a ceiling on the amount of chargeable timber volume that could be sold for a given decade in this context, the two terms are comparable Figure shown reflects latest adjustment to the Timber Management Plan (Amendment 9)
2/ Salvage sawtimber is normally sold and logged as part of the green sawtimber component, but is not a part of the ASQ calculations
3/ Volumes planned are from the Starkey Experimental Forest No other sales planned from lands designated unsuitable for timber production
4/ MMCF volume estimated by applying each alternative's conversion rate to its MMBF volume Not separately identifiable from ASQ volume in first three columns
5/ MMCF volume estimated by applying Alternative NC's conversion ratio to this alternative's MMBF volume
6/ None stated Figures inserted here for purposes of comparison

TABLE II-23 (Continued)
COMPARISON - PAST, PRESENT, AND ALTERNATIVE TIMBER OUTPUTS
MMCF

			ALTERNATIVES										
	Existing TM Plan 1/	Average Timber Sold	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
III "SUBMERCHANTABLE" VOLUMES FROM ALL LANDS This consists of the estimated timber volume that does not meet the sawtimber utilization standards in the Regional Guide, but which could be utilized to produce other than sawtimber It is not considered "chargeable" against planned allowable sale quantity goals													
A Fuelwood (MMCF)	502/	61	50	50	5,0	50	50	50	50	50	50	50	50
B Other (including cull) (MMCF)	10.1 3/	84	101	78	87	100	79	99	82	77	60	69	69
Total "Submerchantable" Volume (MMCF)	151 3/	145	151	128	137	150	129	149	132	127	110	119	119
TOTAL NET MERCHANTABLE SAWTIMBER (I + II) (MMCF)	351	269	351	273	303	346	279	346	288	271	208	239	242
TOTAL NONCHARGEABLE (III) (MMCF)	151	145	151	128	137	150	129	14.9	132	127	110	11.9	119
IV TIMBER SALE PROGRAM QUANTITY (I + II + III)FOR TIMBER PRODUCTION The timber sale program quantity includes the allowable sale quantity for the first decade and established additional volume planned for sale during the first decade, such as fuelwood (MMCF)	502	414	502	401	440	496	408	495	420	398	318	358	361

1/ The assumptions that were used in the existing timber management plan to calculate potential yield differ from those that were used to calculate Allowable Sale Quantity While potential yield represented a level that could be produced, allowable sale quantity represents a timber objective and program for achievement of planned levels However, both the potential yield and allowable sale quantity do represent a ceiling on the amount of chargeable timber volume that could be sold for a given decade in this context, the two terms are comparable Figure shown reflects latest adjustment to the Timber Management Plan (Amendment 9)
2/ None stated Figures inserted here for purposes of comparison
3/ Not calculated Used figures from Alternative NC

Table II-24
Land Classification by Alternative

Classification	NC*	A	B	B-dep	C	C-dep	D	E	F	G	H
1 Nonforest land (includes water and roads)	474,681	930,290	930,290	930,290	930,290	930,290	930,290	930,290	930,290	930,290	930,290
2 Forest land	1,732,000	1,411,925	1,411,925	1,411,925	1,411,925	1,411,925	1,411,925	1,411,925	1,411,925	1,411,925	1,411,925
3 Forest land withdrawn from timber production	178,174	231,623	231,623	231,623	231,623	231,623	231,623	231,623	231,623	231,623	231,623
4 Forest land not capable of producing crops of crops of industrial wood	206,300	0	0	0	0	0	0	0	0	0	0
5 Forest land physically unsuitable -irreversible damage likely to occur	0	9,860	9,860	9,860	9,860	9,860	9,860	9,860	9,860	9,860	9,860
-not restockable within 5 years	0	80,370	80,370	80,370	80,370	80,370	80,370	80,370	80,370	80,370	80,370
6 Forest land--inadequate information	0	0	0	0	0	0	0	0	0	0	0
7 Tentatively suitable forest land (Item 2 minus Items 3, 4, 5, & 6)	1,347,526	1,090,072	1,090,072	1,090,072	1,090,072	1,090,072	1,090,072	1,090,072	1,090,072	1,090,072	1,090,072
8 Forest land not appropriate for timber production											
Due to management requirements	0	28,184	28,184	28,184	28,184	28,184	28,184	28,184	28,184	28,184	28,184
Due to other resource objectives	109,229	185,785	107,966	109,704	163,227	185,880	150,260	231,823	229,254	105,644	184,710
Due to economic efficiency	0	9,623	73,492	12,154	61,871	29,938	54,238	41,495	35,074	155,474	71,228
SUBTOTAL	109,229	223,592	209,642	150,042	253,282	244,002	232,682	301,502	292,512	289,302	284,122
9 Unsuitable forest land (Items 3, 4, 5, 6, and 8)	493,703	545,445	531,495	471 895	575,135	565,855	554 535	623,355	614,365	611,155	605,975
10 Total suitable forest land (Item 2 minus Item 9)	1,238,297	866 480	880,430	940,030	836,790	846,070	857,390	788,570	797,560	800,770	805,950
11 Total National Forest land (Items 1 and 2)	2,206,681	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215

* Includes Oregon acres only

Table II-25

QUANTITATIVE INDICATORS OF RESPONSIVENESS OF ALTERNATIVES TO MAJOR ISSUES AND NATIONAL CONCERNS 1/
1982 MILLION DOLLARS
(Ranked in Order of Decreasing PNV)

Alternative	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 2/	NC 3/
Present Net Value	624	593	583	575	562	551	545	543	498	406	399 4/
Decade 1											
Noncash Benefits 5/	23 1	23 3	24 0	23 6	24 1	24 6	23 9	23 0	24 1	25 3	NE
Cash Receipts 6/	13 1	11 9	15 0	13 3	13 3	12 8	15 7	8 8	12 1	12 0	NE
Costs 7/	15 9	16 3	19 0	18 0	18 6	18 6	20 5	15 5	18 5	23 2	NE
Net Cash Flow 8/	-2 8	-4 4	-4 0	-4 7	-5 3	-5 7	-4 9	-6 7	-6 4	-11 2	NE
Jobs	2,798	2,800	3,054	2,914	2,983	2,974	3,188	2,631	2,915	3,183	3,255
Personal Income (Million 1982 $)	40.4	40 6	45 3	42 8	44 0	43 9	47 9	37 5	42 8	47 8	49.2
Timber Sale Offerings (ASQ) (MMCF)	23.7	24 0	30 1	26 9	28 6	27 7	34 4	20 6	27 1	34 4	35 1 9/
Undeveloped Area (Thousand Acres)	400	390	400	484	400	410	390	470	400	400	400
Old Growth (Thousand Acres)	157	163	150	169	158	164	160	172	154	143	122
Permitted Livestock Grazing (MAUM)	207	186	207	163	191	186	186	143	186	204	186
Wilderness Recreation (MRVD) 10/	78	78	78	78	78	78	78	78	78	78	78
Hunting Use (MWFUD)	254	254	254	254	254	254	254	254	254	254	254
Anadromous Fish Commercial Production (Thousand Pounds)	215	215	215	215	215	215	215	215	215	215	215
Water Yield (Million Acre Feet)	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2.73

NE = Not Estimated

1/ Costs are limited to agency expenditures Payments to Local Governments are not counted as costs

2/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting by allowing widespread harvesting of stands two or more decades prior to achievement of CMAI.

3/ Because it does not meet management requirements, this alternative cannot be implemented without a change to federal legislation

4/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-Dep's PNV.

5/ Noncash benefits are benefits not collected as cash receipts

6/ Comprises timber stumpage receipts (statistical high bid), grazing fee receipts, and miscellaneous receipts

7/ All Forest costs except those for purchaser credit roads, co-op road maintenance, and treatment of activity fuels which costs are already reflected in lower statistical high-bid values

8/ The difference between the receipts and the costs shown

9/ Potential yield not directly comparable to allowable sale quantity

10/ Exclusive of WFUD's

Table II-25 (continued)
QUANTITATIVE INDICATORS OF RESPONSIVENESS OF ALTERNATIVES TO MAJOR ISSUES AND NATIONAL CONCERNS 1/
1982 MILLION DOLLARS
(Ranked in Order of Decreasing PNV)

Alternative	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 2/	NC 3/
Decade 2											
Noncash Benefits 5/	27 9	28 1	28 0	27 9	28 4	27 6	27 9	27.7	28 6	29 5	NE
Cash Receipts 6/	13 6	12 1	15 5	14 2	14 0	13 6	10 7	9 6	11.4	17 1	NE
Costs 7/	15 2	15 6	18 2	17.3	17 9	17 7	17.1	14 8	17.8	22 8	NE
Net Cash Flow 8/	-1 6	-3 5	-2 7	-3 1	-3 9	-4 1	-6 4	-5 3	-6.3	-5 7	NE
Timber Sale Offerings (ASQ) (MMCF)	24 4	24 2	30 2	30 0	28 7	27 3	25 2	30 0	27.3	36 5	35 1
Undeveloped Area (Thousand Acres)	390	360	380	484	360	390	360	450	380	380	380
Old Growth (Thousand Acres)	154	161	145	168	155	162	158	172	150	137	112
Permitted Livestock Grazing (MAUM)	186	186	186	163	191	160	160	143	186	204	186
Wilderness Recreation (MRVD) 10/	91	91	91	91	91	91	91	91	91	91	91
Hunting Use (MWFUD)	295	295	295	295	295	295	295	295	295	295	295
Anadromous Fish Commercial Production (Thousand Pounds)	1,118	1,125	1,125	1,125	1,118	1,125	1,125	1,125	1,118	1,125	1,118
Water Yield (Million Acre Feet)	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73

NE = Not Estimated
1/ Costs are limited to agency expenditures Payments to Local Governments are not counted as costs
2/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting by allowing widespread harvesting of stands two or more decades prior to achievement of CMAI
3/ Because it does not meet management requirements, this alternative cannot be implemented without a change to federal legislation
4/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-Dep's PNV
5/ Noncash benefits are benefits not collected as cash receipts
6/ Comprises timber stumpage receipts (statistical high bid), grazing fee receipts, and miscellaneous receipts
7/ All Forest costs except those for purchaser credit roads, co-op road maintenance, and treatment of activity fuels which costs are already reflected in lower statistical high-bid values
8/ The difference between the receipts and the costs shown
9/ Potential yield not directly comparable to allowable sale quantity
10/ Exclusive of WFUD's.

Table II-25 (continued)

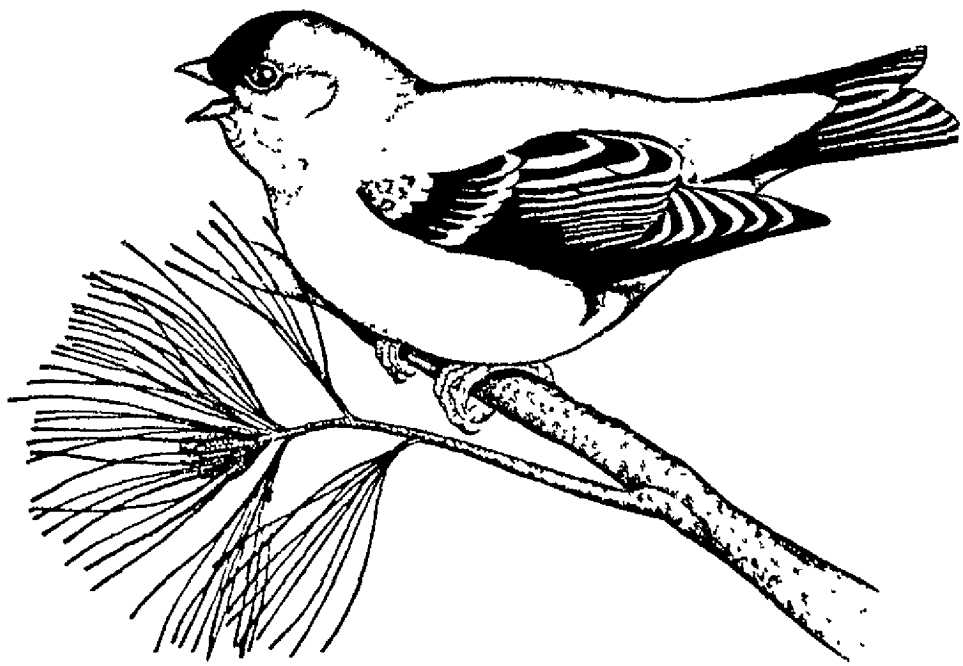
QUANTITATIVE INDICATORS OF RESPONSIVENESS OF ALTERNATIVES TO MAJOR ISSUES AND NATIONAL CONCERNS 1/
1982 MILLION DOLLARS
(Ranked in Order of Decreasing PNV)

Alternative	G	H	B	E	D	C Preferred	C-dep	F	A	B-dep 2/	NC 3/
Decade 5											
Noncash Benefits 5/	31 0	32 2	31 3	33 3	32 5	32 3	32 2	32 5	32 3	36 8	NE
Cash Receipts 6/	18 0	17 5	18.1	13 4	13 1	12.6	12 5	15 4	6.9	-5 4	NE
Costs 7/	15 1	15 5	17 9	17 2	17 7	17 6	17 0	14 8	17 6	23 3	NE
Net Cash Flow 8/	3 0	2 0	0 3	-3 8	-4 6	-5 0	-4 5	0 7	-10 8	-28 7	NE
Timber Sale Offerings (ASQ) (MMCF)	24.0	24 6	30 2	26 8	28 4	27 3	25 1	21.3	27 2	39 0	35.1
Undeveloped Area (Thousand Acres)											
Old Growth (Thousand Acres)	152	160	142	167	153	161	156	172	147	133	105
Permitted Livestock Grazing (MAUM)	186	186	186	163	191	160	160	143	186	204	186
Wilderness Recreation (MRVD) 10/	102	105	98	114	105	107	105	112	106	98	106
Hunting Use (MWFUD)	368	368	368	368	368	368	368	368	368	368	368
Anadromous Fish Commercial Production (Thousand Pounds)	1,239	1,247	1,247	1,247	1,239	1,247	1,247	1,247	1,239	1,247	1,239
Water Yield (Million Acre Feet)	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73	2 73
Decade 6											
Noncash Benefits 5/	31 6	31 8	30.7	32 6	31 8	31 7	31 6	32 2	31 7	30 9	NE
Cash Receipts 6/	16 4	15 3	16 2	15 2	14 3	14 9	14 3	17 3	9 5	9 8	NE
Costs 7/	15 1	15 5	17.9	17 2	17 7	17 6	17 0	14 8	17 6	20 0	NE
Net Cash Flow 8/	1 3	-0 2	-1.7	-2 1	-3 4	-2 6	-2 6	2 5	-8 1	-10 1	NE

NE = Not Estimated
1/ Costs are limited to agency expenditures Payments to Local Governments are not counted as costs
2/ Alternative B-dep cannot be implemented without change to federal legislation It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting by allowing widespread harvesting of stands two or more decades prior to achievement of CMAI
3/ Because it does not meet management requirements, this alternative cannot be implemented without a change to federal legislation
4/ PNV estimated as follows (Alternative B-dep's Decade 1 ASQ in MMBF/Alternative NC's Decade 1 ASQ in MMBF) x Alternative B-Dep's PNV
5/ Noncash benefits are benefits not collected as cash receipts
6/ Comprises timber stumpage receipts (statistical high bid), grazing fee receipts, and miscellaneous receipts
7/ All Forest costs except those for purchaser credit roads, co-op road maintenance, and treatment of activity fuels which costs are already reflected in lower statistical high-bid values
8/ The difference between the receipts and the costs shown
9/ Potential yield not directly comparable to allowable sale quantity
10/ Exclusive of WFUD's

CHAPTER III

Affected Environment



CHAPTER III

AFFECTED ENVIRONMENT

SUMMARY OF CHAPTER III CHANGES DRAFT TO FINAL

This chapter has been revised in response to public comment and new information In addition to editorial improvements, major changes include the following:

1. A section has been added on the timber supply and demand situation

2 The description of the fish resource has been substantially rewritten to improve its comparability with other Forests' information.

3 The Wild and Scenic Rivers section now reflects the enactment of the Omnibus Oregon Wild and Scenic Rivers Act of 1988

4. The Human Environment section has been expanded to provide a more completely portrayal.

5 The list of Threatened, Endangered, and Sensitive Species has been updated

6 A section discussing existing riparian condition has been added.

OVERVIEW

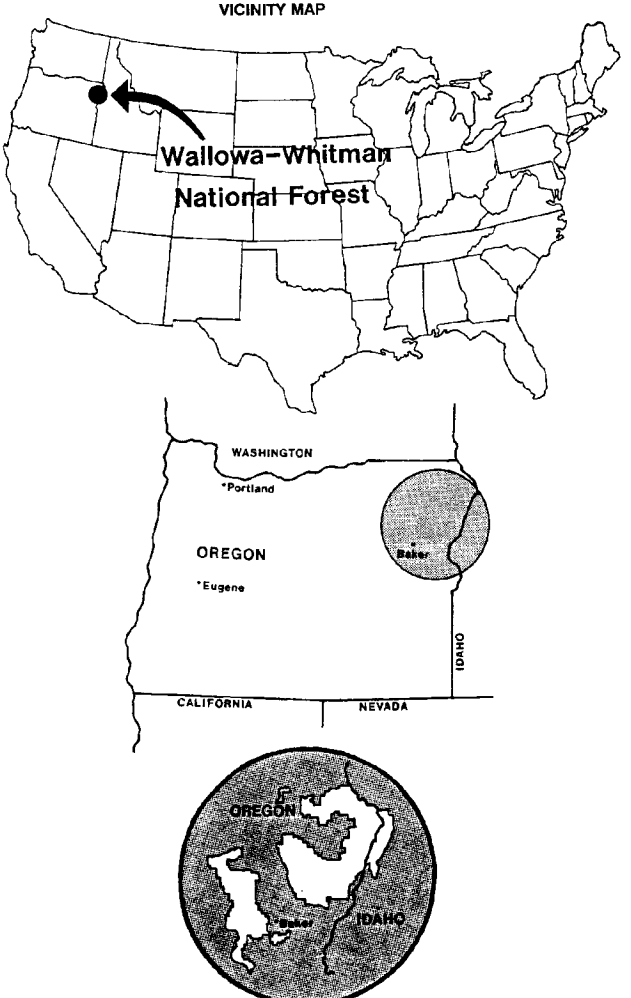
The purpose of this chapter is to describe the environment which may be affected or changed as a result of implementing the Forest Plan or its alternatives. Although most of the discussion focuses on National Forest lands and resources, in some instances the off-Forest environment is also pertinent and, therefore, is described Also described are interrelationships between resources where they are significant to the decisions being made

Location

There are 2 6 million acres within the boundaries of the Forest Included are the Wallowa and the Whitman National Forests in Oregon and portions of the Nez Perce and Payette National Forests in Idaho. Of that total, 2.3 million acres are National Forest System lands. Interspersed within the administrative area of the Forest are various other Federal, State, county, and private land parcels The Forest is in the northeast corner of Oregon and the west central edge of Idaho as shown on the vicinity map (Figure III-1). It lies within Wallowa, Union, Baker, Malheur, Umatilla, and Grant Counties in Oregon, and Idaho, Adams, and Nez Perce Counties in Idaho The Forest Supervisor's Office is in Baker City, Oregon.

District offices for the six Ranger Districts and the Hells Canyon National Recreation Area (HCNRA) are located in the Oregon towns of Baker City, Joseph, Enterprise, La Grande, Halfway, and Unity Offices for the HCNRA are in Lewiston and Riggins, Idaho The Wallowa-Whitman administers the HCNRA with the exception of the wild river segment of the Rapid River Administration of this portion

FIGURE III-1
VICINITY MAP



HCNRA is divided between the Nez Perce and Payette National Forests with headquarters in Grangeville, Idaho and McCall, Idaho, respectively.

The Forest borders the Malheur and Umatilla National Forests. The acreages of National Forest System lands by county, administered by the Wallowa-Whitman National Forest Supervisor, are shown in Table III-1.

Topography

The Forest includes all or portions of three distinct mountain ranges· the Blue Mountains (including the Elkhorn Range) and the Wallowa Mountains in Oregon, and the Seven Devils Mountains in Idaho South and west of Baker City and extending northerly past La Grande, the Blue Mountains provide high ridges with alpine meadows and dense timber, interrupted by the broad prairie valleys of the Burnt, Powder and Grande Ronde Rivers

The Wallowa Mountains are a range of jagged mountain peaks with alpine meadows and dense timber, giving way to Pine Valley on the south, Baker and Grande Ronde Valleys on the west, the Wallowa Valley on the north, and dropping sharply into the Snake River to the east. The Seven Devils Mountains of Idaho are located to the east of the Snake River, rising to provide alpine conditions similar to those in the Wallowa Mountains.

Table III-1
NATIONAL FOREST SYSTEM LANDS

Oregon Counties		*Idaho Counties **	
Baker	- 595,110 acres	Adams	- 24,638 acres
Grant	- 82,782	Idaho	- 112,278
Malheur	- 3,460		
Umatilla	- 25,586		
Union	- 515,320		
Wallowa	- 990,041		

* Does not include 8,288 acres in the Rapid River portion of the Hells Canyon National Recreation Area administered by Nez Perce and Payette National Forests

Elevations vary from 860 feet where the Snake River leaves the HCNRA to nearly 10,000 feet for several peaks in the Wallowa and Seven Devils Mountains Elevations of several mountain peaks on the Elkhorn Ridge approach 9,000 feet

Human Environment

Area of Influence - The area of influence (the area in which almost all the social effects of Forest management are discernable) includes the Oregon counties of Baker, Union, and Wallowa (Tri-Counties). These three counties process the great bulk of the Forest's timber outputs and 90 percent of the Forest's area falls within their boundaries

Table III-2
AREA POPULATION

County 1/	1930	1940	1950	1960	1970	1980 2/	1987 3/	2000			
								OBERS Economic Area 4/	OBERS NON-SMSA Economic Area 5/	BPA 6/	AVG 7/
Baker	16,754	18,297	16,175	17,295	14,919	16,134	15,300	15,373	14,359	19,725	16,796
Union	17,492	17,399	17,962	18,180	19,377	23,921	23,300	18,966	18,650	29,300	26,554
Wallowa	7,814	7,623	7,264	7,102	6,247	7,273	7,150	6,437	6,012	6,925	7,444
Total	42,060	43,319	41,401	42,577	40,543	47,328	45,750	40,776	39,021	55,950	50,794

1/ Columns 1930 through 1987 (Mackey 1978).
2/ 1980 Decennial census (Street 1984)
3/ 1987 figures from "Labor Trends," State of Oregon Employment Division, Department of Human Resources, Nov. 10, 1988 issue.
4/ OBERS projections are based on the U S Water Resources Council's *1972 OBERS Projection, Vol 1* (Washington, D C U.S. Government Printing Office, 1974), p 46 Projections for the Economic Area containing the Tri-Counties were allocated to the counties by their respective 1970 proportions.
5/ OBERS projections are based on the U S Water Resources Council's *1972 OBERS Projection, Vol 1* (Washington D C., U S Government Printing Office, 1974), p 46 Projections for that portion of the Economic Area outside the Standard Metropolitan Statistical Area (SMSA) containing the Tri-Counties were allocated to the counties by their respective 1970 proportions
6/ U S Department of Energy, Bonneville Power Administration. Oregon Population, Employment and Household Projected to 2000 (Portland, OR September, 1979)
7/ The average of the three projections shown

Major employment comes from City, County, State, and Federal agencies, trade; lumber and wood products manufacturing, and agriculture Small in population (45,750 in 1987, as shown in Table III-2), the Tri-Counties comprise an area of 5,297,920 acres separated by long distances (100 to 200 miles) from the nearest metropolitan area, Boise, Idaho For a more complete description of the local area see the Forest's Social Appraisal

Commodity Interests - Many people in the local area rely to considerable extent on Forest commodity production for their livelihoods. Loggers, millworkers, and truckers often fall in this category. They rely on the consumptive use of the Forest's timber resource.

To much lesser extent, some area residents rely on the Forest as a source of seasonal forage for their livestock. Still others have similar interests in the Forest's mineral resources.

Because their jobs depend on these Forest outputs, their concerns for Forest management are real, immediate, and necessary. Any type of Forest management that interferes with these outputs threatens their livelihoods They are keenly aware of the difference that exists between their kind of use of the Forest and the use taken by out-of-area recreationists, for instance.

Table III-3 portrays area per capita personal income over time As shown there, the area has lagged the state average

Tables III-4 and III-5 display information on employment categories, payroll, and unemployment. They show the importance of the various governments as employers and as payroll sources. Wood products manufacturing is undoubtedly the most important sector in generating exports from the local economy This timber processing activity is responsible for generating much of the employment and payroll in the government, trade, and service sectors Recreation is an important part of the local economy and one with significant growth potential. Its effect on the local economy is difficult to gauge with any real precision because it is seldom identified as a district entity.

Table III-3
PER CAPITA PERSONAL INCOME

	1977 1/		1984 2/	
	$	State Rank 3/	$	State Rank 3/
Baker	5,494	32	9,894	34
Union	6,044	26	10,935	20
Wallowa	5,998	28	10,565	25
Tri-County Average	5,845	NA	10,465	NA
Oregon	7,014	NA	12,069	NA

NA. Not Applicable
1/ Bob Mason, respective, *1979 Annual Economic Report(s) for Baker, Union and Wallowa County(ies)*, Tables 6 and 9 Original source: State of Oregon, Employment Division, Department of Natural Resources
2/ *Oregon Labor Trends July 1988.* State of Oregon, Employment Division, Department of Human Resources, page 7. Original source: U S. Department of Commerce Bureau of Economic Analysis.
3/ Out of 36 counties.

Table III-4
EMPLOYMENT IN 1986

	BAKER	UNION	WALLOWA	TRI-COUNTIES
Agriculture, Forestry, Fishing	43	128	39	210
Mining	40	4	0	44
Construction	85	159	25	269
Manufacturing	492	1,453	322	2,267
Lumber, Wood Products	354	1,240	NP	NP
Transportation, Public Utilities	194	348	112	654
Wholesale Trade	98	322	57	477
Retail Trade	841	1,504	312	2,657
Finance, Insurance, Real Estate	170	267	71	508
Services	755	1,355	191	2,301
Hotel & Lodging Places	124	110	24	258
Health Services	339	647	37	1,023
Federal Govt.	349	213	147	709
State Govt.	144	700	68	912
Local Govt.	584	930	424	1,938
Total Private	2,718	5,541	1,129	9,388
Total All	3,794	7,384	1,769	12,947

NP. Not Portrayed.
Source: William Street, *Program Year 1988 & 1989 Business & Employment Outlook JTPA District 13*. State of Oregon, Employment Division, Department of Human Resources, pp. A-36 - A-42 Includes full and part-time, permanant and seasonal employees. Columns may not add to Totals due to rounding

Table III-5
PAYROLL IN 1986
(Million 1986 $)

	BAKER	UNION	WALLOWA	TRI-COUNTIES
Agriculture, Forestry, Fishing	0 681	1.165	.392	2.238
Mining	1.086	.030	0	1.116
Construction	1.494	3.000	0.460	4.954
Manufacturing	9 403	34 095	6,908	50.406
Lumber, Wood Products	7.116	29.468	NP	NP
Transportation, Public Utilities	4 292	7.719	2 301	14.312
Wholesale Trade	1.256	5.065	0.924	7 245
Retail Trade	7 550	13.331	2.878	23 759
Finance, Insurance, Real Estate	2.573	3 288	1 004	6.865
Services	7.932	16 220	1 748	25.900
Hotel & Lodging Places	0 902	0.523	0.120	1 545
Health Services	4.136	10 124	0 501	14.761
Federal Govt.	7 920	5 042	3 162	16.124
State Govt.	3.023	13 742	1.284	18.049
Local Govt.	9.255	15 833	6.148	31 236
Total Private	36.267	83 912	16.615	136 794
Total All	56 465	118.528	27 209	202.202

NP: Not Portrayed.
Source: William Street, *Program Year 1988 & 1989 Business & Employment Outlook JTPA District 13.* State of Oregon, Employment Division, Department of Human Resources, pp. A-36 - A-42. Includes full and part-time, permanant and seasonal employees. Columns may not add to Totals due to rounding

Table III-6 shows recent unemployment rates for the local area.

Table III-6
AREA UNEMPLOYMENT RATES

	1986	1987
Baker	13 6	9 6
Union	10 9	7 9
Wallowa	10.8	7.9
State	8.5	6 2

Source: *Oregon Labor Trends July, 1988.* State of Oregon, Employment Division, Department of Human Resources, p.4.

Amenity Interests - Many people in the Forest's primary area of influence (Oregon's Baker, Union, and Wallowa Counties) enjoy the Forest for the recreational opportunities it provides, for the scenic vistas it offers, and for the work opportunities associated with these kinds of activities. Some view such activities as timber harvesting and livestock grazing as being incompatible with their interests Many local residents rely on Forest fuelwood for primary home heat.

They often perceive the Forest's old-growth areas and roadless areas as being irreplaceable components of our culture which should be left alone rather than managed.

Out-of-Area Recreationists - Within the Forest boundaries are a National Recreation Area, four Congressionally-mandated wildernesses, well-established alpine and Nordic skiing opportunities, large big-game herds, and substantial opportunities for cutting fuelwood. These give rise to a great deal of recreation use by those from outside the immediate area Big-game hunters, float and jet boat users, campers, skiers, and wood gatherers comprise the great bulk of this group. Most of the big-game hunters are from other parts of Oregon Campers and other general recreationists are also heavy users of the Forest, but share a more generalized Oregon, Washington, Idaho base.

Native Americans - Certain rights and privileges are held by members of the Nez Perce Tribe and Umatilla Confederated Tribes by virtue of past treaties. These treaties entitle them to hunt, fish, gather roots and berries, and pasture stock on certain nonclaimed lands (ceded lands). Their rights to believe, express, and exercise their traditional religions (including having access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites) are also protected by law Although the incidence of Native Americans in the Tri-Counties is quite small, as shown in Table III-7, their influence on Forest management is considerable. The Umatilla Confederated Tribes have a reservation in neighboring Umatilla County They and the Nez Perce have strong ties to the lands of the Wallowa-Whitman

Contacts were made with members of the Nez Perce and Umatilla Confederated Tribes to coordinate the Forest planning effort with tribal planning and management programs Tribal plans have been reviewed and consultation with tribes is an ongoing process As with the Forest Service, the tribes are interested in doing what is necessary to restore salmon runs in area streams.

Table III-7
POPULATION CHARACTERISTICS
1980 CENSUS, PERCENTAGES

	BAKER	UNION	WALLOWA
Race			
White	98.2	98.2	99 5
Black	0 2	0 4	0.2
Native American	1.0	0.7	0 2
Asian and Pacific Islands	0.5	0 4	--
Remaining Races	--	0.3	0.1
Hispanic, All Races			
Total	0.8	1 0	0.7
Veterans			
Total	15 2	13 9	14 9
Vietnam Era	3.4	4 8	5.3
Age			
0-19	30 9	33.6	30 2
20-64	53.2	54 4	55.0
65+	15.9	12.0	14 8
Sex			
Male	50 1	49 8	50.2
Female	49 9	50 2	49.8
Below Poverty Level			
Total	12.6	12.4	11.1
Household Income			
Wage or Salary	69.8	74.9	59.3
Self-Employment	22.0	19.3	24.1
Social Security	32.9	26.5	31.7
Public Assistance	5.6	4.7	4 8

Source: William Street, *Program Year 1988 and 1989 Business & Employment Outlook JTPA District 13*. State of Oregon, Employment Division, Department of Human Resources, pp. A-15 - A-21. Original sources for data were Census Bureau sample estimates and Census Bureau data.

Because much of their culture and the practice of their religion is related to sites often known only to certain Indian families, site disturbance is of concern both to Forest managers and the tribes Figure III-2 is a map showing the approximate boundaries of ceded lands

Minorities and Women - Various programs have been implemented on the Forest to focus the resources of these group members on Forest activities to the benefit of both the Forest and the individuals. This effort is reflected in Forest Service hiring, supervisory, and contracting procedures. Under authority of a number of civil rights and equal employment opportunity acts, executive orders and Title X of the 1978 Civil Service Reform Act (EEO Recruitment Plan), the Forest maintains, and intends to continue:

- Affirmative action in hiring minorities and women in nontraditional positions to meet the long-range Forest Service goals of being at parity with the national work force by 1990 and to have women and minorities distributed equally throughout the workforce by 2020.

- Eradication of all forms of discrimination from facilities, programs, activities, and contracting and hiring procedures.

- Positive action in helping to provide developmental opportunities for handicapped, minorities, women and all other employees

- Providing an Equal Employment Opportunity counselor and coordinators for the EEO, Federal Women's, and Hispanic programs.

- Representation of this Forest on the Regional Civil Rights Action Group

- Civil rights training for all employees

Climate

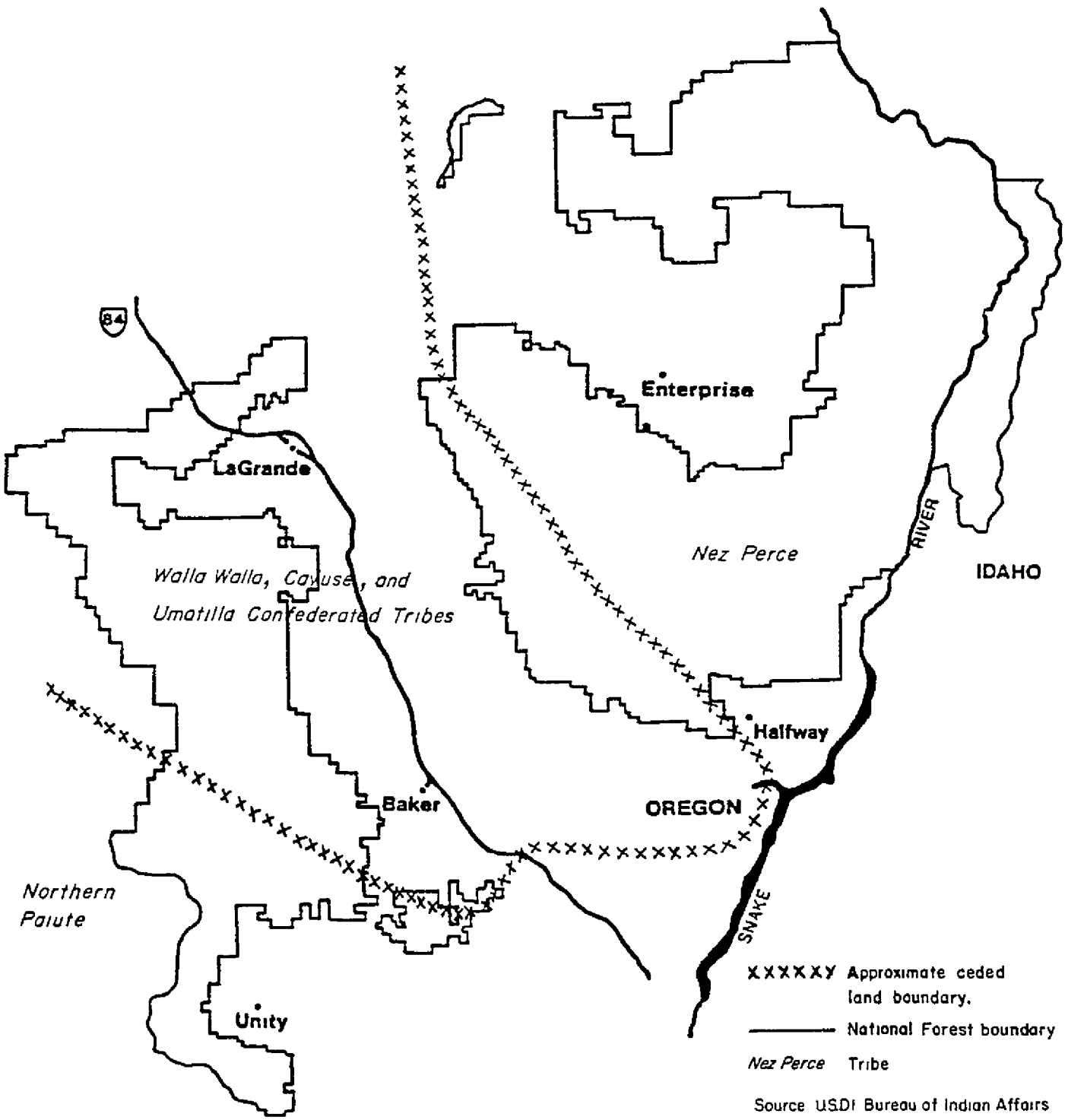
The climate is typical of the northwestern intermountain portion of the United States with cold moist winters and hot dry summers. Average annual precipitation increases as elevation increases with less than ten inches occurring in lower valleys and as much as 80 inches occurring in the highest portion of the Wallowa Mountains In most years, 70 percent of the annual precipitation occurs in the form of snow during the November-April period.

The area experiences wide temperature extremes with summer temperatures at lower elevations commonly exceeding 100 degrees Fahrenheit and winter temperatures at higher elevations commonly below zero.

Soils

Forest soils reflect variations in climate, topography, parent materials, vegetation and the length of time the soils have been developing. Since most of the soils on the Forest have been influenced by volcanic ash, fine to medium textured surface soils dominate. Subsoils are developed from volcanic rock, sediments, and metamorphosed materials and have very fine to fine textures. Areas of coarse textured soils derived from granodiorite are found in the central Wallowa Mountains, along Elkhorn Ridge and in the Seven Devils in Idaho. The southern portion of the Forest contains fine textured soils derived from pyroclastic rocks and sedimentary formations. Numerous localized inclusions and variations in geology and soil types occur across the Forest.

FIGURE III-2
CEDED TRIBAL TREATY LANDS
(Treaties of 1855)



Volcanic ash, deposited across the Forest as a result of ancient volcanic eruptions on Mount Mazama and Glacier Peak, still influences soils on about 60 percent of the Forest This ash, which is capable of absorbing and holding large quantities of water, substantially increases timber and forage productivity on most sites where it is found (Geist, 1978).

As required by the National Forest Management Act implementing regulations, lands suited for timber management have been identified during the development of this environmental statement (36 CFR 219 14) Approximately 90,000 acres of forested land were found to be unsuited for timber management, including some 9,860 acres which were determined to be unsuited because of slope instability. These unstable areas typically have steep slopes made up of soft unstable materials and exhibit signs of mass soil movement The remaining area was determined to be unsuited because of likely difficulty in achieving reforestation In almost all instances, this condition is a result of shallow rocky soils, where the capacity of the soil to hold water is insufficient to support new trees through the dry summers often experienced on the Forest. (For additional description of this process see Chapter III, Timber and Appendix E.)

Many forest activities can affect soils. Timber harvesting, livestock grazing, and off-road vehicle use can remove the soil's protective cover of vegetation and permit soil erosion These same activities can also compact the soil, reducing its long-term productivity Road and trail construction dedicate lands to uses which prevent the soil from producing vegetation at its potential level. In some instances soil erosion and compaction can result from recreation use (particularly within developed recreation sites) and use by wildlife

Fire, if hot enough, can significantly affect soils by permitting erosion, destroying nutrients and organic matter in the surface layer, and reducing wettability (the ability of the soil to absorb rain or snowmelt).

Management of the soil resource as a part of overall forest management is in a state of change. Traditionally, soil management efforts have concentrated on reducing soil losses due to erosion. Strides have been made in controlling losses following timber harvest activities and in reducing erosion from rangelands, however, areas with accelerated erosion persist. Research now indicates that changes in soil structure, particularly those associated with soil compaction, can have long-term effects on productivity (Froehlich 1979) This may occur even though soil loss from the site does not occur. Recent efforts on the Forest have been directed toward reducing and mitigating damage to soil structure through improved timber harvest techniques. In some instances this has included subsoiling previously damaged soils.

The Forest is correcting known watershed problems as opportunities to do so arise In recent years, little direct funding for watershed improvement has been available and this type of improvement work has averaged only five acres per year. Often, watershed improvements are made in concert with other activities occurring in the area, such as timber sales

Some 48,000 acres of the Forest are estimated to be in a compacted condition or having accelerated soil erosion. Activities to correct these problems may include erosion control through grass seeding or other means, stabilization of channels, gulleys, and streambanks through the use of structures or establishment of vegetation; obliteration and rehabilitation of unneeded roads or wheel tracks; and subsoiling of compacted soils

Fertilizers are used to speed the recovery of disturbed soil areas where the topsoil has been lost or displaced, such as cutslopes and fillslopes along roads, or on depleted ranges. To date, little research has been done on the possible improvements in productivity of Forest soils which could be realized through broadcast application of fertilizers on forest or rangelands.

Minerals

The Forest is in the heart of the most productive gold and silver region in the State of Oregon and has the highest level of mineralization of any Forest in the Pacific Northwest Region. Other metals including copper, lead, zinc, chrome, mercury, and antimony have also been produced in the Forest vicinity. Both lode and placer mines have made substantial contributions to total production figures. At 1983 prices, northeastern Oregon's historical metal production would be worth nearly $1 5 billion. Historical metal production from the vicinity of the Forest would be worth nearly $800 million

Although mineralization occurs in numerous areas across the Forest, some areas have a higher potential for mineral occurrence than others. Areas on the Forest have been classified according to their mineral potential and likelihood of near-term development, with classes ranging from I-High to V-Low or Unknown. (See Table III-8 for a description of the various categories.)

Table III-9 is a list of mineralized areas on the Forest. Their locations (by number) are shown in Figure III-3. A more detailed description of each can be found in Appendix J.

The Forest has not historically been considered favorable for oil and gas exploration. Only recently has there been interest in obtaining leases in the vicinity Recently, leases and lease applications covered a significant part of the Forest, including land outside the area considered favorable by the U. S. Geological Survey (see Figure III-4). However, interest in obtaining oil and gas leases has waned considerably, many applications have been withdrawn, and most leases were terminated after one year.

A new, possibly extensive, lignite coal field has been found near the communities of Flora and Paradise in northern Wallowa County. Most of the coal-bearing strata have been found outside the National Forest. A large program of exploratory drilling, sampling, analysis, and geologic mapping is necessary before any assessment can be made as to the feasibility of extracting the coal Given a marketable deposit, many environmental concerns, including aquifer disruption and loss of productivity, would still have to be addressed.

Although a few hot springs are known to occur in and near the Forest, there does not presently appear to be a high potential for geothermal resource development or for recreation use. There currently are no geothermal leases or lease applications within Forest boundaries. The U.S. Geological Survey considers some lands prospectively valuable for geothermal resources in the vicinity, some of which are within the Forest boundaries. See Figure III-4

Sand, gravel, crushed rock, building stone, and limestone occur within the Forest boundaries. These are all materials having low unit values which must be near transportation routes, and usually the point of consumption, to be utilized A continuing need for some quantities of these materials can be anticipated, with increased demand during periods of growth The region has a history of producing large amounts of cement.

Historical mining activities have heightened the concern of many Forest users over present and future mining activity. Environmental effects of past mining activities included reduced riparian condition and water quality due to placer mining in streams and other wet areas, loss of site productivity due to dredging of large acreages such as Sumpter Valley, reduced air quality and visual quality near operating sites, and increased noise

Some of these, most notably water and air quality damage, have been reduced in more recent activities through increased control over the operations. Operators on National Forest lands are required to file an operating plan which includes environmental mitigation measures. Regardless, mining is a ground-disturbing activity, not always compatible with other uses on sites where it occurs.

Table III-8
CATEGORY DEFINITIONS FOR LOCATABLE MINERALS

CATEGORY		I	II	III	IV	V
1	Potential for Substantial Development/ Production Within Ten Years	High	Moderately high	Moderate	Low knowledge	Very low based on current
2	Current Activity Level	Production or development in progress or pending investment decision	Comprehensive exploration, development likely. May include some small scale production.	Exploration programs which may include sampling, geochemical and geophysical surveys, geologic mapping, reconnaissance drilling. May include some hobby-size producers	Sporadic exploration with occasional isolated intense programs by companies or prospectors	Occasional interest by prospectors
3	Land Position	Long term maintenance of claims by established mineral companies/individuals	Long term	Intermittent by established mineral companies/individuals, long term by prospectors	Short term by established companies/ individuals Intermittent by prospectors	Sporadic
4	Geology	Known and favorable for development of significant ore deposits	Known and considered favorable from comparison with other producing districts	Not well known, but appears to have favorable characteristics	Not well known, some favorable characteristics	Either unknown or unfavorable
5	Reserve/Resource	Ore reserves established Will sustain significant production	Presence of, or strong potential for, substantial resource May include small reserves	Potential for large resource is unknown. Small resources, possibly some very small pockets of reserves	Some mineral occurrences, but not enough information to establish resources	Unknown

Table III-9
MINERALIZED AREAS

	Name	Map Reference for Figure III-3
Category I	Cornucopia	8
	Homestead	6
Category II	Bourne	17
	Cable Cove	16
	Granite	15
Category III	Baker City	21
	Blue Jacket	2
	Geiser	24
	Greenhorn	23
	Pine Creek	29
	Red Ledge	4
	Rock Creek	18
	Unity	31
	Upper Grande Ronde	12
Category IV	Auburn Creek	30
	Bald Dooley	28
	Beaver Creek	22
	Beaver Dam	26
	Elkhorn	20
	Greenhorn-Whitney	25
	Homestead-Cliff Mountain	5
	Jackley Mountain	3
	Keating	10
	Kirkwood Creek	1
	Limber Jim-Meadow Creek	11
	Medical Springs	9
	Mt Ireland	19
	Onion Creek	14
	Trail Creek	13
	Wallowa Mountains	7
	Whipple Gulch	27

FIGURE III-3
NONENERGY MINERAL AREAS

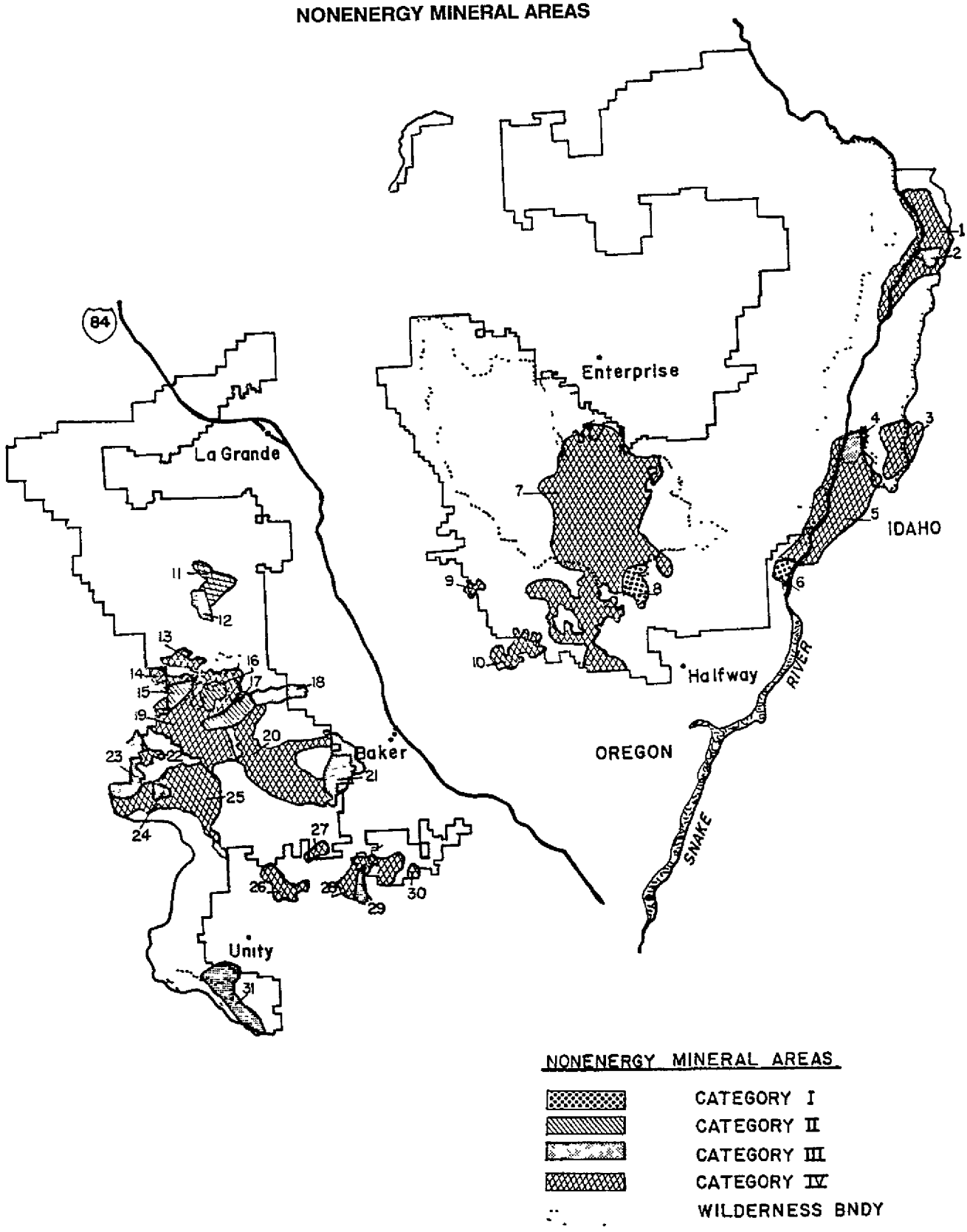
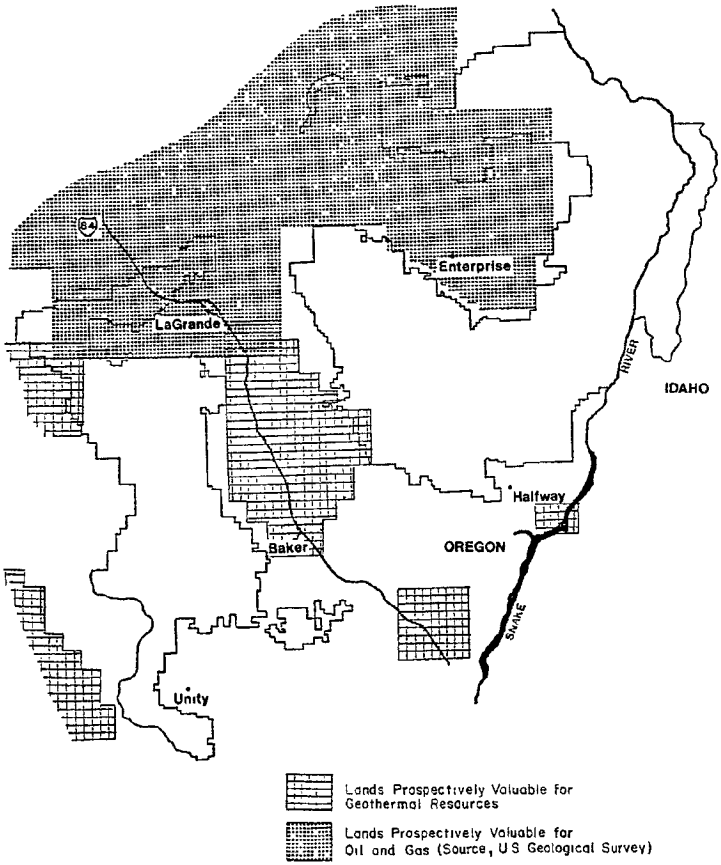


FIGURE III-4
LANDS PROSPECTIVELY VALUABLE FOR GEOTHERMAL, OIL, AND GAS RESOURCES



Air Quality

Many air pollution sources are off-Forest These include such diverse sources as agricultural field burning, forest debris burning on private and other public lands, dust from agricultural lands, industrial pollution from local and distant sources, and fuelwood used for home heating

In recent years home heating with wood has increased significantly, noticeably increasing smoke in many local communities. Since the Forest is the major source of fuelwood locally, and contributes to fuelwood use as far away as Boise, Idaho, the availability and cost of fuelwood from the Forest may affect air pollution levels in these communities.

Forest management activities, particularly prescribed fire, can contribute significantly to short-term air quality problems Prescribed fire on the Wallowa-Whitman currently contributes approximately 6,000 tons of particulates to the air of northeastern Oregon annually. Other activities on the Forest which can create short-term air quality problems include road construction, road use, and mining. Wildfires can also significantly reduce air quality.

The Forest lies in the Eastern Oregon Intrastate Air Quality Region, the Idaho Intrastate Air Quality Region (No 62), and the Eastern Washington-Northern Idaho Interstate Air Quality Region (No. 63). In accordance with the Clean Air Act (P.L. 88-206) as amended, these regions are classified according to the amount of air degradation that could be permitted.

The Eastern Oregon Air Quality Region has been classified Priority 2 (moderate degradation permitted) for suspended particulates and Priority 3 (fairly heavy degradation permitted) for other pollutants The two Idaho regions are classed as Priority 1 (virtually no degradation permitted) for particulates. However, Region 62 is classed Priority 1 for other pollutants whereas Region 63 is classed as Priority 3. A further consideration is the fact that the Eagle Cap and Hells Canyon Wilderness areas have each been classified as Priority 1 for both measures, regardless of the air quality region in which they lie

Air quality is becoming an increasingly important issue in eastern Oregon. Avoiding air quality impacts from Forest activities is major consideration in all Forest activities having the potential to reduce air quality.

Water

The Forest includes 130 lakes and reservoirs totalling 5,400 acres. Of these, 105 are within wilderness. Water storage within many of the wilderness lakes has been increased through the addition of dams (prior to wilderness designation) Release is controlled to provide irrigation water for off-Forest valley lands when needed. Nearly all viable reservoir sites on the Forest have been developed There are currently 30 dams on National Forest land. The State of Oregon, through coordinated basin planning, has developed basin management programs for the Powder, Grande Ronde, North Fork John Day, and Middle Snake River Basins.

There are about 9,600 miles of streams on the Forest Of these, 730 miles are Class I streams Class I streams are intermittent or perennial streams which are a direct source for domestic use, are used by large numbers of fish for spawning, rearing, or migration, or flow enough water to be a major contributor to a Class I stream There are 570 miles of Class II streams. These are perennial or intermittent streams which are used by significant numbers of fish, or are major contributors to other Class II streams Other perennial streams (Class III) total 900 miles These flow yearlong, but do not contain significant numbers of fish The remaining 7,400 miles are intermittent streams which do not contain significant numbers of fish at any time during the year

Total water production from the National Forest averages some 2.73 million acre feet annually. While Forest lands comprise only 40 percent of the total land base in the area, they provide some 80 percent of the annual water runoff. Streamflow varies substantially by season, with some 6 percent of the total annual flow occurring in the October-December period, 16 percent in the January-March period, 59 percent in the April-June period, and 19 percent occurring in July-September.

Major uses of water from National Forest lands include irrigation, municipal and other domestic, industrial, power, mining, fisheries, and recreation Irrigation is by far the dominant consumptive use, with total water rights exceeding 2.2 million acre feet. Water rights for municipal, domestic, and industrial use total some 390 thousand acre feet.

All major drainages are currently over-appropriated Seasonally low flows, depleted by irrigation withdrawals, are a primary cause of high stream temperatures during the summer months. This is of particular concern in anadromous fish streams where high temperatures and depleted flows may reduce fish production. There is little opportunity to increase streamflows through timber management, although timber management techniques can substantially protect existing streamflows and water quality. Only short-term streamflow changes of small magnitude are expected, and these will occur in early spring when there is no shortage

Some increase in irrigated acreage is expected over the next 20 years along with gradual increases in other uses. Meeting increased water needs will require additional storage facilities, increased reliance on wells, and/or more efficient use of existing water supplies since substantial streamflow increases cannot be expected.

The Cities of Baker and La Grande have Memoranda of Agreement with the Secretary of Agriculture establishing municipal supply watersheds. Requirements of these memoranda are common to all Forest Plan alternatives. The Baker City Watershed includes 8,740 acres of National Forest land, providing water for a population near 10,000. The La Grande Municipal Watershed includes 15,631 acres on National Forest land supplying a population of over 11,000 Both cities have experienced water shortages in recent years and now rely on wells to supplement stream flows Opportunities exist for increased supply if facilities are improved, increased storage is provided, or additional sources are tapped.

The agreement with the City of La Grande includes the following requirements:

1. That before entering into any agreement for the cutting of timber or removal of other forest products from National Forest lands within the area, the officials of the City of La Grande will be consulted and full consideration will be given to any requirements the City of La Grande may desire to impose as necessary for the safeguarding of the water supply.

2 That in permitting the use of said lands for timber cutting or other purposes, full consideration shall be given to the preservation of the volume and purity of the city water supply, and if the proper State or Federal agencies shall determine, after due study and investigation, that the city water supply is being or will be diminished, contaminated or polluted through permitted operations upon said lands, and there is no other more practicable remedy for the situation, the Secretary, so far as he has the legal authority to do so, will cause such permitted operations to be restricted, modified or discontinued.

3. Grazing of livestock on National Forest lands in the watershed will not be authorized by the Forest Service except with the consent of the officials of the City of La Grande. Any fencing or other improvements found necessary to effectively exclude livestock from the watershed or to aid in safeguarding the water supply will be constructed and maintained by the City under special use permit to be issued by the Forest Supervisor.

4. So far as practicable with the means at his disposal, the Secretary of Agriculture will extend and improve the forests upon these lands by seeding and planting, and by the most approved methods of silviculture and forest management.

5 The Forest Service will administer and protect the area in connection with adjoining National Forest lands. Should the City of La Grande desire any special measures not provided by the regular Forest Service administration, they may be obtained at the expense of the City of La Grande by the appointment of additional employees to be appointed by and to be directly responsible to the Forest Supervisor of the Whitman National Forest, but their compensation will be paid by the said City at the same rate as persons employed by the Forest Service on similar duties

The agreement between the City of Baker and the Secretary of Agriculture requires that use of land within the domestic supply watershed will not be permitted without the approval of the City of Baker except for measures necessary for the proper protection and care of the forests. These measures include timber management activities which are not detrimental to the water supply, construction activities consistent with the objectives of the agreement and rights-of-way acquired under Acts of Congress.

Commercial livestock grazing is not currently permitted in either watershed, primarily due to concerns over possible bacterial pollution. Timber harvesting is permitted but little has occurred, to date.

Several other communities rely on the Forest for municipal water Sumpter obtains its water from the McCully Fork of the Powder River, Granite from a spring located on National Forest land, and Union utilizes water from Catherine Creek. In addition, Wallowa and Joseph receive all or part of their domestic water supplies from streams originating on National Forest lands The water supply intakes for Union, Wallowa, and Joseph are sufficiently far from the Forest boundary so that significant potential for off-Forest pollution exists

The City of Halfway possesses a special use permit for use of Leep Springs as a domestic source, although it currently is not using this supply

The National Forest has 1,462 identified water uses on its most recent water uses inventory. There are 27 Forest Service campgrounds and two picnic areas with piped-in water Two uses for irrigation (pastures) have been identified. The remaining 1,431 uses are associated with stock watering. For many of these uses, application for water use must be made to the respective States. Water rights have been acquired or requested for 462 of these uses. The Forest is presently reviewing some 800 other uses to determine those which require water rights. It is estimated that eventually water rights will be needed for an additional 300-400 uses Water for uses such as fire fighting, road construction and maintenance, or watershed protection was reserved under the Organic Administrative Act of 1897 and water rights from the States are not required

The Forest has the opportunity to increase the quality of water flowing from National Forest land. In theory, all water flowing from the Forest could be improved to meet quality standards In reality, there are some water quality problems, such as sediment from poorly located arterial roads, or stream temperature increases due to depleted flows which, while they may be improved, cannot practically be eliminated in the foreseeable future The opportunity exists to improve or correct many of the water quality problems caused by cattle in riparian areas, local streambottom roads, and other areas of reduced watershed condition.

Forest fires may also reduce water quality by increasing soil erosion and reducing stream shade. Under controlled conditions (as with prescribed fire) these effects are generally negligible, but the extreme heat generated by wildfires may significantly reduce water quality for several years until vegetation returns

Many National Forest streams are bordered by floodplains (Maps are located at the National Forest Headquarters.) Wetlands have not been mapped on a Forest-wide basis. Policy and direction for managing floodplains and wetlands are found in Forest Service Manual 2500 Management activities are constrained to assure that wetland and floodplain values are protected, sometimes resulting in reduced timber yields, increased road construction costs, and changes in livestock management. Site-specific analyses of projects or activities within, or which could affect, floodplains and wetlands are conducted through the NEPA process and according to this policy and direction.

Major flooding remains a problem only in the Grand Ronde Valley Prior to completion of Mason Dam on the Powder River in the late 1960's, flooding was also a problem in Baker Valley. With the streamflow control provided by the dam, damage there is now limited to localized events such as ice jams which occasionally force the river out of its banks

All significant flooding occurs off the National Forest, but much of the streamflow contributing to the floods comes from National Forest land. Flooding within the Grande Ronde Valley occurs both from the Grande Ronde River and from Catherine Creek Major floods of record from the Grande Ronde River have all occurred when the streamflow at La Grande was above 5,000 cubic feet per second (CFS). All major floods from Catherine Creek have occurred at flows of 1,000 CFS or higher (U. S. Army Corps of Engineers 1964, 1971). Most flooding occurs on agricultural land and much stream channel work has been completed within the valley in an attempt to reduce the severity of floods in these areas.

In the late 1960's and early 1970's, plans were made by the U S. Army Corps of Engineers to build dams both on the Grande Ronde River and on Catherine Creek to reduce flood damage within the valley. These plans, which were challenged in court because of concerns over fishery values, have since been dropped

Although not major in nature, flooding also occurs in Wallowa Valley. This is primarily due to high flows in the Wallowa River Flooding has also occurred along Hurricane and Bear Creeks and the Lostine River

Flow frequencies for several streams are shown in Table III-10.

Table III-10
PEAK FLOW FREQUENCIES FOR SELECTED STREAMS
(cubic feet per second)

Stream	Recurrence Interval (Years) 2	5	10	20	50	100
Grande Ronde River at La Grande 1/	3,350	4,950	6,100	7,300	8,900 3/	10,200
Catherine Creek Near Union 2/	782	1,042	1,197	1,377	1,502	1,619
Imnaha River at Imnaha 2/	2,673	4,056	5,153	6,762	8,136	9,668
Wallowa River Above Wallowa Lake 2/	828	1,185	1,427	1,739	1,974	2,211
Hurricane Creek 2/	545	742	867	1,017	1,124	1,228
Powder River Near Baker 2/	734	1,048	1,232	1,440	1,578	1,703

1/ U S Army Corps of Engineers, 1964.
2/ Developed from data gathered by the USDI Geological Survey
3/ Twenty-five-year frequency

Hydroelectric Facilities

Currently, there are five hydroelectric facilities on the Forest: (1) Hells Canyon Dam on the Snake River, (2) Little Sheep Creek on the Wallowa Valley Improvement Canal, (3) Pacific Power and Light Company dam on the East Fork of the Wallowa River, (4) Rock Creek Diversion and Conduit on Rock Creek; and (5) the City of Cove hydroelectric project, near the City of Cove The generating facility for the Cove project is located off National Forest land Approximately one mile of ditch for the project is located on the Forest. The on-Forest facilities are described in Table III-11

Table III-11
EXISTING HYDROELECTRIC FACILITIES

Name	Watershed	Installed Capacity (MW)	Developable Potential (MW)	Average Annual Generation (MWH)
	Within National Forest Boundaries			
Hells Canyon	Snake River	391.5	0	2,995,600
Rock Creek	Rock Creek	.9	0	4,900
Sheep Creek	Sheep Creek	7 0	0	4,075
Wallowa Falls	East Fork Wallowa River	1.1	0	4,835
	Outside National Forest Boundaries			
Brownlee	Snake River	585.4	0	2,417,000
Goodrich Dam	Goodrich Creek	75.0	0	650
Oxbow	Snake River	190.0	0	1,044,300

MW - Megawatts
MWH - Megawatt Hours

Streams flowing from National Forest system lands supply a significant amount of water to hydroelectric projects at Brownlee Dam and Oxbow Dam, which are located off-Forest, as well as to the small hydroelectric facility maintained by Baker City.

Passage of the Public Utility Regulatory Policies Act in 1978 encouraged the private development of small power projects It requires electric utilities to connect with and purchase power from qualified small power production facilities Current interest in small hydroelectric development is reflected in the projects which have been proposed on, and adjacent to, the Forest. Evaluation is underway for adding power generation to Mason Dam, Rock Creek, Pine Creek, and Hurricane Creek Numerous off-Forest proposals are being evaluated for Thief Valley, Wallowa Valley and elsewhere

A listing of potential hydropower sites (withdrawals) is contained in Volume XXII of the Regional Assessment, National Hydroelectric Power Resources Study: Western Systems Coordinating Council prepared by the U.S Army Corps of Engineers, September 1981. There are 10 sites on the Forest as shown in Table III-12.

Table III-12
FOREST POTENTIAL HYDROPOWER SITES

Power Site Reserve Number	Location
78	Snake River, T 4,5S; R49E; 1N50E; 1N51E, 2N51E, 3N50E; 4N48,49,50E; 5N47, 48E, 1S50E; 2S49,50E; 3S39E; 4S49E.
170	Minam River, T1NR41E
191	Lower Grande Ronde River, T3N,R40E; 4N40E, RN41E; 5N41E
240	Snake River, 4N49E
248	Crow Creek, T2NR4SE; 3N4SE, Joseph Creek 4N4SE
263	Imnaha River below Cliff Creek, T5S,R45,46,47,48E; 2N48E, 3N48E; 3N49E; 4N49E; 5S45,46,47,48E; 2N48E; 3N48E; 3N49E, 4N48E; 5S45, 46, 47, 48E
282	Wallowa River below Minam, T2N,R42E, Hurricane Creek, 35,44E
348	N. Pine Creek, T5S,R48E
380	Upper Grande Ronde River, T3S,R36E; Little Minam, T3S,R41E
4231	Snake River

Vegetation

Wide ranges in elevation and precipitation provide distinctly different physical environments across the Forest. These environments, in turn, are reflected in numerous vegetative types or communities The four major physiographic units (alpine, forested uplands, grass-shrub uplands, and valley lands) are described below.

Alpine - Alpine conditions are found in three general areas of the Forest. the Elkhorn Ridge, the high Wallowas, and at the upper elevations in the Seven Devils Mountains. In general, alpine conditions are not found at elevations below 6,800 feet These represent the highest precipitation zones on the Forest with average annual values of up to 80 inches. Rock outcrops and talus slopes, devoid of vegetation, make up much of these areas Where soils have developed, vegetation is composed primarily of species tolerant of cold and suited to short growing seasons Rock types include granodiorite, argillite, tuff, chert, limestone, and greenstone.

Forested Uplands - These areas make up the principal forest zone. These lands provide valuable habitat for numerous wildlife species, a wide variety of recreation opportunities, and also provide the bulk of the commercial timber coming from the area. Elevations range generally from 3,500 feet to 7,000 feet. Within this zone numerous plant communities are found. The major coniferous tree species are ponderosa pine, Douglas-fir, white fir, western larch, Engelmann spruce, lodgepole pine,

and subalpine fir. Hardwood species including quaking aspen, willow, black cottonwood, and alder are also found.

Mean annual precipitation varies from 15 to 40 inches, occurring mostly as snow. These areas exhibit wide variations in slope, aspect, and soil depth Included within this zone are numerous areas which, because of shallow soils or moisture conditions, are incapable of supporting stands of trees. These lands occupy approximately 40 percent of this zone.

Grass-Shrub Uplands - The grass-shrub uplands are found in numerous areas across and adjacent to the Forest, predominantly in the transition zones between valley lands and the upland forested areas. Vegetation consists of forbs, grasses, sagebrush and other shrubs. Grasses common to this vegetation type include bluebunch wheatgrass, Idaho fescue, cheatgrass, and Sandberg bluegrass

Grass-shrub uplands typically occur in areas of shallow soil and low precipitation (10-20 inches annually) These areas are of importance in providing forage both for domestic livestock and wildlife

Valley Lands - Valley lands are predominantly under private or other non-Forest ownership The three major valleys are Baker, the Grande Ronde, and Wallowa with lesser valleys including Pine, Sumpter, Keating, and Burnt River For the most part, these are agricultural lands with good fertility.

Precipitation varies from 8 to 25 inches, frequently with little occurring during the growing season Irrigation is used on substantial acreages within the valleys, largely alleviating this moisture shortage.

Timber Production

Of the 2 3 million acres of the Forest, approximately 46 percent, or 1.09 million acres have been identified as being tentatively suited for timber production This means that they are capable of sustaining crops of commercial tree species, are available for timber harvest (if not allocated to some other use), that technology is available which permits harvest of timber without irreversible damage to soil productivity or watershed conditions, and that technology is available to reasonably assure reforestation Figure III-5 shows, schematically, the process which was used to identify these lands (a detailed description is found in Appendix E) Table III-13 is a summary of this classification of forest land.

Following this determination of tentatively suitable land, the National Forest Management Act Regulations require that the economic suitability of forest lands be determined. That process is described in Appendix B and summarized in Chapter II This is completed as a part of the analysis for each Forest Plan alternative, with the acreages scheduled for harvest being dependent on the objectives of that particular alternative.

Regional Timber Supply and Demand Projections - The principal projections used in developing long-range plans and programs for management of the National Forests are contained in the Forest and Rangeland Renewable Planning Act (RPA) Assessment and 1984 update These projections focus on the situation over the next 50 years and are not designed to recognize current short-term regional fluctuations

FIGURE III-5
LAND SUITABILITY ANALYSIS

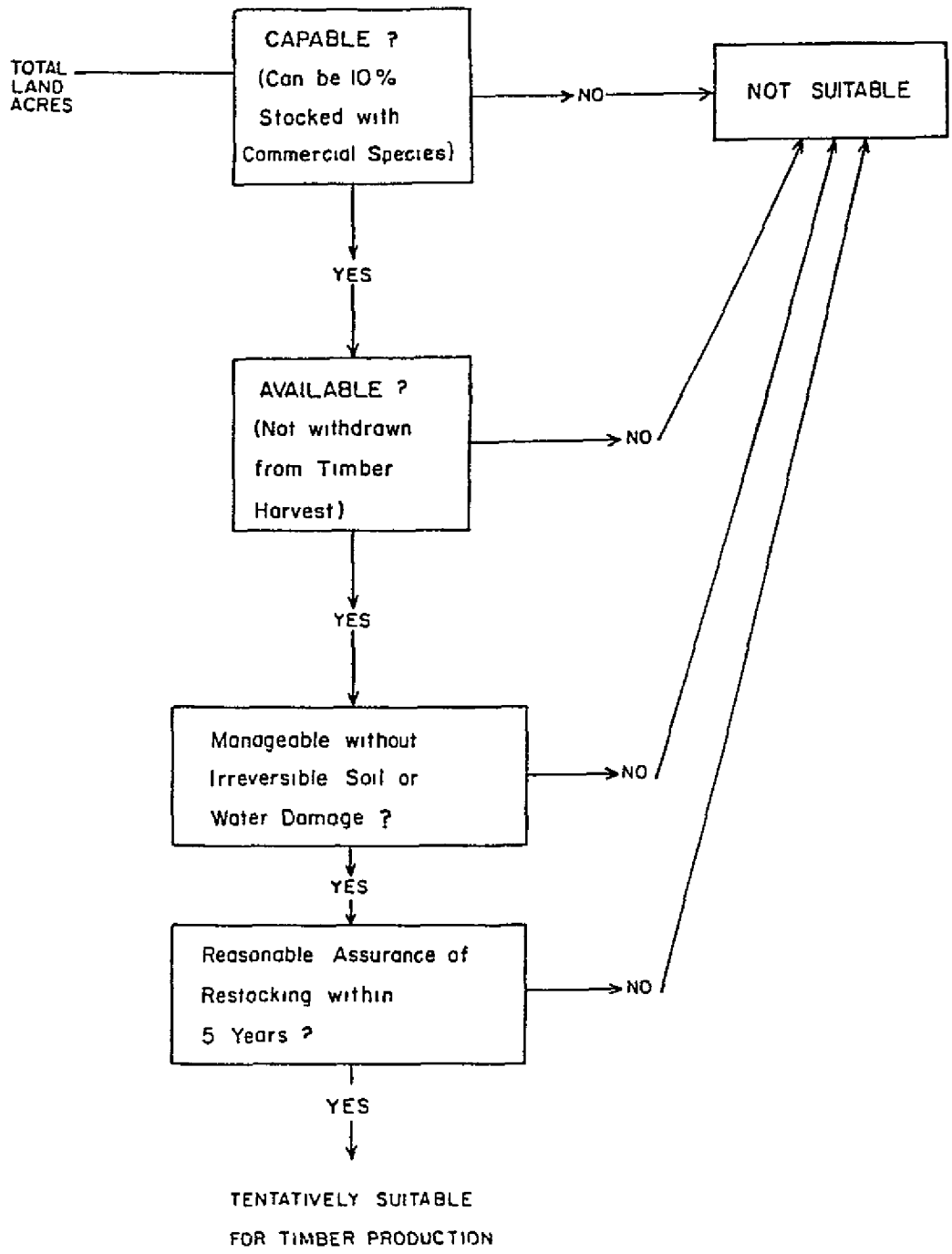


Table III-13
LAND SUITABILITY FOR TIMBER MANAGEMENT
(Acres)

	Not Suited for Timber Production	Suited for Timber Production
Total National Forest Area		2,667,961
Other Ownerships	318,746	
Net National Forest Area		2,349,215
Water	5,386	
Nonforest (not stocked with 10% tree cover)	921,218	
Roads	10,686	
Forested Lands	1,411,925	
Withdrawn From Scheduled Timber Production		
Wilderness		
Eagle Cap	134,900 1/ 6,113 2/	
Hells Canyon	64,504 1/ 3,679 2/	
Monument Rock	5,972 1/ 718 2/	
N Fork John Day	11,603 1/ 3,252 2/	
Indian Creek Research Natural Area	876 1/ 6 2/	
Starkey Experimental Forest and Range	15,823	
HCNRA "Forage" Allocation		39,620
HCNRA "Dispersed Recreation/ Native Vegetation" Allocation		51,690
Subtotal	231,623	107,133
Lands Growing Less Than 20 Cubic Feet/Acre/Year		
Lands Classified as Unsuitable	12,534	
Lands Classified as Suitable	(347)	
Lands with Extreme Regeneration Difficulty	67,489	
Lands Which Cannot Practicably Be Logged Without Irreversible Resource Damage	9,860	
Tentatively Suitable Forest Land		1,090,072
Totals of Suitable and Nonsuitable Lands	1,259,143	1,090,072
Land Status Under Current Timber Management Plan 3/	968,384	1,238,297

1/ Lands capable of producing 20 cubic feet per acre of commercial wood fiber annually.
2/ Lands not capable of producing 20 cubic feet per acre of commercial wood fiber annually
3/ Based on Amendment 9 to the 1962 Timber Management Plan, Does not include lands in Idaho Acreages were determined using inventory plot-expansion techniques rather than map measurements

Total projected softwood roundwood harvest would rise 24 percent from 9 6 billion cubic feet in 1980 to 11.9 billion cubic feet in 2030 Though the outlook is for increased softwood harvests nationally, there are important differences among the major softwood timber producing regions (RPA 1984)

In the Douglas-fir subregion of the Pacific Northwest Region, the projected annual harvest from 1980 to 1990 is about 2 3 billion cubic feet It then declines slightly to about two billion cubic feet per year. This level is roughly maintained through the rest of the 50-year projection period (RPA 1984)

In contrast, the other major source of softwood timber harvest is the South, where production is projected to rise from about 4 1 billion cubic feet in 1980 to 7.3 billion in 2030 Much of the expansion in the south, with softwoods as well as hardwoods, is due to the fact that its wood products production has become more diversified compared to other regions of the country. (RPA 1984)

Over the next ten years, timber demand from the Pacific Northwest is estimated to grow slowly. Although there is a backlog of unfulfilled housing demand, the future will depend primarily on strength in personal income and the availability of affordable housing and financing In addition, projections of exports to the Pacific Rim countries show a continuing slow economic growth The analysis acknowledges there will be a declining trend in the construction sector Structure replacement, rather than new construction, will characterize the market. The projections of increases in demand may be described as considerably restrained and cautious (Nomura 1981)

Evaluation of recent data indicates that demand for timber is increasing moderately compared to the slowdown that occurred in the early 1980's. The ability to sustain this increase on a long-run basis is linked to the critical issue of costs The short-term future of timber and wood products demand is clouded by factors such as the severity and length of the housing and wood products recession that began in 1980. The long-term trends in wood production, the availability of wood substitutes, and a shift in business management strategies and methods, all contribute to a potential shift in future demand (Haynes and Adams 1985)

Wood supply will continue to be an issue in the sense that it will be highly dependent on the ability of producers to lower costs to be competitive with wood substitutes (Schallau 1986)

The possibility also exists for the Pacific Northwest Region to increase exports to international markets To achieve this, the forest products industry will need to learn the workings of the overseas market systems and provide more products in the form demanded (Campbell et al 1983)

In addition, actions by industry such as modernizing facilities, adopting state-of-the-art technology, reducing costs, and diversifying into other sectors of production (similar to what the southern region has done) could help to rebuild and stabilize the wood-based sectors of the region. (Schallau 1985) One consistent theme in technological change has been the substitution of capital for labor (Fox 1989)

Local Timber Supply and Demand Conditions - Supply estimates presented here are physical and biological in nature Economic factors related to characteristics of the timber and its location and markets for wood products determine the economic supply. These economic factors change with time, causing changes in economic supply. For example, changes in processing technology may change the limits on size of material used or species suitable for processing This can cause the economic supply to shift from currently valuable species and size classes to a different mix This causes both a change in the value of timber stocks held by various owners and shifts between regions.

Such changes have occurred in the past Some mills have begun purchasing timber from areas far-distant from their traditional sources of supply. Species which for a long time were considered to be of only nuisance value have found a niche in the market place.

There are three major influences on the potential supply of timber from the Forest.

--the number of acres available for harvest;

--the intensity of management on those acres, and

--the harvest flow schedule

Acreage available for timber harvesting is an important factor because it defines the total area and the total standing timber volume that can be logged. It also establishes the baseline for growth.

Management intensity can greatly influence the supply level on the Wallowa-Whitman National Forest by affecting the growth rate of trees Planting trees immediately after logging a stand is expected to provide merchantable trees more quickly than would be the case if natural regeneration were employed Likewise, precommercial thinning is expected to increase merchantable volume. These are the kinds of practices included under management intensity.

Departure from nondeclining flow can increase timber harvest levels temporarily, but also results in a decrease in harvest levels sometime in the future Departure from nondeclining flow means logging more timber in any given period of time than can be logged in the future indefinitely.

As shown in Table III-14 the Forest has traditionally supplied about half the local (tri-county) log flow.

Table III-14
Log Flows in the Local Area (MMBF Scribner Log Rule) 1/

	1972	1976	1982	1985
Total Log Flow	335	319	192	302
Volume from all National Forests	254	208	114	215
Volume from the Wallowa-Whitman National Forest	161	152	106 2/	147

1/ The material for this table is taken from the Oregon Forest Products Industry publications for the years shown.
1972. John Schuldt and James O. Howard, Corvallis Oregon, Oregon State University, 1974.
1976· James O. Howard and Bruce A. Hiserote, USDA Forest Service Resource Bulletin PNW-79, Portland Oregon, 1978.
1982: James O. Howard, USDA Forest Service Resource Bulletin PNW-118, Portland Oregon, 1984
1985· James O. Howard and Franklin R. Ward, USDA Forest Service Resource Bulletin PNW-RB-149, Portland Oregon, 1988.
2/ Due to efforts to avoid disclosing information about individual mills, the figure shown here is probably high. The maximum amount of the error is 12 MMBF.

The species mix of the material processed has also changed over time as shown in Table III-15. Trends are difficult to identify--the figures shown are more indicative of fluctuations than trends.

Table III-15
Log Consumption by Local Area Lumber Mills (MMBF Scribner Log Rule) 1/

	1972	1976	1982	1985
Total Log Consumption	227	235	192	303
Douglas-fir	26	46	37	54
Hemlock	0	0	5	6
True fir	42	66	26	44
Spruce	12	7	9	7
Ponderosa pine	107	80	97	104
Lodgepole pine	24	24	17	64
Other softwood	16	13	1	24

1/ The material for this table is taken from the Oregon Forest Products Industry publications for the years shown. Figures shown are for lumber mills only Comparable data is not available on a species basis for other mills
1972: John Schuldt and James O. Howard, Corvallis Oregon, Oregon State University, 1974.
1976: James O. Howard and Bruce A Hiserote, USDA Forest Service Resource Bulletin PNW-79, Portland Oregon, 1978.
1982: James O. Howard, USDA Forest Service Resource Bulletin PNW-118, Portland Oregon, 1984.
1985: James O. Howard and Franklin R. Ward, USDA Forest Service Resource Bulletin PNW-RB-149, Portland Oregon, 1988.

To put the timber supply potential of the Forest in its proper context, it is necessary to consider the timber supply picture of the area as a whole A summary of local log production is shown in Table III-16.

As shown in the above tables, the area's National Forests are an important part of the local supply picture for stumpage and the Wallowa-Whitman comprises the main part of that National Forest supply. Since 1960 the National Forests have been responsible for more log production than the private sector in every year except 1974. Absent the private sector and the National Forest suppliers, there would be no significant timber production in the area

Table III-17 shows actual Wallowa-Whitman timber offerings over time. It shows the importance of mortality salvage offerings as well as live offerings and shows the relatively small impact the "Buy-Back" legislation had on the local timber economy. Relatively little timber was "sold" back to the government as a result of that legislation which was designed to assist timber purchasers who had overbid timber stumpage This was due in part to the fact that stumpage sold on the Wallowa-Whitman is generally subject to a price adjustment.

Table III-16
Local Area Log Production (MMBF Scribner Log Rule) 1/

	Private	National Forest	All Other 2/	Total
1949	60	20	1	80
1950	75	37		112
1951	102	22		124
1952	108	33		141
1953	133	37		170
1954	183	59	3	245
1955	140	73	2	215
1956	176	98	1	276
1957	191	114	4	309
1958	154	123	5	282
1959	195	130	7	332
1960	116	117	5	238
1961	116	135	1	252
1962	97	154	18	269
1963	108	207	1	317
1964	98	207		305
1965	123	239		362
1966	91	215		306
1967	111	224	5	340
1968	87	252	6	345
1969	72	296	3	371
1970	94	192	3	289
1971	100	228	6	335
1972	50	272	7	329
1973	64	191	6	261
1974	181	157		338
1975	65	192	2	259
1976	87	196	1	285
1977	95	192	2	288
1978	100	202	3	306
1979	99	198	1	298
1980	140	147	2	289
1981	98	169	2	268
1982	96	98		195
1983	101	196	5	302
1984	100	189	1	289
1985	83	220		304
1986	89	321	2	412
1987	91	297	2	390

Components may not sum to Total due to rounding.

1/ Source of 1949-1970 data: Brian R. Wall, *Log Production in Washington and Oregon*, USDA, FS Resource Bulletin PNW-42 (Portland: Pacific Northwest Forest and Range Experiment Station), pp. 68-89. Figures shown were originally done in Scribner Log Scale. Referenced source converted them to International 1/4 inch by multiplying the figure for the ponderosa pine region by 1.07 (p. 22 thereof) For purpose of comparing with later data, the data has been returned to Scribner Log Scale by multiplying it by the inverse of 1.07.
Source of 1971-1973, 1975, 1976 data: Annual USDA FS Publication *Oregon Timber Harvest* 1976 was the last Forest Service issue. 1977 data, most recent available, was published by the Oregon Department of Forestry, their file designation 1-0-4-500
Source of 1974 data: State of Oregon, Department of Forestry 1974 "Approximate Acres Logged and MBF Volume Recorded - State of Oregon" General File 1-0-4-500
Source for 1978 and following years' data. Oregon Timber Harvest Reports as published by the Oregon State Department of Forestry, file designation 7-0-4-000, except for 1978 which is 1-0-4-500
2/ Includes production from State, BLM, and Indian sources Also includes production from public entities not elsewhere classified.

Table III-17
TIMBER SALE OFFERINGS (MMBF) 1/

Year	Live	Mortality Salvage 2/	Reoffered	Total
1988	120	75	6	201
1987	141	64	0	205
1986	135	41	40	216
1985	133	44	0	177
1984	163	37	0	200
1983	151	29	0	180
1982	197	18	0	215
1981	173	34	0	206
1980	104	102	0	206
1979	171	57	0	228
1978	181	63	0	244
1977	160	40	0	199
1976	179	10	0	189

May not sum to Total due to rounding
1/ Source: Forest file designation 6520
Live corresponds to MARS (Management Attainment Reporting System) 17 1.
Mortality corresponds to MARS 17.2.
Reoffered corresponds to MARS 17 0
2/ Recorded as SSF (Salvage Sale Fund) or TSS (Timber Sale Salvage).

Under stumpage price adjustment, sales are indexed at the time of sale. If the price of a species is up by $10 at the time the material is removed from the site, the purchaser is charged an extra $5. If the price is down $10, the price is lowered the full $10--subject to certain minimums.

Table III-18 shows information on timber volumes from the Wallowa-Whitman and its neighboring National Forests in the recent past as well as possible future sale levels. In their aggregate the preferred alternatives shown there would increase the ASQ (Allowable Sale Quantity--the amount of sawtimber that may be offered for sale) over recent levels

Table III-18
TIMBER VOLUMES UNDER CONSIDERATION FOR OREGON'S NORTHEASTERN NATIONAL FORESTS

National Forest Alternative	Recent Levels	Lowest ASQ Alternative	Preferred Alternative ASQ	Highest ASQ
Malheur	196	134	245	258
Umatilla	158	81	154	202
Wallowa-Whitman	159	98	144	167
Total	513	315	543	639

Source: Malheur and Umatilla Forest Plan DEIS's; and this FEIS.

Table III-19 shows the actual species composition of sales over time. Notice in the pre-1985 period that the sale of ponderosa pine had been below 50 MMBF on only two occasions but that since that time ponderosa pine sales have never amounted to 50 MMBF. The decline in ponderosa pine production is inevitable. As the premier species, it has long commanded a price premium and thus has been logged more than other species.

Table III-19
FOREST SAWLOG SALES MMBF
(Calendar Year Data Through 1982, Fiscal Year Data Thereafter)

Year	True Fir	Western Larch	Engelmann Spruce	Lodgepole Pine	Ponderosa Pine	Douglas Fir	Total
1988	33	3	15	5	34	37	127
1987	30	-	10	5	44	63	152
1986	31	-	-	4	48	63	146
1985	21	-	3	10	39	32	104
1984	30	-	4	2	55	35	126
1983	29	2	3	1	48	44	127
1982	34	4	4	4	52	43	140
1981	29	3	2	-	83	57	174
1980	18	7	1	2	57	40	123
1979	34	4	-	7	82	66	193
1978	20	2	1	4	98	59	184
1977	17	3	1	10	87	32	150
1976	20	2	-	2	82	54	159
1975	32	5	2	6	71	61	177
1974	25	-	-	8	39	43	115

141.2

Individual species may not sum to totals due to rounding. Data source is Report 2 of the 2400-17 Report Series

Table III-20 displays the incidence of different species in sawtimber sales over time It shows that the true firs have come to be an important part of local sawtimber sales

Table III-20
PERCENT OF FOREST TIMBER SALES BY PRINCIPAL SAWTIMBER SPECIES

Year	Ponderosa Pine	Douglas-Fir	True Fir
	%	%	%
1988	27	29	26
1987	29	41	20
1986	33	43	21
1985	38	31	20
1984	44	28	24
1983	38	35	23
1982	37	31	24
1981	48	33	17
1980	46	33	15
1979	42	34	18
1978	53	32	11
1977	58	21	11
1976	52	34	13
1975	40	34	18
1974	34	37	22

Data Source Report 2 of the 2400-17 Report Series Individual species do not sum to 100 because of the exclusion of minor volume species. Calendar year data through 1982, fiscal year data thereafter

Table III-21 shows the differences between timber volume sold and timber volume cut. It also includes volume sold and harvested from small timber sales. Sales volume from those small sales is not recorded in the 2400-17 Report Series, therefore it's volumes are lower than those shown for the Cut and Sold Report.

The demand for timber processed locally is dependent largely on the same things that affect the national demand picture Mortgage interest rates, housing starts, the use of substitute materials, types of housing, and numerous other considerations all enter into the overall demand picture The local demand picture is part of that larger picture, although local demand is more dependent on events in the western states.

Table III-21
Cut and Sold Report
(Board Feet)

Fiscal Year	Sold	Cut
88	168,398,490	195,088,330
87	214,972,000	303,662,000
86	209,895,960	229,814,320
85	182,490,700	232,688,230
84	253,044,690	259,380,370
83	172,112,250	148,554,400
82	207,923,570	122,975,920
81	245,951,440	190,710,760
80	165,796,430	160,144,000
79	225,206,290	218,246,800

Source: Forest File Designation 2490

There are also regional variations. The local demand picture is more affected by housing starts in California than by housing starts in New England, for instance.

Table III-22 shows timber inventory information for the local area.

Information on installed mill capacity is shown in Table III-23. Installed mill capacity, greatly exceeds the area's historical production levels. In 1985 for instance, area sawmills consumed over 300 MMBF of sawtimber, running about 1 4 shifts per day over 207 operating days (Howard 1988) Two shifts per day for 250 operating days would have consumed over 500 MMBF. Information presented in Chapter II shows that the Forest lacks the capacity to supply an additional 200 MMBF on a sustained basis.

Area plywood and manufactured board facilities likewise have unused capacity which would further increase the gap between log production and log consumption.

Below-Cost Timber Sales - In the recent past, the issue of below-cost timber sales has been brought to the public's attention. This section addresses those concerns. Table III-24 summarizes information for costs (exclusive of road costs which are presented in Table III-25) and receipts

A number of factors contribute to the Forest's high level of sales below costs. Perhaps most readily apparent is the harvest of low dollar valued lodgepole pine Some of this material is dead or dying Even sold green, lodgepole pine prices are normally low due to the ready availability of other highly competitive species throughout the country. The Forest has been harvesting this material because the stands were dead, dying, or stagnant; and because harvesting the material provides employment in an economically depressed area

Table III-22
Timber Inventory Information 1/
Million Cubic Feet

Source	1950's 1/	1968	1977 2/	1988 3/
Private Commercial Growing Stock				
Baker County	198 (1956)	NA	102	165
Union County	488 (1958)	NA	322	353
Wallowa County	399 (1957)	NA	328	368
Total	1,085	NA	752	886
Wallowa-Whitman Inventory	3,388 (1957) 4/	3,013 5/	1,860 6/	NA

NA. Not Available
1/ Data for the counties was taken from the county-respective Resource Atlases published by the Oregon State University Extension Service in 1973, Gary Valde author The original source of the information was the USDA Forest Service Pacific Northwest Region Forest and Range Experiment Station publications:

Baker County Forest Statistics for Baker and Malheur Counties, Forest Survey Report 132, 1958, p 15.

Union County Forest Statistics for Umatilla and Union Counties, Forest Survey Report 135, 1960, p 14.

Wallowa County: Forest Statistics for Wallowa County, Oregon, Forest Survey Report 134, April, 1960, p 11.

2/ Letter from Thomas O. Farrenkopf of the USDA Forest Service Pacific Northwest Region Forest and Range Experiment Station dated March 13, 1981
3/ Personal communication with Don Gedney of the USDA Forest Service Pacific Northwest Region Forest and Range Experiment Station dated February 15, 1989
4/ USDA Forest Service Pacific Northwest Region, Forest Inventory Statistics for the Wallowa-Whitman National Forest, June 12, 1961, p. 3. Reflects the timber resource situation as of January 1, 1957 for the Burnt River, Elkhorn, Pine, and Union components, as of January 1, 1958 for the Wallowa and Grande Ronde components
5/ USDA Forest Service Pacific Northwest Region, Forest Inventory Statistics for the Wallowa-Whitman National Forest, April 14, 1970, p 3 Reflects the timber resource situation as of January 1, 1968.
6/ USDA Forest Service Pacific Northwest Region, Wallowa-Whitman National Forest Summary Tables for Timber Resource Inventory 1979.

Large volumes of dead lodgepole pine have been removed since the late 1970's. Harvest of this material may affect fire incidence favorably (by removing the dead fuel mass) or unfavorably (by providing access and thus increasing the possibility of human-caused fire) The harvest increases transitory forage but that forage is not generally a constraint on area wildlife or livestock. Removal of the massive amounts of dead material has also been advocated on the basis of aesthetics--some find the dead stands more unsightly than the clearcuts which replace them In the final analysis,

however, Forest management harvests the material so that new productive stands may supplant the existing nonproductive stands, and to assist the local economy.

Table III-23
Installed Area Mill Capacity 1/

	1972	1976	1982	1985
Lumber Mills				
MBF Lumber Tally (8-Hour)	716	733	745	1,012
Veneer and Plywood Mills				
Thousand Square Feet, 3/8" basis (8-Hour) 2/	237	397	240	177
Board Mills 3/				
Thousand Square Feet, 3/4" Basis (24-Hour)	460	4/	4/	4/
Million Square Feet, 3/4" Basis (Annual)	4/	149	115	187

1/ The material for this table is taken from the Oregon Forest Products Industry publications for the years shown
1972: John Schuldt and James O. Howard, Corvallis Oregon, Oregon State University, 1974
1976. James O. Howard and Bruce A Hiserote, USDA Forest Service Resource Bulletin PNW-79, Portland Oregon, 1978.
1982: James O. Howard, USDA Forest Service Resource Bulletin PNW-118, Portland Oregon, 1984.
1985: James O Howard and Franklin R Ward, USDA Forest Service Resource Bulletin PNW-RB-149, Portland Oregon, 1988
2/ Veneer and Layup capacity were not double-counted.
3/ Material such as waferboard.
4/ Figures for these years were not available in the referenced sources in the stated unit of measure.

The Forest also conducts other harvests which are not all economically justified on an individual project level basis. This is frequently the case because of the high costs of planting trees Creating forest openings in excess of 40 acres is generally precluded by law Two adjacent 40 acre stands could not, therefore, be harvested in the same decade Nor could a stand adjacent to a harvest unit be harvested in subsequent decades unless the harvest unit has been reforested.

Rather than delaying harvest on adjacent stands until the harvest unit achieves a 4 1/2 foot height for tree cover naturally, the model specifies some planting. This allows it to harvest adjacent units in the following decade rather than waiting. The cost of planting is less than the dollar loss the Forest would incur if it had to defer harvest of a lucrative adjacent stand.

Table III-24
WALLOWA-WHITMAN NATIONAL FOREST TIMBER SALE COSTS AND RECEIPTS 1/4/

Fiscal Year	Timber Harvested Volume MMBF 2/	Timber Harvested Value MM $ 3/	Timber Sale Costs MM $ 4/
1979	218	19	5
1980	160	10	4
1981	191	13	4
1982	123	5	5
1983	149	6	5
1984	259	9	6

1/ In order to maintain comparability with data presented in other Forest Plans in the Region, the information presented in this table is that contained in the attachments to the Regional Office Below Cost Sales letter of direction dated September 24, 1985.
2/ Convertible products as shown in the Cut and Sold Reports Convertible products are those products which are processed into other goods such as lumber and plywood They exclude the tiny segment comprising such output as Christmas trees. Units of measure differ from those used elsewhere in this document Figures are, therefore, not comparable to others shown in the document.
3/ Convertible products as shown in the Cut and Sold Reports. Nominal dollars
4/ Identified as total operation cost in the attachment to the RO letter dated September 24, 1985. Nominal dollars. Includes KV, timber sale preparation and administration, timber management planning, stand examination, salvage sale fund, and some timber sale support. Roading costs are identified separately in Table III-25

Dispersing harvest units acts in other ways to increase the costs of timber harvest, thereby increasing the likelihood of below-cost sales. Harvest dispersion means more miles of road access, longer transport routes, and more time spent for setup and takedown of logging equipment than if a larger, single unit were accessed.

Some portion of the road work will yield returns in the future, as the roads are used to access other stands. The Forest claims no recreational benefit from these roads because it already has a surplus of roaded-recreation opportunities which will more than accommodate existing and projected use It is true that those recreationists may experience less crowding, but this is not expected to significantly alter the value of the recreational experience.

Roads require maintenance and will have to be rebuilt, if still needed, when their approximate 20-year lifespan is reached. Reconstructing the roads will be less expensive than building them anew if the earlier roadway can be reused Table III-25 summarizes recent roading costs

Much of the information in the Forest model is necessarily average in nature. This is because the model is not capable of tracking every acre or every tree on the Forest as a totally unique entity. For example, figures for certain species groups and logging systems have been used A single set of costs is used for cable logging less than 2,000 feet distance There is variability within that one identified logging system and within the other three logging systems identified in the model. Consequently it is likely that some level of below-cost sales will occur, regardless of the alternative selected.

The possibility exists even in Alternative G (the only alternative specifically designed to avoid below-cost sales) that below-cost sales may occur. The Forest has no control over interest rates, for instance, which are a key determinant in the level of demand, and hence prices for Forest timber Shifts in demand could take a projected below-cost sale out of that category altogether or make it even more costly.

Table III-25
ROADING COSTS RELATED TO THE WALLOWA-WHITMAN NATIONAL FOREST
TIMBER SALE PROGRAM 1/

Fiscal Year	*Asset Value 2/* MM $
1979	6
1980	6
1981	6
1982	4
1983	4
1984	3

1/ In order to maintain comparability with data presented in other Forest Plans in the Region, the information presented in this table is that contained in the attachments to the Regional Office Below Cost Sales letter of direction dated September 24, 1985
2/ Nominal dollars Includes Engineering Support, Purchaser Road Construction, Timber Road Construction, and Timber Sale Capital Investment Roads.

It is not possible to project accurately the level of below-cost sales likely in the future This is due both to the limitations of the model the Forest is using and to such things as timber prices which may vary significantly over short time periods.

Distinction should be made between below-cost sales and deficit sales A below cost sale is one whose associated dollar costs are expected to exceed its dollar returns A deficit sale is one whose appraisal indicates that the average (in terms of efficiency) purchaser would make less than an appropriate profit.

Annual sawtimber offered for sale in recent years averaged 28.6 MMCF (159 MMBF) under the 1962 Timber Management Plan, as amended An additional 14 6 MMCF of other materials (roundwood - 9 6 MMCF; personal use fuelwood - 5 0 MMCF) were sold during the same period Because of the relatively small size of lodgepole pine, utilization of this material continues to depend upon the pulpwood chip market

Installed mill capacity exceeds the current capability of the area to produce wood fiber. The supply-demand imbalance is most apparent for large diameter ponderosa pine Ponderosa pine has generally been in greater demand, has been more accessible, and through history has been harvested at a more rapid rate than the other species. Lodgepole pine, for example, was virtually ignored until the

1970's. As a result, ponderosa pine comprised 35 percent of the standing timber inventory in 1958, but now comprises only about 23 percent of the inventory. The timber inventory is described in more detail in Appendix L

The average size of trees harvested has declined as more lodgepole pine has entered the mix As timber stands are brought under management, trees of all species will be harvested at younger ages. This will also contribute to smaller log sizes than have been available in the past Many local mills are best suited for the processing of larger logs and most would benefit from maintaining or increasing the sale of larger, more valuable species in the short-term. This would allow a fuller utilization of present equipment and conversion to equipment suitable for smaller materials. Maintaining or increasing sales of larger, more valuable species now would maintain or increase short-term returns to the U. S and local governments, but would also result in reduced future returns.

Timber harvests are designed to achieve multiple-use objectives, including insect and disease control. Harvesting is accomplished through the application of silvicultural systems, such as shelterwood, clearcutting, and selection. In clearcutting all, or nearly all, trees in a stand are removed at one harvest entry In shelterwood cutting, most of a stand is harvested in a regeneration harvest leaving only enough trees to provide shelter for the new stand underneath. When the new stand is firmly established, the remaining overstory trees are removed. In selection harvest, trees of a variety of sizes and ages are maintained and the site is always occupied by trees as illustrated in Figure III-6. (For a discussion of timber harvest methods see Appendix B, Determining Silvicultural Systems)

Commercial harvest techniques have been evolving to more sophisticated and less resource-impacting logging systems. The most significant trends are the increase in the use of skyline and helicopter logging systems which partially or totally suspend logs above the ground and a decrease in the use of tractor skidding of logs along the ground Tractor yarding currently averages 70 percent of the harvest program; skyline, 22 percent, helicopter, 3 percent, and mobile yarder, 5 percent.

Timber harvesting and management have direct and indirect effects on other resources. Forage production is frequently increased, while wildlife cover is often reduced, especially in the short run. Old-growth habitat is reduced as are snags available for cavity-nesting species Recreational opportunities are changed and visual qualities are altered. The location and scheduling of future timber harvest units will have significant short- and long-term implications on the abundance and distribution of cover and forage areas for wildlife, the visual quality and recreational settings provided, and the returns to the U. S. and local treasuries.

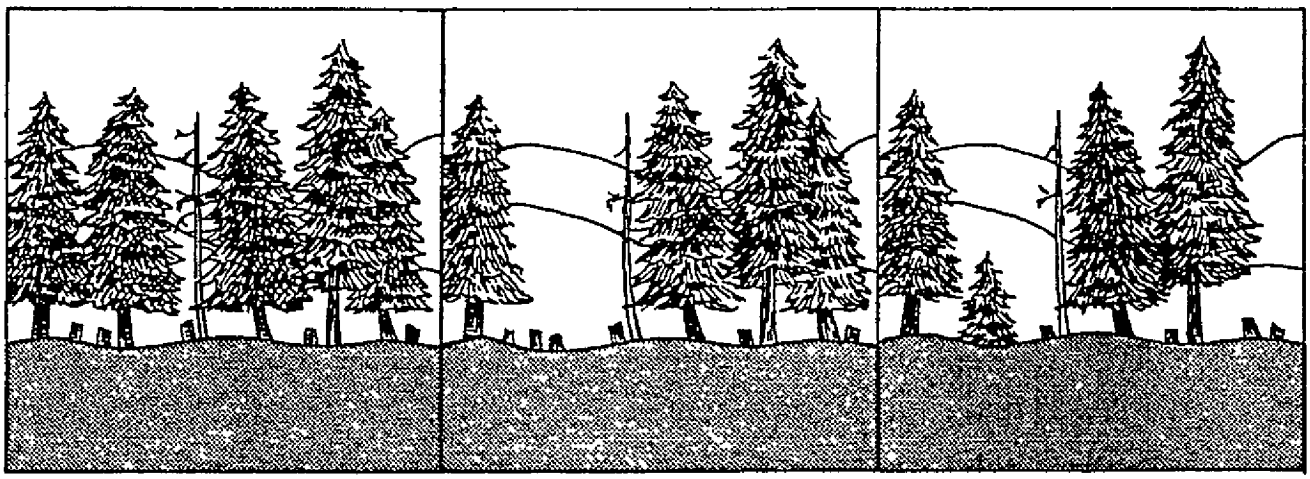
Timber harvest and road construction may reduce water quality by contributing sediment to streams and by reducing stream shade This also affects fish spawning and rearing. The roads required for timber removal take lands out of production. Site productivity may also be lost due to soil compaction and erosion on harvested lands Short-term localized streamflow increases may result Timber harvest may increase or decrease the diversity of plant and animal species across the Forest

Forest Pests - Insects and disease have caused an estimated mortality of over 74 million board feet of sawtimber per year over the last ten years About six million board feet of sawtimber are salvaged annually Some of the remainder is harvested as pulp material or fuelwood. A Douglas-fir tussock moth outbreak in 1972-74 severely damaged white fir and Douglas-fir stands on the north end of the Forest. This insect damage, followed by a drought, resulted in population buildups of fir engraver and Douglas-fir beetle.

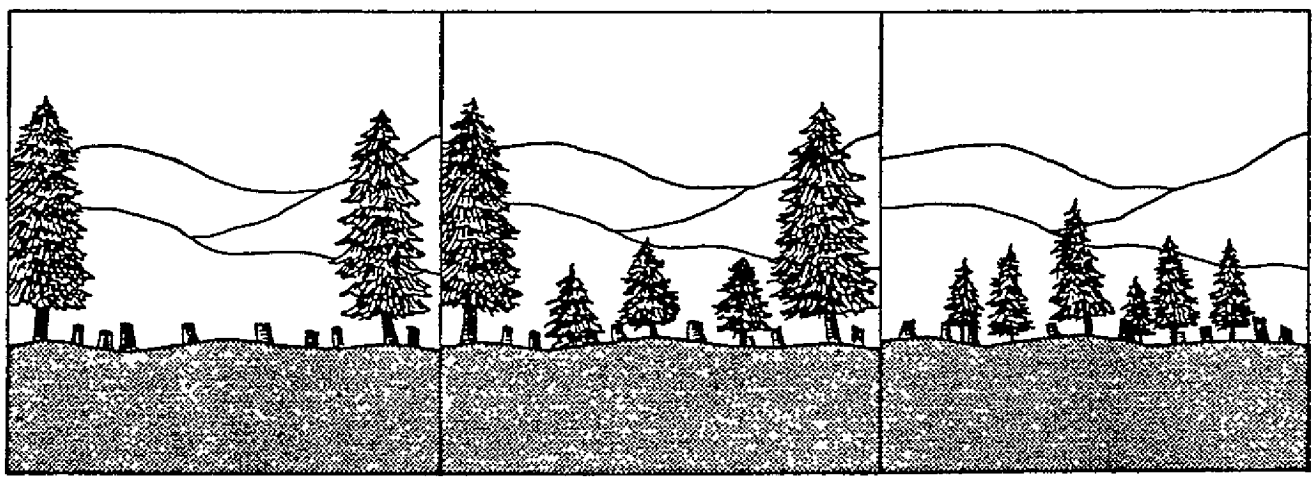
A mountain pine beetle epidemic on the Forest in the 1970's resulted in large areas of tree mortality, primarily in lodgepole pine Salvage of the dead and dying material is continuing in accessible areas under a multi-year rehabilitation program. More recently, a spruce budworm epidemic has affected a substantial portion of the Forest Other significant insect pests include the spruce bark beetle, larch casebearer, pine engraver, and western pine beetle.

FIGURE III-6
HARVEST METHODS

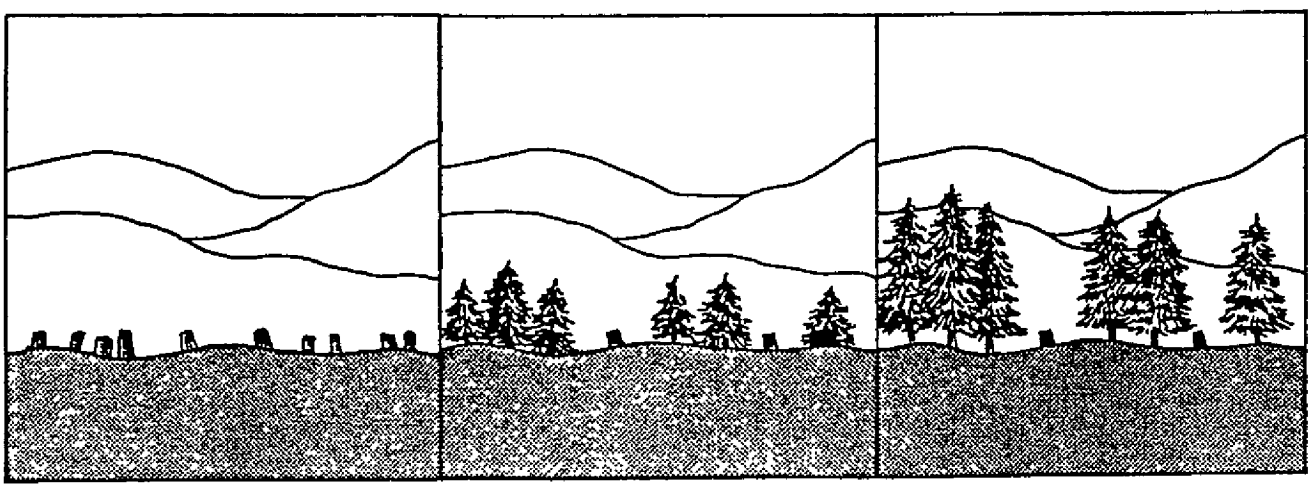
TIME →



Selection - Harvesting is designed to maintain trees of a variety of ages and sizes.



Shelterwood - Healthy, mature trees are left to provide shade and seed until a new stand is established.



Clearcut - All trees are removed in one harvest entry.

Dwarfmistletoe infection of ponderosa pine, lodgepole pine, Douglas-fir and western larch results in significant growth losses. Most stands have infection levels that can be managed with acceptable growth rates, however, some stands are so heavily infected they will need to be removed and new plantations of healthy trees established.

Significant timber losses also occur as a result of stem decays, root diseases, stem and branch rusts and a number of foliage diseases.

The ability to prevent future insect and disease outbreaks is somewhat dependent upon the level and intensity of timber management Many forest pests can be held to endemic levels through intensive timber management practices Activities such as precommercial thinning and harvesting trees before they become old and decadent tend to maintain healthy, vigorous stands which are less susceptible to insects and disease Areas where timber harvest is prohibited or reduced, such as in wilderness, visual corridors, riparian zones and undeveloped lands may be more vulnerable to attack and may serve as source areas for disease outbreaks on adjacent lands

The Forest uses herbicides to control noxious weeds and sometimes to control grasses or sedges in tree plantations In comparison with Forests on the west side of the Cascade Mountain range, there is much less need for the use of herbicides on the Wallowa-Whitman There is not the need for broad application of herbicides to control vegetation on clearcuts, for example. Applications are often by hand, treating only the few square feet near each tree seedling.

A relatively small portion of the available commercial timberland on the Forest (approximately 37,000 acres) contains ninebark shrubs which are highly competitive and will prevent tree re-establishment if not controlled. On steep lands, use of herbicides is the only known practical means of controlling the shrubs.

Herbicides are also used to control roadside vegetation (especially along State highways), to control vegetation within powerline corridors, and to control noxious weeds and other competing vegetation. All such uses are analyzed on a case-by-case basis and are tiered to the Regional Environmental Impact Statement, Managing Competing and Unwanted Vegetation, Pacific Northwest (USDA Forest Service, November, 1988).

Fuelwood

Historically, the collection of fuelwood has been a recreational activity for many local families as well as a principal source of home heating in area communities. Besides residents from local communities, people from the Treasure Valley in Idaho and Oregon and the Tri-Cities area of Washington travel to the Forest to gather firewood

The personal-use fuelwood program has been used to help remove the backlog of dead and down material left from timber sales and the mountain pine beetle epidemic. The future fuelwood supply is expected to come primarily from the thinning of green trees in overstocked tree stands, as well as from logging residue Recently, the Forest has designated several areas in which individuals may cut "live, green" trees for personal use fuelwood

To some extent, the availability of fuelwood is dependent upon the degree of access to the Forest Areas which are left unroaded or where roads are closed provide less fuelwood than portions of the Forest which are readily accessible. Historically, this has not been a problem As future stands of trees become more intensively managed, tree mortality and the availability of fuelwood are likely to become more of a concern.

Prior to 1983, personal-use firewood permits were free With a free-use permit, a person could obtain up to 10 cords of firewood However, many people did not cut any firewood or cut less than 10 cords of firewood. Since the implementation of the charge firewood program in 1983, there has been a decline in the number of permits and the volume of firewood sold Under the current firewood program, the Forest receives $3.00 for each cord sold

Oregon, Idaho, and Washington have all recently moved to reduce wood smoke pollution by tightening emission standards for wood-burning stoves or by restricting their use. This increased regulation, the institution of charging for personal-use fuelwood, the fact that the "best" fuelwood sources have already been tapped, and increasing competition from alternative fuels have all contributed to the reduction in personal-use fuelwood consumption. Table III-26 shows the volume of firewood sold over time. The volume available is sufficient to meet current and expected future demand, but that volume will generally be less accessible and will consist of less desirable species. Commercial firewood sales on the Forest have declined in the past few years too

There has been a steady decline in the amount of dead, woody material in the forest This material *provides important habitat for many species of wildlife and helps maintain overall forest productivity.* In 1988, the Forest prohibited the cutting of down ponderosa pine logs larger than 10 inches in diameter and the cutting of standing dead ponderosa pine trees for firewood to protect this important wildlife habitat Ponderosa pine is one of the least preferred species of firewood, but is preferred by many species of wildlife that are dependent on snags and other dead woody material

Table III-26
Forest Personal Use Fuelwood Sales and Free Use

Year	Cords
1989	28,294
1988	18,275
1987	34,572
1986	38,147
1985	30,485
1984	54,261
1983*	85,804
1982	152,288
1981	100,198
1980	71,043
1979	64,812

*Forest began charging for most personal use fuelwood

Old-Growth Forests

During the past ten years, there has been a growing interest in old-growth forest ecosystems, brought about by an awareness that unaltered old-growth stands are diminishing. The reason most often given for retaining old-growth is to meet wildlife needs, but the desire goes beyond this. On the Wallowa-Whitman National Forest there is no wildlife species that has been identified as requiring

solely old-growth forest, although some species require conditions that are best represented in old-growth stands

Mature and old-growth timber stands provide features of habitat such as large snags, down logs and multiple canopy layers which are essential to numerous wildlife species (Thomas and others 1979) These features are best provided by old-growth and are nearly absent in immature stands. Many species utilizing these features are habitat specialists and less tolerant of habitat alteration than the habitat generalist species which typify the early successional stages. Large woody debris of the forest floor within old-growth stands is valuable for nutrient cycling and stream stability (Franklin 1981), and provides uniquely stable, cool, moist environments for animals and substrate for microbial and root activity (Maser and Trappe 1984)

Some minimal distribution of, and continuity between, mature and old-growth habitats is essential to maintaining diversity and viability of wildlife species Fragmentation of these stands by logging isolates members of a population and begins to limit reproductive success The increasing isolation of mature and old-growth stands increases the risk of reproductive failure, eventually threatening the entire population of some wildlife species (Soule' and Wilcox, 1980).

People also want old-growth forest for the recreational enjoyment it provides, for aesthetic and other qualities such as the size of the trees. Those opposed to the retention of old-growth conditions cite their concern for the loss of wood production They would prefer that land be converted to rapidly growing timber stands. These conflicting desires are the basis of the old-growth forest issue. For further discussion of the issue, see the Regional Guide and Chapter I of this EIS

As of 1984 there were some 173,000 acres of old-growth forest on the Wallowa-Whitman National Forest, including some 67,000 acres in classified wilderness

Under current land management (unit) plans there are 131 areas of 100 to 3,000 acres totalling 73,000 acres within the commercial forest land base that have been designated for management as old-growth timber. Of these areas, 28,000 acres meet the definition of old-growth now The remaining areas are in various successional stages leading to old-growth. The distribution of these areas is not adequate to meet the management requirements for species needing old-growth or mature timber In addition, a minimum of 10 percent of the lands in the Dispersed Recreation Timber Management (Management Area 11) allocation in the Hells Canyon National Recreation Area is to be managed as old-growth and all the timber in the Forage Management allocation (Management Area 10), also within the HCNRA, is to be so managed. In certain other land allocations, timber cutting is not permitted or is permitted at a very low rate, thereby providing substantial old-growth values.

Diversity

The structure and composition of the forest and nonforest landscape determine the level of diversity of flora and fauna and contribute to the vitality of the plant communities contained within the National Forest Natural events such as fire, insect epidemics, and disease outbreaks contribute to the appearance, structure, and composition of plant communities.

Human-caused events such as logging, grazing by domestic animals, road building, and spraying all contribute to the degree of diversity within and among the plant communities and their associated fauna The ability of various sites to sustain long-term productivity is determined by the extent, severity, and periodicity of site modification; whether human-caused or naturally occurring

Biological diversity speaks strongly to the distribution and abundance of different plant communities and their associated plant and animal species. The distribution of varying seral stages across the landscape provides a break in monotony and creates a stability among the plant and animal species that are adapted to specific seral stages of a diverse landscape.

As a way of maintaining diversity, human-caused modifying events should ideally leave a patchwork of varying seral stages across the National Forest at a scale which allows late seral stage sites to be repopulated by species of earlier seral stages when those areas lose their older-growth component A linkage of old- with mid- to late-seral stage vegetation is important for the diversity desired for stable, thrifty and resilient plant and animal communities.

Plant community diversity on the Wallowa-Whitman is provided by a complex mosaic of vegetation which has grown in response to variations in land form, elevation, aspect, climate, substrate and soils. It has been further modified by the influence of fire, insects, disease, mining, grazing, logging, and the introduction of nonnative plants Identifiable vegetation communities occur in repeating patterns within this mosaic These communities have been classified into plant associations. They are classified according to site potential, productivity, and environmental features They are described in part for the Wallowa-Whitman in Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern Washington (Hall 1973) and Plant Associations of the Wallowa-Snake Province (Johnson & Simone 1987).

Inherent diversity on the Forest is high Ponderosa pine, Douglas-fir, grand fir, subalpine fir, Engelmann spruce, and lodgepole pine communities are intermingled. Grassland, rock outcrops, meadows, and hardwood shrub communities often integrate and mix with the forested communities to add to the rich species mix and diversity of the National Forest landscape

In the absence of human activities, diversity would probably be represented by mature forest stands with relatively little understory vegetation and numerous, small (1/4 acre to 20 acres) openings Diversity would also be represented by young stands in the ponderosa pine and Douglas-fir types resulting from frequent low-to-moderate intensity fires

The true fir and Engelmann spruce types are naturally dominated by extensive, mature, multistoried forest stands with shade intolerant species such as ponderosa pine and western larch well represented in the overstory (particularly at lower elevations). Infrequent high intensity fires provided the opportunity for these shade intolerant species to become established in similarly extensive stands Lodgepole pine also establishes itself well after such fires and the current dominance of mature lodgepole pine on many areas arises from turn-of-the-century fires.

In the existing situation, many of the large (mature) overstory trees have been removed through harvest. Particular selection has been made for ponderosa pine This has resulted in irregular dominance of younger stands of ponderosa pine and Douglas-fir where these species represent the plant community, and increasing dominance of true firs on the true fir plant community The latter represents a species composition shift and a reduction of diversity within the stands

Increased emphasis on regeneration harvest in the last ten years has provided opportunity for ponderosa pine, Douglas-fir, and western larch to become re-established in grand fir plant associations and has therefore caused greater diversity between and within stands. Timber harvest, and the establishment of new trees is breaking up the existing extensive mature lodgepole pine stands which have suffered heavy mortality from the mountain pine beetle.

Transportation

General - Transportation facilities for the Forest include approximately 9,300 miles of road, 7,000 miles of which are open to use, 1,750 miles of trail, and five landing strips, all of which occupy some 14,000 acres of land In addition, the Snake River provides 68 miles of stream that are part of the transportation network. The arterial and collector road system (major roads) is established and is likely to be satisfactory for serving most future management needs. Exceptions are the undeveloped areas. These will require additional roads if they are to be developed.

Trails - The present trail system primarily serves the four wilderness areas, unroaded areas in the Hells Canyon National Recreation Area, and the Elkhorn Range. Whereas the trails once served many administrative purposes (such as access to remote fire lookouts), there is now management concern that the trail system needs to be brought more in line with recreational needs such as access to scenic vistas or fishing access

Approximately 65 percent of the trail system is considered to be adequate to meet present needs The remaining trails need reconstruction or relocation to correct inadequate drainage, eroded tread and other problems There is a need to acquire rights-of-way in several instances where a portion of a major trail crosses private land. This is a particularly serious problem in the Imnaha River drainage

A Trails Management Plan has been developed (latest revision 1984), including an assessment of the existing system, determination of needs for construction and reconstruction and definition of standards for management and maintenance.

Four trails have been designated as National Recreation Trails.

- *The Elkhorn Crest National Recreation Trail* follows the Elkhorn Ridge for nearly 20 miles south from the Anthony Lakes developed recreation area providing views of Baker City and Sumpter Valley and into the North Fork John Day Wilderness.

- *The Snake River National Recreation Trail* runs from Pittsburg Landing, south to Brush Creek on the Idaho side of the Snake River, a distance of about 35 miles.

- *The High Wallowa National Recreation Trail* runs from the Mt Howard Tramway at the head of Wallowa Lake along a scenic alpine ridge into the Eagle Cap Wilderness

- *The Nee-Me-Poo National Recreation Trail* runs 3.7 miles near Dug Bar in the Hells Canyon National Recreation Area. This trail follows a part of the 1,800-mile route used by Chief Joseph and 400 other Nez Perce Indians in their historic flight in 1877 The entire route was designated by Congress as a National Historic Trail in 1986.

A 16-mile segment of the Oregon Trail, a National Historic Trail, crosses the Forest (see additional discussion under Cultural Resources).

Roads - Of all the various transportation facilities, roads usually have the most significant positive and negative impacts Additional road construction in unroaded areas, and the number of miles of roads that are open to unrestricted public use, have been identified as issues to be dealt with in the Forest Plan. A brief history of the road system on the Wallowa-Whitman is helpful in understanding the current situation

Much of the National Forest was logged by railroad in the early part of the 20th century, but since the 1930's, roads have become the primary method of accessing timberlands Although some roads were built in connection with mining activities, timber harvesting was the reason behind construction of a large majority of the roads on the Forest Most roads were built to remove timber, provide for other uses such as recreation and fire access, and to establish a basic system that could be used for future management activities

By the end of the 1960's, most of the basic road system had been constructed into the Forest timbered areas, and the emphasis began shifting from accessing new areas to reconstructing older roads to meet more stringent environmental concerns, serve increasing public recreation traffic, and to better meet the needs of different, and sometimes larger, logging equipment

By the mid-1970's, construction of new roads on the Forest was averaging 100 miles per year, but reconstruction was averaging about 200 miles per year. Most reconstruction was to improve roads which had been built 20-40 years before, and consisted of upgrading to higher standards for reasons of safety, reduced maintenance, reduced timber haul costs, and to a large extent, to extend the logging season

Logging on the Wallowa-Whitman is limited to a short, dry summer period, plus a few areas where winter logging is feasible, but improving roads (particularly placing rock surfacing on the roads) can extend that season significantly. This extension of the logging season was considered to be beneficial to the local economy by allowing a longer period of employment.

As the 1970's drew to a close, the public and the Forest Service became increasingly concerned about the high cost of road construction and reconstruction activities. Standards were reanalyzed and new guidelines developed which were more flexible than had been the case. The Forest Service land managers began to look more closely at the benefit/cost ratios associated with roads, and written objectives were used to document the minimum criteria for which roads were to be designed. As a result of this increased cost-consciousness, both construction and reconstruction standards were reduced and brought in line with actual needs. The effects of these changes are shown in Table III-27, in which the cost of construction and reconstruction shows a significant drop in recent years.

Reductions in the cost of road construction were not made without impact. Many of the decisions on limited road access were based on strict control of use, including public access, to allow roads to be built for single purposes only, and to be closed to all uses during long periods between projects.

Although placing restrictions on access is considered in a negative light by many users, there are others who favor such actions. Those recreationists who favor more solitude, less crowding, and more primitive conditions in the National Forests favor reduced access and lower standard roads

Wildlife managers are also faced with contradictory feelings regarding access. While roads allow better dispersal of hunters and easier harvesting of game, they can also reduce the quality of the habitat as the impact of users increases (Thomas and others 1979). To deal with this problem, the Forest Service and the State of Oregon (Department of Fish and Wildlife) have been involved in cooperative efforts aimed at balancing the number of open and closed roads based on habitat and hunter needs. Many areas of the Forest have roads that are closed either seasonally or year-round in an effort to deal with this situation.

In an effort to provide consistency across the Forest in dealing with road closures, the Wallowa-Whitman developed a general guideline in the late 1970's which was aimed at managing for an open road density of no more than 2.5 miles per square mile in roaded areas of the Forest. This guideline was intended to provide some balance between the needs of those wanting roads closed and those wanting more open roads (such as fuelwood cutters, and berry pickers).

Roads which are located too close to streams can also be contributors of stream sedimentation. Research indicates that much of the sediment from forest lands that reaches stream channels originates on roads (Meevwig and Packer 1976). Many miles of roads on the Wallowa-Whitman are located adjacent to streams, as these "water grades" were a natural location as access was spreading into the Forest. Many of these streamside roads have been closed during timber sales and other project work over the years, but many more still exist. Most of the roads served only short, local purposes (spur roads), and as such they can be closed without much impact

Table III-27
ROAD BUILDING PAID FOR BY TIMBER PURCHASERS
(Figures Shown in 1982 Dollars)

Year	Purchaser Credits for Road Construction and Reconstruction
1988	$1,428,869
1987	920,916
1986	1,434,680
1985	1,563,581
1984	2,697,296
1983	2,720,800
1982	2,726,600
1981	5,913,300
1980	3,851,900
1979	6,465,600
1978	4,691,700
1977	2,546,300
1976	3,694,200
1975	6,186,500
1974	3,316,300
1973	4,627,200
1972	4,712,400
1979-1983 Average $	4,335,640

However, several major roads also parallel streams, and the cost of closing these or construction of new roads in their places can be prohibitive Therefore, these major roads are usually left in place and the effects mitigated by using improved drainage and reducing surface erosion by paving or other methods

The Forest maintains an inventory of all roads that exist (including "wheel tracks") so that management decisions can be made on which roads should be retained as part of the permanent system and which can be closed and returned to resource production Table III-28 shows the present condition class of all the roads on the Forest

Federal and state highways and county roads are an important consideration in management of the Forest and the Forest transportation system. Interstate 84 passes through the Forest for some six miles and the Forest is visible for nearly 50 additional miles, making aesthetics a primary concern. The Forest is also bisected by Oregon State Highways 245, 7, 3, and 203 Numerous county roads enter or skirt the Forest. The Forest Service coordinates with State and county governments on matters concerning rights-of-way for these roads and when Forest roads connect to State and county roads

Table III-28
CURRENT TRANSPORTATION SYSTEM
(Miles of Roads)

	Arterial	Collector	Local	Total
Primitive (wheel track)	9	90	2,651	2,750
Graded, Drained, Unsurfaced	180	830	4,110	5,120
Graded, Drained, Surfaced	178	593	525	1,296
Paved	118	11	9	138
Total on Forest	485	1,524	7,295	9,304
National Forest System Roads Outside Forest Boundary	47	99	136	282

Livestock Grazing

The Forest provides a diverse setting for range resources Most of the Forest supports herbaceous or shrubby vegetation that provides forage and habitat for wildlife, protection for soils, water production and a visually pleasing diversity. Range vegetation on the Forest varies from riparian meadow bottoms to grass and shrubs under conifer overstories, grasslands, and high alpine lands characterized by harsh conditions and short growing seasons

Of the approximately 2 3 million acres of the Forest, approximately 1.3 million are classified as suitable for livestock grazing under controlled management conditions that will maintain or improve the range resource Historical problems exist in that resources had been severely damaged by uncontrolled grazing early in the century. This damage is evident in some areas today In addition, in some specific instances, current management is insufficient to correct the past damage or to prevent additional damage.

Many of the conflicts associated with the range resource occur in the riparian areas where cattle have traditionally concentrated Much work has been done to reduce the impact to acceptable levels, but much remains to be done Allotment management planning emphasizes riparian values, where they exist, as the top priority for management improvement.

The Forest annually provides 186,000 animal unit months (AUM's) of livestock grazing use However, all of this capacity is seldom used, either at the choice of the permittees or because of the need to defer grazing to protect new grass seedings or other temporary restrictions In 1988, grazing use amounted to 150,000 AUM's by 21,700 cattle and 5,600 sheep. For this use, grazing permittees paid over $161,000 at a rate of $1 54 per AUM In 1989, the rate increased to 1.89 per AUM.

There is a desire on the part of the local livestock industry to maintain or increase grazing on the National Forest. This coincides with RPA projections of increases in our National population and in our total demand for beef. There is also a desire on the part of some individuals and interests to eliminate or reduce grazing on the Forest Concerns have been expressed about the damage to riparian areas, soils and water quality and the cost of improvements needed to alleviate the problems. Some people feel that domestic livestock grazing should be eliminated from wilderness areas

Hells Canyon presents unique range management problems and opportunities in that the rugged terrain, suitable primarily for sheep grazing, has proven to be unprofitable for several operators in recent years. Consequently, large allotments have not been profitably used. Future use depends on an upturn in market conditions

Most range sites are in a much improved condition as compared with the early to mid portion of this century. However, in some areas, the effects of grazing use by domestic livestock and wildlife continues to exceed the grazing capacity. This continues to result in less than satisfactory soil and/or vegetative conditions. As allotment management plans are developed on a priority schedule basis, and as implementation of more rigid utilization standards occurs, it is likely that many of these allotments will require adjustments in numbers as well as intensification in management systems.

Conflicts between the grazing of domestic livestock and timber management have generally been minimal Occasional conflicts occur in regeneration areas with some damage occurring to seedlings. This is usually minor and can be controlled through management Benefits to the range resource from timber management activities can accrue through the opening of forest canopies which provides for increases in native herbaceous and shrubby vegetation. Seeding for erosion control and forage enhancement can also provide for increases in available forage for livestock and wildlife

In some parts of the Forest, notably on the Oregon side of Hells Canyon, concern has been expressed over competition between domestic livestock and big game, primarily elk, for forage resource and for space As elk populations increase, competition with existing permitted domestic livestock can be expected to occur. There is also a concern that some transmission of diseases may occur between domestic livestock and big game, particularly between domestic and wild sheep

Wildlife

Three hundred seventy-nine species of terrestrial vertebrate wildlife are known to occur within the Forest. These species include 10 amphibians, 16 reptiles, 263 birds, and 90 mammals (Thomas and others 1979) Fifty-one of the bird species are migrant or accidental visitors.

The NFMA Regulations require that " fish and wildlife habitat be managed to maintain viable populations of existing...species in the planning area " To ensure this, the regulations direct that·

> "(1) Habitat must be provided to support, at least, a minimum number of reproductive individuals, and (2) Habitat must be well-distributed so that those individuals can interact with others in the planning area."

The key concepts in these two items are adequate numbers of reproductive individuals, and assurance that these numbers will continue to exist through interaction of individuals within the population.

To assure that these viable populations are maintained, the Pacific Northwest Region of the Forest Service has identified management requirements (MR's) for a number of wildlife species within the Region. These species are emphasized either because they are threatened or endangered (such as the bald eagle or American peregrine falcon) or because their populations can be used as an indicator of the health of a specific type of habitat.

For example, the pileated woodpecker is highly dependent on large-diameter snag habitat If good habitat is provided for pileated woodpeckers and their population is maintained at some desired level, it is assumed that adequate habitat is also being provided for other species with similar requirements Species used to indicate the suitability of specific types of habitat are called management indicator species

The management indicator species on the Wallowa-Whitman are listed below. The rationale for selection of these indicator species is contained in Appendix G

Indicator Species/Species Groups	Habitat Type
Pileated woodpecker	Large-diameter dead trees in mature to old successional stage.
Primary cavity excavators	Standing dead trees between 10"-18" diameter in a variety of habitats Several species represented.
Goshawk	Mature-to-old conifer stands
Rocky Mountain Elk	Appropriate cover and forage and restrictions on roads
Pine marten	Mature-to-old conifer stands
Resident trout	High quality water and fishery habitat
Steelhead trout	Same as resident trout for anadromous streams.

The Wallowa-Whitman National Forest provides habitat for more than 20,000 Rocky Mountain elk, and is widely recognized for the elk hunting it provides (Also see Recreation Section) Elk numbers have increased in response to protection, management, and favorable habitat conditions since their low populations of the early 1900's. Timber harvest has "opened up" areas which were dominantly forest, providing significant increases in forage available to elk. Available cover has been surplus to elk habitat needs so that much of the past timber harvest activity has, by design or accident, improved habitat However, significant shortages of cover naturally exist or have been caused by timber harvest on portions of the Forest. These instances are especially evident on lands located at lower elevations with gentle slopes. Frequently they correspond with areas designated as winter range.

Continued timber harvest may maintain or enhance cover/forage relationships if rates of harvest can be limited to allow proper distribution of harvest units. Limiting the rate of harvest reduces the potential amount of timber available to local mills in the early decades

The issue is complicated by the introduction of roads Open roads can cause displacement of elk and the combination of forage, cover, and road access influences the number of elk hunting opportunities provided on the Wallowa-Whitman National Forest.

Bear, cougar, mountain sheep, grouse, and chukar partridge are also hunted and provide recreation for significant numbers of people. Many species of wildlife are adaptable to use of the Forest by humans. Some are not, or are not capable of sustaining as high a population level as is possible in a Forest with little human influence

The numbers of cougars, bobcats, pine martens and numerous other species have also declined as use of the Forest by people has increased Historically, these species were not valued to the same extent as game animals which provided food and hunting recreation

Deer, and to a lesser extent elk, are relatively adaptable to human activities; elk are probably present in greater numbers today than at any time in recorded history However, because of their importance to the increasing numbers of recreational hunters, there is a desire for more animals to hunt Since deer and elk utilize the coniferous forest for cover, and eat many of the same plants which livestock eat, conflicts do occur.

The eating habits of elk are much closer to those of domestic livestock than are those of deer. It is recognized that there is a level of competition for forage between elk and domestic livestock where dual use by these animals occurs The actual amount or level of competition is highly variable between areas and seasons of the year, but in most cases observed, elk use of forage species also preferred by domestic livestock has been less than 30% of total annual production

While the Forest Service has responsibility for managing wildlife habitat on National Forest lands, the States are primarily responsible for managing the wildlife species on all lands. In Oregon, this responsibility is assumed by the Oregon Department of Fish and Wildlife. In Idaho, the programs are managed by the Idaho Fish and Game Department These wildlife management agencies are pressured by the hunting public to increase elk numbers, the habitat of which is on public and private lands which have competing uses.

In recognition that big-game numbers cannot continue to increase indefinitely, the States have established elk and deer population objective levels for each game management unit. At present, most units on the Wallowa-Whitman have reached these target levels, although deer populations are currently down in several units due to recent severe winter weather conditions Big-game numbers on the Idaho portion of the Hells Canyon NRA are below state objectives.

Deer and elk support a high level of recreational activity since hunters (especially elk hunters) tend to tolerate a low rate of success. As success ratios vary, the level of recreational use may or may not follow.

The majority of the National Forest lands provide summer range for elk and deer while most of the winter range is found on private lands and other public lands at lower elevations

The winter range found on National Forest land is considered very important. However, the potential for conflicts arising from winter wildlife use are fewer on these lands than on private lands Much of the winter range on the Forest is dominantly grassland or mixed timber-grassland. Cover for deer and elk is limited in quality and distribution on these portions of the winter range. Thermal cover is especially important on big-game winter ranges (Leckenby 1984).

Current management direction gives special consideration to cover values on most of the winter ranges Deer and elk which summer on the Forest impact area ranchers where the ranches lie within the natural winter range of the game animals This problem has been mitigated by State feeding programs

A number of fish and wildlife projects are completed each year in cooperation with the Oregon Department of Fish and Wildlife Some of these, such as the cooperative road and area closure program, are species-related while other projects are direct habitat improvement benefiting several species

Threatened, Endangered, and Sensitive Species

The Endangered Species Act of 1973 (PL 93-205), as amended, declared that federal agencies shall seek to conserve endangered and threatened species of plants and animals Section 5 of the Endangered Species Act directs the Secretary of Agriculture to establish and implement a program to conserve fish, wildlife, and plants, including federally listed species In order to meet the intent of this direction, the Forest Service has established objectives and policies for inventorying the species, determining habitat or environmental needs, and protecting critical habitat and/or conditions necessary to preserve the plants or animals (FSM 2670) Included is direction to protect certain sensitive species to ensure that they do not become threatened or endangered

The U. S Fish and Wildlife Service, USDI, has responsibility for administering the Endangered Species Act. When the Forest Service proposes an activity that may affect a species listed or proposed for listing as threatened or endangered, the Fish and Wildlife Service is consulted. The Forest will comply with the Pacific States Bald Eagle Recovery Plan and the Recovery Plan for Peregrine Falcon (Pacific Population) which were produced by the U.S. Fish and Wildlife Service

The northern bald eagle winters along several streams on the Forest and a pair nesting near Unity Reservoir has successfully reared young Key areas identified in the Pacific States Bald Eagle Recovery Plan (U.S. Fish and Wildlife Service, August 1986) include the Unity Reservoir, Powder River, Burnt River, Grande Ronde River, Wallowa River, Phillips Reservoir, Minam River and Wallowa Lake Large-limbed green trees near these waters are important to both roosting and potential nesting for the bald eagle Eight pair of nesting bald eagles are the target for recovery of the population in these areas. There was no differentiation between private and public lands in this target.

Peregrine falcons are periodically sighted in Hells Canyon and the Upper Imnaha River and occasionally elsewhere on the Forest At least one historical nest site exists in the Hells Canyon Wilderness and the area has identified potential for recovery of peregrine falcon In addition, since 1987 the Forest has cooperated with the Oregon Department of Fish and Wildlife and the Peregrine Fund in annually "hacking out" peregrines at P.O. Saddle in Hells Canyon. Northeast Oregon has been targeted for four pairs of peregrine falcon in order to move the population from endangered to threatened status (Harlow and others 1982).

Consultation with the U. S Fish and Wildlife Service was completed as a part of the development of this EIS Copies of the letters received from the U S Fish and Wildlife Service are found in Appendix N.

The threatened, endangered, and sensitive species on the Wallowa-Whitman are listed in Tables III-29 and III-30.

Forest managers are concerned about potential impacts to sensitive plants and will be working toward maintaining or improving habitat conditions for those species The Forest maintains a record of the known sightings of sensitive plants Trained personnel are developing the capability to predict when and where these plants are likely to occur. Volunteer professional help from universities and private sources has been helpful in preparing this record.

The Forest is currently working with Oregon State University in a remote sensing project (earth satellite) which will further this effort. Most of the sensitive plants are also included on a "Special Plant Species" list which was adopted in 1981 by the State of Oregon The Forest Service and the State cooperate in inventory and protection of the various species As projects are planned, a check is made to determine if a sensitive plant species is likely to occur at or near a project site

Table III-29
THREATENED, ENDANGERED, AND SENSITIVE ANIMALS

List	Species	Status
Threatened	Northern bald eagle	One nesting pair and significant wintering populations along several rivers on Forest.
Endangered	American peregrine falcon	Several areas on the Forest exist where sightings have occurred.
Sensitive	Ferruginous hawk	Feeding, nesting, and rearing occur on Forest in several areas USFWS needs additional information before proposing as Endangered or Threatened.
	California wolverine	Abundant habitat exists on Forest but sightings are uncommon USFWS needs additional information before proposing as Endangered or Threatened
	Long-billed curlew	Habitat exists on Forest and scattered sightings *have occurred. USFWS needs additional information* before proposing as Endangered or Threatened
	Pacific western big-eared bat	Known to occur within the Forest but the range and population size are unknown
	Redband trout	Habitat exists on Forest, but populations not identified at present. USFWS needs additional information before proposing as Endangered or Threatened.
	Bull trout	Habitat exists on Forest and sightings have occurred. USFWS needs additional information before proposing as Endangered or Threatened
	Western sage grouse	Habitat exists on Forest, but populations not identified at present USFWS needs additional information before proposing as Endangered or Threatened

Source: FSH 2600 - Wildlife, Fish and Sensitive Plant Habitat Management Interim Directive No. 6, August 15, 1989.

Table III-29 (cont.)
THREATENED, ENDANGERED, AND SENSITIVE ANIMALS

List	Species	Status
Sensitive (cont.)	Greater sandhill crane	Habitat exists on Forest and sightings have occurred
	Upland sandpiper	Habitat exists on Forest and sightings have occurred
	Tricolored blackbird	Habitat exists on Forest and sightings have occurred. USFWS needs additional information before proposing as Endangered or Threatened.
	Harlequin duck	Habitat exists on Forest and sightings have occurred.
	Black rosy finch	Habitat exists on Forest, but populations not identified at present.
	Preble's shrew	Habitat exists on Forest and sightings have occurred USFWS needs additional information before proposing as Endangered or Threatened.
	North American lynx	Habitat exists on Forest and sightings have occurred. USFWS needs additional information before proposing as Endangered or Threatened
	California bighorn	Habitat exists on Forest and sightings have occurred USFWS needs additional information before proposing as Endangered or Threatened.
	Blue Mountain Cryptochian	Habitat exists on Forest and sightings have occurred. USFWS needs additional information before proposing as Endangered or Threatened.

Source. FSH 2600 - Wildlife, Fish and Sensitive Plant Habitat Management. Interim Directive No 6, August 15, 1989

TABLE III-30
THREATENED, ENDANGERED, AND SENSITIVE PLANT SPECIES WITH DOCUMENTED SIGHTINGS ON THE WALLOWA-WHITMAN NATIONAL FOREST
(Excludes Status 3c, Inventory and Watch List Species)

Scientific Name (Common Name)	Status	Threats	Habitat	Known Locations	No of Sightings	Plant Association
SENSITIVE PLANTS (OREGON)						
Allium brandegei (Brandegee's onion)	S	?	?	Pine Creek (PRD), Summit Creek (WVRD)	2	Unknown
Allium campanulatum (Sierra onion)	S	?	Subalpine meadows to lithic grassland	Experiment Creek (HCNRA) W FK. Pine Cr (PRD)	2	AGSP-P0SA3/ OPPO
Allium geyeri var *geyeri* (Geyer's onion)	S	?	Rocky outcrops	Lower Imnaha R (HCNRA)	1	GLNE/AGSP
Allium madidum	S	none	Vernally wet meadows, flats, draws, gentle slopes	Target Spring, Sparta Butte, Anthony Lakes, Balm Cr Res, Cornucopia, Lehman Spring	6	Unknown
Asplenium viride (green spleenwort)	S	?	cliffs (granite, limestone)	Head of Imnaha R (ECWA)	2	Unknown
Botrychium ascendens (upward-lobed moonwort)	S	logging, road construction	grassy mdws w/spruce	Hurricane Cr (ECWA)	1	Unknown
Botrychium crenulatum (crenulate grape-fern)	S	logging, road construction	grassy fields w/spruce	Hurricane Cr, Lostine R (ECWA)	2	Unknown
Botrychium lanceolatum (lance-leaved grape-fern)	S	logging, road construction	grassy fields, lodgepole with spruce	E FK Wallowa R, Lostine R (ECWA)	3	Unknown
Botrychium lunaria (moonwart)	S	logging, road construction	grassy fields, lodgepole with spruce	Lostine R, Hurricane Cr (ECWA)	3	Unknown

LEGEND

Status Codes — T - Threatened, E - Endangered, S - Sensitive
Location Codes — (BRD - Baker Ranger District)
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(HCNRA - Hells Canyon National Recreation Area)
(LGRD) - La Grande Ranger District)
(WVRD) - Wallowa Valley Ranger District)
Plant Association — (See "Plant Associations of the Wallowa-Snake Province, 1987, Johnson and Simon)

TABLE III-30 (Continued)
THREATENED, ENDANGERED, AND SENSITIVE PLANT SPECIES WITH DOCUMENTED SIGHTINGS ON THE WALLOWA-WHITMAN NATIONAL FOREST
(Excludes Status 3c, Inventory and Watch List Species)

Scientific Name (Common Name)	Status	Threats	Habitat	Known Locations	No of Sightings	Plant Association
Botrychium minganense	S	None	small grassy openings with pics	Lostine River, Hurricane Creek	2	Unknown
Botrychium pedunculosum (stalked moonwort)	S	logging, road construction	grassy fields w/lodgepole	Lostine R (ECWA)	1	Unknown
Botrychium pinnatum (grape-fern)	S	logging, road construction	grassy fields w/lodgepole	Lostine R , E FK Wallowa R (ECWA)	3	Unknown
Bupleurum americanum (bupleurum)	S	grazing	subalpine grasslands, savanna	Maxwell PK (BRD), Wallowa Mtns (ECWA)	4	FEVI/LULA2
Carex concinna (low northern sedge)	S	logging, road construction	Spruce forest	Hurricane Cr (ECWA)	4	Unknown
Carex limnophila (pond sedge)	S	logging, grazing	forest openings, meadows	Cayuse Flat (HCNRA) Flagstaff Butte (LGRD)	2	Meadows
Castilleja fraterna fraternal paintbrush	S	grazing, recreational use	talus slopes and in alpine meadows	(ECWA) E Fk Wallowa and W Fk Wallowa River Canyons, Razz Lake vicinity, head of Imnaha R Canyons	7	Unknown
Cheilanthes feei (Fee's lipfern)	S	grazing	seepy rims, outcrops	Lightning Cr (HCNRA)	1	AGSP-POSA2/ OPPO, GLNE/AGSP
Cryptogramma stelleri slender rock-brake	S	Unknown	limestone outcroppings	(ECWA) Cornucopia vicinity	1	Unknown

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Plant Association — (See "Plant Associations of the Wallowa-Snake Province, 1987, Johnson and Simon)

TABLE III-30 (Continued)
THREATENED, ENDANGERED, AND SENSITIVE PLANT SPECIES WITH DOCUMENTED SIGHTINGS ON THE WALLOWA-WHITMAN NATIONAL FOREST
(Excludes Status 3c, Inventory and Watch List Species)

Scientific Name (Common Name)	Status	Threats	Habitat	Known Locations	No of Sightings	Plant Association
Erigerom engelmannii var *davisii* (Engelmann's daisy)	S	grazing	?	Cache Cr (HCNRA)	1	Unknown
Geum rossii var *turbinatum* (slender-stemmed avens)	S	grazing	talus, alpine slopes	Maxwell PK, Van Patton Pk, Anthony Lake (BRD)	5	Unknown
Kobresia simpliciuscula (simple Kobresia)	S	grazing, logging	bogs and meadows	Hurricane Cr (ECWA)	2	Unknown
Leptodactylon pungens ssp *hazeliae* (Hazel's prickly-phlox)	S	?	cliffs, outcrops	Battle Creek, Lower Imnaha R. (HCNRA)	2	AGSP-POSA3
Lomatium erythrocarpum red-fruited lomatium	S	grazing	granitic slopes	Elkhorn Peak (BRD)	5	Unknown
Lomatium greenmanii (Greenman's lomatium)	S	recreational users	subalpine savanna (PIAL)	Mt Howard, Ruby Peak, Ice Lake (ECWA)	4	Unknown
Lomatium "pastoralis" meadow lomatium	S	Unknown	overgrazed meadows	Mt Emily (LGRD)	1	Unknown
Lycopodium annotinum (stiff club-moss)	S	logging	bogs and seeps with spruce	Minam Lake, (ECWA) Anthony Lake (BRD) Broady Cr , Ferguson Cr ; L Sheep Cr (WVRD)	8	ABGR/CLUN ABCA2/CLUN
Mimulus clivicola (bank monkey flower)	S	logging, grazing	seepages under PIPO	N Pine Cr , Imnaha-Snake Divide (HCNRA)	3	Unknown

LEGEND

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Plant Association — (See "Plant Associations of the Wallowa-Snake Province, 1987, Johnson and Simon)

TABLE III-30 (Continued)
THREATENED, ENDANGERED, AND SENSITIVE PLANT SPECIES WITH DOCUMENTED SIGHTINGS ON THE WALLOWA-WHITMAN NATIONAL FOREST
(Excludes Status 3c, Inventory and Watch List Species)

Scientific Name (Common Name)	Status	Threats	Habitat	Known Locations	No of Sightings	Plant Association
Mimulus hymenophyllus (membrane-leaved monkey flower)	S	grazing	rimrock, cliffs	Horse Creek (HCNRA)	3	Unknown
Mirabilis macfarlanei (Macfarlane's four-o-clock)	E	grazing, rec use	mid seral grasslands, mining tailings	Tryon Cr , Imnaha R Canyon, West Cr (HCNRA)	4	CELE2/AGSP FEID-AGSP
Oryzopsis hendersonii (Henderson's ricegrass)	S	grazing	lithic basaltic soil	E. FK Sumac Cr (WVRD)	2	ARRI/POSA3 ERST2/POSA3
Pellaea bridgesii (Bridge's cliff-brake)	S	?	talus, granitic slopes	Eagle Cr , Pine Lakes (ECWA)	5	Unknown
Phacelia minutissima	S	recreation	moist flat	Buckhorn	1	Unknown
Platanthera obtusata (small northern bog-orchid)	S	logging, road construction	spruce bogs	Hurricane Cr (ECWA)	2	Unknown
Primula cusickiana (Wallowa primrose)	S	road construction	seepy lithic basaltic soils, scablands	Grouse Cr , Carroll Cr , Ferguson Cr (WVRD) Imnaha-Snake Divide (HCNRA) Target Spg Area (WVRD)	12	AGSP-POSA3 POSA3-DAUN
Ranunculus oresterus (Blue Mtn buttercup)	S	grazing	subalpine meadows	Pine Lakes (ECWA)	1	Unknown
Ribes irriguum	S	?	canyon slopes, wooded open hillsides	Deer Ridge, Bobcat Ridge, Lake Fork, Duck Creek, Hurricane Creek, Minam River	9	Unknown

LEGEND

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(LGRD) - La Grande Ranger District)
(WVRD) - Wallowa Valley Ranger District)
Plant Association — (See "Plant Associations of the Wallowa-Snake Province, 1987, Johnson and Simon)

TABLE III-30 (Continued)
THREATENED, ENDANGERED, AND SENSITIVE PLANT SPECIES WITH DOCUMENTED SIGHTINGS ON THE WALLOWA-WHITMAN NATIONAL FOREST
(Excludes Status 3c, Inventory and Watch List Species)

Scientific Name (Common Name)	Status	Threats	Habitat	Known Locations	No of Sightings	Plant Association
Rubus bartonianus (Bartonberry)	S	?	talus, ravines	Snake River Canyon near Three Creeks (HCNRA)	1	Unknown
Silene scaposa var *scaposa* scaposa catchfly	S	grazing	grassy slopes	Salmon Cr (BRD)	1	Unknown
Salix Farriae Farr's willow	S	browsing	meadows and stream-banks	Thorp Creek (ECWA)	1	Unknown
Saxifraga adscendens var *oregonensis* (wedge-leaf saxifrage)	S	grazing	talus slopes	Petes Peak (ECWA)	1	Unknown
Senecio dimorphophyllus Payson's groundsel	S	Unknown	subalpine slopes	Cusick Peak (ECWA)	1	Unknown
Senecio porteri (Porter's butterweed)	S	?	?	Douglas Lake, Marble Mtn (ECWA)	2	?
Silene scaposa var *scaposa* scaposa catchfly	S	grazing	grassy slopes	Salmon Cr (BRD)	1	Unknown
Silene Spaldingii	S	grazing	FEID grass-lands	Off-Forest	12	Unknown
Thalictrum alpinum var *hebetum*	S	Unknown	Seepy, buggy sites	Francis Lake, Hurricane Creek (ECWA)	2	Unknown
Trollius laxus var *albiflorus* (American globeflower)	S	?	?	Hat Point (HCNRA) Aneroid Lake (ECWA)	3	?

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TABLE III-30 (Continued)
THREATENED, ENDANGERED, AND SENSITIVE PLANT SPECIES WITH DOCUMENTED SIGHTINGS ON THE WALLOWA-WHITMAN NATIONAL FOREST
(Excludes Status 3c, Inventory and Watch List Species)

Scientific Name (Common Name)	Status	Threats	Habitat	Known Locations	No of Sightings	Plant Association
SENSITIVE PLANTS (IDAHO)						
Adiantum pedatum var *novum* (northern maidenhair fern)	S	?	cliffs, talus fields	Seven Devils (HCNRA)	3	Unknown
Allium tolmiei var *platyphyllum* (Tolmie's onion)	S	?	stone stripes, thin soils, basaltic	Cow Cr Saddle (HCNRA)	2	Unknown
Calochortus nitidus (broad-fruited mariposa)	S	grazing	early to late seral grass-lands	Cow Cr Saddle, Grave Point, Tablelands (HCNRA)	8	FEID-KOCR FEID-AGSP
Campanula scabrella (rough harebell)	S	?	cliffs, savanna (PIAL-ABLA2)	Seven Devils (HCNRA)	2	Unknown
Halimolobus perplexa var *perplexa* (puzzling halimolobos)	S	?	rocky sub-strates	Cold Springs, Little Granite Cr , Sheep Creek (HCNRA)	4	Unknown
Polystichum kruckebergii (Kruckeberg's sword-fern)	S	?	talus and crevices	Seven Devils (HCNRA)	1	Unknown
Ribes wolfii (Rothrock's currant)	S	?	?	Seven Devils (HCNRA)	3	Unknown

LEGEND

Status Codes	T - Threatened, E - Endangered, S - Sensitive
Location Codes	(BRD - Baker Ranger District) (ECWA - Eagle Cap Wilderness Area) (HCNRA - Hells Canyon National Recreation Area) (LGRD) - La Grande Ranger District) (WVRD) - Wallowa Valley Ranger District)
Plant Association	(See "Plant Associations of the Wallowa-Snake Province, 1987, Johnson and Simon)

Existing Riparian Condition

Riparian areas are those land areas that can be identified by the presence of vegetation that requires free or unbound water. They are therefore associated with streams, marshes, springs or other sources of water. Within the Wallowa-Whitman National Forest, there are an estimated 9600 miles of streams and associated riparian areas Of this total, approximately 730 miles are Class I (streams of significant size and importance), 570 are Class II (smaller important streams), 900 are Class III (perennial streams without significant fish populations), and the remainder are Class IV (intermittent flow streams)

A review of limited existing Stream Habitat Survey information (1980-1981) by stream class for three indicators of riparian health (streambank stability, stream surface shaded, and streambed sedimentation) is discussed in the following paragraphs. Although the sample size is relatively small (from 8-18% of the total miles in each stream class), the information is shown as an indication of riparian conditions.

Streambank stability is a measure of that portion of a stream reach in which the streambanks are in a stable, noneroding condition It is an estimate of existing conditions and is not a measure of the potential of the stream. Averaging all streams shows 9% of the stream miles to be in the 81-100% (optimum stable) range, 42% in the 61-80% stable category, and 37% in the 41-60% stable group with the remainder falling below 40% This generally indicates that slightly more than half of the streams have fair or better streambank stability.

Stream surface shaded is a reflection of the percent of the stream surface that receives temperature protection by vegetation. Measurements are a reflection of actual conditions and do not reflect potentials. Large streams have a low shade potential due to stream width relative to the potential of the vegetation to provide shade Intermittent streams may also have a low potential due to the lack of perennial water to support shrub type vegetation The information available shows an average of 3% of the stream reaches in the 61% shade or better grouping, 22% in the 41-60% shade category, 43% in the 21-40% range. Considering the lack of information regarding potentials, this indicates that there is considerable room for improvement in shade-producing vegetation

Streambed sedimentation is an estimate of the percent of the stream bottom that is covered with sediment. It is a measure of the ability of the stream to provide spawning gravels for fish, to provide hiding cover for fry and to provide habitat for macroinvertebrates that are important in the food chain Streams with low sediment levels usually provide better habitat The information basically shows low sediment readings for all stream classes. Approximately 78% of all reaches are in the 0-40% sediment category with an additional 16% in the 41-60% range. Sediment appears not to be a significant problem but there does appear to be some room for improvement.

The above information can be aggregated into an estimate of the potential trout production of the streams. The higher the rating, the closer the stream is to maximizing trout production. This rating may be a reflection of the overall condition of the stream and riparian community.

In general, no streams in the survey group are producing at the optimum 80% or better range and only 5% are producing in the 61-80% category Approximately 70% are in the 21-60% range with an average of 25% in the 0-20% category. This indicates that trout production is significantly below optimum levels for all stream classes.

Riparian areas are impacted by numerous factors. Livestock tend to concentrate in the riparian areas during the hotter, drier parts of the summer seeking the green forage, cooler temperatures and available water. Big game also tend to utilize the riparian areas at these times and may also seek out the riparian hardwood browse in the spring and fall when other forage is lower in palatability or nutrition Recreationists congregate in the riparian zones seeking the water, shade, gentle slopes and access.

Many riparian areas have been significantly impacted by road development that has constricted channels, altered natural hydrologic forces and increased access by all types of users. In some cases, riparian areas supporting coniferous trees were heavily impacted as logging activities concentrated landings, spur roads and harvest activities in the gentle flats

All of these factors have led to a degradation of riparian areas to a condition below that occurring naturally In many cases, the impacts have been of such a permanent nature that the natural situation can no longer be attained and the area must be managed for an altered potential Within the past few years, there has been a significant increase in emphasis on restoring, protecting, or improving riparian communities This increased emphasis has been implemented on the ground through the

development of allotment management plans and timber management prescriptions based on riparian-specific objectives, and through the installation of numerous projects designed to improve riparian soil, and vegetative conditions and fish habitat.

Fish

Rainbow or eastern brook trout inhabit most perennial streams within the National Forest In many instances they are in association with various rough fish (shiners, suckers, dace, and squaw fish). Numerous small alpine lakes within the Wallowa, Elkhorn, and Seven Devils Mountains are stocked with trout, as are Balm Creek Reservoir and Fish Lake. Phillips Reservoir provides the largest body of water within the National Forest and is good habitat for trout, smallmouth bass, and coho salmon.

Major anadromous fishery streams are shown in Figure III-7. Details are in Tables III-31 through III-34. Chinook salmon comprise the commercial anadromous species spawned on the Forest. Numerous streams also provide spawning and rearing habitat for steelhead trout. Anadromous fish from spawning grounds on the Wallowa-Whitman play a role, not only as commercial fish, but also in the culture of the Native Americans who retain certain fishing rights to them by treaty

Prior to the 1950's, the spawning streams of the Wallowa-Whitman played a significant role in the salmon and steelhead fisheries of the Columbia River System. However, beginning with the construction of Bonneville Dam in the mid-1930's, a total of 8 dams have been constructed on the Columbia and lower Snake Rivers which have significantly contributed to their decline

Presently, the Imnaha and the Grande Ronde drainages are the highest upstream spawning streams tributary to the Snake River in Oregon. Combined, they provide for about 640 miles of spawning and rearing habitat for salmon and steelhead Fish from these two streams must pass eight dams on the lower Snake and Columbia Rivers in their round trip to the ocean An additional 42 miles of spawning and rearing habitat exist on the upper North Fork John Day River within the Wallowa-Whitman Fish from these streams must pass three dams

Juvenile fish (smolt) suffer heavy losses during downstream passage over or through these dams If the low rate of spawning escapement to the ocean were allowed to continue, the fish runs would soon disappear, particularly on the Imnaha and Grande Ronde systems.

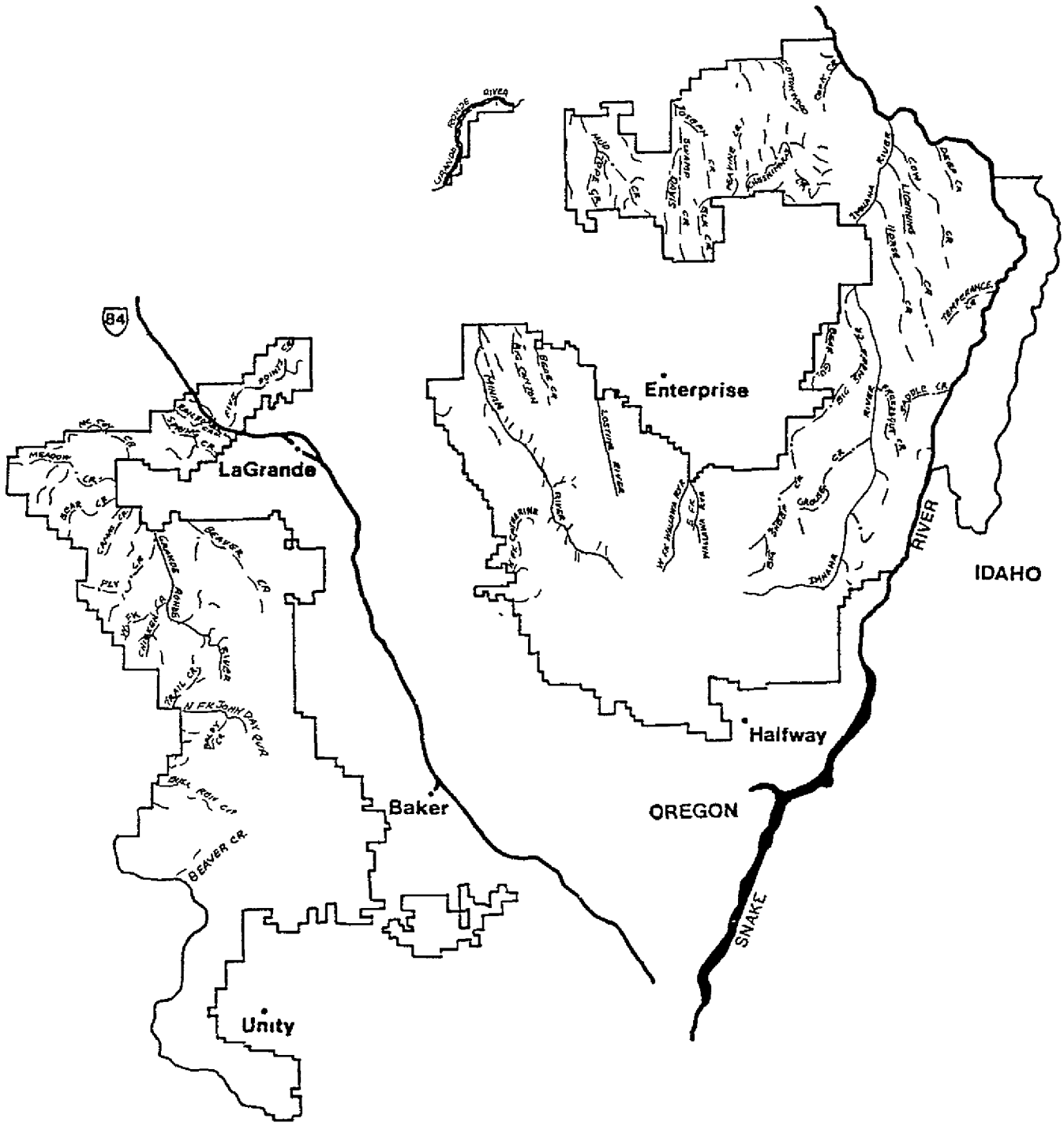
The full impact of the escapement problem can be seen in Table III-31. As shown, it is estimated that steelhead and salmon production from the National Forest streams could increase from about 335,000 smolt to about 596,000 smolt if full escapement were effected.

State, federal, and tribal agencies are presently investing millions of dollars in projects to provide better escapement. Projects such as barge transportation of smolt, improving passage facilities at dams, and increasing river flows during out-migration are all designed to increase escapement. These efforts have begun to show results with higher spawning redd counts inventoried during recent spawning seasons Fishery biologists are optimistic that anadromous fish runs in the Columbia and Snake Rivers can be restored to near the 1950 level.

The Pacific Northwest Electric Power Planning and Conservation Act of 1980, 16 U.S.C 839 et seq (the "Northwest Power Act") directed the Northwest Power Planning Council to "promptly develop and adopt . a program to protect, mitigate, and enhance fish and wildlife including related spawning grounds and habitat, on the Columbia River and its tributaries." The Act further directed that, "The Program, to the greatest extent possible, shall be designed to deal with that river and its tributaries as a system."

To this end a fish and wildlife program has been developed by the Council as a result of this Act and fish and wildlife enhancement work on the Forest is part of the program Since 1984, the Forest has

FIGURE III-7
ANADROMOUS FISH STREAMS



Source . Oregon Dept of Fish and Wildlife Stream Surveys.

TABLE III-31

Wallowa-Whitman National Forest Anadromous Fisheries
(For more detail see Tables III-32 through III-34)

Fish Species and Major Drainage	Miles of Spawning/Rearing Stream in National Forest Land	Existing (1984) Situation		Situation with Full Seeding of Habitat		Situation with Full Seeding of Habitat and Enhancement on Selected Streams		Miles of Selected Stream Improvement
		# Spawning Adults	# Smolts	# Spawning Adults	# Smolts	# Spawning Adults	# Smolts	
		(from Table III-32)		(from Table III-33)		(from Table III-34)		
Spring Chinook*								
N F John Day & tribs	10	300	30,500	800	39,984	880	46,860	10
Upper Grande Ronde & tribs (above Rondowa)	20	138	27,005	802	39,603	984	47,524	23
Wallowa R & tribs	16	35	9,193	1,080	57,620	1,080	57,620	0
Minam R	28	51	13,396	1,610	79,313	1,610	79,313	0
Imnaha	32	365	78,095	2,702	169,000	2,695	181,856	5
Totals spring chinook	106	889	158,189	6,994	385,520	7,449	413,173	38
Fall Chinook								
Snake R (mainstem)	71	500	100,000	40,000	2,150,000	40,000	2,150,000	0
Summer Steelhead								
N F John Day & tribs	42	546	13,078	605	13,582	726	16,298	42
Imnaha R & tribs	154	739	43,809	3,787	76,537	3,854	79,255	14
Snake R (mainstem & several short tribs)	91	3,000	206,587	17,000	403,597	17,000	403,597	0
Grande Ronde								
Joseph Cr & tribs	80	267	14,571	1,040	20,800	1,215	24,310	45
Lower Grande Ronde tribs (below Rondowa)	80	267	14,571	1,040	20,800	1,083	21,658	11
Wallowa R & tribs	31	103	5,621	403	8,060	426	8,528	6
Minam R & tribs	52	174	9,496	676	13,520	676	13,520	0
Upper Grande Ronde & tribs (above Rondowa)	150	501	27,342	1,950	39,000	2,320	46,410	95
Totals - Steelhead (which includes all salmon for miles of stream)	680	5,597	335,075	26,501	595,896	27,300	613,576	213

* To avoid duplication, fisheries information for the mainstream of the Lower Grande Ronde below Rondowa will be reported solely by the Umatilla National Forest

Updated March, 1988

Table III-32

Wallowa-Whitman National Forest Anadromous Fisheries
Estimated Existing Production - 1984

Fish Species and Major Drainage	Miles of Spawning/ Rearing Stream National Forest Land	Number of Spawning Adults	Eggs Per redd	Percent of max adult excapement	Egg to Smolt Survival %	Number of Smolts	Smolt to Returning Adult Survival %	Smolt to Returning Adult Survival # Fish
Spring Chinook*								
N F John Day & tribs	10	300	4,000	37 0	6 1%	30,500	1 5%	457
Upper Grande Ronde & tribs (above Rondowa)	20	138	3,940	9 9	11 92	27,005	0 40%	108
Wallowa R & tribs	16	35	3,940	3 2	16 0%	9,193	0 40%	38
Minam R	28	51	3,940	3 1	16 0%	13,396	0 40%	54
Imnaha	32	365	5,135	13 5	10 0%	78,095	0 40%	312
Totals spring chinook	**106**	**889**				**158,189**		**969**
Fall Chinook								
Snake R (mainstem)	71	500	4,300	NA	NA	100,000	0 40%	400
Summer Steelhead								
N F John Day & tribs	42	546	5,000	90 0	80%	13,078	4 0%	523
Imnaha R & tribs	154	739	4,500	19 0	2 2%	43,809	1 5%	657
Snake R (mainstem & several short tribs)	91	3,000	5,000	17 6	2 3%	206,587	1 5%	3,099
Grande Ronde								
Joseph Cr & tribs	80	267	4,340	21 3	2 1%	14,571	1 5%	218
Lower Grande Ronde tribs (below Rondowa)	80	267	4,340	21 3	2 1%	14,571	1 5%	218
Wallowa R & tribs	31	103	4,340	23 5	2 1%	5,621	1 5%	84
Minam R & tribs	52	174	4,340	23 5	2 1%	9,496	1 5%	142
Upper Grande Ronde & tribs (above Rondowa)	150	501	4,340	21 4	2 1%	27,342	1 5%	410
Totals - Steelhead (which includes all salmon for miles of stream)	**680**	**5,597**				**335,075**		**5,351**

* To avoid duplication, fisheries information for the mainstream of the Lower Grande Ronde below Rondowa will be reported solely by the Umatilla National Forest

Updated March, 1988

Table III-33

Wallowa-Whitman National Forest Anadromous Fisheries
Estimated Production with Full Habitat Seeding

Fish Species and Major Drainage	Miles of Spawning/Rearing Stream National Forest Land	Number of Spawning Adults	Number of Smolts	Smolt to Returning Adult Survival	
				% 4	# Fish
Spring Chinook*					
N F John Day & tribs	10	800	39,984	1 5	600
Upper Grande Ronde & tribs (above Rondowa)	20	802	39,603	0 40	158
Wallowa R & tribs	16	1,080	57,620	0 40	230
Minam R	28	1,610	79,313	0 40	317
Imnaha	32	2,702	169,000	0 40	676
Totals spring chinook	**106**	**6,994**	**385,520**		**1,981**
Fall Chinook					
Snake R (mainstem)	71	40,000	2,150,000	0 40	8,600
Summer Steelhead					
N F John Day & tribs	42	605	13,582	4 0%	543
Imnaha R & tribs	154	3,787	76,537	1 5%	1,148
Snake R (mainstem & several short tribs)	91	17,000	403,597	1 5%	6,054
Grande Ronde					
Joseph Cr & tribs	80	1,040	20,800	1 5%	312
Lower Grande Ronde tribs (below Rondowa)	80	1,040	20,800	1 5%	312
Wallowa R & tribs	31	403	8,060	1 5%	121
Minam R & tribs	52	676	13,520	1 5%	203
Upper Grande Ronde & tribs (above Rondowa)	150	1,950	39,000	1 5%	585
Totals - Steelhead (which includes all salmon for miles of stream)	**680**	**26,501**	**595,896**		**9,278**

* To avoid duplication, fisheries information for the mainstream of the Lower Grande Ronde below Rondowa will be reported solely by the Umatilla National Forest

Updated March, 1988

Table III-34

Wallowa-Whitman National Forest Anadromous Fisheries
Estimated Fish Production at Full Seeding and with Habitat Enhancement

Fish Species and Major Drainage	Miles of Spawning/Rearing Stream National Forest Land	Estimated Miles of Stream Enhancement	Number of Spawning Adults	Number of Smolts	Smolt to Returning Adult Survival	
					%	# Fish
Spring Chinook						
N F John Day & tribs	10	10	880	46,860	1 5%	703
Upper Grande Ronde & tribs (above Rondowa)	27*	23**	984	47,524	0 40%	190
Wallowa R & tribs	*16*	*0*	1,080	57,620	0 40%	230
Minam R	28	0	1,610	79,313	0 40%	317
Imnaha	32	5	2,895	181,856	0 40%	727
Totals spring chinook	113	38	7,449	413,173		2,167
Fall Chinook						
Snake R (mainstem)	71	0	40,000	2,150,000	0 40%	8,600
Summer Steelhead						
N F John Day & tribs	42	42	726	16,298	4 0%	652
Imnaha R & tribs	154	14	3,854	79,255	1 5%	1,189
Snake R (mainstem & several short tribs)	91	0	17,000	403,597 /	1 5%	6,054
Grande Ronde						
Joseph Cr & tribs	80	45	1,215	24,310	1 5%	365
Lower Grande Ronde tribs (below Rondowa)	80	11	1,083	21,658	1 5%	325
Wallowa R & tribs	31	6	426	8,528	1 5%	128
Minam R & tribs	52	0	676	13,520	1 5%	203
Upper Grande Ronde & tribs (above Rondowa)	150	95	2,320	46,410	1 5%	696
Totals - Steelhead (which includes all salmon for miles of stream)	680	213	27,300	613,576		9,612

* To avoid duplication, fisheries information for the mainstream of the Lower Grande Ronde below Rondowa will be reported solely by the Umatilla National Forest
** This reflects the resumed use of Meadow Cr for salmon spawning and rearing (7 additional miles).
*** About 4 miles of salmon spawning and rearing stream will not be enhanced

Updated March, 1988

been receiving between $100,000 and $300,000 annually for habitat improvement on steelhead and salmon spawning streams within the Grande Ronde and North Fork John Day River Basin. The Forest is to continue to receive these funds until 1991. Funding after that will be subject to subbasin plans

Where fish habitat has declined it is usually as a result of livestock damage to riparian areas, loss of stream shade due to timber harvest and road construction, or increased sediment due to poor road drainage or location The improvement work includes fencing and vegetation planting to increase shade and decrease water temperature It also includes installation of instream structures to improve rearing water for young fish. The Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Indian Tribe, and the Oregon Department of Fish and Wildlife have been cooperators in the planning and improvement work.

Approximately 213 miles of spawning streams on the Forest within the Grande Ronde and North Fork John Day River drainages have been identified as requiring some form of improvement work to bring them to near-optimum condition Existing estimates of benefits resulting from the planned work are subject to many variables and assumptions. However, with completion of all work and attainment of habitat objectives, it is projected that adult spawning steelhead could increase from the 1984 count of about 6,000 to more than 27,000. Salmon could increase from about 900 to more than 7,000 with full funding These estimates include benefits from planned work on private land portions of the streams as well as on the National Forest.

Fire and Fuels Management

Fire, and its exclusion, have been significant factors in the development of plant communities on the Wallowa-Whitman. Prior to the arrival of European man, natural and Indian-caused fires burned at frequent intervals (3-25 years) in the grass and ponderosa pine types, and less frequently (100-300 years) in the mixed conifer stands. Stand replacement fires (fires that destroy the existing stand) occurred in lodgepole pine every 80-120 years after epidemic outbreaks of mountain pine beetle.

Fire suppression activities during the past 50 years have dramatically affected the fire frequency. This tends to change the mix of tree species and increase the level of natural debris on the forest floor. As the stand composition changes from the fire tolerant pine, Douglas-fir, and western larch to the less-tolerant mixed conifer and true fir, the potential for fire damage increases greatly.

It is important to understand the differences between wildfires and fires which are prescribed by Forest managers to achieve specific resource objectives. Wildfires tend to occur at the hottest and driest times of the year, when Forest fuels are very dry and fires tend to burn intensely. The level of heat produced by wildfire often kills trees, destroys the vegetation protecting the soil, may destroy shallow roots, and frequently increases soil erosion and stream sedimentation Wildlife may also be seriously affected through loss of cover, food, and snag habitat

Conversely, when fire is prescribed for an area, it is permitted to burn only under tightly controlled conditions intended to protect soils and desirable vegetation.

Timber harvest activity has a major influence on the fire management program of the Wallowa-Whitman It frequently adds to the amount of burnable material on the forest floor Since most fires on the Forest are caused by lightning (70 percent of all fires during the 1970-84 period), opportunities to reduce ignitions are limited. A fuel treatment program is necessary to manage the fuel loading so that resource protection objectives are met. Prescribed burning, both underburning and broadcast burning clearcuts, has been increasing over the past five years, and is expected to increase in the future. During 1984, the Wallowa-Whitman prescribed burning on approximately 5,000 acres

A large part of the Wallowa-Whitman (583,000 acres) is in federally designated wilderness. Fire has historically been suppressed within these areas like everywhere else on the Forest This resulted in

some unnatural fuel build-ups, gradual changes in the composition of the timber stands, and a higher probability of catastrophic wildfires. Since 1982, some lightning-caused fires have been allowed to burn within wilderness, under carefully monitored conditions. Under current management direction, it is possible for wilderness managers to start fires within wilderness where this will enhance wilderness values. Over time, this will result in a return to natural wilderness ecosystems in which the signs of human activity are less apparent

Land Status

There are nearly 319,000 acres of non-National Forest land within the proclaimed National Forest boundary. These include private lands, many of which are patented mining claims, lands managed by other federal agencies, state lands, and land owned by counties and municipalities. Ownership changes occur through land exchange, fee purchase, and the use of scenic easements to acquire certain rights short of fee ownership.

In some instances, the Forest boundary is irregular due to varying ownerships There are also scattered private lands within the Forest as well as isolated National Forest parcels surrounded by private lands. Because of these situations, there is a continuing need for adjustment to meet the needs of National Forest administration as well as for effective private land management. At present, the Forest is responding to proposals from adjacent and intermingled landowners and many acres have been exchanged in recent years. This has resulted in consolidating ownership of many lands to the benefit of both parties A land adjustment plan has been prepared for the preferred alternative and is a part of the Forest Plan which accompanies this EIS.

Occasionally, it is in the public interest to purchase private lands or acquire them through condemnation Substantial purchases, totalling 4,769 acres, were made within the Hells Canyon National Recreation Area after its creation An additional 15,085 acres have been acquired through condemnation The need for such purchases in future years will depend largely on the success of local counties in administering private land use regulations within the Hells Canyon National Recreation Area. Where it proves futile to gain landowner compliance with the private land use regulations, purchase of the lands by the federal government may be the only recourse.

Although most rights-of-way have been acquired, there is a continuing program for the acquisition of road and trail rights-of-way in order to ensure public access to National Forest lands.

The Forest is working with public agencies and private parties to achieve a more efficient pattern of land ownership. A land adjustment and acquisition plan serves as a basis for land adjustment.

Special Land Uses

The Forest provides lands for a wide variety of special uses by private individuals and public agencies. Such uses are authorized by special use provisions, mining laws, and withdrawal authority of agencies. The most common are those covered by special use permits. Examples are recreation residences, pastures, telephone lines, airport beacons, fences, tramways, cultivated areas, roads, dams, and cemeteries. There are currently approximately 380 permitted special uses on the Forest These are summarized in Table III-35.

Special uses are periodically inspected to ensure compliance with conditions of use and to evaluate whether to continue such use. Permittees paid $25,525 for the right to use National Forest lands for these purposes in 1980.

Table III-35
SUMMARY OF SPECIAL USES - 1985

Uses	Total Cases	Total Miles of Right-of-way	Total Acres Permitted Area
Boat dock & wharf	1	0	.1
Organization camp	1	0	2 0
Cabin (recreation)	7	.0	14.1
Recreation residence	43	0	20.2
Resort	3	.0	65.2
Camp & picnic	2	.0	179.0
Target range	2	.0	39.9
Tramway	1	.0	7.0
Outfitting & guiding	63	.0	.0
Winter sports resort	1	.0	22.5
Ski slope, trail	1	20 1	243 3
Cultivation, hay production	3	0	25 7
Pasture	27	0	4,098.2
Nonrecreation residence	2	.0	24.0
Range facility	4	.0	40.1
Cemetery	1	.0	1 6
Solid waste disposal area	1	0	.4
Community residence	3	0	3.6
Service building	1	0	.1
Camp (industrial)	1	0	.2
Fish hatchery	1	0	.4
Warehouse, storage yard	16	0	18.2
Weighing station	1	0	.2
Experimental, demonstration	1	0	.1
Education center	1	.0	15 0
Airport, beacon	2	1 0	1.4
Class D road permit	13	13.6	14 9
Class E road permit	5	4.4	16.1
Powerline	20	80.3	547.9
Powerplant	1	0	1.4
Buried powerline	1	1.9	3 2
Antenna system (receiving)	2	1.6	8
Electronic site	33	.0	10.8
Telephone, telegraph	7	39 4	145.0
Telephone buried cable	4	145.2	57.8
Water transmission	55	233.3	263.5
Dam, reservoir	16	.0	463 6
Water diversion, weir	6	.2	3 5
Well spring, windmill	15	1 0	4 9
Stock water	1	.0	7
System, supply	4	3	.9

Transportation and Utility Corridors

The Forest includes existing and proposed utility and transportation corridors totalling approximately 6,600 acres These lands are set aside for oil and gas pipelines, and for power lines A major corridor exists along Interstate Highway 84 and numerous other utility lines are found across the Forest (see Figure III-8).

Within these corridors opportunities for recreation, livestock grazing, timber management, mineral extractions and other uses are provided to the extent that they are compatible with the primary use

Often it is necessary to prevent timber from reoccupying the corridor The corridors which are kept free of tree growth provide increased forage for game and domestic livestock though the acreage is too small to significantly affect total forage production from the Forest Keeping these corridors free of trees requires vegetation management to control encroaching seedlings Recreational use, such as hunting, often occurs in these corridors although many recreationists find the corridors visually unappealing.

Construction of new utility facilities is not permitted within wilderness. The Comprehensive Management Plan for the Hells Canyon National Recreation Area discourages new construction within the NRA and suggests that existing facilities be removed as opportunities to do so arise.

As part of this planning process three classes of land are to be identified:

-- exclusion areas (areas in which new utility corridor development will not be permitted),

-- avoidance areas (areas with high resource values which are in conflict with utility corridor facilities and which are used only if no other choices exist), and

-- other lands.

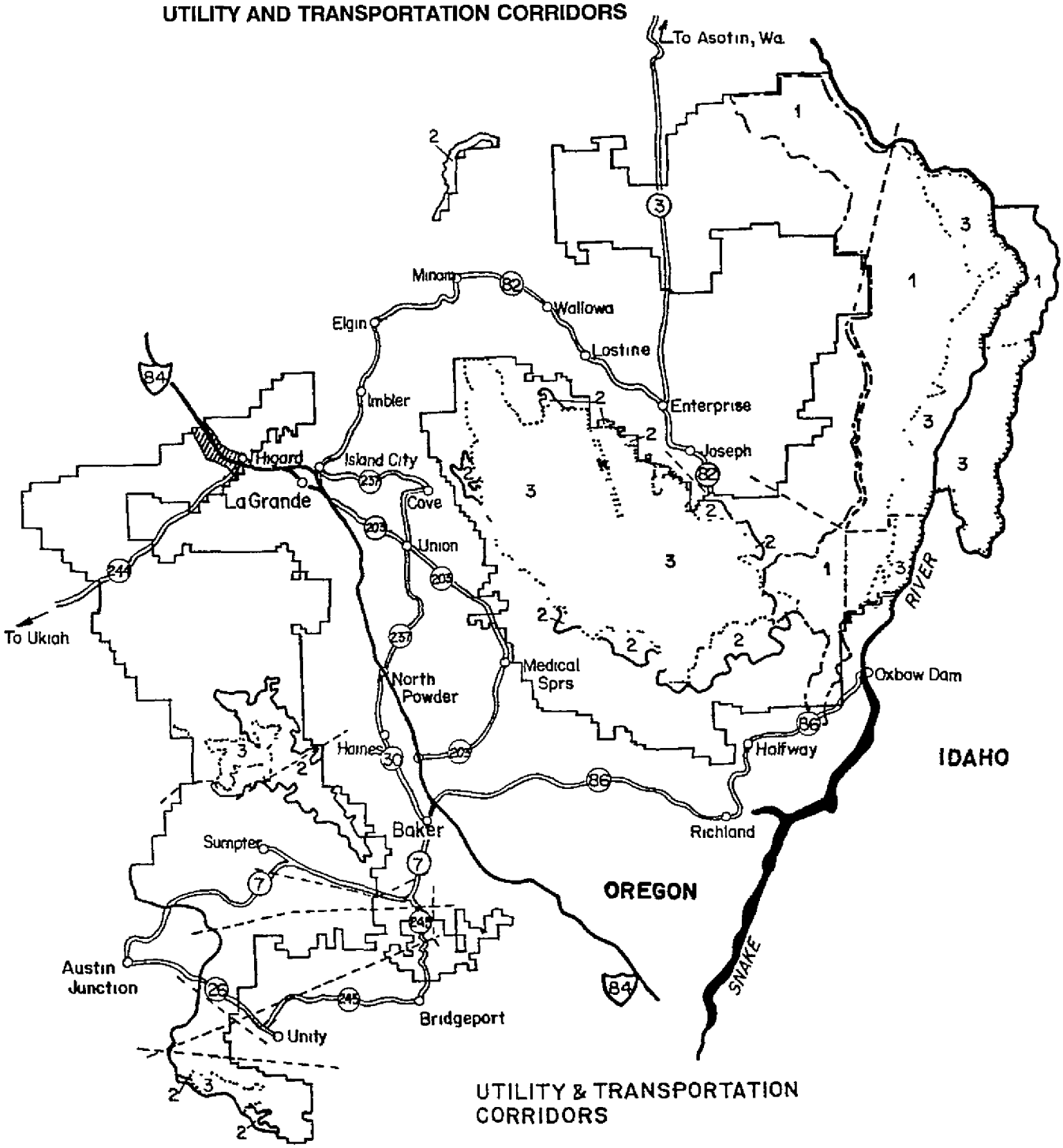
Exclusion areas include wilderness, research natural areas and, at least until individual river plans are completed, wild scenic and recreational rivers that have been established under the Wild and Scenic Rivers Act. These plans may move some river corridors to an avoidance classification Avoidance areas include developed recreation sites and areas managed to retain an undeveloped appearance.

Payments to States

Payments to States is an important part of financing for local roads and schools. The collections are generated from the income sources shown in Table III-36. It clearly shows the dominance of timber sale receipts in providing this source of income. The table also shows that timber sales funded by the Salvage Sale Fund were first included in the calculations in 1988. The legislation that permitted this was temporary. Whether it will become a permanent part of the calculation remains to be seen

The table also shows how the receipts have varied over time. The three highest years were 1979-1981 which were followed by the modern-day record low year of 1982. Recent level figures portrayed elsewhere in this document included all those years as part of the recent average level The formula for computing these payments has changed in the past It may change again

FIGURE III-8
UTILITY AND TRANSPORTATION CORRIDORS



Information on present utility lines from Pacific Power & Light Company using data from the Western Regional Corridor Study of May 1980

Table III-36
FOREST ANNUAL COLLECTIONS FOR 25% FUND

FY	Timber 1/	Land Use	Land Rec.	Power 2/	Minerals 3/	Admin. & Users Fees	Grazing 4/	Total	K-V Current Yr Collectns	Purchr Credits During Yr	Salvage Sale Fund 5/	Total Base for 25% Payments
1988	$ 7,600,836	$ 26,268	$ 57,052	$ 980	$ 340	$ 3,615	$ 151,769	$ 7,840,860	$ 2,587,368	$ 814,176	$ 640,866	$ 11,883,270
1987	5,367,958	18,431	51,859	1,130	272	8,320	123,642	5,571,612	4,093,363	1,193,301	0	10,858,276
1986	7,469,209	20,166	39,973	-	305	5,343	143,568	7,678,564	2,403,363	1,538,391	0	11,620,318
1985	4,706,013	14,027	31,271	679	3,528	4,454	136,213	4,896,185	4,577,563	1,096,228	0	10,569,976
1984	4,633,735	18,452	30,053	654	1,672	4,383	139,129	4,828,078	3,112,204	931,500	0	8,871,782
1983	3,736,358	23,473	35,200	360	7,039	5,122	147,709	3,955,261	2,850,871	2,845,669	0	9,651,801
1982	1,960,854	9,384	34,560	1,742	727	8,082	253,622	2,268,971	1,800,031	1,579,705	0	5,648,707
1981	10,054,358	12,851	13,934	1,517	404	30,179	289,211	10,402,454	2,825,376	3,990,977	0	17,218,807
1980	8,354,093	13,329	18,947	2,419	85	27,221	273,802	8,689,896	3,196,425	3,220,770	0	15,107,091
1979	12,091,458	7,486	11,035	4,383	168	23,549	238,212	12,376,291	3,911,335	1,666,248	0	17,953,874
1978	6,948,211	9,358	21,465	4,496	14,752	2,957	211,177	7,212,416	1,574,355	2,129,130	0	10,915,901
1977	5,835,906	15,701	14,384	1,759	266	15,342	224,007	6,107,365	2,020,732	2,729,691	0	10,857,788

Source Forest File Designation 6500 Does not include Idaho portion of HCNRA, whose addition to this table would not be significant

1/ Timber receipts vary with prevailing market conditions and volumes harvested They are exclusive of K-V collections, Purchaser Credits and Salvage Sales which are tracked separately

2/ Some use receipts were incorrectly entered in this column prior to FY 1983

3/ Mineral receipts vary with the level of private construction Locatable minerals whose outputs are controlled by the Forest through a permit system

4/ Grazing receipts declined with the declines in grazing fees

5/ Temporary addition as of this writing, March 16, 1989, for fiscal years 1988 and 1989 Legislation not permanent

Table III-37 shows how the payments are distributed to the individual local governments. These disbursements are based on the locations of the revenue-producing activities A portion of the receipts from a Wallowa-Whitman timber sale logged in Wallowa county, for instance, will go back to Wallowa county

Payments from the 25% fund interact with funds paid local governments from the Department of Interior's Payments in Lieu of Taxes (PILOT) program People frequently confuse the two PILOT payments are dependent on population levels, acreage, and other federal payments to local governments. Their calculation and additional information on other local tax revenues are contained in the Forest Plan AMS (Analysis of the Management Situation).

Table III-37
PAYMENTS TO COUNTIES BY FISCAL YEAR

FY	Baker	Grant	Malheur	Umatilla	Union	Wallowa	Total
1988	$841,982	$115,109	$4,449	$36,261	$718,062	$1,250,126	$2,965,989
1987	897,580	122,710	4,743	38,655	761,935	886,245	2,711,868
1986	890,251	121,708	4,704	38,339	757,447	1,089,258	2,901,707
1985	799,993	109,683	4,239	34,551	682,856	1,011,171	2,642,493
1984	586,313	80,387	3,107	25,323	502,751	1,020,043	2,217,924
1983	736,264	100,891	3,900	31,782	628,846	911,270	2,412,953
1982	353,579	48,454	1,873	15,264	304,064	688,943	1,412,177
1981	1,458,637	200,062	7,729	62,991	1,242,594	1,332,689	4,304,702
1980	942,965	129,322	4,996	40,718	811,416	1,847,355	3,776,772
1979	1,706,416	234,118	9,045	73,714	1,449,634	1,024,738	4,497,665
1978	911,272	125,025	4,830	39,365	776,765	862,521	2,719,778
1977	1,047,499	143,736	5,553	45,256	889,391	583,012	2,714,447

Source: Forest File Designation 6500. Does not include Idaho portion of HCNRA. Funds are paid the year after their generation

Human Resource Programs

The Forest has historically participated in various human resource programs including Young Adult Conservation Corps, Youth Conservation Corps, and the Senior Community Services Employment Program It has also served as a host for national programs such as the Comprehensive Employment and Training Act and the Job Training Partnership Act.

Enrollees have participated in many aspects of Forest management, but most of the benefits have been realized in the management and protection of natural resources.

For the past few years, an important facet of the human resource program has been the use of volunteers. They provide significant support to wilderness management, and to a somewhat lesser degree, other recreation programs. Nearly all resource areas benefit from work done by volunteers

Volunteers have accomplished much work which due to reduced budgets, otherwise would not have been accomplished. In 1984 volunteer work totalled 11.7 person-years with an estimated value of $195,000.

In addition to the benefits to resources, these programs provide work and training for participants, and can be used as an opportunity to involve local communities in the actual management of the Forest. By improving communications between the Forest Service and the public, the exchange of ideas and concerns will improve public understanding of the Forest Service and increase our awareness of public opinions and expectations.

Human resource programs fluctuate with the political-economic climate. During periods of high unemployment or the presence of an administration supportive of the programs' philosophy, funding for human resource programs often increases. Since the Forest can provide work in both urban and rural areas, agencies responsible for administering these programs look to the Forest to host them. The only influence the Forest has in securing these programs is that which results from its past performance on similar programs. Ultimately its participation is determined by other government agencies.

State and County Planning

Coordination with local planning within Idaho counties was accomplished through development of the Comprehensive Management Plan for the Hells Canyon National Recreation Area which the Forest Plan will adopt.

City and county comprehensive management plans in Oregon are designed to carry out State-wide planning goals A purpose of the plans is also to incorporate the plans and programs of the various governmental units into a single management tool for the planning area The State governmental body responsible for reviewing county comprehensive plans is the Oregon Land Conservation and Development Commission

County plans recognize the National Forest as "primary forest," "timber grazing" or similar designation. Although counties do not have responsibility for regulating use on Federal lands, the Forest Service and county governments coordinate planning efforts to avoid conflicts The alternatives discussed in this EIS are generally compatible with local governmental plans (see further discussion in Chapter IV).

Following are the pertinent State-wide planning goals (paraphrased) to which county plans must adhere (State of Oregon 1980)

Goal No. 1 "To provide for citizen involvement in planning."

Goal No 2: "To establish a planning process and policy framework."

Goal No 3: "To preserve agricultural lands."

Goal No. 4 "To conserve forest lands for forest uses."

Goal No 5: "To conserve open space and protect natural and scenic resources."

Goal No 6: "To maintain and improve the quality of air, water, and land resources in the State."

Goal No 7: "To protect life and property from natural disasters and hazards."

Goal No 8: "To satisfy the recreational needs of the citizens of the State and visitors."

Goal No. 9: "To diversify and improve the economy of the State."

Goal No 10: "To provide for the housing needs of citizens of the State "

Goal No. 11: "To plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve as a framework for urban and rural development "

Goal No. 12 "To provide and encourage a safe, convenient and economic transportation system "

Goal No. 13: "To conserve energy."

Goal No. 14. "To provide for an orderly and efficient transition from rural to urban land use."

Cultural Resources

The cultural resource program was developed as a result of public interest in protection of nonrenewable National heritage resources. In the Pacific Northwest Region, the program is a formal effort to organize the stewardship of the extensive, nonurban cultural heritage resource base

The management of cultural resources benefits the public by protecting and providing knowledge of past lifeways Public participation in the form of visitor days has not been measured, but some part of recreation visitation relates to heritage sites.

The cultural resource base of the Wallowa-Whitman National Forest includes a diverse range of historic and prehistoric artifacts and sites. These include (1) historic cabins, trails, mines and related flumes, adits, ditches and other structures, railroad grades, immigrant roads, mills, and homesteads; (2) historic Forest Service structures including guard stations, lookout towers, corrals, camps, administrative centers, and CCC campgrounds and buildings; (3) prehistoric (American Indian) campsites, villages, graves, quarries, workshops, trails, caves, shelters, and religious sites All of these have historic and cultural value to the general public as well as research value for the scientific community.

One important cultural feature on the Forest is the Blue Mountain segment of the Oregon Trail. This trail, which spans the 2000 miles from Independence, Missouri to Oregon City, Oregon, contributed significantly to the settlement of the Pacific Northwest during the period 1841-1848 It was designated a National Historic Trail in 1970.

The Blue Mountain segment of the trail is 16 miles in length, of which six miles are on National Forest lands with the remainder being on private lands. This segment contains some of the best remaining examples of intact trail The Forest is the lead agency for managing this segment and has developed a management plan to assure that its historic value is preserved.

Key concepts of cultural resource management are the inventory and evaluation of all resources. The major goals are the protection and enhancement of all eligible resources for the advancement of public knowledge and enjoyment Cultural resource management is guided by statutes and their implementing regulations as well as Forest Service policy expressed in the Forest Service manuals.

Protection of cultural resources is a major consideration in many Forest management activities Road construction, timber sales, mining, water development for livestock and recreation site development are some of the more common types of activities which can affect cultural resources. Prior to implementing these and similar ground-disturbing activities, an inventory is conducted to identify sites of cultural value. In most cases activities are designed to avoid the identified cultural sites, but in some cases other mitigative steps are taken such as collecting the artifacts found and recording

the significant information associated with them. All such activities are coordinated with the State Historic Preservation Officer for the State in which the site is found.

An overview of historical and archaeological resources for the Forest (excluding Hells Canyon NRA) was completed in 1978. The Hells Canyon NRA historical overview was also completed in 1978. The archaeological overview for the NRA was completed in 1982. Some 800,000 acres on the Forest have been surveyed for cultural resources (through 1984). Over 4,400 cultural resource sites were found and recorded during this process

Landscape Appearance

Much of the Forest retains a natural or nearly natural appearance. Past land management activities have not extensively disturbed this resource except where recent clearcutting of dead and dying lodgepole pine timber has taken place.

Those activities which result in modification to the landscape include shelterwood cutting, seed tree cutting, clearcutting, creation of utility corridors, and loss of vegetation due to tailing piles from mining operations. To date, approximately 126,000 acres of National Forest have been impacted by these activities. Following regrowth, clearcuts will eventually return to a natural-appearing condition. Utility corridors and mine tailings, however, are long-term modifications Maintaining high visual quality tends to reduce timber harvest levels, and increase timber management and road construction costs. Since maintaining a high level of visual quality often requires retention of large trees and snags, benefits to some species of wildlife are significant

The visual resource has been inventoried according to the National Forest Visual Management System. This provides an inventory of the existing visual condition as well as identifying visual quality objectives (see Chapter IV) Current land management direction from Unit Plans requires that these objectives be met to the extent practical in all management activities. Forest Plan alternatives analyze two options: (1) meeting these objectives and (2) reducing visual quality objectives in favor of other resource uses.

The inventory system divides the Forest into several categories based on variety class, sensitivity level, and distance zone (Clark and Stankey 1979) Through combining these characteristics, visual quality objectives are identified (see Appendix K)

Variety Classes - Variety classes are obtained by classifying the landscape into different degrees of variety This determines those landscapes which are most important and those which are of lesser value from the standpoint of scenic quality

- **Class A** is distinctive It refers to those areas where features of land form, vegetation patterns, water forms, and rock formations are of unusual or outstanding visual quality.

- **Class B** is common It refers to those areas where features contain variety in form, line, color and texture, or combinations thereof, but which tend to be common throughout areas whose features have little change in form, line, color, or texture

Sensitivity Level - Sensitivity levels are a measure of the people's concern for the scenic quality of National Forests Level 1 is highest sensitivity, Level 2 is average sensitivity, and Level 3 is lowest sensitivity Sensitivity Level 1 and Sensitivity Level 2 travel routes on the Wallowa-Whitman are listed in Appendix K and are displayed in the map packet accompanying this FEIS

Distance Zone - Distance zones are divisions of a particular landscape being viewed.

-- **Foreground** (fg) is limited to those distances at which details can normally be perceived Normally, in foreground views, the individual boughs of trees form texture. Foreground is usually limited to areas within one-quarter to one-half mile of the observer

-- **Middleground** (mg) extends from foreground zone to three to five miles from the observer. Texture is normally characterized by masses of trees in stands of uniform tree cover.

-- **Background** (bg) extends from middleground to infinity. Texture in stands of uniform tree cover is generally weak or nonexistent

Quality Objective - The quality objectives are **preservation** (P), **retention** (R), **partial retention** (PR), **modification** (M), and **maximum modification** (MM).

-- *Preservation* is the visual quality objective assigned to all existing and recommended wilderness

-- The *retention* visual quality objective provides for management activities which are not visually evident

-- *Partial retention* visual quality objectives provide for management activities that remain visually subordinate to the characteristic landscape

-- *Modification* allows management activities to be visually dominant, but natural in appearance even when viewed as foreground or middleground within the surrounding area.

-- The *maximum modification* quality objective allows management activities of vegetative and land form alterations to dominate the characteristic landscape. However, when viewed as background the visual characteristics must be those of natural occurrences within the surrounding area

Recreation

The Forest offers a wide range of outdoor recreation opportunities varying from primitive hiking and horseback riding within the wilderness areas to the relatively developed atmosphere found at Anthony Lakes, Phillips Lake, and a number of other recreation sites. Although recreation is concentrated in the late spring, summer, and fall when most of the Forest is accessible by wheeled vehicle, opportunities for winter recreation are abundant for those interested in downhill or cross-country skiing, snowshoeing, or snowmobiling

The Forest includes the Eagle Cap and Hells Canyon Wildernesses as well as portions of the Monument Rock and North Fork John Day Wildernesses, the Hells Canyon National Recreation Area; wild, scenic, and recreational rivers totaling 269 miles; 45 developed recreation sites, including 30 campgrounds; and three National Recreation Trails During the 1980-1984 period, recreation use averaged 1,511,000 recreation visitor days (RVD's) per year. Closely tied to population projections, recreation use is expected to show a continual increase for the foreseeable future.

Recreation Opportunity Spectrum - Recreation opportunity on the Forest has been classified under the Recreation Opportunity Spectrum (ROS) (Clark and Stankey 1979). ROS is a classification of land according to a producible range of recreation experiences. The six spectrum classes of recreation situations a visitor can experience vary from an undisturbed, natural environment with little or no contact with other humans, to a highly modified, altered environment with many contacts with others.

The current Forest capacity and use by ROS class is shown in Table II-5. (A more detailed definition of the Recreation Opportunity Spectrum is found in the Glossary.)

Developed Recreation - Developed recreation opportunities are found in campgrounds, picnic areas, boat launching sites, resorts, recreation homes, winter sport sites, and other constructed facilities. Developed recreation sites occur on relatively small amounts of the Forest land area, totalling approximately 3,900 acres. In recent years, developed recreation use accounted for 24 percent of the public recreation visitor days or 367,000 RVD's, with camping being the single largest use. If present trends continue, overall developed recreation use would exceed the Forest's capacity by the fifth decade of plan implementation The capacity of existing developed recreation sites is 583,000* RVD's while demand is expected to be 621,000 RVD's by the fifth decade of plan implementation

Although current capacity exceeds total use, this fact does not account for locational problems with current facilities. Some undeveloped sites receive frequent heavy recreational use. More development in the form of fences, sanitary facilities, fire rings, etc. may be needed to provide site protection, for example. While the need for such facilities may not warrant the concern of situations on other forests where current use exceeds overall capacity, it does indicate a real need as reflected in the capital investment schedule in the Forest Plan

The Comprehensive Management Plan for the Hells Canyon National Recreation Area calls for construction of a number of additional recreation sites including campgrounds at Pittsburg Landing, the Upper Imnaha River area, Hells Canyon Reservoir, Dug Bar, near Hat Point and Low Saddle, and in the vicinity of Seven Devils Guard Station. Congress authorized expenditure of funds for this purpose at the time the National Recreation Area was established This is expected to increase developed recreation capacity by approximately 78,000 RVD's

Since developed recreation sites occupy such a small portion of the Forest, their effects on other resources are usually minor. Trampling of vegetation and compaction of soils occur at heavily used sites Recreation sites near water tend to contribute to bacterial pollution. Some recreation sites are withdrawn from mineral entry but this has not proven to be a problem since no significant mineralization is known to occur at existing or proposed recreation sites The timber on developed recreation sites is not available for scheduled timber harvest

Local private interests are continuing the restoration of a portion of the historic Sumpter Valley Railroad. Nationally recognized for its historic significance (it is a listed National Register District), this narrow-gauge railroad first served the Sumpter area in 1896, providing the main link between the sawmills in Baker City and the extensive stands of ponderosa pine found in Sumpter Valley and surrounding mountains. Known as the "Stump Dodger" this train contributed significantly to the mining-related boom town development of Sumpter in the early 1900's. A section of track through Sumpter Valley has been reconstructed and train rides are available to the public.

Dispersed Recreation - Dispersed recreation opportunities occur on most Forest lands and include a diversity of activities Average use for the period 1981-1984 shows approximately 1,144,000 RVD's per year or 76 percent of the total recreation use on the Forest. The major activities in descending order of use are: camping, motorized travel, hunting, fishing, riding, hiking, and mountain climbing. Many dispersed recreation activities require developed sites such as parking lots, trailheads, and boat launching sites for support and access.

* Developed recreation site capacity is from Recreation Information Management System (RIM) data.

The estimated dispersed recreation capacity on the Forest is well over seven million RVD's annually*. If present use trends continued, and ROS classification did not change, there would be adequate capacity in all ROS classes other than rural, primitive, and wilderness semiprimitive to provide for projected use through the fifth decade of plan implementation. However, if roading of unroaded areas continues, shortages may develop in some ROS classes. There is adequate roaded capacity to meet demand well beyond the fifth decade of plan implementation. Retaining semiprimitive recreation opportunities (by leaving roadless areas undeveloped) makes access for minerals and livestock management more difficult and precludes scheduled timber harvest.

A principal recreation use conflict exists between motorized use and habitat for elk. Studies have shown that elk tend to avoid areas near motor vehicle travel routes (Perry and Overly 1977, Leege 1976, Thiessen 1976) Some trails and low standard roads have been closed to motorized use for this reason. Some areas have been closed to snowmobiles for the same reason Logging road development has eliminated other primitive motorized travel routes. Thus, opportunities for off-road vehicle travel are decreasing and appear likely to decrease further.

Winter Use - The Forest has a wealth of potential opportunities for snow-related dispersed recreation, but present use is quite light. Snowmobile clubs, under cooperative agreements, mark and groom a network of routes on snow-covered Forest roads There are marked Nordic ski routes at several locations One outfitter has offered guided ski trips in wilderness. Several communities have winter "festivals" that include some events, such as dogsled and snowmobile races, that occur partly on National Forest land. With use at a very low density, there is little conflict between uses and little need for regulation or separation to prevent conflicts.

Off Road Vehicles - Off-road vehicle use is managed through the Forest Travel Management Plan, which is subject to annual review and revised when appropriate Off-road vehicle use is monitored and changes in the plan are made as dictated by the results of monitoring.

The plan, effective September 1, 1985, provided for road access as shown below.

Land Open to Motorized Use

	Open Seasonally	Open Yearlong	Closed
National Forest Acres	431,400	1,131,400	821,400
Roads (Miles)	1,320	5,700	2,280
Trails (Miles)	139	269	1,337

* Dispersed recreation capacity was calculated using methods contained in The Recreation Opportunity Spectrum A Framework for Planning, Management and Research (Clark and Stankey 1979).

The open road mileage includes an estimated 1,000 miles of low-standard routes suited primarily for four-wheel drive vehicles, trail motorcycles, and all-terrain vehicles. The "closed" roads are mostly physically closed (impassable).

Wilderness

The Forest contains two wildernesses, plus a portion of two others, totaling 582,700 acres (see Figure III-9) Wilderness acreage, present use, capacity, and predicted use in the fifth decade of plan implementation are shown in Table II-5

The Eagle Cap Wilderness was administratively created in 1940 and was one of the original areas included in the National Wilderness Preservation System through passage of the Wilderness Act in 1964 Subsequent legislation added to the original acreage in 1972. The Hells Canyon Wilderness was established as part of the Hells Canyon National Recreation Area legislation in 1975.

With the passage of the Oregon Wilderness Act of 1984, the two existing wildernesses on the Wallowa-Whitman (Eagle Cap and Hells Canyon) were expanded and two new wildernesses were established, each of which lies partially on the Forest. They are the Monument Rock, which extends onto the Malheur National Forest, and the North Fork John Day, which lies primarily on the Umatilla National Forest with one unit, Baldy Creek, entirely on the Wallowa-Whitman

With the 1984 wilderness additions, most of the primitive and about 70 percent of the semiprimitive areas are located in wilderness. If present trends continue, the primitive and semiprimitive acreage outside of wilderness will shrink and those individuals seeking these kinds of recreational experiences may be drawn to wilderness

All wilderness meets air quality standards for Class I areas, except for brief periods when visibility is impaired by smoke from wildfires, nearby prescribed fires, or general smoke and smog moving through from western Oregon on a fast-moving weather front.

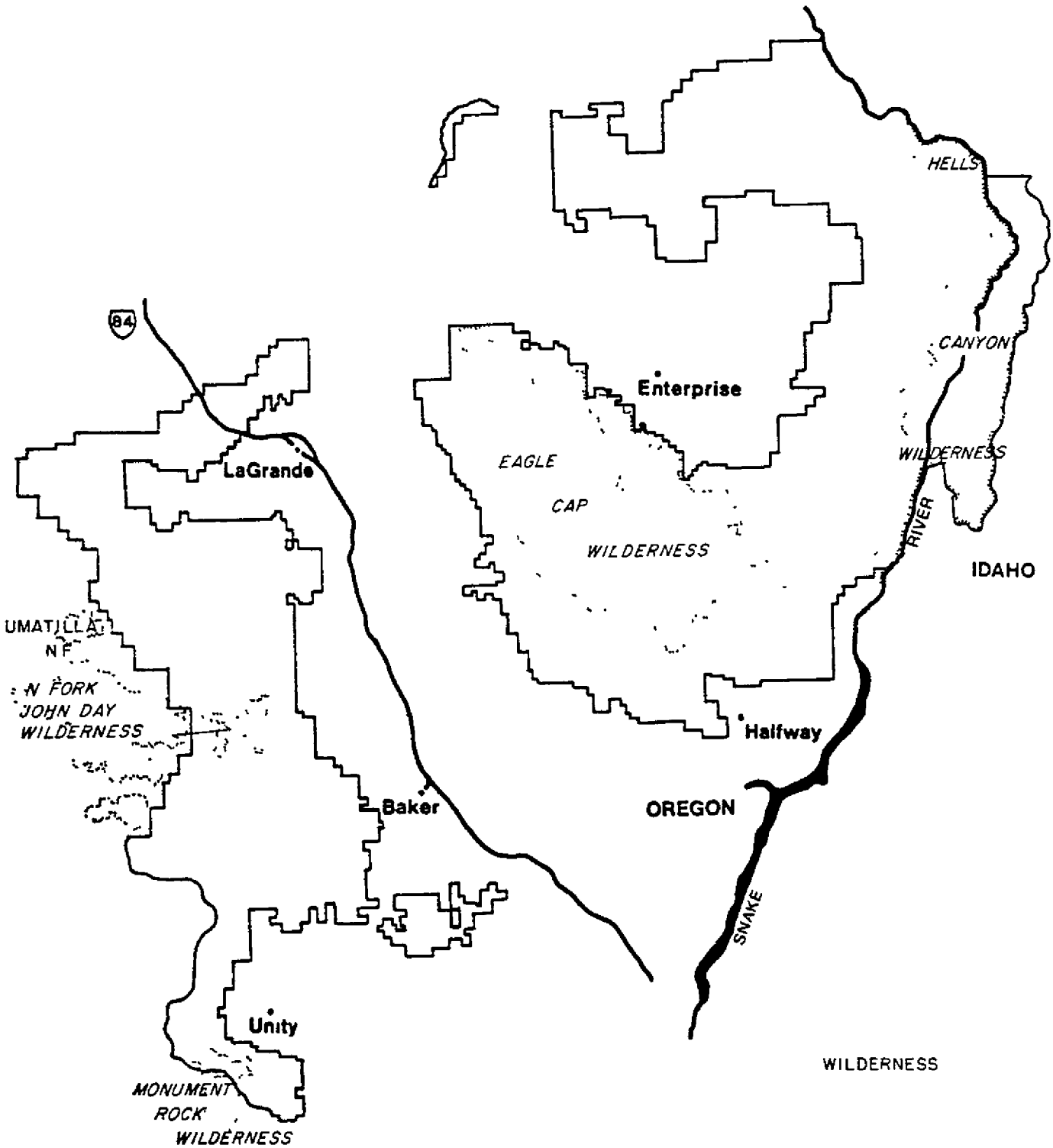
There is no primitive (trailless) wilderness land on the Wallowa-Whitman National Forest. The best opportunity for off-trail recreation experiences is in the Eagle Cap Wilderness. The Environmental Assessment for Interim Management of the Eagle Cap Wilderness, completed in 1982, identified four alternatives for management including one that would significantly decrease trail mileage and create a more primitive situation However, it would not have resulted in large enough trailless areas to meet the primitive (trailless) criteria

With a relatively low intensity of use, there are few conflicts between public use and maintenance of wilderness character. Some areas around lakes in the Eagle Cap Wilderness receive heavy use during July and August Popular hunting areas are heavily used during October and November.

Eagle Cap Wilderness - The Eagle Cap Wilderness totals 346,000 acres in the Wallowa Mountains. It includes the Matterhorn, the highest peak in eastern Oregon Included within the wilderness are 73 lakes, 55 of which contain fish Fish within these lakes are the result of a fish stocking program which began in some lakes as early as 1917 and continues today under the direction of the Oregon Department of Fish and Wildlife.

Use within the Eagle Cap Wilderness tends to concentrate near lakes, particularly in the Lakes Basin. The Lakes Basin area is a concentration of scenic lakes surrounded by numerous high peaks. Easily accessible from the Lostine River trailhead, it is the most used portion of the wilderness This use has caused localized trampling around the lakes and adjacent campsites. Other portions of the wilderness receive substantially less use

FIGURE III-9
EXISTING WILDERNESS



Major portions of the wilderness are in domestic livestock allotments and are grazed by sheep and cattle during mid to late summer The continuation of grazing is provided for in the Wilderness Act. Recreational visitors who encounter recently-grazed areas are frequently offended by the after-effects However, the effects are temporary in nature and little evidence can be found a few months later Visitors who inquire will find there are many opportunities to avoid active grazing areas.

The area has an extensive trail system that provides access by foot and horse to most places. Even so, the size of the wilderness assures many opportunities for a primitive, remote recreation experience. Some trails need relocation or reconstruction to meet wilderness management objectives or make maintenance feasible.

Hells Canyon Wilderness - The 214,000-acre Hells Canyon Wilderness is located almost entirely within the Hells Canyon National Recreation Area Split by the Snake River Corridor, the wilderness includes the west face of Hells Canyon in Oregon and parts of the east face of Hells Canyon and the Seven Devils Mountains in Idaho. All of the 32 lakes are in Idaho. Of these, 31 contain fish as a result of fish stocking activities by the State of Idaho The extreme variation in elevation, topography, and climate provide a unique wilderness character

The trail system is a result of past ranching activity It provides good access to much of the area, but the size and rugged nature of the wilderness assures excellent opportunities for solitude and primitive recreation Some trails need relocation or reconstruction to meet wilderness management objectives or to facilitate maintenance

North Fork John Day Wilderness - The North Fork John Day Wilderness, totalling about 122,000 acres, is shared with the Umatilla National Forest to the west. The North Fork John Day, Tower, and Greenhorn units of the wilderness comprise 107,000 acres and are located almost entirely on the Umatilla National Forest The 15,000-acre Baldy Creek Unit is located entirely on the Wallowa-Whitman National Forest and is separated from the main body of the wilderness by one and one-half miles of nonwilderness lands

The area is known for its anadromous fishery with the main stem of the North Fork John Day River and its tributaries providing over 40 miles of steelhead and trout habitat

The wilderness is highly mineralized and is rich in early mining sites including log cabins, wagon roads, tailings from placer mines, and mining ditches which date back to the mid-1800's. These draw people for recreational and historical pursuits, especially local residents. Popular recreation uses also include deer and elk hunting

The area is heavily forested. Conifers common to the area include western larch, Douglas-fir, Engelmann spruce, lodgepole pine, subalpine fir and white fir.

Monument Rock Wilderness - The Monument Rock Wilderness is divided between the Malheur National Forest (12,700 acres) and the Wallowa-Whitman National Forest (7,300 acres), straddling the ridge between the Malheur River and Burnt River drainages It is a mixture of open and timbered slopes.

The major recreational uses of the area are deer and elk hunting although hiking and backpacking are locally popular Resident trout are found in the Little Malheur River and several smaller streams

The Monument Rock Wilderness adjoins the Unity mineralized area (see Figure III-3) which has moderate potential for gold, copper, and molybdenum The bulk of the mineralized area is outside the wilderness.

Wild and Scenic Rivers

In 1968 through an act of Congress (P L. 90-542) the National Wild and Scenic Rivers System was created. The policy of United States, as established in the Act is:

> ". that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

The Act goes on to define three classes of rivers· wild, scenic, and recreational.

> "Wild river areas are those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted These represent vestiges of primitive America
>
> Scenic river areas are those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads
>
> Recreational river areas are those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past "

The Act established many rivers throughout the county as members of the National Rivers System.

In 1975 PL 94-199, the act which established the Hells Canyon National Recreation Area, amended the Wild and Scenic Rivers Act to include the National Forest portions of the Snake and Rapid Rivers in the National System.

With enactment of PL 100-557, the Omnibus Oregon Wild and Scenic Rivers Act of 1988, all streams that were inventoried in the DEIS for possible inclusion, became parts of the National Rivers System These were portions or all of the Lostine, Grande Ronde, North Powder, Eagle Creek, Joseph Creek, and the North Fork John Day. In addition, the Minam, South Fork Imnaha, and Imnaha were added, bringing the number of wild and scenic rivers on the Forest to ten (including the Snake) They are now part of all alternatives. Thus, the characteristics for which the streams were selected will be protected, boundaries of the corridors will be defined (within a year of the Act) and management plans will be prepared (within three full fiscal years of the Act). Corridors are approximately one-half mile wide. The Minam and Grande Ronde portions are also parts of the Oregon State Scenic Waterway System

Under terms of the Wild and Scenic Rivers Act, streams may be classified as Wild, Scenic, or Recreational. In general, this means that the free flowing nature of the streams will be maintained, but that management may otherwise vary according to the specific designation.

Wild river corridors are to be managed to retain their primitive character. Within scenic or recreational portions, more activities may occur such as timber harvest, mineral extraction, and recreational developments, but there is greater emphasis on maintaining natural landscapes along Scenic Rivers than there is along Recreational Rivers.

See Management Area 7 in Chapter 4 of the Forest Plan for more specific management information Table III-38 summarizes the Rivers in the Forest according to specific classification

Table III-38
Summary of Wild, Scenic, and Recreational Rivers
Wallowa-Whitman National Forest
(Figures in parentheses are off-Forest portions)

River	Wild	Scenic	Recreational	Total
Eagle Creek	4 0	6 0	17 0	27 0
Grande Ronde	16 4(10)		(15.9)	16 4(25 9)
Imnaha	6 0	4 0	58 0	68 0
S. Fork Imnaha	9.0			9.0
Joseph Creek	8.6			8.6
Lostine	5.0		11.0	16.0
Minam	39.0			39.0
N Fork John Day	4 5(23.3)	(10.5)	7.0(8 8)	11.5(42.6)
North Powder		6 0		6 0
Snake	31.5	36 0		67 5
TOTAL	124 0(33.3)	52.0(10.5)	93.0(26 2)	269.0(68 5)

Natural Landmarks

Under authority of the Historic Sites Act of 1935, the Secretary of Interior has established a National Registry of Natural Landmarks to encourage the preservation of areas that illustrate the ecological and geological character of the United States, to enhance the educational and scientific value of those areas, to strengthen cultural appreciation of natural history, and to foster a wider interest and concern in the conservation of the Nation's natural heritage.

On the Wallowa-Whitman National Forest, the Hells Canyon-Seven Devils geomorphic province and the Wallowa Mountains have been identified as potential National Natural Landmarks due to their geological features.

Each area will remain in potential status until it is further studied by the U. S. Department of Interior, National Park Service to determine if either area should be designated Since most of both areas are currently designated as wilderness, they are not high on the Park Service list of priorities for study.

Research Natural Areas

In an effort to preserve important or unique ecosystems, habitats and organisms, a Nationwide system of Research Natural Areas (RNA's) has been and continues to be developed. RNA's are tracts of land where natural processes are allowed to dominate and where natural features are preserved for research and education.

The objectives of establishing RNA's are critical to understanding their importance in Forest planning As stated by the Federal Committee on Research Natural Areas (1968) they are

-- (1) preservation of examples of all significant natural ecosystems for comparison with those influenced by man,

-- (2) provision of educational and research areas for ecological and environmental studies; and

-- (3) preservation of gene pools for threatened and endangered plants and animals

The Indian Creek Research Natural Area is the only RNA currently established on the Forest. Eighteen potential areas, representing some 30 ecologic cells not found in currently established natural areas, have been identified and suggested for inclusion by the research community Which areas will be recommended for inclusion will be decided through this analysis For a discussion of potential research natural areas, see Appendix H

Roadless Areas

The Oregon Wilderness Act of 1984 (P.L 98-328) decreed that lands which were reviewed in the second Roadless Area Review and Evaluation (RARE II) need not be considered for wilderness in the initial Forest Land and Resource Management Plan, but that wilderness options are to be reviewed when the plans are revised. This current (initial) plan is to be reviewed at least every 15 years.

For the purposes of wilderness, this EIS considers only the Dunns Bluff roadless area for addition to wilderness since it was identified after Congressional deliberations on the Oregon Wilderness Bill had taken place. However, all remaining roadless areas are discussed and information on their resources, suitability for roadless recreation, and potential for future consideration as wilderness is provided. (See Appendix C and Chapter IV for detailed information on roadless areas.)

There are now 38 roadless areas on the Forest totalling 484,443 acres Some that lie along the perimeter of the Eagle Cap Wilderness are very small, having had major portions added to the Wilderness by the Oregon Wilderness Bill. The largest remaining areas are the Twin Mountain, which includes most of the Elkhorn Mountain Range west of Baker City, and the Lords Flat-Somers Point area near the geographic center of the Hells Canyon National Recreation Area.

Of the remaining roadless areas, 13 are all or partially within the Hells Canyon National Recreation Area. Homestead, which also lies on land administered by the USDI, Bureau of Land Management, is being studied for wilderness The Bureau of Land Management is the lead agency. The allocation of the others, with the exception of Lake Fork which lies largely outside the NRA, was determined through the recently completed Hells Canyon National Recreation Area planning process. These decisions will be adopted by the Forest Land Resource Management Plan. This leaves 27 areas (including Lake Fork) to be dealt with in the current planning effort. Figure III-10 and Table III-39 show the locations and sizes of the areas For detailed roadless area information, see Appendix C.

RESOURCE SUPPLY AND DEMAND PROJECTIONS

This section summarizes anticipated supply and demand conditions for Forest goods and services for the RPA time period. The great bulk of the Forest outputs and activities identified in the RPA Program are intermediate in nature--they do not represent final outputs. To speak of supply-demand relationships for precommercial thinning or miles of road constructed, for instance, would be inappropriate. The appropriate consideration in the former case is sawtimber production, in the latter instant, roaded versus nonroaded recreation. Precommercial thinning, road construction, local area impacts, and so on are effects and are therefore not discussed here.

As used in this section of the document, "demand" is used to identify a particular point or instant on a demand schedule. As such, it reflects an intersection at a particular time between a demand

FIGURE III-10
ROADLESS AREAS

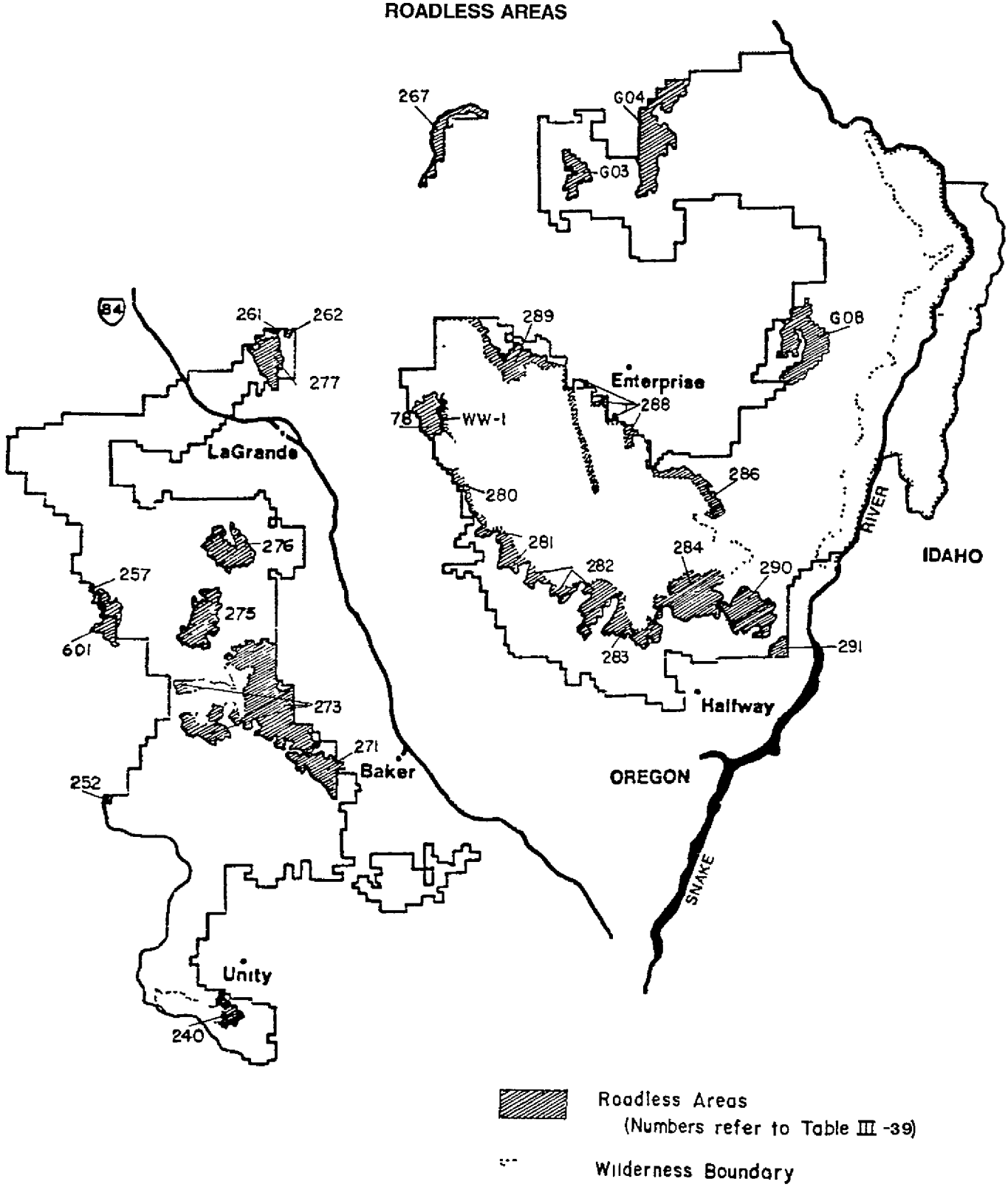


Table III-39
ROADLESS AREAS

See Appendix C for description of each roadless area listed below

Name	Roadless Number	Area Net Acres	Ranger District
Beaver Creek	276	12,470	La Grande
Boulder Park	282	12,311	La Grande, Pine
Castle Ridge	278	8,300	La Grande
Deadhorse	G08	10,451	Wallowa Valley
Dunns Bluff	WW1	1,013	La Grande
Grande Ronde 1/	267	4,890	Wallowa Valley
Greenhorn 2/	252	161	Unity
Homestead 4/	291	5,733	HCNRA, Pine
Hellhole 1/	261	513	La Grande
Huckleberry	289	10,107	Eagle Cap
Hurricane Creek	288	1,623	Eagle Cap
Joseph Canyon	G04	23,602	Wallowa Valley
Lake Fork	290	17,663	HCNRA, Pine
Little Creek	280	2,907	La Grande
Little Eagle Meadows	283	7,140	Pine
Little Sheep	286	5,278	Eagle Cap, Wallowa Valley
Marble Point	271	7,135	Baker
Monument Rock 3/	240	5,958	Unity
Mount Emily	277	8,822	La Grande
North Mount Emily 1/	262	772	La Grande
Reservoir	284	13,595	Pine
Squaw 1/	601	3,220	La Grande
Tope Creek	G03	8,674	Wallowa Valley
Tower 1/	256	85	La Grande
Twin Mountain	273	60,903	Baker
Upper Catherine Creek	281	6,844	La Grande
Upper Grande Ronde	275	11,810	La Grande
Totals	27	251,980	

See Hells Canyon FEIS Appendix D for description of each roadless area listed below.

Buckhorn	297	15,466	HCNRA
Cook Ridge	299	16,149	HCNRA
Imnaha Face	294	25,812	HCNRA
Lick Creek	285	218	HCNRA, Pine

1/ Portions lie within the Umatilla National Forest
2/ Portions lie within the Malheur and Umatilla National Forests.
3/ Portions lie within the Malheur National Forest.
4/ Portions lie within the lands administered by USDI Bureau of Land Management.

Table III-39 (continued)
ROADLESS AREAS

Name	Roadless Number	Area Net Acres	Ranger District
Lord Flat Somers Point	295	63,912	HCNRA
Mountain Sheep	298	16,777	HCNRA
Sheep Divide	G02	16,178	HCNRA, Wallowa Valley
Snake River	296	29,933	HCNRA
Wildhorse	300	14,602	HCNRA
Big Canyon (Idaho)	853	14,236	HCNRA
Corral Creek (Idaho)	854	19,180	HCNRA
Totals	11	232,463	

See Hells Canyon FEIS Appendix D for a description of each Roadless area listed below

schedule (a list of willingness-to-pay values for various levels of offerings) and a supply schedule (a list of volumes the seller is willing-to-offer at various prices)

Table III-40 depicts those intersection points over time for those Forest outputs for which such a display is meaningful. As such, they assume a continuation into the future of those factors which would provide viability for the respective enterprises In the case of livestock grazing, for instance, the figures assume continued population growth in the United States, a certain level of red meat consumption per capita, certain levels of imports and exports, certain cost levels for the goods and services used in the production of red meat, and so on The projections, like any projections, are therefore expected to be less accurate in the distant future than in the near future.

Table III-40
SUMMARY OF PROJECTED SUPPLY AND ANTICIPATED DEMAND

		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Recreation						
Developed Recreation						
Including Visitor Information Service (MRVD's & WFUD's)						
Projected Supply						
Current Direction		587	595	603	610	618
Maximum Developed Recreation 1/		661	661	661	661	661
Forest Plan		661	661	661	661	661
Anticipated Demand 2/		399	464	523	571	621
Dispersed Recreation Including Wildlife and Fish Use (MRVD's & WFUD's)						
Projected Supply						
Current Direction		7,067	7,379	7,621	7,614	7,606
Maximum Dispersed Recreation 3/		6,957	7,213	7,380	7,380	7,380
Forest Plan		6,995	7,183	7,304	7,304	7,304
Anticipated Demand 2/		1,427	1,577	1,819	2,037	2,189
Projected Supply of Roaded Recreation 4/						
Current Direction		6,492	6,983	7,351	7,351	7,351
Maximum Roaded Recreation 5/		6,553	7,228	7,657	7,657	7,657
Forest Plan		6,492	6,860	7,105	7,105	7,105
Anticipated Demand 2/		1,141	1,275	1,463	1,630	1,755
Projected Supply of Nonroaded Recreation 4/						
Current Direction		575	396	270	263	255
Maximum Nonroaded Recreation 3/		1,188	1,075	997	997	997
Forest Plan		503	323	199	199	199
Anticipated Demand 2/		286	302	356	407	434
Timber						
Sawtimber (MMCF, MMBF in parentheses)						
Projected Supply						
Current Direction	134	27.1	27 3	27 6	27 0	27 2
Maximum Timber Benchmark	184	39 1	39 1	39.1	39 1	39 1
Forest Plan	(144)	27.7	27 3	28.1	27 5	27 3
Anticipated Demand 6/	(250)	50 0	50 0	50 0	50 0	50 0
Roundwood (MMCF)						
Projected Supply						
Current Direction		7 8	6 5	5 2	5 2	5 2
Maximum Timber Benchmark		10 9	9 1	7 2	7 2	7 2
Forest Plan		7 9	6 6	5 2	5 2	5 2
Anticipated Demand 7/		12	12	12	12	12

SEE END OF TABLE FOR FOOTNOTES

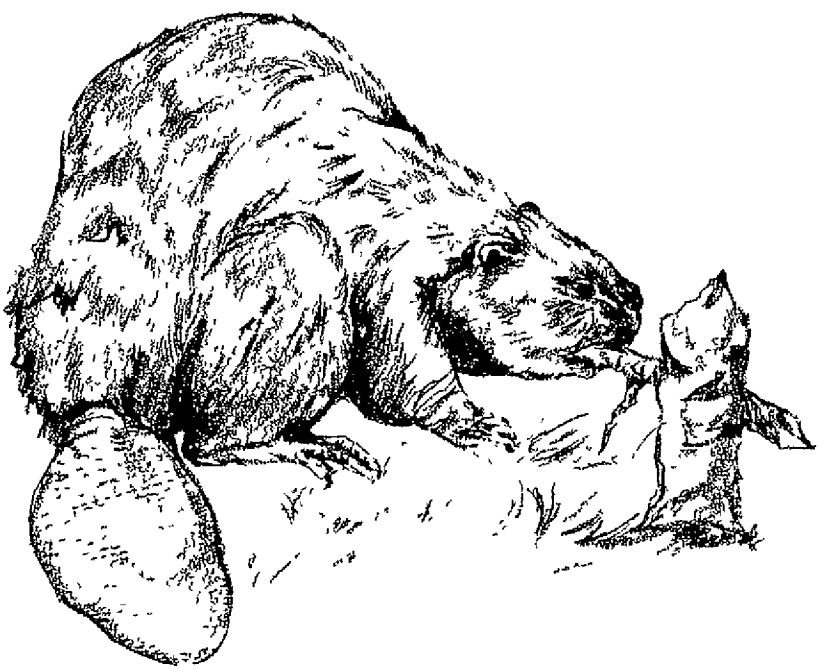
Table III-40 (Continued)
SUMMARY OF PROJECTED SUPPLY AND ANTICIPATED DEMAND

	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Livestock Grazing (MAUM's)					
Projected Supply					
Current Direction	186	186	186	186	186
Maximum Livestock Benchmark	227	227	227	227	227
Forest Plan	186	160	160	160	160
Anticipated Demand	227	227	227	227	227

1/ All alternatives except A, which is a budget-constrained alternative
2/ Based on recent historical experience, OBERS population projections for the State of Oregon, and Forest recreational opportunities
3/ Alternative E.
4/ Inclusive of WFUD's and recreational experience occurring in wilderness Roaded recreation is the sum of rural, roaded natural, and roaded modified recreation Nonroaded recreation is all other ROS categories
5/ Alternative B
6/ Based on mill capacity depicted on pp 25 and 53 of James O Howard's Oregon's Forest Products Industry' 1982, Resource Bulletin PNW-116, October 1984, USDA Forest Service Projections of demand entail projections of a myriad of interconnected factors--some of which can reasonably be estimated (population, for instance) and some of which cannot (technological breakthrough, shifts in appraisal methods, etc) It is reasonable to assume that installed mill capacity could be maintained for 2 decades, and that mill capacity beyond that time would be sufficient to process Forest offerings Cubic foot figures were generated using a 5 1 ratio
7/ Anticipated demand levels are basically an expression of mill capacity continued into the future Arguments might be made that population pressures would tend to increase overall National demand, assuming a relatively stable price structures No increase was shown however because of the opportunities available to substitute other products for wood and because, as an expression of local demand, expanded mill capacity would be contrary logic when raw material supply levels are not expected to increase e

CHAPTER IV

Environmental Consequences



CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

SUMMARY OF CHAPTER IV CHANGES

DRAFT TO FINAL

1. Data tables and figures have been updated to account for adjustments in Alternative C and other alternatives as described in Chapter II.

2. The discussion of potential effects on wild and scenic river additions has been eliminated to account for the Omnibus Oregon Wild and Scenic Rivers Act of 1988

3. The discussion of the effects on big-game habitat has been expanded in response to public and agency comments.

4. The discussion of the consequences of even-aged and uneven-aged timber management has been expanded

5 The evaluation of the effects of timber harvest on spring and summer stream flows has been expanded.

6. The role and effects of mitigation measures has been expanded, particularly in regard to soil and water.

7 Information on other agency planning has been added.

8. In response to public comments, and for clarification, there have been numerous editorial changes

9 There have been formatting changes to more clearly illustrate cumulative effects and mitigation measures.

OVERVIEW

This chapter provides the scientific and analytic basis for the comparison of alternatives presented in Chapter II. Chapter IV provides written discussion of the reasons and causes of the environmental effects of the alternatives, and presents the important interrelationships among resources, land uses, and environmental conditions. Outputs and activities associated with the various alternatives are shown in Table II-5 and discussed narratively in Table II-6. These outputs are not reproduced in this chapter unless needed to clarify the discussion or aid in comparing the different effects of the alternatives. This chapter discusses those effects which are related to the major issues identified in Chapter I or are of specific public or management concern

The net public benefits from the Wallowa-Whitman National Forest are derived from resources with market and assigned prices as well as resources and conditions for which prices cannot reasonably be assigned Nonpriced benefits include quantifiable and quali-

tative outputs and effects. Quantified and qualitative outputs and effects are both crucial to understanding the whole picture of environmental consequences and the net benefits to the public Both are discussed here (section titled Social and Economic Effects) and in comparing alternatives in Chapter II Material in this chapter will explain the relationships between resource outputs and environmental qualities, consequences, and include, where relevant, the ties between quantitative and qualitative aspects.

Alternatives are primarily different combinations of land management areas Thus, the effects of an alternative are largely determined by the effects of management area direction and the number of acres allocated to each management area However, the rate of implementation is also important For example, the effects on soil and water within a drainage basin will be different if the merchantable timber is removed over a 10-year period than if the same timber is removed over a 30-year period.

Effects can be beneficial or adverse and can be direct, indirect, or cumulative. Although direct and indirect effects are discussed they are not, in general, discussed separately in this section. Where cumulative effects are expected to occur, they are discussed separately Effects vary in importance from negligible to significant and may be short-term (10 years or less) or long-term (over 10 years). The analysis identifies the significant adverse effects which cannot be avoided and those effects which represent irreversible and irretrievable commitments of resources should the proposed action be implemented.

Cumulative consequences include the accumulation of impacts on the environment which result from the impact of an action when added to other past, present and reasonably foreseeable future actions. A cumulative effect can be any effect on the human environment (physical, biological, economic, social). The intent in this environmental impact statement is to focus analysis and decisions at a programmatic level and to describe their associated direct, indirect, and cumulative effects Since effects of project-level activities may be different from those at the programmatic level, additional NEPA analysis, including cumulative effects analysis, will be necessary for individual projects. For example, when timber sales are being considered, the cumulative effects of potential activities in the watershed, and perhaps on adjacent private land, will be analyzed This project level analysis will determine whether the resource management objectives (Forest Plan, Chapter 4) can be met, considering specific cumulative effects If resource objectives cannot be met, then the project cannot be implemented in its proposed form.

In order to analyze the effects of each land management alternative, the relationships in each alternative must be understood, and the total combined effects of these relationships identified and evaluated. This chapter documents that analysis.

Much of this analysis is based on modeling of the complex interrelationships among economic, physical and biological conditions, and management prescriptions An important part of implementation will be to monitor the accuracy of predictions in order that more information is available for future planning efforts

There are certain environmental effects that are common to most or all alternatives that are not discussed in this chapter, but are dealt with in other studies An example is the limitation on created openings, such as through clearcut tree harvest, to a 40 acre maximum in eastern Oregon National Forests The effects of this limitation are discussed in the Environmental Impact Statement for the Pacific Northwest Regional Guide. The effects of limitations on the dispersal of created openings, and the height which trees must attain before an opening is no longer considered an opening (4 1/2 feet in eastern Oregon), are also evaluated in the Regional Guide EIS.

The herbicide issue has been and will continue to be dealt with in separate environmental analyses and NEPA documents at the Regional level All alternatives in this Forest Plan EIS assume the continued use of the full range of alternative treatment methods including manual, mechanical, prescribed fire, biological, and chemical methods under the conditions prescribed in the current Regional EIS. If chemical tools are not available in the future, it may be necessary, regardless of the alternative, to adjust projected costs or the proposed levels of timber outputs Timber stand condition and performance (with or without the availability of chemical release) will be evaluated and any needed adjustments in the harvest level made during implementation and monitoring

Some issues which were brought up by reviewers of the Forest Plan DEIS are not discussed because they are beyond the scope of this analysis An example is the effect of Forest management on global warming It may be that this will be an issue for future Forest Plans, however. Another example is an evaluation of the morality of the alternatives in terms of traditional religious values We have attempted to keep evaluations within the framework of laws and regulations.

In 1986, a research study to determine the effects of intensive Forest management on elk and deer, and for other purposes, was initiated on the Starkey Experimental Forest and Range. This particular study required construction of 30 miles of elk-proof fence. Several of the reviewers of the Forest Plan DEIS commented on the project and questioned or criticized it. Because the study was described and evaluated in a study report entitled "Controlled Elk, Deer, Cattle and Timber Studies on the Starkey Experimental Forest and Range· Environmental Assessment," it is not dealt with in this EIS. However, it can be said that research projects on the Starkey area will continue as planned regardless of the Forest Plan alternative that is selected for implementation.

No Change Alternative

In many instances, information on the effects of the NC Alternative is not available and cannot be reasonably estimated This is due to the differences in the way the NC Alternative was developed and the fact that management direction, within the NC Alternative, for nontimber resources is generally lacking. Consequently, some of the outputs and effects discussed for the other alternatives in the EIS are unknown for Alternative NC and are not discussed Where only qualitative information is available for the NC Alternative, this information is provided in narrative form.

Mitigation

As defined by the Council on Environmental Quality (40 CFR 1508.20) "mitigation" includes·

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments

In accordance with 40 CFR 1502.16(h), mitigation measures are included in this chapter when not fully covered in Chapter II (Alternatives including the Proposed Action) In Chapter II, mitigation measures are described as an integral part of each management alternative with specific reference to standards and guidelines (S&G's). The role of S&G's is of utmost importance in considering environmental consequences since they provide the primary means of mitigating the effects of all projects designed to implement the Forest Plan. The S&G's, and their effectiveness, will be further evaluated during the implementation phase through formal as well as informal monitoring (See monitoring plan in Chapter 5 of the Forest Plan.)

Standards and guidelines are found in Appendix D of this EIS and Chapter 4 of the Forest Plan. These S&G's rely to considerable extent on Best Management Practices (BMP's) which provide specific proven methods of mitigating effects on water quality, fish habitat, and riparian areas The process for determining BMP's is described in EIS Appendix O. The watershed BMP's are found in a book entitled "Watershed Management Practices Guide for Achieving Soil and Water Objectives," and is available for review at the Forest Supervisor's Office and each Ranger Station on the Forest.

VEGETATION

All alternatives will affect vegetation to varying degrees These changes may take several forms, including diversity (changes in species composition, age class distribution), vigor (health), and extent (for example, how much of the land is covered with vegetation vs. how much is occupied by roads) Activities which affect vegetation include timber management, grazing by livestock and wildlife, mining, road construction, construction and maintenance of utility corridors, fire and fuels management, recreation, insects, and diseases Although there is considerable overlap, this section is subdivided into several sections in order to make the discussion more clear

DIVERSITY OF PLANT SPECIES AND TREE STAND AGE CLASSES

Direct and Indirect Effects

Timber management has more influence on Forest diversity than any other activity. Timber management can increase or decrease diversity. The level of diversity is expected to increase through early decades in all alternatives as mature stands are converted to shrub seedling, pole-sapling, and young timber stands. Diversity is expected to peak between the third and fifth decades with mature and older timber stands still represented, but will decline from there as mature timber stands continue to be harvested. Table IV-1 displays the projected distribution of tree stands by age class.

Diversity within any alternative will also vary by management area. For example, there will be less diversity in Management Area 1 than in Management Areas 2, 3, or 18. Created openings will sometimes abut stands where the trees are little more than 4 1/2 feet tall, providing minimal edge contrast Within Management Area 1, most mature stands on gently sloping ground will be scheduled for harvest in their entirety within thirty years Mature stands presently represent nearly 55 percent of all gently sloping forest lands and often occur in major continuous patches. An additional 10 percent of the gentle forest lands are characterized by overwood removal opportunities which are also scheduled

TABLE IV-1

AGE CLASS DISTRIBUTION BY ALTERNATIVE, DECADES 1,2, AND 5 1/
(Thousands of Acres)

	NC	A	B	B-DEP	C	C-DEP	D	E	F	G	H
DECADE 1											
Nonvegetated	69	69	69	69	69	69	69	69	69	69	69
Grass/forb 2/ (0-10 yrs)	NE	943	948	901	937	939	936	940	939	954	938
Immature conifer (11-70 yrs)	NE	270	285	343	280	304	287	280	243	251	266
Mature Conifer (71-160 yrs)	NE	574	574	566	577	552	572	579	584	581	582
Mature + (161 + yrs)	NE	493	474	471	486	485	485	481	515	495	494
DECADE 2											
Nonvegetated	69	69	69	69	69	69	69	69	69	69	69
Grass/forb 2/ (0-10 yrs)	NE	912	932	910	918	911	920	930	929	949	917
Immature Conifer (11-70 yrs)	NE	399	417	457	406	437	411	392	324	338	370
Mature Conifer (71-160 yrs)	NE	496	486	486	488	470	486	499	511	523	508
Mature + (161 + yrs)	NE	473	445	427	468	463	464	459	517	470	486
DECADE 5											
Nonvegetated	69	69	69	69	69	69	69	69	69	69	69
Grass/forb 2/ (0-10 yrs)	NE	901	938	889	925	919	932	930	895	931	932
Immature Conifer (11-70 yrs)	NE	667	718	836	675	669	680	664	570	598	598
Mature Conifer (71-160 yrs)	NE	283	281	241	297	292	287	325	318	349	334
Mature + (161 + yrs)	NE	429	343	314	383	400	381	362	497	402	417

1/ At end of decade
2/ Includes natural grasslands and forest lands from which trees have been removed

within the first two decades. Therefore, large areas of relatively flat ground will be converted to openings or young tree stands unless interrupted by riparian zones, visual foreground areas, timber lands unsuited for timber production, or old-growth management areas. The intermingling of steep lands, economically unsuitable in some alternatives, will occasionally increase the interspersion of forest cover and openings

In general, Management Areas 2, 3, and 18 will provide better diversity, through time, than Management Area 1. Management direction for these areas requires 10-foot tall trees prior to the harvest of adjacent units and permitting a substantially better edge contrast which will benefit wildlife, recreation, and aesthetics Created openings will often abut stands of trees that are 10 feet tall and others with trees that are 30-35 feet tall The cover dispersion requirements of Management Area 3 will further enhance edge contrast by providing interspersion of stands 60-100 feet in height.

Increases in edge and successional stages in plant communities provide habitat for greater numbers of wildlife species and are thought to provide a higher degree of ecological community stability. The variety of big-game cover may also affect recreational opportunity by changing distribution of hunters, composition of animals harvested, and the length of time it takes to harvest the available animals. For more discussion of the benefits of edge, interspersion of types, successional stage diversity, and their relationship to Forest management, the reader is encouraged to read "Wildlife Habitats in Managed Forests" (Thomas and others 1979).

Tree species diversity will remain high in all alternatives Tree species which do not reproduce well under the shade of existing tree crowns, such as western larch and ponderosa pine, will occur less frequently in stands managed under uneven-aged methods. Shade-tolerant species (true firs and Englemann spruce) will increase These changes will be most noticeable in Alternatives E, F and G, since timber management is generally less intensive in these alternatives, encouraging shade-tolerant species Douglas-fir, ponderosa pine, western larch, and lodgepole pine will increase in Alternatives NC, B, B-departure, and D. The high level of even-aged regeneration harvest (clearcutting, seed tree, or shelterwood) in these alternatives will encourage these shade-intolerant species. White fir, spruce, and subalpine fir will remain strong components of riparian areas, wilderness and Management Area 6 in all alternatives.

In addition to the changes in tree sizes and species composition that will occur over time as timber stands are established and managed, other forest plants will also change. Timber harvest will disturb soil and prepare seedbeds for many plants that were less apparent prior to harvesting. Wildflowers will increase Seeding to control erosion will establish grass species which will also provide additional elk and deer forage. Huckleberry shrubs are likely to increase as are ceanothus shrubs Mushrooms will be more available for a few years immediately following timber harvest Pine grass and elk sedge will often increase.

Ground disturbance also creates the opportunity for plants considered undesirable such as Canadian thistle or knapweed species Use and maintenance of roads tend to promote the spread of noxious plants onto and within the Forest, and from the Forest.

Changes in species composition which are dependent upon ground-disturbing activities will be most pronounced in Alternatives NC, B-departure, B, and C-departure, with their high levels of timber management activities. Changes would be slight in Alternatives F and G which have relatively low levels of timber management activities, and intermediate in Alternatives C, D, E, and H.

Cumulative Effects

Nearly all of the previously mentioned effects are cumulative as more than 20,000 acres are harvested each year in most alternatives. In addition, similar changes in vegetational diversity will be occurring on neighboring lands of other ownership or on other federal lands. It is not as though the changes will start and become evident once the Forest Plan is implemented. Diversity changes brought about by timber management practices have been occurring on and off the National Forest for more than 70 years. In many ways, the changes that will occur will be a continuation of changes that many people have come to *recognize as the norm.*

Mature and old-growth tree stands (also see discussion under old growth) will be reduced on the Wallowa-Whitman National Forest and on adjacent National Forests. Significant stands of mature and old-growth trees are already rare on private lands and are expected to be further reduced with continued private land timber harvesting.

Overall, diversity will be higher in those alternatives which retain high levels of old growth forest and which have low levels of timber harvest activity. Alternative F, with a high level of old growth forest retention and a low rate of timber harvest will provide the highest overall plant diversity. The other alternatives, in decreasing order of overall diversity, are E, C, H, C-departure, D, G, A, B, B-departure, and NC.

Mitigation Measures

Effects on diversity will be mitigated by other lands where timber will not be managed. These will help to provide overall forest diversity, including the old-growth successional stage. All alternatives include nearly 250,000 acres of forest in wilderness or other lands within Hells Canyon National Recreation Area which are, and will remain, mature or old-growth trees except as altered by fire or natural events All alternatives contain approximately 90,000 acres of widely scattered lands unsuited for timber production, but which contain trees and will contribute to the mature and old-growth ecosystems. The scattered old growth allocations and riparian areas will also contribute to maintaining diversity, even in the alternatives with the most timber management activity.

Mitigation is also provided through the establishment of research natural areas (RNA's). RNA's are intended to preserve examples of all significant natural ecosystems for comparison with those influenced by humans, to provide educational and research areas for ecological and environmental studies, and to preserve gene pools for typical and rare and endangered plants and animals.

Additional mitigation measures influencing diversity are found in Forest-wide standards and guidelines (Plan, Chapter 4) in sections entitled Diversity and Timber Management.

FOREST VEGETATION

Direct/Indirect Effects

On those portions of the Forest where *timber management activities* are proposed under any alternative, forest vegetation will be significantly changed. These changes or effects vary by the frequency of treatment and the type of treatment.

The two major silvicultural systems are even-age management and uneven-age management The Regional Guide and EIS specify that the even-aged silvicultural system will be

the most commonly used system in the coniferous forests of the Pacific Northwest Region although uneven-aged systems may be used under specified conditions where continuous forest canopy is necessary to meet management objectives such as streamside protection, visual resources, or critical soil conditions This management philosophy is consistent with recommended silvicultural systems for the Forest's timbered types as described in Agricultural Handbook 445, "Silvicultural Systems for the Major Forest Types of the U. S " See discussion in Appendix B, Determining Silvicultural Systems.

Within the Hells Canyon National Recreation Area, selective harvest is required. Selective harvest may be uneven-aged but may include even-aged methods such as shelterwood harvest (Crowell 1984). The interim rule for management of the area, 36 CFR 292, October 5, 1989, interpreted selective harvest to mean selection harvest.

Throughout the remainder of the Forest, either uneven-aged or even-aged regimes may be used depending on which methods best meet resource management objectives as determined by site specific analysis. Since even-aged methods are preferable for disease control and economic efficiency, they are most likely to be used where timber production is emphasized, regardless of alternative. Where landscapes are particularly sensitive, or along stream courses, uneven-aged methods will predominate

Consequences of even-aged harvest methods include changes in landscape appearance, and impaired or improved habitat for some wildlife species (See landscape appearance and wildlife and wildlife habitat sections of this chapter for discussion of these effects.) Even-aged management is considered the most effective harvest method for achieving timber management objectives on the majority of sites Uneven-aged methods well be used where necessary or desirable to provide special consideration for other resource values, regardless of management alternative.

When uneven-aged methods are used, trees are harvested selectively, and large, unnatural-appearing openings are less apt to be created. (Openings up to two acres in size may be created with uneven-aged methods) However, frequent harvest entries are necessary to keep the stands growing freely. Even-aged managed stands may be left alone for 80-100 years with only one precommercial thinning entry

Because of the necessity for frequent entries to maintain uneven-aged stand character, it is necessary to leave more roads open or close and reopen them frequently. Because of the lower volume per acre that is harvested, it is necessary to have timber sale activities occurring over more acres each year than with even-aged management.

Regeneration harvesting by both even-aged and uneven-aged methods removes much of the existing forest vegetation During the period between when logging occurs and trees regain dominance on the site, cover for some species of wildlife will be reduced or eliminated However, increases in grass, forbs, and shrubs will benefit animals whose habitat in early seral vegetation The increase in grasses and forbs will benefit domestic livestock. Where adequate cover remains after logging, forage increases will also benefit some wildlife species.

Logging with even-aged or uneven-aged methods would reduce conifer canopy closure to encourage the establishment of tree seedlings Grass, forb, and shrub vegetation would also increase following a reduction in the conifer canopy The greatest increases in grass, forb, and low shrub cover would occur under even-aged management. Following logging, the site may be scarified to temporarily reduce the growth and density of ground vegetation where conifer regeneration is desired. The purpose of scarification is to provide short-term environmental conditions that are favorable to the germination, establishment,

and growth of conifer seedlings. The alternatives with the greatest amount of even-aged management would have more acres scarified following logging to promote reforestation. Conifer crowns will begin to close within 20 to 30 years after logging, reducing the amount and vigor of other vegetation Where uneven-aged methods are used to regenerate stands, conifers would remain dominant on the site following each harvest entry

All alternatives include a mix of even-aged and uneven-aged management. (The decision on the most appropriate harvest method for each individual stand is made at the project level) Regardless of alternative, uneven-aged management is expected to predominate in the sensitive visual corridors adjacent to major travel routes, in riparian areas, and within the Hells Canyon National Recreation Area, with even-aged management most common elsewhere

The overall effect of timber management activities is most closely related to the acreage allocated to timber production. These acreages are shown, by alternative, in Table IV-2, which also projects even-aged and uneven-aged management

Table IV-2
FORESTED ACRES ALLOCATED TO TIMBER PRODUCTION
AND NONCONSUMPTIVE USES, BY ALTERNATIVE
(Thousands of Acres)

	ALTERNATIVES										
	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
Timber Mgt (Total)	1,238	867	880	940	837	846	857	789	798	801	806
Even-aged	1,238	714	795	834	730	728	733	699	692	731	703
Uneven-aged	0	153	85	106	107	118	124	90	106	70	103
Nonconsumptive Use	174	545	532	472	575	566	555	623	614	611	606
Total Forested Acreage (M Acres)	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,412

Salvage of dead and dying trees will directly reduce the numbers of standing snags and down logs in the forest. This may indirectly affect the wildlife species dependent on this type of habitat. (For details, see Wildlife and Wildlife Habitat section of this chapter.)

Removing dead trees from the forest may reduce dead and down woody material needed for nutrient recycling. Salvage of dead trees may also reduce the future numbers of down logs and improve access for domestic livestock. These are both indirect effects.

Alternative NC is somewhat different from the other alternatives in several respects. It does not recognize the Congressionally-mandated use of selection harvest systems in the Hells Canyon National Recreation Area (HCNRA). If Alternative NC were adopted, it is likely that the Act which created the HCNRA (Public Law 94-199) would have to be amended.

Another significant difference between Alternative NC and the other alternatives is that Alternative NC schedules harvest from lands which have been identified as unsuited for timber management NFMA

regulations (36 CFR 219 14) require that a suitability assessment of forest lands be made and that scheduled harvest not occur from lands determined to be unsuited These include lands which are difficult to reforest (technology is not available which will reasonably assure reforestation within five years) or which cannot be harvested, using existing technology, without causing irreversible damage to soil or water resources Lands which have been identified as difficult to reforest, if harvested under Alternative NC, would likely remain devoid of trees for one or more decades

While it is necessary to harvest trees at relatively young ages (60-100 years for most species) in order to maintain desired sustained volume yields, there are disadvantages from a wood quality standpoint. Because the harvested trees are small, less than 20 inches in diameter at breast height, there is a lower percentage of clear, knot-free wood than is found in larger trees that have grown much longer. This results in lower grade lumber Because the timber cut from fast growing trees is less dense and it is not as strong as trees that have grown less rapidly. This is an important factor if wood is to be used directly as cut from the tree in the form of boards or structural materials such as two-by-fours. If the wood fiber is to be further processed and glued back together, or laminated, strength is less of a factor.

Reforestation following logging would be by both natural seeding and by planting of nursery grown seedlings. Where even-aged methods are used about half of the mixed conifer stands and nearly all of the lodgepole pine stands would be regenerated with natural seedlings. The balance would be planted. Uneven-aged management will rely heavily upon natural regeneration. However, some planting will occur to assure that a desirable mixture of species will exist in future stands

Other activities may also affect forest vegetation The construction of utility corridors may result in a cleared strip of land, miles long, and devoid of trees. Mining activities may also result in some loss of forest. Neither of these is likely to affect much of the forest or to vary by alternative.

Recreational activities have little direct or indirect effect on forest vegetation although recreation caused soil compaction may inhibit tree and other plant establishment in some very localized instances.

Most effects of recreational use on other resources increase as use increases This includes soil disturbance and compaction, damage to vegetation within and adjacent to developed sites, and the variety of other effects that occur when people are concentrated. However, the very fact that use is concentrated at particular attractions (e g , campgrounds) makes it easier to deal with the associated effects on other resources, than if use were less concentrated These effects are not expected to vary significantly by alternative

Soil compaction caused by *livestock trampling* can make it more difficult for trees to become established and/or cause reduced growth rates. Neither of these effects on Forest vegetation is considered significant They will not vary significantly among the alternatives

Roads may also reduce the amount of forest vegetation Roads accessing the Forest are necessary to manage timber, mineral, and other resources Within the clearing limits, all trees are removed On the road running surface, all vegetation is removed Native and exotic grass species may be seeded on cut and fill slopes to reduce erosion and inhibit invasion by noxious weeds. On constant service roads, vegetation is permanently excluded from the running surface. Where roads are used only intermittently, the running surface may be scarified and seeded with native or exotic grass and forb species Miles of road construction vary by alternative. Those alternatives which schedule more intensive harvest or access more roadless area, such as Alternative B, B-departure, and C-departure, have high levels of road construction and will have greater road-related effects on vegetation than will the other alternatives. Alternatives F, G, and H, with relatively low levels of timber harvest, also require fewer roads The remaining alternatives are intermediate. See Table IV-8 for a comparison of road construction and reconstruction in all alternatives

The supply and availability of *fuelwood* is affected by several factors. In future decades, the Forest will harvest smaller trees. Forest industry is increasing its use of chips and wood wastes Increased use of smaller trees would tend to decrease the amount of fuelwood made available by harvest operations. Emphasis on scenic quality, wildlife habitat values, and nutrient cycling in forest ecosystems may also decrease the amount of fuelwood available in future years. Increased roading associated with developing roadless areas, higher harvest levels, and roading associated with mining will improve access for firewood and make it more available to the public

Adequate fuelwood to meet demand will be available, regardless of alternative, at least for the next decade Alternatives such as NC, B-departure, B, and G, which provide high levels of forest access, would make fuelwood gathering somewhat easier Alternatives such as F and E, with highly restricted access, would make fuelwood gathering more difficult Alternatives A, C, C-dep, and D would be intermediate in difficulty of fuelwood access.

Cumulative Effects

In general, effects on forested vegetation on other ownerships will be similar to those on the National Forest. Tree stands will take on a more managed appearance, regardless of ownership Most changes will be the result of timber management activities although those related to mining, grazing, recreation, and utility corridors will continue Indirect effects, such as reduced habitat for snag-dependent wildlife species will be cumulative across all ownerships where timber management occurs.

Since activities on private lands are expected to occur largely independent of activities on the National Forest, and since timber management is the biggest impactor of forest vegetation, alternatives having the largest amount of timber management activity are expected to have the greatest cumulative effects on forest vegetation. These are, from most to least in descending order: NC, C-dep (first decade), B-dep, B, D, A, C (Preferred), E, H, G, and F.

Mitigation Measures

Mitigation of timber harvest effects is provided by a variety of methods including dispersing harvest units across the landscape and through time, controlling unwanted vegetation using mechanical or chemical means, protecting snags from fuelwood cutters, and retaining green trees for future snags For details, see the standards and guidelines in those sections of the Plan, Chapter 4 dealing with Timber Management, Wildlife, and Fuelwood.

The most noticeable objectionable effects of power transmission corridors are the cleared strips for overhead lines and their associated structures. There are a variety of mitigation measures available to help "soften" the visual effects but none which make the corridors disappear, as can be the case with underground transmission facilities. Measures include painting structures colors which blend with surrounding colors, raising Christmas trees within the corridors, shaping the corridors by varying the widths and leaving and maintaining trees and shrubs within the corridor. The Forest Service relies on Agricultural Handbook No. 478 for methods of mitigating utility corridors Also see the Standards and Guidelines in Plan, Chapter 4 dealing with Landscape Management and Power and Transportation Facilities (Management Area 17).

Livestock-related problems are sometimes avoided by excluding livestock from timber stands during the critical regeneration period. Once the trees are established and large enough to be obvious to the livestock, grazing will tend to reduce vegetation competition and may aid tree growth In those alternatives which require higher levels of tree planting (C, D, B-dep, C-dep), livestock grazing could be a problem and would require more expenditures for plantation protection fencing or temporary exclusion of livestock from areas of newly planted trees. Also see Plan, Chapter 4 Standards and Guidelines for Range.

Damaged vegetation at developed recreation sites can be restored by rerouting people through the use of signs and trails, or use can be otherwise curtailed to allow site recovery. The restriction of use in certain areas is also a means of mitigating resource deterioration caused by too much dispersed recreational use Such measures are currently being taken in some National Forest wildernesses.

Mitigation measures for mining activities are found in the Minerals and Watershed sections of the Standards and Guidelines (Plan, Chapter 4).

OLD-GROWTH FOREST

Direct/Indirect Effects

Old-growth forest is directly impacted by timber harvesting To assure that old-growth forest is retained across the Forest, some lands are allocated for old-growth preservation.

The old-growth forest allocation (Management Area 15) varies by alternative as described in Chapter II The areas vary in size from 40 to 300 acres and are scattered over the Forest to maintain associated recreational experiences, wildlife habitat, genetic diversity, and old-growth ecosystems The areas will not be scheduled for timber harvesting, but harvest may occur in the event of a catastrophe or when the timber stands deteriorate and no longer serve the intended purposes. If an old-growth stand is lost, a replacement stand will be selected.

The management requirement for old-growth groves throughout the Forest, while providing habitat for wildlife species which depend on large dead trees, also provides forest habitat that benefits other wildlife species, and variety for human enjoyment.

There are presently 173,000 acres of old-growth on the Forest. In the long term the amount will range from 172,000 acres in Alternative F to 105,000 in Alternative NC as illustrated in Table IV-3. The acreage remains fairly high because of the amount of old-growth in the Hells Canyon National Recreation Area and the four wildernesses.

Although all alternatives (except NC) meet management requirements, distribution of old-growth stands is poorest in alternatives having the least acreage of old-growth. With the exception of Alternative E, distribution is best in alternatives with the greatest acreage of old-growth. Except for extensive roadless areas where old-growth is maintained, Alternative E shares the distribution pattern of Alternative B.

Table IV-3
ACRES OF OLD-GROWTH FOREST BY ALTERNATIVE 1/
(Thousands of Acres)

Decade	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
1	122	154	150	143	164	160	158	169	172	157	163
2	112	150	145	137	162	158	155	168	172	154	161
5	105	147	142	133	161	156	153	167	172	152	160

1/ For further understanding of where these acres are located, see Table II-8 in Chapter II.

In the absence of specific old-growth allocations, Alternative NC has the lowest level of old growth of any alternative. In the long term, old growth would be found only in the Hells Canyon National Recreation Area, Wilderness, and some roadless areas

As can be seen from the table, even after 50 years, Alternatives C, C-departure, D, E, F, and H maintain as much as 90% of the current levels of old growth, and the most severe, Alternative NC, retains over 60 percent. This is because on the Wallowa-Whitman, a large proportion of the Forest is in wilderness and the Hells Canyon National Recreation Area, and a correspondingly large percentage of the currently existing old growth is in those areas. This factor, more than anything else, mitigates the effect of old growth reduction, by preventing reduction, at least for the Forest as a whole.

The process of designating patches of old-growth forest separated by areas of intensively managed forest lands indirectly results in fragmentation of the habitats of those species which require mature and old-growth trees. Distances between habitats were based on the best available information regarding species mobility (see Appendix M). It is expected that viable populations of all dependent vertebrate species will be maintained although the numbers of individual species may be reduced, indirectly, as a result of habitat reductions in most alternatives (also see Wildlife and Wildlife Habitat section of this chapter).

Cumulative Effects

As shown in Table IV-3, most of the reduction in old growth occurs within the first 20 years, regardless of alternative. This is due to the cumulative effects of timber harvest over that period Not estimated are the effects of forest fires over time In addition to the reduction, old-growth becomes cumulatively more fragmented over time in all alternatives. Old growth outside wilderness is already highly fragmented on the Wallowa-Whitman.

Old growth on adjacent private and public lands is expected to decline regardless of the Forest Plan alternative selected. The rate of decline on private and other public lands will depend on such factors as stumpage values and demand for lumber. It is expected that eventually nearly all of the old-growth and mature forest in northeastern Oregon will be found on National Forest and other public lands

Mitigation Measures

The fragmentation of old-growth stands (Management Area 15) surrounded by timber management areas is mitigated by stream corridors which tend to connect old-growth groves with strips of trees within which many old-growth characteristics are retained, i.e., large trees, and snags and a low level of timber harvest activity

RANGE VEGETATION

Direct/Indirect Effects

Range vegetation is directly affected by a variety of activities The more significant of these are livestock and wildlife grazing. Lesser effects are those associated with timber management, recreation, and mining

Livestock and some *wildlife* directly affect range vegetation through forage removal. This effect may be beneficial or detrimental depending on how much forage is removed and when it is removed.

Direct benefits of grazing include trampling of seed to cover it (thus encouraging germination) and improvement of decadent shrubs on winter range (breaking down dead material and cropping to

promote new growth) Livestock use of forage that would otherwise die and become a fire hazard is a beneficial indirect effect of grazing

On the negative side, livestock directly contribute to soil compaction which can change the soil structure, affect water absorption and holding capacity and inhibit plant growth. Compaction is minimized by assuring that grazing lands are relatively dry before grazing occurs. However, naturally-moist meadows receive damage regardless of when they are grazed. To avoid all such damage would be possible only through elimination of grazing of both wildlife and livestock.

Because of the terrain typical of much of the Wallowa-Whitman -- narrow creek bottoms interspersed with high steep-sided ridges or plateaus -- cattle tend to concentrate along creeks and canyon bottoms This can result in overuse of forage, soil erosion, and damage to streambanks.

Grazing also influences the species of plants that grow in any grazed area. In meadows for example, bluegrass species being more resistant to grazing than many other meadow species, will increase with heavy grazing On drier sites, different species, usually those most palatable to livestock, will decrease while other species will tend to increase If overgrazing occurs, nonpalatable species, including noxious weeds, will become established and increase

Livestock will sometimes bring noxious weeds onto the Forest by transporting seeds from distant areas

All alternatives include livestock grazing, so all include the risk of adverse grazing-related effects The degree of risk is related to the amount of livestock grazing under each alternative. Those alternatives such as B and G which have high levels of livestock grazing also have the highest risk of grazing-related vegetation damage. Alternative E and F, with substantially less total grazing use, prevent proportionally less risk of grazing-related effects on range vegetation Projected permitted livestock for all alternatives is shown in Table IV-4.

As *timber* is harvested, understory plants are released to grow and potential forage is increased. As the new timber stands grow and reoccupy the land, this "transition" forage gradually decreases Because of tree thinning and relatively early re-entry for timber harvest, the potential forage production never falls back to unmanaged levels This cycle causes more total forage to be available under a continuing timber management program than without management (assuming absence of periodic wildfire) Therefore, somewhat more forage is produced as more acres are managed for timber. Alternatives B or NC would be expected to produce more forage than Alternatives F or G.

Table IV-4
PERMITTED LIVESTOCK FORAGE ALLOCATION BY ALTERNATIVE
(Thousands of AUM's Per Year, First Decade)

NC	A	B	B-dep	C	C-dep	D	E	F	G	H
186	186	207	204	186	186	191	163	143	207	186

On the Wallowa-Whitman, the potential future transition forage production differences between alternatives are not large because over 50 percent of the land suitable for grazing is nontimbered and many of the gains due to transition forage resulting from timber harvest are already a part of the current situation Therefore, analysis indicates a range of less than 4 percent between Alternatives B and F over the Forest as a whole at the end of the first decade. However, the range is 13 percent when calculated only on the forested area.

Cumulative Effects

Livestock are joined by elk and deer in their use of the forage on the Forest and the effects of combined use are cumulative. Wildlife have the advantage of being able to use the range earlier in the year than livestock, as well as during the time that livestock are using it Early use, when the ground is moist, can damage soil and deplete early spring forage. However, since elk move around more on the range than livestock, soil damage is less significant than would be the damage from livestock if they were permitted to use the range early (Lyon 1985). To a lesser extent, recreational use and mining may also affect range vegetation. These effects may be cumulative with those of livestock grazing and timber management.

Little variation among the alternatives is expected to occur regarding the effects of timber management, recreation, or mining on range vegetation Consequently, the overall (or cumulative) effects on range vegetation are expected to most closely reflect livestock grazing levels As shown in Table IV-4, Alternatives B and G, at 207 MAUM's per year, have the greatest potential for affecting range vegetation. Alternative D is next at 191 MAUM's, followed by Alternatives NC, A, C, C-departure, and H at 186 MAUM's Alternatives E and F show relatively low risk at 163 MAUM's and 143 MAUM's, respectively.

Mitigation Measures

The Forest Plan (Chapter 4 - Standards and Guidelines for Range) provides forage utilization standards intended to reduce or eliminate adverse effects of grazing on range vegetation These Standards and Guidelines apply both to grazing by domestic livestock and big game The key to making the standards and guidelines effective is in their consideration and application during the development and implementation of allotment management plans (AMP's) These plans form the basis for agreements between the Forest Officers and the grazing permittees on how the allotments will be managed. This includes kind of livestock, livestock numbers, times when livestock may be turned on to the allotments, when they must be removed, the grazing system that will be used, maintenance and development of structural improvements, etc.

Monitoring to determine effectiveness of the AMP's is also a part of mitigation This includes utilization checks to determine if sufficient vegetation remains after the prescribed grazing period, if fences and other improvements are properly maintained, and whether the grazing system is accomplishing its objectives or whether adjustments are necessary.

In some instances, it is necessary to close allotments to grazing as a means of accomplishing other resource objectives. Closure can be an effective mitigation measure.

Unwanted vegetation that results from livestock grazing can be reduced or eliminated by a variety of means, the most effective of which is through spraying with herbicides followed by sound grazing management.

RIPARIAN

Direct/Indirect Effects

Riparian areas are directly affected by timber management activities, recreation, livestock grazing, mining, and roads

Timber management effects include disturbance and compaction of riparian soils, loss of shade-producing trees, and damage to herbaceous and shrubby vegetation. Indirect effects may include higher stream temperatures and higher turbidity and sediment levels (also see sections of this chapter dealing with Soil and Water, and Fish) Timber harvest activities also reduce the amount of large woody debris available for nutrient recycling and for retaining stream channel stability.

The significance of these effects varies by alternative, with those alternatives having more riparian timber management activity also having higher risk of riparian damage Table IV-5 compares riparian timber management activity, by alternative, for Decades 1, 2, and 5 As can be seen in the table, those alternatives with high first-decade total harvest levels (such as B-dep and C-dep) have relatively high amounts of riparian timber management activity. Alternative A, which manages timber-producing lands at a high intensity level, also includes substantial first-decade activity within riparian areas. Alternatives B, C, D, E, F, G, and H have substantially lower levels of riparian timber management in the first decade Although not estimated in the table, Alternative NC has the highest potential for timber-related riparian damage since it assumes full timber yield from these areas

Livestock grazing, which may be the single greatest impactor to riparian areas, has contributed locally to streambank instability, channel cutting, sedimentation of fish spawning gravels and reduction of deciduous stream shade This indirectly affects the productivity of spawning gravels, the pool-riffle structure and shading of smolt rearing areas.

Since livestock grazing on any individual riparian area normally occurs every year, or nearly every year (depending upon the grazing system being used), a high percentage of the riparian areas on the Forest are impacted every year.

The risk of livestock-related riparian damage is tied directly to the numbers of livestock on the Forest and inversely to the efforts made to reduce their use of riparian areas. All alternatives include substantial increases in range improvements, proportional to the numbers of livestock being grazed. The risk of riparian damage, even with increased investments, will be closely related to total livestock use, as shown in Table IV-4. Alternatives B and G, at 207 MAUM's per year have the highest risk Alternative D is next at 191 MAUM's, followed by Alternatives NC, A, C, C-dep, and H at 186 MAUM's Alternatives E and F show relatively low risk at 163 MAUM's and 143 MAUM's, respectively.

In the past, *mining-related activities* have resulted in undesirable environmental effects which are still plainly visible These effects include stream siltation, topsoil removal, aquifer disruption, and scars on the landscape Most noticeable on the Wallowa-Whitman, and on adjacent lands, are the many miles of dredge tailings that have severely altered the channels and floodplains of many streams.

Table IV-5
RIPARIAN TIMBER HARVEST ACTIVITIES BY ALTERNATIVE

	ALTERNATIVE										
	NC	A	B	B-Dep	C	C-Dep	D	E	F	G	H
Decade 1											
Acres 1/	NE	1,174	730	1,897	856	957	719	659	727	716	719
Percent 2/	NE	3.4	2 1	5 5	2 5	2 8	2.1	1.9	2.1	2 1	2 1
Decade 2											
Acres 1/	NE	768	1,212	0	872	866	1,150	990	1,068	1,207	1,150
Percent 2/	NE	2 2	3 5	0 0	2 5	2.5	3.3	2.9	3 1	3.5	3.3
Decade 5											
Acres 1/	NE	1,021	1,744	1,648	1,494	989	1,676	1,473	1,635	1,698	1,648
Percent 2/	NE	3 0	5 1	4 8	4 4	2 9	4.9	4.3	4 8	4 9	4.8

1/ Acres of riparian area projected to be disturbed by logging activity per year.
2/ Percent of total riparian area projected to be disturbed by logging activity per year.

Mineral activities result in environmental impacts which, though usually mitigated, are still noticeable for many years. Like many industrial operations, smoke, dust and noise are created. Tailings piles are often conspicuous. Placer operations, even with reasonable care taken, increase sediment in streams. They often remove riparian vegetation, thereby removing the shade and other benefits this vegetation provides. These effects will be the same for any given mining operation regardless of the land management alternative selected

Roads adversely affect riparian areas where they parallel closely or cross streams The greatest impacts are from poorly designed or located roads already in place (Recently constructed roads and roads planned in the future are designed and built to have little riparian impact). All alternatives call for reducing the adverse impacts of existing roads. Consequently, few differences in road-related riparian impacts between the alternatives are projected. Even though the intent is to provide good riparian protection in new construction, the risk of accidental riparian damage from roads will depend on the total amount of road construction activity. Alternatives with higher levels of road construction activities, such as NC, C-departure, or B-departure provide higher risk than Alternatives F, G, or H, which have low levels of timber management. Alternatives A, B, C, D, and E would be intermediate in risk. (See Table IV-8 for projections of road construction and reconstruction by alternative)

Recreation activities such as fishing, boating, swimming, and camping may affect riparian areas by compacting soil and trampling riparian vegetation These effects are localized, and are of very limited magnitude compared to timber harvest, mining, and roads. They will not vary by alternative.

Cumulative Effects

Since grazing, timber harvesting, roads, recreation, and mining can all occur in close proximity, their riparian effects are cumulative Also, riparian effects may last for a long period of time and may be cumulative with future activities in the same area. In addition to the combined impacts of livestock and machinery on the soil, timber harvest often creates openings and paths which can attract livestock, possibly causing more grazing use than is desirable in certain areas, or helping to distribute livestock to areas where more use is desirable.

Total effects are most dependent on grazing levels, timber harvest levels, and road construction and use. Alternative NC provides the highest total risk since it assumes full timber yield from riparian areas, would require substantial road construction and use and maintains a fairly high level of grazing The remaining Alternatives, in descending order of total effect are B-dep, B, A, G, C-dep, D, C, E, and H

Mitigation Measures

Mitigation of timber management effects on riparian areas includes such things as using selective cutting, cable yarding to reduce soil disturbance, leaving trees to provide shade and future dead woody material, protecting snags, revegetating disturbed areas, and avoidance when riparian objectives cannot otherwise be met

The proper application of standards and guidelines (Chapter 4, Forest Plan) will largely mitigate the effects of timber harvest on stream courses (or other riparian areas) regardless of alternative. These measures include strict limitations on the level of vegetation removal that may take place along stream courses and controls on machinery operating near streams Many timber sale contractual clauses have been developed and proven over time to be effective in protecting fish habitat.

All alternatives seek to reduce grazing-related riparian problems through mitigation measures that provide better control of livestock and reduced grazing level in riparian areas In addition, many miles of stream are being restored through combined agency efforts (See Chapter III for information on rehabilitation programs and baseline information on riparian grazing areas)

Since this EIS was issued in draft, the Regional Forester has issued new standards which will, in effect, reduce the degree of vegetation utilization by livestock in riparian areas. The primary purpose is to give greater protection to soil and water values (including water temperatures.) Implementation of these standards, through development of allotment management plans, will result in less conflict between livestock grazing and recreation or wildlife uses.

Allotment management plans will include a strategy for managing riparian areas for a mix of resource uses A measurable desired future riparian condition will be established based on existing and potential vegetation conditions. The plans will identify management actions needed to meet riparian objectives within the specific time frame. Measurable objectives will be set for key parameters, such as stream surface shaded, streambank stability, and shrub cover. This process is described in "Managing Riparian Ecosystems (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington" (1979). The plan will address the monitoring needed to determine if the desired rate of improvement is occurring. Allotment management plans currently not consistent with this direction will be developed or revised on a priority basis under a schedule established by the Forest Supervisor.

Modern-day prospecting and mineral operations are more sophisticated and do not result in the same degree of environmental degradation as occurred in the past State laws have also been enacted which, for example, regulate the amount of suspended or dissolved material that may be introduced to a stream from a mining operation. On the National Forest, plans of operation are

required which control significant impact on surface resources from development of mineral deposits and provide for rehabilitation of disturbed sites after operations are completed

For details of mitigation activities, see Plan, Chapter 4, Standards and Guidelines for Watershed, Range, and Roads

THREATENED, ENDANGERED, AND SENSITIVE PLANTS

Direct/Indirect Effects

On the Wallowa-Whitman National Forest, there are no known threatened plants but there is one endangered plant species, the MacFarlane's Four-o'clock (Mirabilis macfarlanei). No adverse effect on this species is anticipated in any alternative See Chapter III of this EIS for additional information.

In addition to MacFarlane's Four-o'clock, there are 50 other plant species which are considered "sensitive". *Timber harvesting* may affect sensitive plant species, detrimentary or beneficially. Species which respond positively to increased light or site disturbance may benefit from harvest activities. Other species may be adversely affected by these same activities

Some species may be adversely affected by *natural or prescribed fire Grazing* by livestock and wildlife may adversely affect sensitive species by consuming the plant or through trampling.

Road construction can destroy sensitive plants through site conversion to a different use.

Although the intent is to protect sensitive species in all alternatives, the likelihood of damage to sensitive species is greater in those alternatives with higher levels of timber activity and road construction (such as NC, B-departure, and C-departure) and lower in Alternatives F, G, and H which have relatively low levels of these activities. The remaining alternatives would be intermediate in risk.

Cumulative Effects

Effects from road building, fire, livestock grazing, and timber harvest could be cumulative on some species The relative ranking of risk, considering cumulative effects, would not differ from that shown under direct/indirect effects

Mitigation Measures

Regardless of the alternative, protection of listed species will take precedence over other land management direction. Informal consultation with the U S Fish and Wildlife Service determined no effect on threatened or endangered species arising from the decisions addressed within this EIS and Land and Resource Management Plan. Provision is made in the plan to pursue informal or formal consultation as necessary during project design and analysis

Project-level inventories are made and projects adjusted to assure that sensitive species are protected. For additional details, see Plan, Chapter 4, Standards and Guidelines for Threatened, Endangered, and Sensitive Species

INSECTS, DISEASE, FIRE, AND ANIMAL DAMAGE

Direct/Indirect Effects

In general, the incidence of *insects and disease* which affect trees will be in inverse proportion to the acres of land intensively managed for timber production. For example, Alternative B, with a high percentage of Management Area 1, will have a high proportion of young, healthy timber which is more resistant to insect attack and not as susceptible to disease as are older, more slowly growing trees Alternative F, with more acres of old-growth forest, Management Area 6, and other management areas with objectives which preclude intensive timber management practices, will have a greater amount of infection These same areas may provide a source of insects and diseases that can infect adjoining timber stands.

Tree disease problems are likely to increase with uneven-age management since it is not possible to remove an entire diseased stand at one harvest entry. Dwarf mistletoe and various root rots are prominent examples of disease that are difficult to control where uneven-aged management is used.

Although the differences in alternatives will influence *fire and fuels*, there are many factors that are similar regardless of the alternative considered. In general, a higher level of timber management activity will require greater emphasis on fire prevention and detection programs because of the higher levels of investment in the land. Recreation use is also expected to gradually increase in all alternatives, necessitating increased fire prevention and detection programs.

In recent years Forest managers have become increasingly skilled in the use of fire and consider it a valuable tool for achieving objectives that would often be prohibitively expensive or less environmentally sound if achieved by other means If fire is to be used effectively, it must be used when conditions are suitable for proper combustion, smoke dispersal, and when other conditions are satisfactory to meet objectives Therefore, a degree of risk must be assumed There will be instances when fires will burn more intensely than anticipated, producing undesirable effects These can include increased soil erosion, reduced site productivity and increases in undesirable vegetation. This will often be true for the spots where slash is piled and burned but may also occur when heavy concentrations of fuels occur in broadcast burn areas Impacts on air quality may occur as a result of burning (see Air Quality, this chapter)

Fire is also important for preparing the ground for tree planting or natural seeding. Other beneficial effects can include reductions in undesirable plant species, increased availability of nutrients and reduction of undesirable microorganisms (Boyer and Dell 1980).

The differences in acres allocated to timber production in any alternative will cause the greatest variance in acres burned due to use of fire for fuel reduction Harvest and silvicultural treatments on steep slopes will limit mechanical fuel treatments, in some instances making use of fire the only suitable alternative.

Prescribed burning may result in increases in noxious weeds, particularly Canadian thistle Where this proves to be a serious problem, control of the weeds through the use of chemicals or other means may be necessary

There is a prevalent opinion that fires grow larger and are more damaging when they occur in areas where timber harvest has not occurred and there are apparently greater accumulations of fuel The fires of 1989 did not affirm that assumption If anything, they showed that under severe burning conditions, there is little difference in rate of fire spread or the degree of tree mortality between timber stands which have been managed for timber production and those that have not It may be that the drier conditions under the more open, managed stands, and the greater exposure to the wind, may offset the advantages of lower fuel accumulations. Tree stands managed for timber production are

usually more accessible, making it easier to get to fires, but this accessibility also means there is increased risk of human-caused fires.

Regardless of the foregoing, it is recognized that fuel loading (the accumulation of fuels over time) is a factor in the control of fires and the intensity of burn in a variety of conditions. Those alternatives *which tend to allow the buildup of higher levels of fuels, Alternatives E and F in particular, will have* a higher risk of serious and damaging fires

Wildlife cause some damage to trees, most of which is not of sufficient magnitude to be considered serious except in recently established stands or young stands in which large investments have been made. Pocket gophers can kill large numbers of young trees by severing the roots. Porcupines are sometimes a problem due to their girdling of trees, particularly in plantations. Deer and elk sometimes bite off the tops of trees during feeding activities These are the only wildlife species that are recognized for creating conflicts with timber management on the Wallowa-Whitman at this time.

Unlike insect and disease trends, animal damage problems are likely to increase in direct proportion to the number of acres intensively managed for timber production The potential for damage to young trees by rodents, as well as by grazing or browsing animals, will increase as the acres of newly planted stands increase Alternative NC, with the highest level of timber harvest and associated reforestation would be expected to have the highest animal damage. The other alternatives, in decreasing order of risk, are B-departure, C-departure, B, D, E, C, A, H, G, and F.

Cumulative Effects

Actions which affect insect and disease levels on National Forest land may affect adjacent and interspersed lands in other ownerships. If insects and diseases build on increase on National Forest lands, these buildups may serve as a source of infection on adjacent lands.

Mitigation Measures

The key to successfully mitigating the effects of prescribed fire are dependent on the Forest's ability to predict and measure conditions (fuel, weather, topography, manpower, and tools) which will lead to a successful operation with few undesirable effects One method of mitigation is to accomplish fuel reduction and resource management objectives by other means such as soil scarification by mechanical *means to prepare seed beds, herbicide use to control undesirable plants, or hauling away* nonmarketable fuels from the forest

Prescribed fire can be used to reduce fuel loading, and accomplish other objectives, regardless of whether or not timber management is a land management objective (Brown 1971). For example, prescribed fire could be used to reduce fuels in Management Area 6 Air quality, funding, and public *acceptance will be major factors in determining when and where prescribed fire is used.*

Control of damage to trees from pocket gophers is effectively accomplished by poison grain baiting in the animals' burrows. Leaving perch trees in plantations for hawks can also help control pocket gophers levels.

Because of low reproductive rates, porcupines can be controlled by hunting or by poisoning. Deer and elk damage is often mitigated by treating seedlings with a repellent.

SOIL AND WATER

The major impacts to soil and water from management activities include reduced soil productivity (from compaction, displacement, erosion, nutrient loss), reduced water quality (from sediment, increased stream temperatures, bacterial pollution, and chemical pollution), and changes in stream-flow (which may show up as altered flows, changes in aquifer recharge, or both)

Numerous activities affect soil and water These include timber management activities, livestock grazing, wildlife use, recreation, fire, roads, mining, and water withdrawal

SOIL PRODUCTIVITY

Direct/Indirect Effects

Timber harvest and slash disposal will directly impact soils by displacement, compaction, or reducing fertility, depending on method used. On gently sloping ground (normally less than 35 percent slope) where tractors are used, roads, skid trails and landings may occupy 20 percent of the land area These facilities are necessary for the harvesting operations, and it is intended that the impacted area will be kept to this amount or less, regardless of alternative

Different yarding methods cause different levels of soil disturbance. Studies in Oregon and Washington indicate about five times greater soil area disturbance from unconstrained tractor skidding of logs as compared to cable yarding. The difference is about ten times between helicopter yarding and tractor yarding (Dryness, 1965) Helicopter yarding causes the least amount of soil disturbance, especially on steep slopes (45 to 90 percent) and is applicable on areas with shallow or fragile soils Helicopters, however, require large landings which can contribute measurably to soil erosion if not properly constructed and maintained Further, road density is at a minimum, which reduces erosion potential.

Tractor yarding with either wheel skidders or tracks can disturb soil over relatively large areas. Tractors cause deep soil disturbance by compaction, displacement, or puddling under saturated conditions. The deep soil disturbance causes reduced infiltration capacity and accelerates surface erosion Tractor yarding requires a network of skid roads over the entire cutting unit Soil disturbance and surface erosion can be severe when tractors are used on steep terrain. Because tractors operate most efficiently with short skidding distances, access road mileage is high. If logging is well planned (i e , designating skid roads), soil damage during tractor logging can be markedly reduced over a project with unplanned skid trail locations Uneven-aged silviculture will likely increase the number of tractor trips over the number of trips in even-aged management. A greater portion of the area will likely be in skid trails and landings when uneven-aged management is practiced.

Tractor skidding may be difficult to conduct within acceptable damage limits on some sites. Working on displaced soils, crossing perennial streams, and operating on steep slopes under unfavorable weather conditions or on hydric soils can cause unacceptable damage to soil, water, fishery, and timber values.

Cable logging systems move logs to the landing by dragging or suspending logs with cables Cable systems generally cause less soil disturbance than tractor logging and can operate where tractors would be unsuitable. Depending on the system, yarding distances up up to 5,000 feet are possible, which reduces road density compared to tractor yarding

The helicopter is a mobile yarder. Yarding distances up to 10,000 feet are possible with optimal distances of 2,500 to 4,000 feet The logs are flown completely free of the ground to the landing. Water

and soil disturbance is minimal. Safety and maneuverability may require large landings of up to one acre.

Horse logging creates about one-half of the site disturbance of tractor yarding. Deep disturbance or compacted soils are only about one-eighth of the level found in tractor operations in similar conditions, or about the same as skyline systems (Satterlund, 1972)

Horse logging generally results in low site disturbance because of the maneuverability of the animals and the small discontinuous ground contact of their feet. More disturbance is caused by the trailing logs than the horses. Because of limited power, animals often skid downhill. These repeated trips on the same trails may concentrate water. Some work may be necessary to disperse water from the trails (Satterlund, 1972). Horses are occasionally used in campgrounds and other sensitive areas on the Wallowa-Whitman.

Log gouging is usually associated with cable yarding systems. Under dry conditions, there is a rearrangement of the surface soil layers by scraping or plowing action. That can cause a concentration of runoff, subsequent erosion, and a reduction in productivity. Under wet soil conditions, it causes localized soil puddling. Some log gouging of the litter and portions of the top soil can be beneficial to tree seedling establishment

Soil disturbance is also influenced by road construction. The disturbance is determined by road width, road gradient, and slope gradient. The soil disturbance increases surface erosion

In the absence of rehabilitation, soils recover very slowly from compaction. Compaction may last 20 to 40 years based on field observations and occasionally longer. Increased timber harvest and post-sale activities, such as mechanical site preparation, could cause cumulative increases in compaction and corresponding decrease in soil productivity as old sale areas are relogged with tractors New compaction could occur in addition to the old compaction.

Table IV-6
AREA DISTURBED ANNUALLY BY TIMBER HARVEST
FOR EACH MANAGEMENT ALTERNATIVE
(Thousands of Acres/Average Annual by Decade)

ALTERNATIVE	DECADE 1	DECADE 2	DECADE 5
NC	NE	NE	NE
A	22	25	31
B	22	24	28
B-dep	28	32	42
C	24	22	26
C-dep	31	21	26
D	22	25	28
E	20	23	25
F	18	22	21
G	17	21	22
H	18	23	24

NE Not Estimated

During the first and second decades, harvesting will continue to occur on a higher percentage of gentle ground than in later decades. This is true with any of the alternatives On steep ground (over 35 percent slope) where timber is yarded by cable or helicopter, compaction is much less a problem but erosion from rain or snowmelt can be serious.

Although effects on soil productivity from timber management activities in the different alternatives will be similar, those alternatives with higher levels of activity will have greater total effect. Table IV-6 compares the alternatives on the basis of acres disturbed per year in Decades 1, 2, and 5.

Alternative NC does not include specific standards and guidelines for soil and water protection as required by 36 CFR 219 23. It is likely, however, that the effects will be similar, in most areas, to the effects described for the other alternatives

Since tractor use has the greatest soil impact, timber-management related effects on site productivity are primarily associated with tractor yarding and tractor piling of slash Table IV-7 lists the expected tractor logged area by alternative. Of course, not all the area will be crossed with tractors

Table IV-7
ACREAGE OF TRACTOR LOGGING IN DECADE 1
BY ALTERNATIVE (M.ACRES)

ALTERNATIVE	DECADE 1
NC	NE
A	17.1
B	17 8
B-dep	17 5
C	17 9
C-dep	22 3
D	17.3
E	16.2
F	14 0
G	15.5
H	14 8

NE- Not Estimated

A significant difference between Alternative NC and the other alternatives is that Alternative NC schedules harvest from lands which have been identified as unsuited for timber management NFMA regulations (36 CFR 219 14) require that a suitability assessment of forest lands be made and that scheduled harvest not occur form lands determined to be unsuited. These include lands which are difficult to reforest (technology is not available which will reasonably assure reforestation within five years) or which cannot be harvested, using existing technology, without causing irreversible damage to soil or water resources. Alternative NC is likely to result in long-term erosion from some of these lands

The effects of repeated timber harvest may include a decrease in site productivity, due to such factors as nutrient loss and soil compaction. On-going research will help determine whether timber management, as practiced on National Forests in the United States, results in long-term loss of site productivity. The long-term relative risk of damage to site productivity is directly proportional to the level of timber harvest that is authorized by the alternative Thus, Alternatives NC, B, or B-departure, with high levels of activity, would carry greater risk than Alternative F or G. The remaining alternatives would present intermediate risk.

Livestock contribute to soil compaction which can change the soil structure, affect water absorption and water holding capacity and inhibit plant growth

It is the intent of management to prevent the serious detrimental effects of grazing by close adherence to the standards and guidelines described in the Forest Plan Nonetheless, there is greater risk of grazing damage with higher livestock grazing levels than with lower levels, other factors being equal. Alternative F would involve the least risk with numbers some 23 percent lower than present levels Alternatives B, B-dep, and G involve greater risk than present with numbers 11 percent greater than present The Forest-wide differences between other alternatives are probably not significant. The significant differences will be on individual allotments where project level analysis will determine whether certain allotments need grazing reductions, whether some currently vacant allotments will be stocked at all, and whether stocking of some allotments can be increased.

As with any large animals, *elk and deer* contribute directly and cumulatively to soil compaction and streambank damage through trampling Because they are on the ranges in *early spring when soil is moist and soft, this damage can be significant*

Developed recreational activities take place at improved sites such as campgrounds, swimming and boating areas and winter sports sites. These uses have direct impacts on the specific land areas such as soil compaction, incidental damage to vegetation and normal wear and tear on facilities

Dispersed Recreation activities may result in localized soil compaction and displacement in relatively small areas such as hunter camps. Effects of dispersed recreation on soils are generally considered insignificant. Exceptions are occasional adverse direct effects on soil by off-road vehicles and recreational livestock. Since recreation activities are fairly constant between alternatives, differences in effects are expected to be negligible

Wildfire and prescribed fire can seriously deplete soil nutrients and damage soil structure (Wells, 1979) There will be instances when fires will burn more intensely than anticipated, producing undesirable effects These can include increased soil erosion, reduced site productivity and increases in undesirable vegetation This will often be true for the spots where slash is piled and burned, but may also occur when heavy concentrations of fuels occur in broadcast burn areas.

Induced non-wettability, the water repellency of a soil from concentrated heat and a coating of organic materials on the surface of the soil particles, can be caused by excessively hot fires on certain soils covered with litter and vegetation. Non-wettability changes the hydrologic continuity of the soil, reducing water infiltration, and reducing eventual movement of soil nutrients into vegetation Surface erosion rates may also increase Wildfire and prescribed burning may cause this to occur.

There may be some soil nutrient losses through soil erosion, burning activities (planned and unplanned), and slash disposal practices If the soil's nutrient reserve is in the upper 4-6 inches of the soil profile, management activities can reduce the reserve by: 1) displac-

ing the soil, 2) volatilizing nutrients during high intensity burns, or slash disposal practices that do not leave enough organic matter on site to maintain the current nutrient recycling Total slash disposal would reduce or eliminate organic matter from the soil. This reduces the nutrient source of organic matter which is important in forming and maintaining soil structure. Structure is important because it affects the soil water holding capacity, resistance to erosion, and nutrients available for vegetative growth.

Slash burning also releases nutrients for vegetation use, which is considered beneficial However, under conditions of coarse textured soils and high precipitation, nutrients may be leached from the site. Water quality may be changed slightly because more nutrients will occur in water runoff and shallow ground water. Runoff from the Wallowa-Whitman National Forest normally has so few dissolved nutrients that a substantial increase in dissolved nutrients is not likely to cause significant water quality problems. It may improve the aquatic food chain

Mining activities directly affect soil productivity through erosion, burying of nutrient-rich surface soils, and compacting soils in the area of operation. The total area affected by mining activities is small and is not expected to vary by alternative.

Roads normally reduce soil productivity through dedication of the site as a transportation facility. The Forest currently includes some 9,300 miles of road, occupying nearly 11,000 acres. All alternatives identify the need for additional roads (see Table IV-8). Although roads can be rehabilitated and returned to timber and forage production, road construction is normally considered an irretrievable loss of productivity.

Whenever soil loss occurs due to erosion, indirect effects on water quality and fish are likely to occur. Erosion, compaction, and displacement of soils will indirectly affect future growth of forest vegetation.

Cumulative Effects

Timber management activities can have cumulative effects on soil through repeated entries to harvest timber, dispose of logging debris, and prepare sites for planting In general, the higher the timber harvest level of the alternative, the greater the ground disturbance, the greater the risk of cumulative effects, and the greater the need for mitigation measures

Timber management effects must also be considered along with the effects of other management activities. For example, in most areas where timber harvesting occurs, livestock grazing also takes place. The same areas will also require road access and fuel treatment. Since the major soil productivity effects are related to timber management activities, those alternatives with the highest level disturbance for timber management will also have the greatest cumulative effect on soil productivity Alternative NC, with the highest level of timber harvest would be expected to have the highest risk of productivity loss The other alternatives, in decreasing order of risk, are B-departure, C-departure, B, D, E, C, A, H, G, and F. This general relationship will hold true for all decades, with C-departure being higher than B-departure only in the first decade.

Mitigation Measures

Means of mitigating the effects of timber management activities on soil especially when they occur through commercial harvest, are numerous and varied They include such things as careful design and location of roads and skid trails, seeding grass on recently harvested slopes which are subject to erosion, directional tree felling, keeping large

machines out of wet meadows and other wetlands, and limiting harvest to dry seasons. Those that are used, and the effectiveness of them, can best be determined through site-specific analysis and monitoring of each sale project. In the case of commercial timber sales, the prescribed mitigation measures are determined by interdisciplinary teams and will show up in environmental assessments, timber sale design, and as clauses in timber sale contracts

The key to successfully mitigating the effects of prescribed fire are dependent on our ability to predict and measure conditions (fuel, weather, topography, manpower, and tools) which will lead to a successful operation with few undesirable effects Prescribed fire can be scheduled to occur when moist soil conditions prevent damage.

Reducing soil damage due to livestock is minimized by such measures as insuring that grazing lands are relatively dry before grazing occurs, resting allotments or pastures for one or more years, and by fencing livestock out of critical areas.

Since this EIS was issued in draft, the Regional Forester has issued new standards which will, in effect, reduce the degree of vegetation utilization by livestock. The primary purpose is to give greater protection to soil and water values. Since these standards apply to total utilization, regardless of whether use is by domestic livestock or big game, these standards will to some degree mitigate the effects of game on soils also.

On the National Forest, plans of operation are required which control significant impact on surface resources from development of mineral deposits and provide for rehabilitation of disturbed sites after operations are completed.

Since most roads on the Forest have been constructed, or will be constructed, to remove timber, one means of mitigating road-related soil productivity losses is to determine whether the road is needed. In timber sale planning, the option of alternate means of sawlog removal is always considered, e.g., long-span cable yarding or use of helicopters can reduce need for roads

For additional details on soil-related mitigation measures, see the Standards and Guidelines (Plan, Chapter 4) dealing with soil, watershed, timber, livestock grazing, recreation, and transportation systems

WATER QUALITY

Direct/Indirect Effects

Although standards and guidelines will be followed, some soil loss and sediment production will occur and will affect streams when *timber* is harvested. This sedimentation will be detrimental to water quality and fish habitat. Normally, sediment increases related to timber management will not be apparent, being within the natural variation in sediment levels. In individual drainages, larger increases will sometimes occur as a result of unusual climatic events, a concentration of activities within a short period of time, or where mitigative measures were inadequate Figure IV-1 displays accelerated sediment production for the various alternatives by decade. This is actually an index of sediment risk, since it is virtually impossible to accurately predict sediment production from management activities on a Forest-wide basis Actual sediment production from timber sale or road construction activities is much more dependent on the quality of project design and implementation than on the size of the project. For example, one poorly located road or skid trail on a small timber sale may create more sediment than an entire large timber sale if the large sale is well designed and implemented Research has shown large increases in sediment pro-

duction when "mistakes" are made (Rice and others 1979) and small increases when " . the best available knowledge in timber harvest layout and execution was applied " (Heede 1987).

Alternatives which include more timber sales, or harvest timber from a larger total area have a higher sediment production risk because of increased chance for error Any of the alternatives will result in little sediment increase from timber harvest activities if those activities are properly designed and implemented. Alternative NC, with the highest level of timber harvest would be expected to have the highest sediment production risk, particularly since it would require much more intensive management within riparian areas. The other alternatives, in decreasing order of risk, are B-departure, C-departure, B, D, E, C, A, H, G, and F. This general relationship will hold true for all decades, with C-departure being higher than B-departure in the first decade. For derivation of sediment production estimates, see Appendix F.

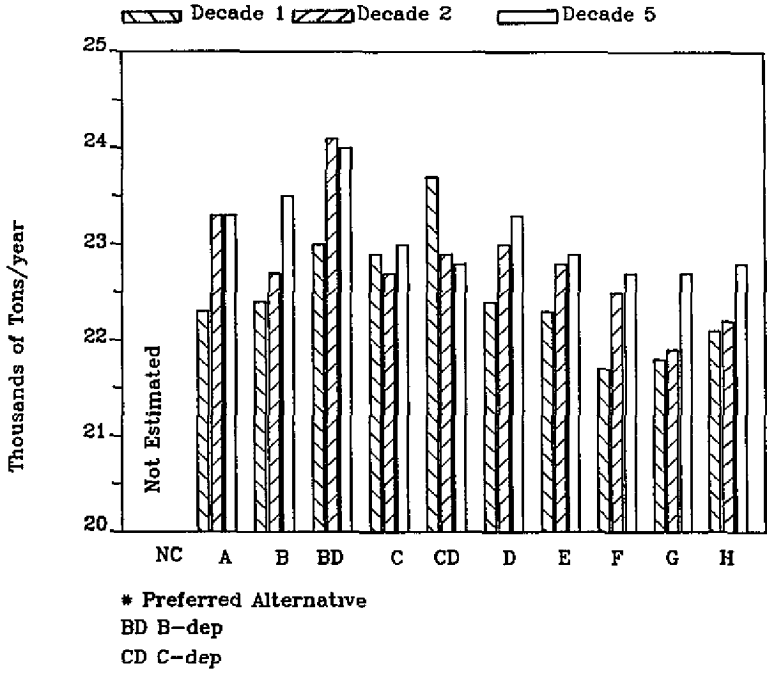
Unlike the other alternatives, Alternative NC assumes full timber production in riparian areas. It is unlikely that water quality standards for temperature could be met In the long-term, large woody debris would be lacking from riparian areas, thus reducing stream channel stability The changes would reduce the quality of fish habitat

Changes in water quality can result from *wildfire or prescribed fire*. Wildfire can have many serious impacts because it often takes place during periods when it burns too hot For example, wildfire may adversely affect water by increasing its turbidity, changing its chemical content, and influencing flood and low water levels (Martin and Dell, 1978) A primary advantage of prescribed fire is that it occurs where needed and under specified conditions. Prescribed burning, if properly implemented, can be accomplished in such a way that even small watercourses adjacent to the burn need not be severely modified.

There is also some risk to water quality as a result of *chemical use*, such as herbicides and insecticides. These risks, and those associated with prescribed fire, vary, to some degree, by alternative. Those alternatives with higher levels of timber management and road construction (such as NC, B-Departure, B, and C-Departure) also have relatively high levels of chemical use, logging activity, and prescribed fire. Consequently, these alternatives have higher risk of effects on the chemical water quality of groundwater and surface water. Alternatives such as C, D, E, F, G, and H, which involve less intensive management, also present less risk.

The index in Figure IV-1 represents only the risks associated with timber production and road construction activities. There are other activities on and off the Forest which also can increase sediment for which no estimates can reasonably be made A significant sediment-producing activity on the Forest is *grazing by domestic livestock* and, to a lesser degree, by *wildlife* Sediment production from these activities is primarily the result of streambank trampling and gully development, although heavy grazing use may also result in erosion from the soil surface where vegetation density is substantially reduced. (Also see Range Vegetation, this chapter)

FIGURE IV-1
ACCELERATED SEDIMENT PRODUCTION
THOUSANDS OF TONS PER YEAR



Livestock, through urinating and defecating, also contribute to water contamination when in or close to streams, lakes, ponds and springs This appears to be a more serious point *of conflict in wilderness where many people expect water to be "purer" than elsewhere* Such effects are virtually unavoidable if many of the more productive forage areas are to be grazed.

As with domestic livestock, defecation in water by wildlife of *all* species contributes to bacteria in streams, lakes, and ponds

Recreation contributes to water quality problems through improper disposal of domestic and human wastes near developed and dispersed recreation sites, through erosion and sedimentation from such things as ORV use, and from activities such as swimming and wading, which involve human contact with water. None of these effects are significant at the existing and projected level of Forest use They do not vary by alternative

In the past, *mining-related activities* have resulted in undesirable environmental effects which are still plainly visible. These direct effects include stream siltation, topsoil removal, aquifer disruption, and scars on the landscape Most noticeable on the Wallowa-Whitman, and on adjacent lands, are the many miles of dredge tailings that have severely altered the channels and floodplains of many streams

Placer operations, even with reasonable care taken, increase sediment in streams. They often remove riparian vegetation, thereby removing the shade and other benefits this vegetation provides.

The amount of mining activity is primarily dependent on mineral prices Consequently, mineral activity is expected to increase or decrease as the values of gold, silver, and other minerals fluctuate rather than as a result of which Forest Plan alternative is selected

Water running from *roads* often carries silt into streamcourses, especially at stream crossings or where roads parallel streams for long distances. Indirect effects are damage to fish spawning gravels

The effects of road reconstruction are usually much less than those of initial construction since reconstruction normally takes place in a cleared right-of-way where much of the excavation and shaping of the road prism have already occurred Minor reconstruction can mean resurfacing, minor curve widening, drainage improvement, or less However, major reconstruction may include measures to straighten or widen a road, or change the grade In these instances the effects are similar to those of initial construction

Regardless of the Forest Plan alternative, new road construction is concentrated in the first decade, substantially dropping in succeeding decades as the transportation system for the Forest is completed. Those alternatives which schedule more intensive harvest or access more roadless area, such as Alternatives B, B-departure, and C-departure, have high levels of road construction in the first decade and provide higher risk of road-related sedimentation Alternatives F, G, and H, with relatively low levels of timber harvest, also require fewer roads The remaining alternatives are intermediate See Table IV-8 for a comparison of road construction and reconstruction in all alternatives.

Protection of *domestic watersheds* is an overriding objective of all alternatives as reflected in the Standards and Guidelines (Plan Chapter 4). Different alternatives, however, provide lesser or greater risks to watershed values depending on the intensity of management proposed.

For the Baker and La Grande domestic supply watersheds, the least amount of risk would be under Alternative E, which would keep both in an undeveloped condition (This alternative minimizes risk associated with management activities such as timber harvesting and road building, but would also make protection of the watersheds from naturally-occurring fires more difficult). For the Sumpter and Wallowa watersheds, the least risk is associated with Alternative F, as in that alternative the watersheds would be managed for timber production, but at a reduced rate of harvest.

Alternatives B, B-departure, D, G, and NC provide the greatest risk to watershed values because, under these alternatives, the watersheds would all be managed dominantly under Management Area 1 which would include a high rate of timber management activity. Alternatives A, C, C-departure, and H provide a moderate risk to watershed value, as compared to the other alternatives, with the Baker City and La Grande domestic supply watersheds managed at a reduced rate of timber harvest and with the Sumpter and Wallowa watersheds managed dominantly under Management Area 1

Regardless of the alternative chosen, project-level analysis and project design will center on the need to protect or improve water quality and streamflows

The most significant potential effects on *groundwater quality* are from forest chemicals. These include herbicides, insecticides, and rodenticides, fuels and oils used in the operation of log trucks and logging equipment, fertilizers, and retardants used in fire control. Under proper usage these chemicals represent little risk to the environment The greatest risks to the groundwater or surface water come from accidental spills or incorrect usage. To reduce these risks, special requirements for their use have been developed including the requiring plans to deal with accidental spills on any project where hazardous volumes of chemicals are to be used.

Burning of timber slash may affect groundwater and surface water quality. When organic material is burned, nutrients and other chemicals are released, some of which are soluble in water. These chemicals may enter the groundwater or may immediately flow off-site as surface water Although these chemical changes may be measurable, they are normally of short duration with no significant effects on use of the water either by wildlife or by humans.

The degree of risk to groundwater quality in with any alternative is directly dependent upon the amount of chemical use associated with that alternative and the amount of fuel and oil being transported through or used within the Forest. Since most chemical, fuel, and oil use on the Forest is tied directly to the level of timber harvest activity, and greatest first-decade risk would come from Alternative NC The remaining alternatives ranked by acres of timber harvest in the first decade are C-dep, B-dep, D, B, A, D, E, H, F, and G.

Cumulative Effects

Some effects of timber harvest, grazing, and road construction are cumulative. All of these activities cause increases in stream sediment levels In addition, grazing can reduce the rate at which a watershed recovers from impacts such as timber harvest, mining, or road construction. This occurs when livestock graze new plants, either pulling them out of the ground, reducing their vigor, or otherwise reducing their effectiveness at controlling erosion and sediment production.

Table IV-8

AVERAGE MILES OF PERMANENT ROADS CONSTRUCTED
AND RECONSTRUCTED PER YEAR BY DECADE*

ALTERNATIVE		DECADE 1 MILES	DECADE 2 MILES	DECADE 3 MILES
A	Construction	115	52	30
	Reconstruction	85	94	111
	Total	200	146	141
B	Construction	133	65	34
	Reconstruction	91	98	80
	Total	224	163	114
B-DEP	Construction	145	69	45
	Reconstruction	122	137	166
	Total	267	206	211
C	Construction	117	52	29
	Reconstruction	88	80	108
	Total	205	132	137
C-DEP	Construction	140	52	27
	Reconstruction	113	105	107
	Total	253	157	134
D	Construction	124	58	31
	Reconstruction	92	93	121
	Total	216	151	152
E	Construction	118	52	37
	Reconstruction	111	118	146
	Total	229	170	183
F	Construction	85	36	22
	Reconstruction	66	66	76
	Total	151	102	98
G	Construction	109	56	27
	Reconstruction	66	81	87
	Total	175	137	114
H	Construction	107	48	25
	Reconstruction	67	71	91
	Total	174	119	116

* Estimates of Purchaser Credits for road work done in association with timber sales; road work specified in the HCNRA Comprehensive Management Plan for the HCNRA; road work to access roadless areas, and 95% of Capital Improvements not included in the above categories

Similar effects and risks are also found on adjacent private and other public lands Nearly all adjacent private lands and public lands are grazed by domestic livestock and wildlife Many are also managed for timber production. Since many of the streams originating on the Forest also bisect downstream private lands, there is potential for cumulative, adverse sediment increases. This relationship holds true regardless of alternative The cumulative impacts of all roads, on and off the Forest, can be significant even though the impact from an individual road may appear insignificant

The overall potential for adverse, cumulative effects on water quality is greatest in those alternatives having relatively high timber harvest, livestock grazing, and road construction -- since other impacting activities, and actions on private lands are not expected to vary substantially, regardless of the selected alternative. As it has the highest total level of timber activity (and reduced riparian protection), Alternative NC presents the greatest total risk. It is unlikely that water quality standards could be met with this alternative. Although water quality standards could be met with the rest of the alternatives, there are more risks with some alternatives than with others Alternatives B, B-departure, and C-departure have high timber harvest and road construction and B and B-departure have high livestock grazing These alternatives constitute a relatively high risk of water quality problems overall Alternatives C, D, E, and A are intermediate in overall risk, having moderate levels of both harvest and livestock use. Alternative G has a moderate overall risk, with a relatively low level of timber harvest, but a high grazing level Alternatives F and H present the lowest water quality risk, having relatively low levels of both timber harvest and grazing

Mitigation Measures

Many timber harvest effects on water quality are mitigated by such measures as the dispersion of created openings (required in all timber management areas), using silvicultural practices which leave part of the original canopy (such as shelterwood harvest, commercial thinning, or selection harvest) and applying Forest-wide standards and guidelines for road construction, log skidding, and soil compaction.

In many instances, road-related impacts are not so much from the road as from use of the road. Thus, limiting the season of use of roads, or year-round closure to vehicular traffic, is an important means of mitigation that is considered in timber sale planning and the annual Forest Travel Management Plan.

The tendency for wilderness users to concentrate along the fragile shores of lakes in the Eagle Cap Wilderness has prompted the need for restrictions on camping and horse use within specified distances from lakes.

Control of off-road recreational vehicle use is presently quite effectively accomplished through the annual travel plan and supporting regulations As use increases, regulations and greater enforcement efforts may be necessary.

At present, there are sites on the Forest, such as West Eagle Meadow Trailhead, where a heavy use pattern is developing that exceeds the capacity of the few facilities that are in place. Sanitation problems are developing, there are conflicts with livestock grazing and the attractiveness of the site is deteriorating If funds can be made available to construct adequate sanitation facilities, fencing, fire places, etc., these and similar impacts elsewhere can be mitigated and the potential recreation experience improved.

Other means of mitigating recreation use impacts are by moving facilities, such as was recently accomplished at Anthony Lakes where campspots were moved further from the lakeshore to prevent further damage to the sensitive shoreline

Sites can be restored by rerouting people through the use of signs and trails, or use can be otherwise curtailed to allow site recovery.

In some instances, it is necessary to close grazing allotments as a means of accomplishing other resource objectives. Closure can effectively reduce water quality effects.

For additional details on mitigation measures for water quality, see Appendix O (Best Management Practices) and Plan Chapter 4, Standards and Guidelines for Watershed, Soil, and Transportation System.

STREAMFLOWS AND AQUIFER RECHARGE

Direct/Indirect Effects

Timber harvest has been known in some instances to result in significant temporary streamflow increases where clearcutting or other methods have been applied in headwaters of experimental watersheds (Troendle 1983) These changes in streamflow occur for a variety of reasons, including: a reduction in the use of water by living vegetation, an increase in the amount of rain or snow reaching the ground (less is caught by and evaporated from the leaves, branches, and boles of trees); and changes in wind patterns following timber harvest which cause more snow to be deposited in created openings than in adjacent timbered areas

Under normal management practices and rates of harvest, only minor changes in streamflow are expected to result, regardless of the management alternative selected. In studying the effects of clearcutting and shelterwood cutting in northeastern Oregon, Fowler, Helvey, and Felix (USDA Forest Service, 1987) found no significant increases in annual water yield. Consequently, no changes in annual streamflow among alternatives are shown. Mean annual streamflow from the Forest is estimated to be 2.73 million acre-feet.

In an individual drainage, however, a series of activities occurring in close proximity or within a short time period could significantly affect streamflows These effects may take several forms One possibility is an increase in spring peak flows. This occurs when removal of the tree canopy causes rapid snowmelt simultaneously in a larger portion of the drainage than occurred prior to the tree canopy removal Although there may not be any significant increase in total volume, it may be concentrated over a shorter period of time, thus increasing the peak level This is important in streams which are vulnerable to channel erosion, either due to their natural characteristic (stream beds are made up of material which erodes easily) or due to management activities (the ability of the channel to withstand increased flows has been reduced by such things as timber harvest, road construction, or livestock grazing).

Conversely, removal of a part of the tree canopy within a drainage may result in reduced spring peak flows This happens when, under the natural or existing situation, rapid snowmelt occurs simultaneously over a large portion of the drainage and removing part of the canopy will cause snow in different parts of the drainage to melt at different times. This is normally considered a beneficial effect, as it tends to reduce channel erosion and permit more rapid recovery of damaged stream channels

Summer low flows in most drainages are expected to increase slightly following timber management activities This occurs primarily as a result of reduced evaporation and transpiration following removal of part of the timber canopy within a drainage. This increase is generally small and is often masked by normal annual variations in flow

None of these effects are expected to be major in any alternative. In reviewing 31 years streamflow and precipitation records from Eagle Creek in the Wallowa Mountains, Fedora (unpublished adminis-

trative report) concluded that low flows, after accounting for changes in precipitation, had increased slightly. No changes were observed in the timing of the low-flow season or in the magnitude of peak flows

Though small, the greatest risks for streamflow changes are associated with those alternatives having higher timber harvest levels. Alternative NC, with the highest level of timber harvest would be expected to have the highest risk of streamflow changes. The other alternatives, in decreasing order of risk are B-departure, C-departure, B, D, E, C, A, H, G, and F This general relationship will hold true for all decades, with C-departure being nearly as high as B-departure in the first decade.

Risks also vary by drainage, with those drainages heavily impacted by management activities (such as the Grande Ronde River above La Grande) having substantially more risk than those drainages with little activity (such as the Lostine River)

Effects of harvesting timber on *groundwater recharge* and *aquifers* are similar to effects on streamflow, except for timing differences, e.g., aquifer responses are typically slower and fluctuate less than streamflow.

Few timber management activities have the potential to affect groundwater. Silvicultural activities such as timber harvest, thinning, and tree planting are not expected to have any effect on groundwater quality or volumes. The presence of the roads necessary for timber management may have minor effects on groundwater recharge in situations where subsurface flows are intercepted by road cuts and diverted into stream channels. This effect is minimized by proper road drainage, which carries intercepted water across the road via drain dips and culverts, thus permitting the water to percolate into the ground again.

Therefore, the above-mentioned findings indicate timber harvesting on a sustained yield basis is expected to have a negligible, unmeasurable effect on downstream aquifers There is no realistic potential to modify timber harvesting to measurably increase downstream water supplies Best Management Practices (see Standards and Guidelines, Chapter 4, Forest Plan) will ensure that adequate infiltration characteristics are maintained. Only if extensive, contiguous areas were compacted would infiltration be expected to be reduced so as to adversely effect downstream aquifers

Cumulative Effects

In some instances it is possible that the total cumulative effect of several timber sales within a drainage will cause earlier snowmelt within the watershed, resulting in earlier peak flows and causing summer low flows to occur earlier. This could be important in drainages where late-spring high flows are an important source of irrigation water or water for other uses and where storage facilities are not available This may also be significant in some streams supporting anadromous fish.

An additional influence on streamflows is the direct removal of water from streams for irrigation purposes, a practice common on the Wallowa-Whitman, and one that will continue regardless of alternative In some cases, during summer months, virtually all of the water is legally withdrawn from streams before or shortly after it leaves the Forest

Mitigation Measures

Effects on streamflows are mitigated by such things as dispersing timber harvest units across the landscape, prescribing silvicultural treatments (such as selection harvest) which have little effect on snowmelt rates or streamflow, and delaying harvest in selected areas Mitigation may also include stream channel improvements where natural or management-related streamflows are causing channel instability. For additional details or mitigation, see Plan Chapter 4, Standards and Guidelines for watershed.

FISH

Fish habitat capability and production are expected to maintain or increase by varying degrees under all alternatives Fish outputs displayed in the document are estimates and actual outputs will depend upon the success of a variety of programs both on and off the Forest Fish habitat capability is also an estimate and will need to be better quantified through implementation of the Forest Plan, including the stream survey program and the monitoring program For a relative comparison of the outputs and trends expected by alternative, the reader is referred to Table II-5 in Chapter II of this final EIS. Improvements in habitat capability are expected to occur due to habitat improvement projects, implementation of BMP's, and Forest-wide Standards and Guidelines.

Direct/Indirect Effects

Those practices which have the most effects on fish habitat are those associated with timber management and livestock grazing Habitat may be directly and indirectly affected by other activities such as road construction, mining, recreation, and habitat improvement projects.

Timber management activities directly affect the availability of large trees and woody material Large trees and woody material are very important to fish habitat Tree canopies provide shade in the summer and insulation in winter, moderating changes in stream temperature. Trees and their root systems help stabilize unstable slopes reducing the frequency of mass soil movement Trees and other vegetation also protect surface soils from eroding, and filter surface soil movement which reduces accelerated sediment input to channels Stream channel stability also is often dependent upon trees and their root systems to anchor banks

Probably the most important interaction between trees and fish habitat occurs as the trees and large woody material enter channels In-stream woody debris helps create a complex aquatic habitat by forming pools, providing low velocity refuge areas and cover, trapping spawning gravel, adding nutrients to the steams, and regulating the routing of sediment

Removal of timber along streams can reduce the availability of large wood input to channels resulting in a reduction in stream habitat complexity and quality, more rapid degrading (down-cutting) of channels, and increases in stream temperatures.

Removal of trees on hillsides can result in an increase in the frequency of surface erosion and mass wasting In addition, logging practices such as ground skidding can compact and expose soils, thereby increasing erosion potential. Stream flow regimes may also be altered by timber harvest, depending on the harvest intensity in a drainage (Also see section on Soil and Water)

The Forest-wide Standards and Guidelines and BMP's are designed to reduce impacts to fish habitat However, the more area harvested, the greater the chance of impacts occurring due to administrative error and uncertainty of the effectiveness of Forest-wide Standards and Guidelines and BMP's

A potential benefit of timber harvest to fisheries is the use of Knutson-Vandenberg (K-V) funds collected on sales to implement fish habitat improvements and other projects

benefiting the condition of the watershed. Alternatives with greater timber harvest will provide greater potential to collect K-V monies, but as previously discussed, there is also a greater risk of habitat degradation Therefore, the funds may be needed to mitigate the impacts and not necessarily result in an overall improvement in habitat capability.

Timber harvesting may increase and extend peak spring streamflows, reduce stream shading (increasing stream temperatures) and alter pool riffle relationships through the introduction or removal of debris from stream channels. Sediment from construction of roads or skid trails may fill spawning gravels. The risk is proportional to the amount of timber harvested. (See section on Soil and Water)

Significant alterations in streamflows are not predicted in any alternatives since all alternatives require Best Management Practices Employment of these measures will also minimize sediment, require adequate shade to maintain stream temperatures, and maintain or improve stream channel stability. However, the degree of risk, the possibility of something going wrong -- does vary by alternative and increases with the amount of activity Table IV-6 illustrates the amount of land disturbance by timber harvest for each alternative and would serve to also show which alternatives involve the greater and least risk to fish habitat The risks have to do with the possibility of soil entering streams in spite of plans or mitigation measures which are intended to prevent such occurrences For example, this could be from improperly located log skid trails, land slumps, lack of proper road drainage, or operating equipment when weather conditions are not suitable.

Livestock grazing can produce impacts on fish habitat by reducing cover for fish, altering stream temperature, altering stream chemistry, trampling banks, and increasing sediment deposition. Riparian habitat standards designed to protect fish habitat would apply to grazing allotments under all alternatives except Alternative NC. Fishery budgets for all alternatives also include monies to monitor riparian habitat in allotments and coordinate with the range program As with other land management activities though, generally the greater the grazing use, the greater the potential for fishery impacts

The Smolt Habitat Capability Index, a measure of the potential of a stream to produce smolt, is currently low in many streams, partly as a result of past livestock grazing Multi-agency efforts to restore habitat are largely directed at correcting this damage

Alternatives B, B-departure, and G, with high grazing levels also have high risk of grazing-related fish habitat damage relative to the other alternatives Alternative E and F present low risk relative to the other alternatives The remaining alternatives present a moderate risk compared to the other alternatives Projected livestock grazing by alternative is shown in Table II-4.

Roads affect fish habitat in several ways Improperly constructed stream crossings can block fish passage. Roads constructed in riparian areas can constrict the floodplain and channel, resulting in changes in channel morphology and associated habitat Roads also increase recreation access and fishing opportunities, but the increase in fishing pressure can result in over-harvest of wild stocks

Water running from roads often carries silt into streamcourses, especially at stream crossings or where roads parallel streams for long distances This may result in damage to fish spawning gravels

Road construction is directly tied with timber production, and will vary by alternative as shown in Table IV-8.

Mining operations directly affect fish habitat Placer operations, even with reasonable care taken, are likely to increase sediment in streams They often remove riparian vegetation, thereby removing the shade and other benefits this vegetation provides

The effects that mineral activities will have on fishery resources cannot be determined until the location, type, and timing of the proposed activity is known As a consequence, the effects that mining would have on fishery resources as well as any differences between alternatives cannot be estimated

Recreation has little effect on fish habitat, although in some areas, fish numbers may be depleted by fishermen Also, sediment or vegetation loss resulting from ORV use, may directly affect fish habitat by reducing the effectiveness of spawning gravel or increasing stream temperatures These effects are not expected to vary by alternative.

Cumulative Effects

Numerous activities affect fish and fish habitat. Since the same drainage often has a variety of actions occurring either at the same time or close together in time, many of these effects are cumulative. Timber harvest, road construction, and livestock grazing occur on large areas throughout the Forest and are cumulative in their effects. All three reduce stream shade (thus indirectly increasing stream temperature and reducing the quality of fish habitat). All three contribute sediment to spawning gravels and may destabilize stream-banks In many drainages, mining also occurs, further contributing to adverse fish habitat effects.

High stream temperatures (and thus reduced fish habitat quality) also result when water is diverted from streams for other uses such as irrigation. Although this effect does not vary by alternative, it would be more important in Alternative NC which does not provide for adequate stream shade

Fish stream habitat involves many landownerships and efforts to restore habitat involves correcting the cumulative impacts of practices along entire lengths of streams Of particular concern is fish passage past dams in the Columbia River (see EIS Chapter III) Also, many streams are in poor condition within and below the National Forest boundary All alternatives assume correction of many of these problems.

Overall, the potential for adverse effect on fish and fish habitat is greatest in those alternatives having relatively high timber harvest levels, high livestock grazing, and road construction Other effects such as those associated with mining and recreation are not expected to vary significantly by alternative Alternative NC presents the highest risk to fish habitat since it has the highest total level of timber harvest and does not provide for special treatment of riparian areas. Alternatives B, B-departure, and C-departure have high levels of harvest and grazing These constitute a high risk to fish habitat relative to the other alternatives Alternatives C, D, E, and A are intermediate in overall risk having moderate levels of both timber harvest and livestock use. Alternative G has a moderate overall risk with a relatively low level of timber harvest, but a high level of livestock use. Alternatives F and H present relatively low risk to fish habitat.

Mitigation Measures

There are many and varied mitigation measures for protecting water, soil, and riparian habitat discussed elsewhere in this chapter and in Chapter 4 of the Forest Plan, all of which also mitigate effects on fish habitat. Others include stocking of streams and lakes to restore populations of resident as well as anadromous fish; preventing grazing along lake shores;

fencing or otherwise keeping livestock away from streams permanently or periodically; closing roads which are contributing silt to streams, constructing instream structures to improve fish resting and hiding habitat, planting vegetation to improve shade and temperature conditions, carefully preparing and administering timber sale contracts to ensure fish habitat protection; and thorough environmental analyses of projects on the National Forest to ensure fishery values are adequately considered.

An important factor in fish habitat management and project environmental analyses will be involvement of local Indian tribes and the organizations they have designated to represent their interests Formal agreements in fish habitat management between the Forest Service and the tribes, will be important tools in mitigating effects on fish as well as improving habitat.

The proper application of standards and guidelines (Chapter 4, Forest Plan) will largely mitigate the effects of timber harvest on stream courses (or other riparian areas) regardless of alternative. These measures include strict limitations on the level of vegetation removal that may take place along stream courses and controls on machinery operating near streams Many timber sale contractual clauses have been developed and proven over time to be effective in protecting fish habitat.

On uplands within the vicinity of streams or lakes, the required spacing of harvest units greatly limits the amount of land in any watershed from which timber harvest can occur at one time As discussed in the section on Soil and Water, this largely prevents timber harvest-induced conditions that could cause watershed and fish habitat, damage from upland runoff.

The success of restoring anadromous fish runs in the streams tributary to the Grande Ronde and Snake Rivers will depend to a large degree on the success of overcoming problems associated with the hydroelectric dams on the Snake and Columbia Rivers (See Chapter III).

Fish habitat improvement projects are designed to rehabilitate fish habitat degraded by past man-related activities or in some cases, natural event or conditions. Projects include correcting passage at culverts or falls blocking access to usable habitat, addition of large wood or rock structures to improve instream habitat, or projects to reduce sediment input.

For additional details on mitigation measures for fish habitat, see Plan Chapter 4, Standards and Guidelines for Watershed, Range, Transportation System, and Timber Management.

WILDLIFE AND WILDLIFE HABITAT

On the Wallowa-Whitman, wildlife habitat is affected more by other resource management activities, particularly timber management, than by direct efforts to alter habitat. Effects, though to a much lesser degree, also result from such activities as livestock grazing, mining, roads, and recreation Effects may be beneficial or detrimental, depending on the species and the activity.

Direct/Indirect Effects

Effects on wildlife species indigenous to the forested area will vary according to habitat needs. These needs have been identified in terms of the species' association with one or more of the six recognized Forest successional stages These stages range from the grass-forb and the shrub-seedling stages, which are present immediately after total timber removal, through harvesting or fire, to the old-growth stage.

Wildlife species associated with old-growth trees and dead trees -- Old-growth tree stands contribute disproportionately to the diversity of wildlife. Mature and old-growth forest successional stages support the greatest number of wildlife species Many of these species are habitat specialists and less tolerant of habitat alteration than the habitat generalist species best represented in early successional stages (Thomas and others 1979). Old-growth stands are characterized by large, down woody debris which contribute to nutrient cycling and stream stability, (Franklin 1981) and provide uniquely stable, cool, moist habitats for animals and substrate for microbial activity (Maser; Trappe 1984). These features of habitat are not unique to old-growth but are most abundant there The loss arising from loss of old-growth habitats may cause disproportionately greater loss to wildlife *than acre figures suggest* (Also *see discussion in Vegetation section*)

The biological carrying capacity for wildlife species associated with the old-growth stage for feeding and reproduction will be reduced in direct proportion to the reduction in the mature and old-growth successional stages. These species include the pileated woodpecker and the pine marten which have been identified as indicator species for this habitat type for northeast Oregon forests These species are not exclusively old-growth dependent, but where short timber rotations occur, their alternate mature forest habitat associations will be virtually eliminated Riparian and visual foreground areas provide some elements of the habitat needs of these species, but are limited in dimension That is, riparian areas are rather narrow and linear Visual foreground areas may be managed for a much more open stand condition than is desirable for these species The visual foreground areas are also normally associated with roads, where human disturbance may adversely impact the species.

Species of specific concern are the 38 birds and 24 mammals that utilize tree cavities for nesting, shelter, and roosting The majority of bird species are insectivorous. The most important are the woodpeckers, since many other animals are dependent upon cavities created by them These species need a variety of dead or defective trees for both nesting and feeding.

Stands managed to emphasize timber production are made up of thrifty, relatively young trees Therefore, the number of dead and defective trees, standing or down, are much fewer than in an unmanaged situation This will be the case in Management Areas 1, 2, 3, and 18. Although natural mortality in managed stands is likely to result in small snags (less than 18 inches in diameter) of approximately 60 per hundred acres, there will be few large snags once those now standing have fallen In these areas, populations of species that require large snags for nesting, as represented by the pileated woodpecker, will also be smaller. This is not to imply that there will be vast areas devoid of large snags Interspersed throughout Management Areas 1, 2, 3, and 18, will be riparian habitat, approximately 90,000 acres of forest lands unsuitable for timber production, visually sensitive landscapes, and old-growth stands, each of which will provide large snags In addition, the management requirements require that, in association with each mature or old-growth stand 300 acres or larger, there be an additional 300 acres where at least two hard snags 10 inches in diameter or larger will be retained Regardless, in all alternatives

except Alternative F, 1/ within Management Areas 1, 2, 3, or 18, there will eventually be scattered timbered areas as large as 400 acres where there will be no large snags. This may be considered an exception to the current snag distribution requirement for the Pacific Northwest Region (Region 6) which suggests that the 40 percent level be maintained on the average over each subdrainage or Total Resource Information System (TRI) compartment (approximately 7,000 acres) 2/ Direction in the Forest Plan may, of course, supercede previous Regional direction.

The four wildernesses and the Hells Canyon National Recreation Area will provide high levels of large and small snags regardless of the Forest Plan alternative selected

Table IV-9 shows an approximation of large snag habitat that will be present in the long term, expressed as a percent of optimum, with each alternative compared to the present (Basis for calculations comes from "Wildlife Habitats in Managed Forests" Thomas, et al, 1979).

Table IV-9
FUTURE LARGE SNAG LEVELS
(Percent of Optimum)

PRESENT	NC	A	B	B-dep	C (Pref)	C-dep	D	E	F	G	H
56	18	27	25	24	28	28	27	32	40	28	30

The use of wood for home heating will also have an important influence on dead tree habitat At present, lack of vehicular access protects many snags but as wood becomes more valuable, users become more adept in their methods of retrieving wood from areas that are difficult to reach. It is likely that in order to maintain old-growth conditions, it will be necessary to prohibit wood cutting in old-growth (Management Area 15) some riparian areas, and the 300-acre snag retention areas that are provided near the old-growth stands This is likely to create an enforcement challenge for Forest administrators

Populations of pileated woodpeckers, and the species represented by this indicator species, are expected to decline in all alternatives, except Alternative F, as large snags are lost through intensive management If 60 percent occupancy of old-growth habitat, at a density of one pair per 300 acres is assumed (see Appendix G), then Table IV-10 shows the number of pairs of pileated woodpeckers which could be supported under each alternative compared to those supported at present.

1/ Alternative F provides large snags within all management areas
2/ Forest Service manual 2630. R6-Supplement 45, August, 1987

Alternative NC does not require providing habitat for viable populations of native vertebrate species (though this is mandated by 36 CFR 219.19) Therefore, there is no special strategy intended to maintain habitats for species dependent on old-growth and mature forest. As can be seen, populations of pileated woodpeckers are lower in Alternative NC than in any other alternative If fully implemented, it is likely that large areas of the Forest (notably outside of wilderness and the Hells Canyon NRA) would have no suitable habitat for this species or other species with similar habitat requirements

Table IV-10
PAIRS OF PILEATED WOODPECKERS BY ALTERNATIVE
(Long-Term Cumulative Effect)

PRESENT	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
346	210	294	284	264	332	312	306	334	344	304	320

Populations of other mature and old-growth indicator species, such as the pine marten and goshawk, are expected to follow the trends of the pileated woodpecker. Maintenance of continuity of cover for the pine marten is enhanced with increased acreage of Management Area 6 in Alternatives C, C-dep, D, E, F, and H. The distribution of old-growth management areas will ensure viable populations of all associated wildlife species Lodgepole pine old-growth is adequately represented in unsuited lands in all alternatives.

Big-game Species -- Timber management affects the amount and quality of big-game cover directly and cumulatively Hiding cover for deer and elk is often eliminated as stands are harvested. However, as the stands are reestablished, they soon provide new hiding cover, often of better quality than in the original unmanaged stands Over the Forest as a whole, where even-aged management is practiced, hiding cover will tend to increase over time due to more areas being in younger tree age classes. Thermal cover is generally reduced although such reductions may allow for desirable mixes of hiding cover and forage. (See Figure IV-2 for comparison of how habitat varies over time by alternative.)

Where uneven-aged management is practiced, frequent entries will tend to reduce both hiding and thermal cover although cover of reduced quality may be available over a larger contiguous area than with even-aged management For a comparison of projected even-aged and uneven-aged management by alternative, see Table IV-2 and accompanying discussion.

The model used to predict the influence of forest management on elk is a habitat effectiveness model It is a biologically-based model that predicts how effective an area will be in supporting elk. The model was designed to measure effectiveness on a scale of 0 to 1, with 1 representing the highest potential effectiveness and 0 representing the least desirable situation for elk. It is intended to be only a relative measure of habitat effectiveness, and does not consider many factors that would influence the actual number of elk found on an area These additional factors include the effects of hunting, predators, disease, yearly changes in weather and forage production, competition with other animals, and the rate at which elk populations can change. The essential differences between alternatives, as

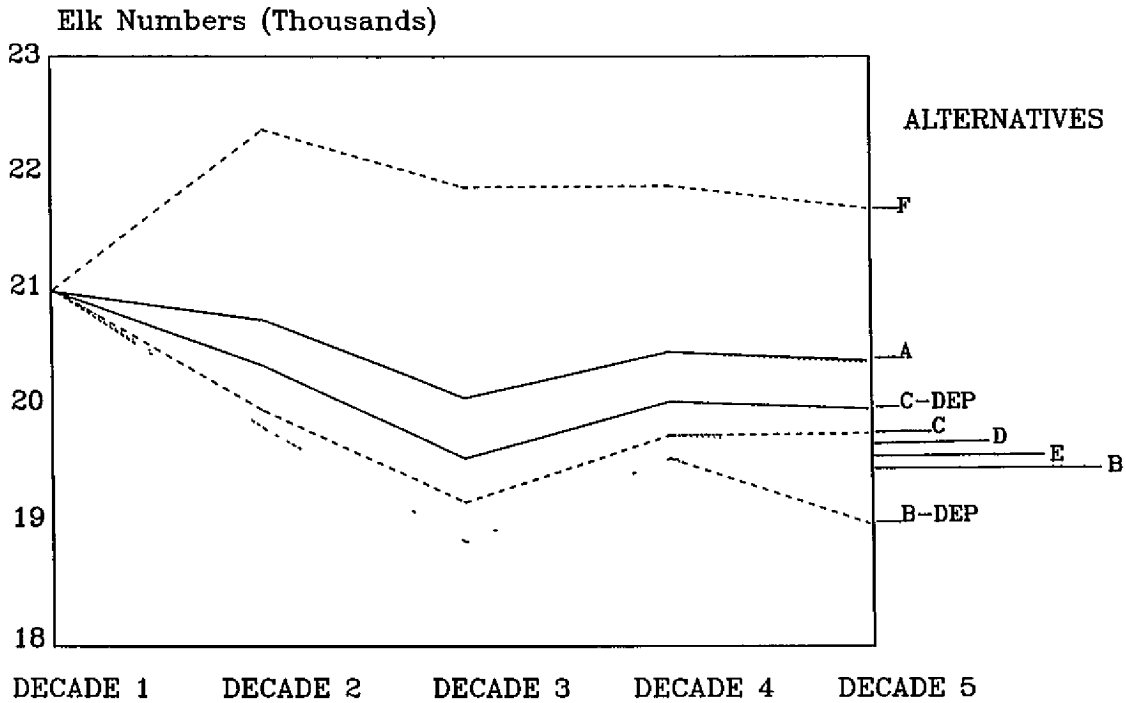
shown in Figure IV-2 are the extent to which they vary over time, from achieving the ideal 60-40 forage-to-cover ratio, density of open roads, and cover quality over the Forest as a whole.

To make the results of the model more easily interpreted, the effectiveness index was translated into a number of animals that could be supported on an area (See Appendix G for a discussion of elk habitat modeling)

Roads affect elk by removing elk habitat from the production of plants and by introducing a disturbance factor (vehicles), which reduces the use of elk habitat adjacent to roads (Compton 1975, Lyon 1979, Marcum 1976, Morgantini and Hudson 1979, Pederson and others 1979, Perry and Overly 1977, Rost and Baily 1974). Cupal the Ward (1976) conclude that direct and indirect effects of road construction, logging, vehicles, and harassment affect elk physiology negatively.

Disturbance is greatest from roads open to use Although all alternatives call for closure of some roads to traffic, significant differences exist between the alternatives in projected total open-road density. Alternative B-departure has the highest projected (Decade 5) open road mileage at 7,400 miles. The remaining alternatives, in order of decreasing total open road mileage, are B (7,300 miles), C-departure and D (7,100 miles), E and A (7,000 miles), G and C (6,900 miles), H (6,800 miles), and F (5,600 miles)

FIGURE IV-2
ELK HABITAT EFFECTIVENESS*
indexed by potential elk numbers



*Based on "Habitat Effectiveness Index for Elk and Blue Mountain Winter Ranges" Thomas, et al., 1979.

The Oregon Department of Fish and Wildlife Management Objective level for elk is 21,000 animals on the Wallowa-Whitman during spring, summer, and fall seasons. Because there are a variety of factors that affect big-game numbers besides the habitat condition of the National Forest (female deer and elk harvest permits issued, conditions of off-Forest winter ranges, winter feeding programs, predator control programs, etc), the elk numbers shown should also be considered an index value. However, there are some assumptions about the habitat effectiveness that can be made with reasonable certainty Differing degrees of habitat effectiveness are expected to affect:

1. The use of adjacent private land by elk and deer. Reduced habitat on public land may increase use of adjacent private land, especially if there is less activity and suitable habitat on the private land The activity on the public land may be in the form of industrial operations or recreational pursuits, including hunting. It is likely that use of private lands would be greater in Alternatives B, B-dep, C, or E than in Alternatives A, F, or G with lower activity levels

2 The distribution of elk and deer, especially during times when they are being hunted Elk will seek security cover when being hunted and will tend to leave areas where such cover is not available. Timber management practices often reduce security and/or thermal cover

3. The length of the hunting season (before harvestable animals are removed from the herds). Vegetative conditions, especially those that provide security cover, tend to increase the chances of animals escaping from hunters, thereby helping to lengthen the time the animals designated for harvest will survive - and lengthening the recreation period for the hunters This could influence the State wildlife agencies in setting season lengths or in establishing number of game permits issued due to concerns about the number of male animals remaining in herds after hunting season closures

   Habitat conditions are only one factor, however More people controls are likely to be necessary as the number of hunters increases, regardless of habitat conditions. The effects of timber management activities are not always deleterious In the long run, cover conditions will often be improved and through dispersal of cutting units, closure of roads and other measures, the negative effects of timber management practices can be mitigated to some degree

4 The physiological stress experienced by elk as they seek to balance the energy expenditures for body temperature maintenance, reproduction, foraging and escape with the energy available in the forage they consume.

The relationships between human activities and the biological needs of elk and deer are far from fully understood or agreed upon. The present studies on the Starkey Experimental Forest and Range are intended to provide valuable scientific evidence that will help this understanding, including further assessing the effects of roads.

The impacts of deer and elk on private lands adjacent to the National Forest are among the more difficult to estimate These impacts include private forage consumed or damaged, fences damaged, irrigation ditches damaged and soil damaged Regardless of management alternative, the impacts will vary with many factors, including the degree of livestock use on the adjacent National Forests, weather conditions, current and past timber management activities, and conditions or attractions on the private lands Some generalizations can be made·

-- When private lands occupy the natural winter game ranges, these lands will be used by game, particularly during severe winters, regardless of conditions or practices on the adjoining public lands. The most important winter ranges in Union and Baker Counties are on private land

-- As elk and deer fluctuate in numbers, there will be a corresponding fluctuation in use of private lands as well as public lands, regardless of other factors or mitigation measures

-- Providing high quality habitat, including security cover, for big game on public ranges can reduce impacts on private lands, at least during winters that are not severe (Recognizing that other factors such as differences in hunting pressure may be significant Deer hunters, according to some, may have more to do with early movement of elk onto private land than habitat conditions in some areas of Oregon.)

-- Winter game feeding programs can reduce game impacts on private lands.

Repeated use by wildlife of private lands has a cumulative economic impact on the landowner's financial well-being by the forage they consume or destroy. Repeated use by elk or deer can also have a cumulatively serious effect on irrigation ditches or on other improvements such as fences, shrubbery, or fruit trees and gardens

On upland areas, the levels of livestock grazing prescribed in allotment management plans will result in few conflicts with most wildlife species; but, since livestock have considerable dietary overlap with elk, they will often consume or damage forage that elk would otherwise eat. The entire matter of elk-livestock competition is uncertain throughout the Northwest (Lyon 1985) The degree of competition on the Wallowa-Whitman is also difficult to measure, but it can be said with reasonable certainty that where use by both classes of animals approaches the capacity of an area, competition problems are likely to develop. Greater risk that competition between elk and livestock could be a problem on some game management units exist in Alternatives B, B-departure, D, and G if elk remain at present levels because of the high livestock grazing levels in these alternatives.

On big-game winter ranges, livestock consume forage that elk and deer may otherwise use. This is a problem only if insufficient forage remains for deer and elk

Livestock grazing can benefit big game by maintaining the form of bunchgrass plants, preventing them from becoming "wolf plants", thereby making the plants more easily used by both classes of animals. Water developments intended for livestock often benefit many species of wildlife.

Domestic sheep host diseases which may also infect bighorn sheep (Aney 1985) Where ranges overlap, these diseases can be a greater problem for bighorn sheep than direct competition for forage. The Oregon State Department of Fish and Wildlife, in cooperation with the Forest Service, is currently studying this problem Possible solutions include vaccination of domestic sheep or elimination of one class of sheep from the range of the other. Separating the domestic animals from the wild sheep will always involve an element of risk due to the tendency of bighorns to travel great distances and mingle with domestic sheep.

Mountain goats occur primarily at high elevations on the Forest and their habitat will remain unaffected regardless of alternative.

Black bear food supplies will be altered in areas where timber management takes place by reducing ant and other insect populations that are associated with accumulations of woody debris. However, timber harvest often stimulates growth of huckleberries and other food plants.

There will be little difference between alternatives in how cougars, bobcats, or coyotes are affected. At present, cougars are found primarily in the Hells Canyon National Recreation Area and the Eagle Cap Wilderness.

Other Wildlife Species -- Timber harvest, especially even-aged practices which create large openings, improves habitat for rodents such as pocket gophers, by stimulating the ground vegetation upon which they depend for food. This in turn increases the prey for owls and hawks. It is often necessary to reduce rodent populations in order to establish new tree plantations because of the rodents tendency to feed on the roots of young trees. This is accomplished by placing poisoned bait in the rodents' below-ground burrows. This, of course, raises the possibility of the birds or mammals that eat the rodents, also being poisoned However, studies to date have not shown long-term adverse effects on nontarget wildlife species from such use of strychnine-treated grain, the poison normally used (Anthony, Lindsey, and Evans, 1984)

Biological carrying capacity for those species which depend on the shrub-seedling, pole-sapling or other young timber stages will be increased in all alternatives, but especially those with the higher timber harvest levels Some representative species of these stages are the Cooper's hawk, sharp-shinned hawk, and snowshoe hare. Ruffed grouse will sustain some reduction in nesting spots due to the cleaner forest floor that is managed for timber production. Important hardwood habitat along streams will not be significantly disturbed. A comprehensive wildlife list, including the Forest successional stage needs of each species, is available in "Wildlife Habitats in Managed Forests" (Thomas 1979)

Although there are no estimates of how serious the problem may be, there is potential for livestock to damage nests of ground-nesting birds through trampling. Since the Wallowa-Whitman has ranges which are grazed during spring months, the possibility of this occurring is greater than on many Forests in the Northwest.

Because of predation by bear, cougar and coyotes on livestock on the open range, predators are sometimes destroyed. This is an adverse effect on wildlife and makes fewer animals available for hunting and viewing by the recreational user.

Recreational use can cause game harassment and is particularly troublesome when considered cumulatively on the private, state, and other federal lands. Snowmobile use on winter game range can cause harassment of animals, reducing survival, as can other recreational vehicle use on summer game ranges during elk calving, deer fawning, or bird nesting season.

Cumulative Effects

Most of the direct and indirect effects discussed in the foregoing are also cumulative as they occur over more area of the Forest, but the effects on wildlife, like the effects of management on other resources, are not confined only to the Wallowa-Whitman. Wildlife, of course, do not recognize political or ownership boundaries The effects on wildlife on the Forest, when combined with effects of management on adjacent ownerships, may be more or less severe, depending on the particular adjacent land practices Efforts to carefully manage big-game winter range on the National Forest will be less effective if there are not corresponding management efforts on adjacent, and often more important, winter

ranges at lower elevations. Practices which reduce cavity nesting bird species on the Forest will be more severe if similar practices occur on adjacent National Forests

Overall, alternatives with low levels of timber harvest, high old growth retention, high snag levels, good big-game cover distribution and low grazing levels will be better for wildlife Alternative F meets these criteria better than any other. Alternatives H and A, being approximately equal, would be the next most desirable for wildlife, having good cover distribution on winter ranges, and some summer ranges, relatively low timber harvest levels, moderate grazing levels, moderate snag levels, and fairly high old-growth retention

At the other extreme are Alternative NC, B, and B-departure with high levels of timber harvest, low levels of old-growth, poor big-game cover distribution, low snag levels, and moderate to high grazing levels These alternatives are relatively poor for wildlife The remaining alternatives are similar in overall effect on wildlife and are intermediate between the group made up of Alternatives A and H, and the group made up of B, B-dep, and NC

Mitigation Measures

Many mitigation measures are a part of management direction for individual management areas described in the Forest Plan, Chapter 4, and come from the National Forest Management Act, or the Pacific Northwest Regional Guide. An example is the 40-acre maximum size limitation on created openings, and the direction that a created opening will remain by definition a created opening until newly established trees are 4.5 feet or more in height. This provision greatly limits the severity of possible timber harvest effects on wildlife as well as other resources, by forcing the dispersal of created openings

Other options available to help reduce impacts on wildlife include adjusting harvest periods to prevent wildlife harassment, positioning timber sale areas to minimize impacts, leaving unburned slash piles for small animal cover, limiting off-road vehicle use, positioning of harvest units to preserve important wildlife cover, etc In addition, dollars collected from timber sales provide a means of funding wildlife habitat improvement projects.

The management requirement for old-growth groves throughout the Forest, while providing habitat for wildlife species which depend on large dead trees, also provides forest habitat that benefits other wildlife species, and variety for human enjoyment

The distribution of wilderness over the Wallowa-Whitman also tends to mitigate the effects of management on wildlife, by providing large areas, relatively free of human disturbance, at a variety of elevations.

Other mitigative measures include winter feeding of elk, installation of nest boxes for birds, and personal or permanent road closures Monitoring of wildlife habitat may lead to the necessity to consider more mitigation measures than are currently foreseen.

Besides retaining aesthetically-pleasing landscapes, visual quality objectives (VQO's) can have a variety of indirect effects on other resources. The VQO's of retention and partial retention will often provide large trees and occasional snags suitable for cavity-nesting birds and mammals Such habitat may not be available in other areas. Therefore, those alternatives with more acres of retention and partial retention VQO's, (Alternatives A, C, C-departure, D, F and H) will, in general, provide greater benefits to cavity-nesting wildlife than will those with fewer acres (Alternatives NC, B, B-departure, G, or E).

As a means of meeting legal responsibilities for protection and recovery of bald eagles, the Forest Service cooperates with the U S Fish and Wildlife Service in the seven state

Pacific Bald Eagle Recovery Plan (U S Fish and Wildlife Service, 1986) This plan assigned northeast Oregon the recovery of eight nesting pair with a site on the Wallowa-Whitman near Unity Reservoir as one of the nest locations -- the only known nest site on the Forest. Special measures have been taken to protect the site and the surrounding habitat. (Green and Thomas, 1985)

The deleterious effects of livestock grazing on wildlife can be avoided or mitigated by *following sound range management principles This includes proper stocking of grazing* allotments, proper distribution of livestock, and grazing at a time of year when conflicts are less likely to occur. On the Wallowa-Whitman, care to leave sufficient forage for elk and deer on winter and summer ranges to support state management objectives is a matter of high importance, but maintaining healthy riparian areas is also critical for wildlife needs. The standards and guidelines in Chapter 4 of the Forest Plan provide direction which has proven effective in achieving these objectives

State game management agencies often provide fencing for hay stacks or prescribe special hunts to reduce big-game numbers in problem areas. High value crops such as orchards can be effectively protected by fencing

Each of the alternatives is designed to meet or exceed the management requirements (MR's) for wildlife in the long as well as the short run on the National Forest National Forests occupy the majority of forested land in northeast Oregon and each National Forest Land and Resource Management Plan will provide for MR's on a coordinated basis Therefore, to the extent that National Forest management has influence, viable populations of fish and wildlife species will be retained regardless of the cumulative effects of management on National Forests and adjacent lands of other ownership with the possible exception of Alternative NC.

LANDSCAPE APPEARANCE

Direct/Indirect Effects

The most significant changes in visual quality occur within the areas where *timber management* is emphasized, i.e., Management Areas 1, 2, 3, or 18 When unmanaged timber stands are converted to managed conditions, the landscape takes on a different appearance. The managed area becomes a mosaic of relatively small (usually less than 40 acres) even-aged stands of varying stand ages. Few trees over 20 inches persist except along riparian zones (stream bottoms) or where special visual quality objectives are established

In the array of alternatives presented in this EIS, the visual quality objectives vary by *alternative. That is, the areas where special constraints are used to reduce the visual* effects of management's impact vary by alternative This is illustrated in Tables IV-11 and IV-12 which display the visual condition which can be expected to result from implementation of the different alternatives The current visual condition is presented for comparative purposes. As can be seen in the tables, Alternatives B, B-departure, NC, E, and G, which employ relatively low visual quality objectives (VQO's), would eventually lower the visual condition of some viewsheds (The Level 1 viewsheds are viewed from major recreational travel routes and can be found in Figure IV-3 Level 2 viewsheds in Figure IV-4 are seen from less important travel routes) The remaining alternatives would provide relatively high quality visual conditions for the foreseeable future

A high degree of vegetation diversity is normally regarded as aesthetically pleasing (USDA Forest Service 1979) Increased vegetation diversity, particularly as represented as edge contrast, allows for more effective shaping and blending of harvest units The low edge contrast in Management Area 1, due to more frequent timber harvests, makes it more difficult to keep apparent openings in scale with natural features of the landscape than is possible in Management Areas 2 and 3.

Depending on the observer's preferences, a managed forest may or may not be attractive. Those alternatives that will show the most change, i e., most evidence of timber management are NC, B-dep, and B Alternative NC would maintain a somewhat natural appearance immediately adjacent to major travel routes, but the appearance of middleground and background areas, i e., the area greater than one quarter mile from the travel route, would be heavily altered. Alternatives B and B-dep would provide more protection than NC, but would also give the impression of considerable alteration. Alternative F would be least altered Alternative F would maintain the landscapes of the Forest approximately as they are today. Alternative E would not develop any roadless areas, but would cause landscape change similar to that of Alternative B in other forested areas outside of wilderness The remaining alternatives vary, depending on the particular travel route and it is difficult to describe a general ranking See Chapter II for a description of how landscape management is emphasized in each alternative

In the past, mining-related activities have resulted in undesirable environmental effects which are still plainly visible. These effects include scars on the landscape Most noticeable on the Wallowa-Whitman, and on adjacent lands, are the many miles of dredge tailings that have severely altered the appearance of many stream courses. Paradoxically, the remains of old mines and mineral processing plants are often points of recreational and historical interest on the Wallowa-Whitman as well as on other National Forests. Mining activity will not vary significantly by alternative and activity will increase or decrease in relation to the price of precious metals

Power transmission corridors may be particularly conspicuous if poorly located or made of highly visible materials These are of greatest concern in areas such as the Hells Canyon National Recreation Area, wild and scenic rivers, or where they are readily visible from wilderness or major travel routes Since no new power transmission corridors are anticipated during the life of this plan, regardless of alternative, most visual impacts will be from ongoing maintenance of presently existing corridors

The construction of *roads and trails* creates scars which alter the character of the landscape but also provides access for scenic viewing The visual impact of roads is greatest immediately after construction when a large disturbed area exists. Roads in steep terrain tend to be more visible since, for a road of a given width, the area disturbed is larger and because steep slopes tend to be visible from greater distances.

Alternatives with higher levels of road construction (see Table IV-8) will result in the greatest amount of road-related change to landscape appearance. Alternatives B, B-departure, and to lesser extent, G, would require access to vast roadless acreages requiring substantial road construction on steep, highly visible roads. Alternatives NC, A, C, C-departure, D, and H require some roadless entry, but substantially less than B, B-departure, and G Alternatives E and F include little roadless area entry and would result in little road-related change to landscape appearance in these areas. (For details on roadless area entry and road construction, see Appendix C.)

FIGURE IV-3
VIEWSHEDS (Level 1)

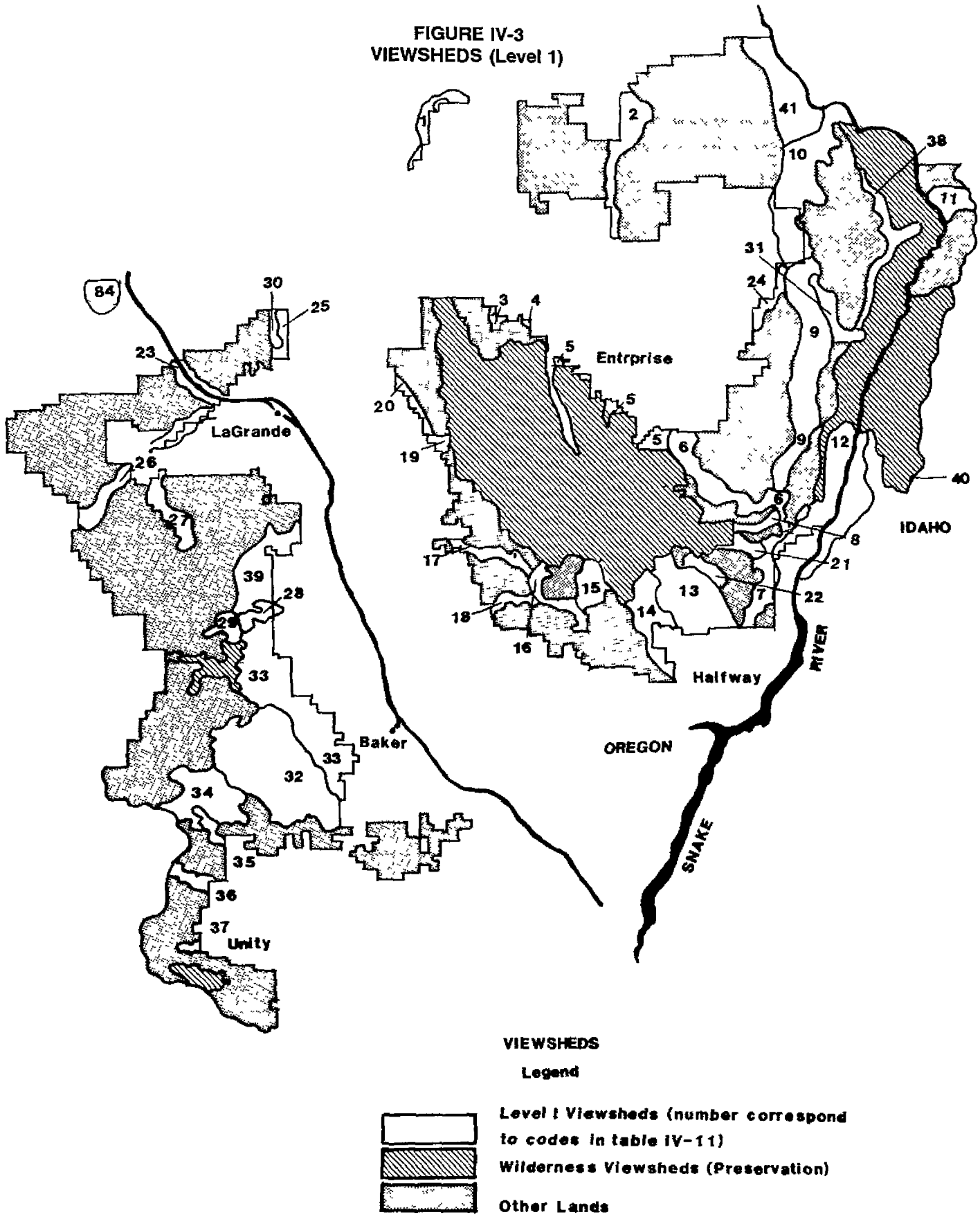


Table IV-11
EXISTING AND PROJECTED VISUAL CONDITION OF LEVEL 1 VIEWSHEDS BY ALTERNATIVE 1/

Viewshed 1/	Map Code	National Forest Acres	1984 Existing Visual Condition 2/	Visual Quality Levels 6/	Projected Condition at 2000 ALTERNATIVES A	B	B-dep NC	C Pref	C-dep	D	E	F	G	H
Grande Ronde River Corridor	1	6,789	1	1	1	2	3	1	1	1	1	1	2	1
Highway 3 Corridor	2	14,162	1	1	1	2	3	1	1	1	2	1	2	1
Bear Creek	3	2,235	1	1	1	2	3	1	1	1	2	1	2	1
Lostine Canyon	4	22,189	1	1	1	2	3	1	1	1	1	1	2	1
Wallowa Face	5	28,470	1	1	1	2	3	1	1	1	2	1	2	1
Wallowa Mountain Road	6	27,841	1	1	1	3	3	1	1	1	3	1	3	1
North Pine Road	7	10,394	1	1	1	1	1	1	1	1	1	1	1	1
Upper Imnaha	8	8,686	1	1	1	1	1	1	1	1	1	1	1	1
Imnaha Corridor	9	27,199	1 9/	1	1	1	1	1	1	1	1	1	1	1
Lower Imnaha	10	24,575	1	1	1	1	1	1	1	1	1	1	1	1
Pittsburg Landing Road	11	10,906	1	1	1	1	1	1	1	1	1	1	1	1
Hells Canyon Road	12	21,032	2 11/	1	2	2	2	2	2	2	2	2	2	2
Pine Valley Face	13	36,527	1	1	1	3	3	2	1	1	3	1	3	1
Cornucopia Road	14	15,143	2	1	1	3	3	1	1	1	3	1	3	1
East Eagle	15	9,251	1	1	1	3	3	1	1	1	2	1	3	1
Main Eagle	16	11,551	1	1	1	2	3	1	1	1	2	1	2	1
West Eagle	17	10,963	2	1	2 5/	2	3	2 5/	2 5/	2 5/	2	2 5/	2	2 5/
Eagle Drive	18	4,263	1	1	1	2	3	2	1	1	2	1	2	1
Moss Springs	19	2,354	2	1	2 5/	2	3	1	1	2	2	1	2	1
Mt. Fanny Face	20	3,443	1	1	1	2	3	1	1	1	2	1	2	1
Duck Creek Road	21	6,522	1	1	1	1	1	1	1	1	1	1	1	1
Fish Lake	22	6,481	2	1	1	2	3	2	1	1	2	1	2	1
I-84 Corridor	23	4,975	1	1	1	2	3	1	1	1	2	1	2	1
Little Sheep Creek	24	5,227	1	1	1	2	3	1	1	1	2	1	2	1
Mt Emily Face	25	3,495	1	1	1	2	3	1	1	1	2	1	2	1
Ukiah Highway	26	7,647	1	1	1	2	3	1	1	1	3	1	2	1
Grande Ronde River Road	27	5,923	1	1	1	2	3	1	1	1	3	1	2	1
Anthony Lakes Road	28	6,088	1	1	1	2	3	1	1	1	2	1	2	1
Anthony Lakes Basin	29	8,136	2 10/	1	2	2	2	2	2	2	2	2	2	2
Grand View Drive	30	1,344	1	1	1	2	3	1	2	1	2	1	2	1
Hat Point Road	31	8,985	1	1	1	1	1	1	1	1	1	1	1	1
Sumpter Valley	32	68,231	2 8/	1	1	2	3	1	1	1	2	1	2	1
Elkhorn Face 12/	33	51,885	1	1	1	2	3	1	1	1	2	1	2	1
Whitney-Tipton Road	34	42,240	1	1	1	2	3	1	1	1	2	1	2	1
North Fork Burnt River	35	3,027	1	1	1	2	3	1	1	1	2	1	2	1
Highway 26	36	4,235	1	1	1	2	3	1	1	1	2	1	2	1
South Fork Burnt River	37	1,583	2	1	1	2	3	1	1	1	2	1	2	1
Northern West Rim	38	10,496	1	1	1	1	1	1	1	1	1	1	1	1
North Elkhorn Drive 12/	39	31,281	2	1	1	2	3	1	1	1	3	1	2	1
Black Lake	40	1,800	1	1	1	1	1	1	1	1	1	1	1	1
North Snake River	41	39,700	1	1	1	1	1	1	1	1	1	1	1	1
TOTAL		617,274												

1/ Sensitivity Level 1 viewsheds (key visual areas) have been identified by name on a map (Figure IV-1) showing their boundaries
2/ 1 = Essentially natural appearance
2 = Somewhat altered appearance
3 = Heavily altered appearance
3/ Heavily altered in the short-term because of lodgepole pine mortality and salvage, but somewhat altered in long-term
4/ Heavily altered in the short-term because of lodgepole pine mortality and salvage, but essentially natural in the long-term
5/ Somewhat altered in the short-term, but essentially natural in the long-term
6/ The Visual Quality Level is a product of the Visual Management System It is a measure of the casual National Forest visitor's concern for the scenic quality of a particular viewshed corridor or use area The visual quality objective (management direction) may or may not be the same
7/ Level 2 will change to Level 1 under Wild and Scenic River Designation
8/ Railroad logged and gold dredged up to 1955, also dam and reservoir
9/ Rural character
10/ Ski area development
11/ Dam and reservoir in a nationally designated area
12/ Includes sensitivity Level 2 access routes to the Elkhorns

FIGURE IV-4
VIEWSHEDS (LEVEL 2)

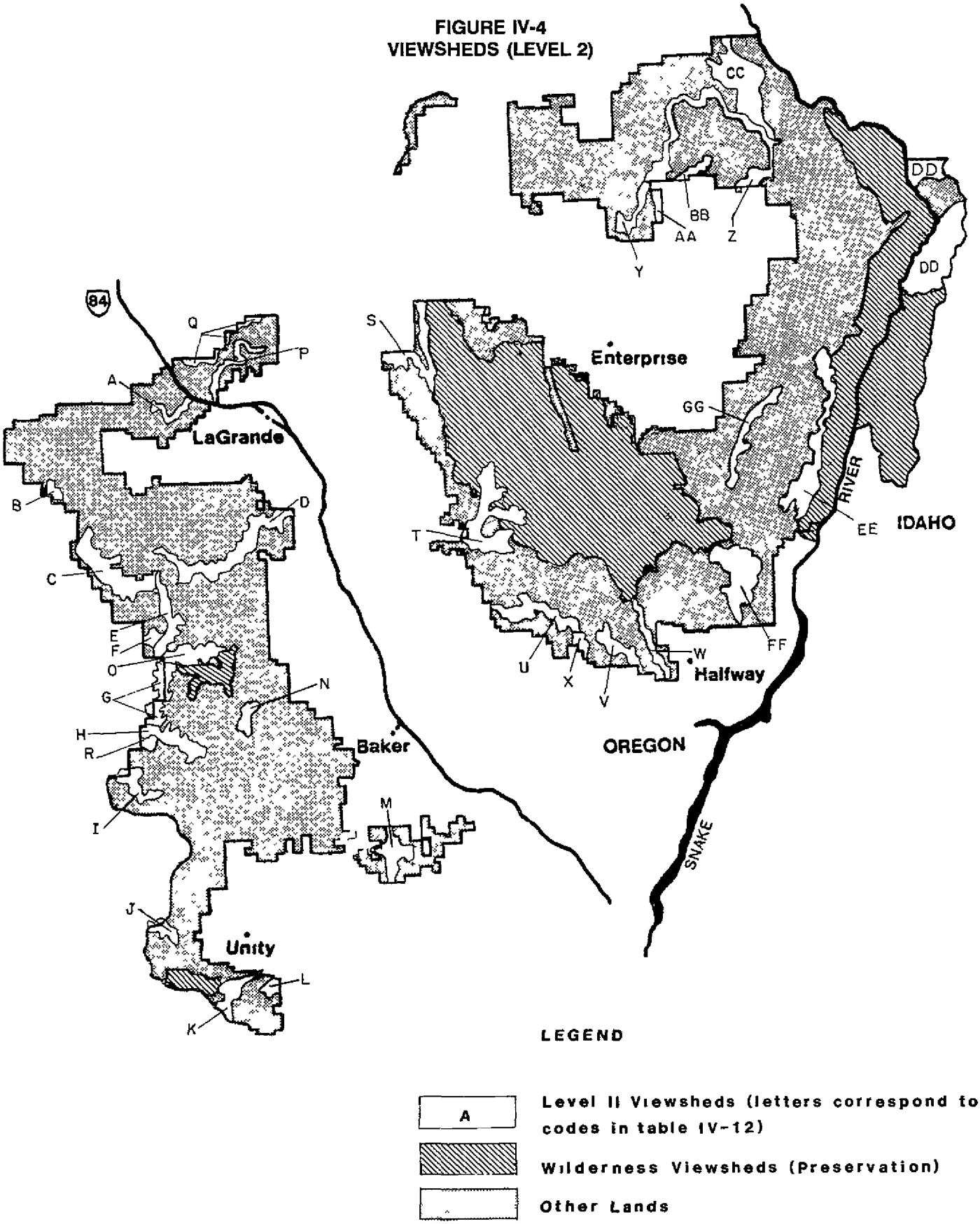


Table IV-12
EXISTING AND PROJECTED VISUAL CONDITION OF LEVEL 2 VIEWSHEDS BY ALTERNATIVE 1/

Code 9/	Viewshed 1/	National Forest Acres	1982 Existing Visual Condition 2/	Visual Quality Levels 3/	Projected Condition at 2000 ALTERNATIVES A	B	B-dep NC	C	C-dep	D	E	F	G	H
A	Spring Creek	4,864	4	2	2 7/	3	4	2 7/	3	2 7/	4	2 7/	4	2 7/
B	Frog Heaven	1,766	2	2	2	3	4	3	3	2	3	2	4	2
C	Tower Mtn Face	17,766	2	2	2	3	4	3	3	2	4	2	4	2
D	Grande Ronde Ladd	19,507	2	2	2	3	4	3	3	2	4	2	4	2
E	Hoo Doo Way	9,932	4	2	2	3	4	2	3	2	4	2	4	2
F	Trout Davis	2,790	3	2	2 7/	3	4	2 7/	3	2 7/	4	2 7/	4	2 7/
G	Crane Flat	6,374	4	2	2 7/	3	4	2 7/	3	2 7/	4	2 7/	4	2 7/
H	Sumpter-Granite (2 prts)	15,155 10/	4	2	2 7/	3	4	2 7/	3	2 7/	4	2 7/	4	2 7/
I	Greenhorn	6,092	2	2	2	3	4	3	3	2	4	2	4	2
J	Rail Gulch	4,096	2	2	2	3	4	3	3	2	4	2	4	2
K	West Camp	6,579	4	2	2	3	4	3	3	2	4	2	4	2
L	East Camp	1,715	2	2	2	3	4	3	3	2	3	2	4	2
M	Dooley Mountain	8,780	2	2	2	3	4	2	3	2	4	2	4	2
N	Bourne	3,020	2	2	2	3	4	2	3	2	4	2	4	2
O	North Fork John Day	8,482	4 4/	2 5/	2 7/	3	4	1 8/	1 8/	1 8/	3	1 8/	4	1 8/
P	Five Points Emily	5,657	2	2	2	3	4	2	3	2	3	2	4	2
Q	Emily Divide	2,176	2	2	2	3	4	3	3	2	3	2	4	2
R	Beaver Meadow	1,971	3	2	2	3	4	2	3	2	4	2	4	2
S	West Rim Minam	10,547	2	2	2	3	4	3	3	2	4	2	4	2
T	Catherine Creek	21,299	2	2	2	3	4	3	2	3	3	4	4	2
U	Balm Reservoir	9,344	2	2	2	3	4	2	3	2	4	2	4	2
V	Lower Eagle	6,988	2	2	2	3	4	2	3	2	3	2	4	2
W	McBride Summit	5,478	2	2	2	3	4	3	3	2	3	2	4	2
X	Forshey	2,227	2	2	2	3	4	2	3	2	3	2	4	2
Y	Charolais	7,291	2	2	2	3	4	2	3	2	4	2	4	2
Z	Wallamotkin	16,744	2	2	2	3	4	2	3	2	3	2	4	2
AA	Crow Creek	3,993	2	2	2	3	4	3	3	2	3	2	4	2
BB	Chesnimnus	2,867	2	2	2	3	4	3	3	2	4	2	4	2
CC	Cold Springs Ridge	25,369	2	2	1	1	1	1	1	1	1	1	1	1
DD	Nez Perce Rim	30,284	4	2 6/	1	1	1	1	1	1	1	1	1	1
EE	Southern West Rim	21,196	3	2	1	1	1	1	1	1	1	1	1	1
FF	Lake Fork	20,275	2	2	2	3	4	2	3	2	1	2	4	2
GG	Harl Butte	8,576	2	2	2	3	4	3	3	2	3	2	4	2
	TOTAL	319,130												

1/ Sensitivity Level 2 viewsheds (secondary visual areas) have been identified by name on maps available at the Forest Supervisor's office in Baker
Level 2 travel routes are listed in Appendix K
2/ 1 = Essentially natural appearance
2 = Somewhat altered appearance
3 = Moderately altered appearance
4 = Heavily altered appearance
3/ The visual quality level is a product of the visual management system It is a measure of the casual National Forest visitor's concern for the scenic quality of a particular viewshed corridor or use area The visual quality objective (management direction) may or may not be the same
4/ This is 1985 visual condition as viewed from Road 73, Elkhorn Loop Drive
5/ Level 2 will change to Level 1 under Wild and Scenic River Designation (Recreational).
6/ Much of the Nez Perce viewshed lies in the Snake River Corridor This Level 2 duplication is meant to deal with Forest visitor's views from the secondary motorized travel routes and viewpoints not readily seen from the bottom of the deep river corridor
7/ Heavily altered in the short-term because of lodgepole pine mortality and salvage, but somewhat altered in long-term
8/ Heavily altered in the short-term because of lodgepole pine mortality and salvage, but essentially natural by about the year 2000 as viewed from the river and by 2010 as viewed from Road 73, the Elkhorn Loop Drive.
9/ Code refers to descriptions in Appendix K
10/ Blue Springs Summit to McCully Campground section is in Level 1 Sumpter Valley Viewshed - Foreground of this section is managed as partial retention on Level 2 travel route

Cumulative Effects

Changes in landscape appearance occur over time and the eventual, steady-state appearance of the Forest will not be achieved in the first decade in any alternative

Many of the changes in landscape appearance that occur on the Wallowa-Whitman will also occur on adjacent National Forests. Thus, the overall change may appear cumulatively greater when travelling across more than one Forest. It is doubtful that appearance of other ownerships will change appreciably over time since most are currently highly altered An exception is that buildings and other structures are likely to increase on private lands

Mitigation Measures

Along major travelways, special landscape management practices will provide a measure of "naturalness," regardless of alternative. This will include such measures as thorough logging slash cleanup, cutting low stumps, providing a variety of tree sizes, and shaping created openings to appear as though they had resulted from natural occurrences.

The most noticeable objectionable effects of power transmission corridors are the cleared strips for overhead lines and their associated structures There are a variety of mitigation measures available to help "soften" the visual effects but none which make the corridors disappear, as can be the case with underground transmission facilities. Measures include painting structures colors which blend with surrounding colors, raising Christmas trees within the corridors, shaping the corridors by varying the widths and leaving and maintaining trees and shrubs within the corridor. The Forest Service relies on Agricultural Handbook No. 478 for methods of mitigating such effects

Visual impacts from roads are mitigated by such practices as locating roads where terrain makes them less visible, building them to minimum widths to reduce disturbed area, providing for prompt revegetation of cutslopes and fill slopes, and using logging systems which require fewer roads

For additional discussion of mitigation measures, see Plan, Chapter 4, Standards and Guidelines for Landscape Management

AIR QUALITY

There are many off-Forest sources of pollution that affect air quality on and off the Forest These are not within control of Forest managers These sources include nearby agricultural field burning, western Oregon logging slash burning, and industrial smoke It also includes dust from northern Oregon agricultural areas and smoke from local, off-Forest industrial operations. This smoke can impair visibility, reducing enjoyment of scenic vistas Populated valleys near the Forest are subject to air stagnation problems

On-Forest sources of air quality degradation include smoke from burning logging slash, prescribed burning for other resource purposes such as range management, wildfire, and dust from roads

Direct/Indirect Effects

Of the air quality effects from Forest management, smoke from slash burning is the most significant In general, smoke will be created in proportion to the amount of slash created from timber harvesting on the Forest

No emissions from forestry burning have yet been identified by the Environmental Protection Agency (EPA) as hazardous (Cook and others 1978), and no threshold limit values have been set for compounds in forest smoke (Sandberg and others 1979). Breysse (1984) does, however, outline health hazards associated with the inhalation of smoke Emissions of polycyclic organic matter (POM) have been reported from burning pine needles (Tyan and McMahon 1976) and from agricultural burning (Darley and Lerman 1974). POM is of special interest in smoke management because it is a class of compounds containing many physiologically active substances Benzo(a)pyrene (BaP) and other implicated carcinogens are usually found in POM (Tangren and others 1976).

Cook and others (1978) report that emissions from prescribed burning are highly complex, consisting of hundreds of gaseous chemical compounds and particulates, which vary greatly in composition and physical properties They also report that a number of the compounds emitted are photochemically reactive and thus the physical and chemical properties of smoke change with increasing residence time in the atmosphere.

Sandberg and others (1979) report that there are few studies on the effects of smoke on forest ecosystems in the vicinity of fire or upon long-range smoke transport and transformation There is also little information on the effects of smoke on forest animals

It is doubtful that the differences among alternatives would be noticeable during most years because there are so many other factors that affect air quality. Table IV-13 illustrates the approximate levels of particulates that will result from on-Forest prescribed burning Experience to date indicates that air quality degradation from on-Forest sources will not be an important factor regardless of alternative, as long as the possible cumulative effects of burning by other local landowners is considered and coordinated.

In Table IV-13, PM-10 refers to particulate matter of 10 microns or less in diameter The quantities are based on estimated levels of logging slash that will be disposed of by burning. The procedures for calculating smoke emissions were developed by the Pacific Northwest Forest Sciences Laboratory, Seattle.

As can be seen in the table, Alternatives B-departure and C-departure, with high first-decade timber harvest levels, will also cause relatively high levels of suspended particulates. Alternatives A, B, D, and E would cause moderate levels of suspended particulates compared to the other alternatives and Alternatives F, G, and H would result in low levels After the first decade, Alternative C-departure would be similar to Alternative D.

Since Alternative NC does not include standards and guidelines for smoke management, the effects may be greater than with the other alternatives. To the degree that production of suspended particulates correlates with timber production, Alternative NC is expected to produce levels greater than those for Alternative C-departure or B-departure

Table IV-13
SUSPENDED PARTICULATES (PM-10)
RESULTING FROM PRESCRIBED BURNING BY
ALTERNATIVE IN THE FIRST DECADE
Tons Per Year*

A	B	B-dep	C Pref	C-dep	D	E	F	G	H
1,829	1,776	2,262	1,768	2,472	1,812	1,678	1,379	1,344	1,385

* Assumes 16.5 tons of fuel per acre with 50 pounds of TSP (total suspended particulates) per ton of fuel. Acres of fuel treated varies from a high of 18,600 acres per year (Alternative C-departure) to 10,100 acres per year (Alternative G). Average acres burned from 1980 through 1984 were 15,000 which produced an estimated 6,187 tons of TSP annually

In recent years, smoke from wood-burning stoves has noticeably increased in communities within convenient driving distance from the National Forest. Since much of the fuelwood comes from the National Forest, this can be considered an adverse indirect effect of National Forest activities Projections do not indicate significant differences in fuelwood sales by alternative, so effects from home wood-burning smoke are not likely to vary.

Cumulative Effects

Smoke from any source, logging, slash disposal from National Forest, field burning on private lands, industrial operations, wood stove heating, etc , can be seriously cumulative when conditions for smoke dispersal are not satisfactory Since smoke and other pollutants from off-Forest sources are not likely to vary regardless of the Forest Plan alternative selected, the risk of serious cumulative effects, by alternative, would be ranked in the same order as for direct effects previously discussed Alternatives NC, C-departure, and B-departure present higher risks than the other alternatives. Alternatives A, B, C, D, and E present moderate risk. Alternatives F, G, and H present low risk, compared to the other alternatives.

Mitigation Measures

The effects of burning on air quality can be mitigated by confining burning to periods when atmospheric conditions cause rapid smoke dispersal and fuels are at the appropriate moisture content to allow rapid, clean combustion

Wood residue can be left unburned when piled or unpiled, lopped and scattered, or buried Woodcutters can be encouraged to remove material All of these methods will reduce effects on air quality

The Standards and Guidelines for Air Quality maintenance in Chapter 4 of the accompanying Forest Plan are expected to be highly effective in mitigating air quality problems caused by practices on the Wallowa-Whitman

Prescribed fire can be scheduled for periods when the created air pollutant emissions are much less (Sandberg 1985). The key to successfully mitigating the effects of prescribed fire are dependent on our ability to predict and measure conditions (fuel, weather, topography, manpower, and tools) which will lead to a successful operation with few undesirable effects

An additional mitigation is to accomplish fuel reduction and resource management objectives by other means such as soil scarification by mechanical means to prepare seed beds, herbicide use to control undesirable plants, or hauling away nonmarketable fuels from the forest. Such means will always be considered, but the economic advantages of prescribed burning appear to make it a tool that will have considerable uses during the period of this Forest Plan.

ROADLESS CHARACTER

Throughout the Forest there are undeveloped areas, totalling more than 484,000,acres, which will be altered in some alternatives as road construction and timber harvesting occur These are areas which were formerly inventoried for potential wilderness during the two Roadless Area Reviews and Evaluations (RARE and RARE II). Because of the extensive areas which contain no or low timber values, sizeable portions of the roadless areas will remain undeveloped in all alternatives. The characteristics which made them eligible for wilderness consideration will remain for the foreseeable future.

Direct/Indirect Effects

In those areas where timber is to be managed, wilderness characteristics will be largely foregone, primarily because the cumulative imprints of man will be noticeable The imprints may be tree stumps, logging slash, skid trails, log landings, roads, or any combination of these factors Trail systems which currently provide access for recreational enjoyment of some of the areas will often be disrupted or replaced by roads.

Developing transportation systems into the roadless areas will make them accessible and useable for recreation by more people than now are able to use them

In some areas where timber will be removed by helicopter, many of the areas' roadless characteristics will remain but man's activities will often be noticeable in the form of tree stumps and slash.

Table IV-14 shows the total acres of nonwilderness roadless area that will remain roadless by decade with each alternative. Table IV-15 is a summary table showing allocation of each nonwilderness roadless area See Appendix C for descriptions of roadless areas and an explanation of how each roadless area is allocated within each alternative. Also see Wilderness Establishment section of the chapter

Because of their size, some of the roadless areas currently provide a sense of solitude that is similar to that found in wilderness Industrial activity and vehicle access will greatly reduce the opportunity for the sense of solitude, but not eliminate it For example, during the winter or periods when there are low levels of activity, solitude will still be available in a somewhat altered environment

Table IV-14
PROJECTED UNDEVELOPED AREA IN DECADES 1, 2, AND 5
(Thousands of Acres)

ALTERNATIVE	DECADE 1	DECADE 2	DECADE 5
A, NC	400	380	362
B	400	380	337
B-dep	400	380	337
C (Preferred)	410	390	380
C-dep	390	360	360
D	400	360	357
E	484	484	484
F	470	450	402
G	400	390	352
H	390	360	360

* Figures include acres of roadless area in management areas which permit development for timber harvest but, due to economic considerations, are unlikely to be developed. Included are portions of roadless areas such as Tope Creek and Deadhorse

Cumulative Effects

The loss of roadless areas, and the effects on the resources within them, is cumulative over time and over a larger area than the Wallowa-Whitman The Umatilla and Malheur National Forests also have extensive roadless area acreage that is proposed for roading over the next few decades. In their Forest Plan DEIS's, the Umatilla and Malheur National Forests proposed 135,000 and 114,000 acres, respectively, of roadless area development.

Mitigation Measures

It has been shown on several areas of the Forest that roadless area recreational potential can be retained to a considerable degree if timber harvest is accomplished using helicopters so that few or no road are required.

Road closures, permanent or seasonal, can help mitigate the impacts on recreational use of the former roadless areas. The "green-dot" system has proven popular with hunters who prefer fewer open roads.

In some instances, it will be possible to retain trails for public enjoyment even though the general area may be roaded

In order to meet management requirements for cavity nesters, old-growth tree stands within roadless areas have been recommended for retention in all alternatives except NC Thus, these portions of the roadless areas will remain unroaded, and will continue to provide roadless area values, though on a much smaller scale, as well as the enjoyment of old-growth stands

Table IV-15
NONDEVELOPMENT MANAGEMENT AREAS
(Acres by Alternative)

ROADLESS AREA NAME	RARE#	A&NC	B&Bd	C	Cd&H	D	E	F	G
Beaver Creek	276						12,470		
Boulder Park	282	10460	2226	11211	5836	5836	12311	12311	2226
Castle Ridge	278	6806	974	4215	4215	4215	8300	8300	974
Deadhorse	GO8						10451		
Dunns Bluff	WW1	305		966	966	966	1013	1013	
Grande Ronde	267	4890	1864	4890	4890	4890	4890	4890	1864
Greenhorn	252	161					161		
Hellhole	261						513		
Homestead*	291	5733	5733	5733	5733	5733	5733	5733	5733
Huckleberry	289	2186		1951	1951	1951	10107	10107	
Hurricane Creek	288	1623		1504	1504	1504	1623	1623	
Joseph Canyon	GO4	2752	2752	2752	2752	2752	23602	2752	2752
Lake Fork*	290	2815	2765	8849	2765	2765	17663	2765	17663
Little Creek	280						2907	2907	
Little Eagle Meadows	283	6277	1561	6652	2792	2792	7140	7140	1561
Little Sheep	286	2124		4738	4738	4738	5278	5278	
Marble Point	271		2150	2297	2297	2297	7135	2141	2150
Monument Rock	240			2097	2097		5958	2125	
Mount Emily	277	8143					8822	8822	
North Mount Emily	262						772		
Reservoir	284	12616	6462	11743	11743	11743	13595	13595	6462
Squaw	601						3220		
Tope Creek	GO3						8674		
Tower	256						85		
Twin Mountain	273	44457	39259	49801	48007	46625	60903	48014	39259
Upper Catherine Creek	281	121		2071	2071	2071	6844	6844	
Upper Grande Ronde	275						11810		
NUMBERS W/O NRA	27	16	10	16	16	15	27	18	10
ACRES W/O NRA		111469	65746	121470	104357	100878	251980	146360	80644
% NUMBER W/O NRA		59	37	59	59	56	100	67	37
% ACRES W/O NRA		44	26	48	41	40	100	58	32
Big Canyon (Idaho)	853	14236	14236	14236	14236	14236	14236	14236	14236
Buckhorn	297	15466	15466	15466	15466	15466	15466	15466	15466
Cook Ridge	299	16149	16149	16149	16149	16149	16149	16149	16149
Corral Creek (Idaho)	854	19180	19180	19180	19180	19180	19180	19180	19180
Imnaha Face	294	25812	25812	25812	25812	25812	25812	25812	25812
Lick Creek	285	218	218	218	218	218	218	218	218
Lord Flat Somers Point	295	63912	63912	63912	63912	63912	63912	63912	63912
Mountain Sheep	298	16777	16777	16777	16777	16777	16777	16777	16777
Sheep Divide	602	16178	16178	16178	16178	16178	16178	16178	16178
Snake River	296	29933	29933	29933	29933	29933	29933	29933	29933
Wildhorse	300	14602	14602	14602	14602	14602	14602	14602	14602
NUMBER NRA	11	11	11	11	11	11	11	11	11
ACRES NRA		232463	232463	232463	232463	232463	232463	232463	232463
NUMBER WITH NRA	38	27	21	27	27	26	38	29	21
ACRES WITH NRA		343932	298209	353933	336820	333341	484443	378823	313107
% NUMBER WITH NRA		71	55	71	71	68	100	76	55
% ACRES WITH NRA		71	62	73	70	69	100	78	65

* Area lies partially within Hells Canyon National Recreation Area

WILDERNESS ESTABLISHMENT

Direct/Indirect Effects

All or portions of four wildernesses lie within the Forest These areas, totalling 582,700 acres, will remain in wilderness in all alternatives Due to the recent adjustment (1984) of the wilderness boundaries by Congress, the Forest Service is not recommending any deletions during this planning period Alternatives E and F show a slight expansion of the Eagle Cap Wilderness with the addition of the 1,013-acre Dunns Bluff Roadless Area See Appendix C for a description and evaluation of this area

Table IV-16 illustrates the acres of roadless areas that will remain suitable for wilderness after 15 years with each alternative Any area that would be both less than 5,000 acres and not contiguous to wilderness was considered unsuitable for wilderness in compiling these figures All other roadless acreages are included

Table IV-16
AREA REMAINING AVAILABLE FOR WILDERNESS
CONSIDERATION AFTER 15 YEARS

Alternative	Acres	Percent of Potential
A, NC	339,500	70
B, Bd	341,700	70
C (Preferred)	338,300	69
Cd, H	324,800	66
D	321,300	66
E	484,200	99
F	371,600	76
G	305,000	62

Cumulative Effects

The reduction in roadless area acreage suitable for wilderness is cumulative over time and across the other National Forests and other public lands in northeast Oregon. There are no large blocks of roadless land in private ownership

Mitigation Measures

Not applicable

MINERALS

Direct/Indirect Effects

New mineral entry is prohibited within the four wilderness areas on the Forest, wild rivers, certain recreational and administrative sites, the Hells Canyon NRA, and Research Natural Areas (RNA's). The only existing RNA, Indian Creek, has no known mineral potential Of the 18 RNA proposals, 11 are within wilderness or the Hells Canyon National Recreation Area Of the remainder, all lie within areas of basalt parent material with low mineral potential except for Cougar Meadow which lies near areas of known mineralization. At 50 acres, it is unlikely to have significant impact on the mineral potential of the Forest

Management Area 6 makes exploration more difficult due to the low road density but development of valid claims is not impossible Mineral prospecting will be more easily accomplished in alternatives which provide a higher degree of roading Therefore, Alternatives C, C-departure, D, H, and A would be slightly less favorable for mineral exploration than more commodity-oriented alternatives such as Alternatives B, B-departure, NC, or G Alternatives E and F, which place relatively large acreages in Management Area 6, would make mineral exploration difficualt relative to the other alternatives. There may also be a reluctance by mining firms to invest in areas that are designated to remain roadless because of their speculation that the areas may be designated wilderness at a later date This perception would also tend to make the more commodity-oriented alternatives more favorable from a minerals standpoint.

Table IV-17 illustrates the relative differences and effects of the various land management alternatives on the minerals resource. Figure III-4 (Chapter III) shows the location of the mineralized areas on the Forest

Recreation sites are not normally withdrawn from mineral, gas or oil exploration and development activities. However, if there is substantial recreation development on a site, it would be more difficult to accomplish mineral extraction. The apparent mineral potential of currently developed recreation sites is negligible.

Cumulative Effects

All actions which have the effect of restricting or eliminating mineral extraction or exploration potential are of concern, since cumulatively, even small withdrawals or restricted areas can become significant

Mitigation Measures

Negative effects of other resource management on Forest mineral are mitigated by considering mineral values or rights during project planning. Examples include projects having capital investments or land allocations which might result in a recommendation for mineral withdrawal or high access restrictions. Standard contract clauses are designed to protect minerals improvements in timber sales and other projects.

Table IV-17
ACRES OF MINERAL POTENTIAL BY ALTERNATIVE

Alternative	A		NC, B, B-dep, & G		C, C-dep, D, & H		E		F		All
Category*	Open	Restricted	Open	Restricted	Open	Restricted	Open	Restricted	Open	Restricted	Closed
I	900	4,200	2,100	3,000	1,100	4,000	1,000	4,100	1,100	4,000	2,200
II	13,300	6,700	14,700	5,300	13,200	6,800	12,300	7,700	13,200	6,800	1,900
III	37,200	5,700	36,900	6,000	34,600	8,300	33,100	9,800	36,700	6,200	5,500
IV	138,000	23,400	151,700	9,700	146,100	15,300	136,800	24,600	139,200	22,200	184,000
Totals	189,400	40,000	205,400	24,000	195,000	34,400	183,200	46,200	190,200	39,200	193,600

* Refers to mineralized areas considered to be of highest mineral potential/likelihood of near-term development (I), to lowest mineral potential with likelihood of near-term mineral development (IV) Nonmineralized and unknown areas are a separate, unmeasured category "Open" includes small area of moderate restriction such as streamsides or sensitive landscapes "Restricted" refers to extensive areas were roadless recreation is emphasized Closed refers to areas where new mining operations are not permitted These are primarily lands in wilderness and the Hells Canyon National Recreation Area Alternative C is the preferred alternative

PRIME FARMLAND, WETLANDS, AND FLOODPLAINS

Direct/Indirect Effects

Executive Orders 11990 and 11988 require protection of wetlands and floodplains, respectively. In general, each Federal agency is to minimize loss or destruction of wetlands and to preserve natural and beneficial values served by floodplains. The potential for damage to wetlands and floodplains is from fire, timber harvest, grazing, mining, and roads

Fire may directly damage wetlands and floodplains by removing vegetation which provides site protection during flood events, thus causing erosion and changing habitats for wildlife species.

Timber harvest activities may remove vegetation needed to protect floodplains from flood waters, and may expose floodplains to increased erosion as a result of log skidding and fuel treatment activities

Road construction in floodplains may constrict flows during flood events, damaging both the road and the floodplain. Although long stretches of roads are no longer built in floodplains, some existing roads continue to cause problems during storm events Crossing of floodplains with roads may result in floodplain erosion if the designed capacity of the culvert or bridge is inadequate to pass the flow during flood stage

Wetlands on the Forest, most of which are small seeps, bogs, and wet meadows, may be damaged by roads if they are not discovered during road design and layout

All alternatives strive to protect wetlands and floodplains from timber harvest and road construction activities, and to correct existing problems The risk of accidental damage from these activities will be greater, however, in alternatives with high levels of timber harvest and road construction. Alternative NC presents the greatest risk since it has the highest timber harvest level and because it assumes full timber yield from most forested floodplains. The other alternatives, in descending order of risk are B-departure, C-departure, B, D, A, C, E, H , G, and F.

Livestock grazing may affect floodplains and wetlands through trampling and removing vegetation, exposing soil to erosion, and compacting or displacing surface soils, thus reducing the rate at which water is absorbed These effects will be greater in those alternatives having high livestock use and lower in alternatives where use is reduced (See Table IV-4 for projected livestock grazing by alternative and discussion of riparian effects, both in the Vegetation section of this chapter)

Mining may directly affect floodplains and wetlands by removing vegetation, changing stream channel hydrology, and increasing soil erosion. These effects are independent of Forest Plan alternative, since the amount of mining activity is most dependent on mineral prices.

All alternatives are in keeping with the intent of Secretary of Agriculture Memorandum 1827 for protection of prime rangeland, farmland, and forest land Regardless of alternative, National Forest lands will be managed with a sensitivity to the effects which their management may have on prime lands, whether the prime lands lie within private or public

ownership Because of low rainfall levels and/or cool temperatures during much of the year, there are few prime lands within or immediately adjacent to the Forest.

Cumulative Effects

The combined effects of stream run-off could erode off-Forest floodplains when streams are much higher than normal Such event is unlikely, however, and much more apt to occur from natural events than from the result of management activities

Mitigation Measures

Executive orders require an eight-step process prescribed by the Water Resources Council be used to evaluate all projects located in the base floodplain. In addition, for all actions involving floodplains or wetlands, 30 days are provided for public review before implementation of a proposal may take place. Chapter 4 of the Forest Plan describes in detail the mitigation measures. Also, see individual resource discussions in this chapter for measures to protect soil and water

A common effective means of preventing damage from timber harvest is by simply avoiding the wetland or floodplain. Otherwise, selection harvest combined with special logging techniques which result in very little ground disturbance are used and have proven effective

Livestock grazing effects on floodplains and wetlands are successfully mitigated by removing livestock before vegetation is removed beyond specified levels, or by excluding livestock

CULTURAL RESOURCES

Direct/Indirect Effects

Cultural sites may be damaged by a variety of activities Prehistorical sites, such as Indian graves or camp sites, may be damaged by activities such as road construction, log skidding, or mining Historical sites, such as cabins, ditches, and railroad beds and trestles may be damaged by the same activities plus they are vulnerable to fire.

Many cultural sites are also susceptible to damage from vandals, pothunters, or recreationists who dig up artifacts or pick up those exposed by erosion or other activities, even though doing so is illegal

Since the cumulative amount of ground disturbance varies with alternative, the potential for disturbing unknown sites will vary Under Alternative A, it would be reasonable to expect to be successful in avoiding cultural resource degradation. Proper evaluation would take place before timber harvesting or other planned activities occur. The risk of damage to important sites would be low. Assuming a direct relationship between ground disturbance and the possibility of cultural site disturbance, the potential for site damage will vary by alternative as follows in comparison with Alternative A Alternatives B and B-departure would have a 9 percent greater chance of disturbance, Alternative G, an 8 percent greater chance; Alternative E, 6 percent less chance, Alternative F, 24 percent less chance; and with Alternative C, C-departure and H there would be no difference. Assuming a direct

relationship between planned acres of harvesting and cultural resources site disturbance, the potential for damage from Alternative NC is 44 percent greater than Alternative A

Management activities which disturb ground and lead to risk of damage to archaeological sites, also may lead to discovery of sites. This could be considered a beneficial effect of the ground disturbing activities, and would also vary with alternatives according to the amount of site disturbance

Cumulative Effects

All alternatives would contribute to the depletion of undisturbed cultural resource sites for this part of the northwest just as similar depletion will continue to occur on adjacent lands of other public or private ownership. For National Forest lands, the depletion would be more gradual under those alternatives with lower commodity output levels such as Alternative F, H, or G. It would be accelerated under Alternatives NC, B, B-departure, or C

Mitigation Measures

Although there is potential for loss of cultural resources through National Forest management activities, there are laws and Forest Service policies which are intended to prevent damage or otherwise protect sites and mitigate disturbance Also to be considered is that as sites are discovered, the opportunity to interpret them and provide educational opportunities, and opportunities to enjoy cultural resources, is increased Discovery and interpretation adds to the body of knowledge about prior cultures

Historical and archaeological sites will be inventoried and evaluated to assure compliance with the National Historic Preservation Act of 1966 (as amended, 1980) and Executive Order 11593 of 1971, Protection and Enhancement of the Cultural Environment. Important cultural sites will be protected in all alternatives. Protection may be in the form of avoiding the site, restoring it, taking measures to stabilize it, and occasionally collecting artifacts and/or site information in those instances when the site cannot be protected Law enforcement plays a key role Before any area is disturbed, such as through timber management activities, regulation (36 CFR 800) requires that the State Historic Preservation Officer be contacted to ensure that the officer is involved and is able to provide information and recommendations based on state records.

The Oregon Wilderness Act of 1984 (P. L 98-328) provides that the Forest Service inventory all archaeological and historic sites within the Joseph Creek drainage and determine their eligibility for the National Register of Historic Places Prior to activities that may affect such prehistoric, historic, or cultural sites, the Forest Service shall follow the procedures in 36 CFR 800 which implement the National Historic Preservation Act, as amended, in order to fully consider and protect the important values of such sites. This will be true regardless of alternative

In compliance with Section II of Executive Order 11593, an action cannot result in the sale, transfer, demolition, or substantial alteration of lands seemingly with characteristics for future nominations to the National Register of Historic Places.

P. L. 95-341, the American Indian Religious Freedom Act provides that the United States protect the rights of Native Americans to express their traditional religious practices Although no specific sites have been identified to date, it is possible that ceremonial sites or sacred objects lie on the National Forest Indian religious leaders have been, and will continue to be, consulted to ensure that these privileges are considered in resource management decisions

The protection of cultural sites may result in restriction or elimination of other resource activities. Because of the small areas involved, it is not anticipated that the effects will be significant, regardless of management plan alternative Individual projects, such as road or trail locations, will be adjusted in order to avoid sites

For additional details regarding mitigation, see Plan Chapter 4, Standards and Guidelines for *Cultural Resources.*

ENERGY

Direct/Indirect Effects

Table IV-18 shows the estimated net energy consumption resulting from implementing each alternative (Schwarzbart and Schmitz 1982). This is a measure of energy efficiency The values indicate that the energy spent to implement each alternative is more than the energy gained. Most activities consume more energy than they produce. Notable exceptions are fuelwood gathering and livestock grazing Timber harvesting, recreation, road construction and fire prevention or suppression all result in energy losses Alternative NC is estimated to be similar to Alternative B-dep

Management alternatives with high timber output levels tend to be proportionately less energy efficient This is due to their involving a higher percentage of steeper, difficult-to-harvest lands, where less energy efficient methods such as helicopter logging, are necessary. The need for less energy efficient, and more expensive techniques, such as helicopter logging, is often due to the need to mitigate soil damage that would occur if more energy efficient means, such as tractor logging, were employed.

Cumulative Effects

Energy requirements for all alternatives are likely to increase over time as more people use the National Forest This increased energy use is likely to be cumulative with use increased on other National Forests and on private lands

Mitigation Measures

Mitigation is accomplished through consideration of the most efficient alternatives for road construction, logging systems, reforestation, and other Forest activities.

Table IV-18
NET ENERGY BALANCE BY RESOURCE GROUP AND ALTERNATIVE
(Billions of British Thermal Units)

Resource Groups	NC 1/ No Change	A	B	B-dep	C Preferred	C-dep	D	E	F	G	H
Timber											
Dec 1	NE	- 1,677	- 1,880	- 2,087	- 1,798	- 2,113	- 1,784	- 1,699	- 1,231	- 1,458	- 1,471
Dec 2	NE	- 1,798	- 1,989	- 2,448	- 1,784	- 1,652	- 1,882	- 1,797	- 1,389	- 1,640	- 1,593
Dec 5	NE	- 1,779	- 1,968	- 2,515	- 1,751	- 1,644	- 1,836	- 1,739	- 1,425	- 1,581	- 1,654
Biomass											
Dec 1	NE	296	296	296	296	296	296	296	296	296	296
Dec 2	NE	296	296	296	296	296	296	296	296	296	296
Dec 5	NE	296	296	296	296	296	296	296	296	296	296
Range											
Dec 1	NE	-68	-76	-75	-68	-68	-70	-60	-52	-76	-68
Dec 2	NE	-68	-68	-75	-59	-59	-70	-60	-52	-68	-68
Dec 5	NE	-68	-68	-75	-59	-59	-70	-60	-52	-68	-68
Recreation											
Dec 1	NE	- 1,798	- 1,798	- 1,798	- 1,798	- 1,798	- 1,798	- 1,798	- 1,798	- 1,798	- 1,798
Dec 2	NE	- 2,088	- 2,088	- 2,088	- 2,088	- 2,088	- 2,088	- 2,088	- 2,088	- 2,088	- 2,088
Dec 5	NE	- 2,533	- 2,415	- 2,415	- 2,541	- 2,518	- 2,518	- 2,637	- 2,609	- 2,474	- 2,518
Roads											
Dec 1	NE	-458	- 1,076	- 1,124	- 1,051	- 1,104	- 1,065	- 1,075	-986	- 1,013	- 1,010
Dec 2	NE	-403	-277	-334	-241	-273	-262	-287	-202	-241	-225
Dec 5	NE	-410	-268	-355	-262	-258	-278	-280	-207	-229	-229
Fire											
Dec 1	NE	-148	-145	-172	-171	-199	-148	-135	-113	-112	-118
Dec 2	NE	-169	-165	-232	-148	-138	-174	-166	-154	-159	-160
Dec 5	NE	-211	-188	-246	-172	-177	-190	-171	-160	-158	-181
Totals 2/											
Dec 1	NE	- 3,853	- 4,679	- 4,959	- 4,589	- 4,986	- 4,569	- 4,471	- 3,885	- 4,160	- 4,169
Dec 2	NE	- 4,230	- 4,291	- 4,880	- 4,023	- 3,914	- 4,181	- 4,102	- 3,589	- 3,900	- 3,838
Dec 5	NE	- 4,704	- 4,629	- 5,310	- 4,488	- 4,359	- 4,596	- 4,590	- 4,158	- 4,214	- 4,355

1/ NE Not estimated
2/ Totals may not add due to rounding

CONSISTENCY WITH OTHER PLANS

In Oregon, city and county comprehensive management plans are designed to carry out State-wide planning goals * A purpose of the plans is also to incorporate the plans and programs of the various governmental units into a single management tool for the planning area. The State governmental body responsible for reviewing county comprehensive plans is the Oregon Land Conservation and Development Commission.

County plans recognize the National Forest as "primary forest", "timber/grazing" or similar designation. Although counties do not have responsibility for regulating use on Federal lands, the Forest Service and county governments attempt to coordinate planning efforts to avoid conflicts. The alternatives discussed in this EIS are generally compatible with local governmental plans.

Direct/Indirect Effects

Following are the *State-wide planning goals* to which county plans must adhere, and a statement of how the Forest Plan alternatives meet these goals (State of Oregon 1980)

Goal No. 1· "To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process "

The public involvement process used to develop this environmental impact statement is consistent with the State of Oregon's emphasis on citizen participation in the planning process

Goal No. 2 "To establish a land use planning process and policy framework as a basis for all decisions and actions related to use of land and to assure an adequate factual base for such decisions and actions "

The State-wide goal for the planning process is consistent with the process established by the National Environmental Policy Act of 1969 (NEPA), and the National Forest Management Act of 1976, the guiding policies for the National Forest Land and Resource Management Planning program.

Goal No. 3. "To preserve and maintain agricultural lands."

Livestock grazing potential on National Forest lands varies by alternative However, National Forest lands which, by State definition, qualify as agricultural land are maintained as such in all alternatives

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* Coordination with local planning within Idaho Counties was accomplished through development of the Comprehensive Management Plan for the Hells Canyon National Recreation Area which the Forest Plan will adopt.

Goal No 4 "To conserve forest lands for forest uses."

The land management areas of the proposal and the various alternatives for areas defined as "forest lands" and "forest uses" are consistent with this State-wide goal However, guideline B 2 states that "Forest lands should be available for recreation and other uses that do not hinder growth." In many Forest Plan management prescriptions, consideration for use other than wood production has resulted in less than maximum wood growth In this sense the preferred alternative does not comply with the forest lands goal

Goal No 5. "To conserve open space and protect natural and scenic resources."

This goal is incorporated by all alternatives. Protection of cultural resources is required by law and Forest Service policy The protection of scenic resources will vary by alternative, but will provide various levels of protection. By their nature and purpose, National Forests provide open spaces.

Goal No. 6: "To maintain and improve the quality of air, water, and land resources in the State "

All alternatives are supportive of this State goal.

Goal No 7. "To protect life and property from natural disasters and hazards "

No actions included in any of the alternatives are projected to contribute significantly to the potential for loss of life or property due to natural disaster.

Goal No. 8: "To satisfy the recreational needs of the citizens of the State and visitors."

Recreational needs are considered in all alternatives Dispersed recreation use is emphasized on National Forest lands.

Goal No. 9 "To diversify and improve the economy of the State."

The alternatives are projected to contribute to the economy of the area and State at varying levels. Depending on the objectives of the alternative, the economy may or may not be improved

Goal No 10: "To provide for the housing needs of citizens of the State."

This goal refers primarily to the availability of suitable land for housing The Forest Plan is not likely to affect housing land needs. The alternatives do provide for various levels of wood products flow for use in housing construction.

Goal No. 11: "To plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve as a framework for urban and rural development."

None of the alternatives are likely to have significant effect on this State-wide goal. The Forest provides land for utility corridors and other facilities that are in the public interest

Goal No 12. "To provide and encourage a safe, convenient and economic transportation system."

The Forest does and will continue to coordinate the needs of the Forest transportation system with those of the State and local governments

Goal No. 13 "To conserve energy."

There are no prohibitions placed on development of potential geothermal or mineral power sources or hydroelectric development except in areas withdrawn from entry for such purposes, such as Hells Canyon National Recreation Area, wilderness (minerals), and wild and scenic rivers (hydroelectric)

Goal No. 14. To provide for an orderly and efficient transition from rural to urban land use

None of the alternatives are projected to affect the State-wide goal.

Goals 15, 16, 17, 18, 19· These goals pertain to resources which are not specifically addressed by plans for the inland Wallowa-Whitman National Forest.

The State Board of Forestry in their "Forestry Program for Oregon," has recommended a *harvest level for the Wallowa-Whitman National Forest that is the same as Alternative* B-departure and somewhat higher than the amount provided by the Forest Service preferred alternative or the level recommended by the current Governor of Oregon This apparent conflict is due to differing objectives The "Forestry Program for Oregon" is intended to mitigate a projected State-wide shortage of timber over the next several decades. The objectives guiding the Governor's response include concerns for Oregon's forest environment, wildlife protection, jobs, timber production, and recreational values. An equitable balance among these often conflicting resources is his principal goal Table IV-19 compares the State Board of Forestry target for the Forest with several alternative management plans.

The *Oregon and Idaho game management agencies* have several on-going programs such as winter big-game feeding, seasonal road closures, game transplanting, and others with which the Wallowa-Whitman National Forest cooperates. The Forest will continue to work closely with these agencies and recognize their responsibility for wildlife management programs on the National Forest. There may be occasional conflicts with State plans at the project level, but these conflicts are likely to be rare.

Plans for managing the adjacent *Umatilla Indian Reservation* have been developed by the tribal government and offered to the Forest Service for review. No conflicts were identified.

Cooperative work with the *Bonneville Power Administration, Oregon Department of Fish and Wildlife,* and *Umatilla and Nez Perce tribal governments,* to restore the anadromous fish habitat potential of streams on the Forest will continue

The need for *energy transmission corridors* has been coordinated based on the Western Regional Corridor Study. No new full corridors (see Glossary, Corridors) are proposed in any of the alternatives and all alternatives propose to establish one existing utility corridor This is the corridor northwest of La Grande which includes Interstate Highway 84, a railway, and several underground and aboveground power transmission lines. The corridor is proposed to be approximately one mile wide.

Table IV-19
COMPARISON OF FPFO OBJECTIVES WITH ACTUAL SALES, HARVEST AND FOREST PLAN ALTERNATIVES
(Average Annual Decade 1 Values Unless Otherwise Indicated)

	MMBF	MMCF
State Board of Forestry Recommended Program Target 1/	253 2/	50 5
Forest Sales (1979-1988) 3/	205	40.9 4/
Forest Harvest (1979-1988) 3/	206	41.2 4/
Forest Sales (1984-1988) 3/	206	41.2 4/
Forest Harvest (1984-1988) 3/	244	48.8 4/
Alternative B-departure (to meet FPFO objective)	243 5/	49.6 6/
Alternative A	199 5/	40.1 6/
Alternative C (Preferred Alternative)	210 5/	40 8 6/
Timber Management Plan (Potential Yield) 7/	259	50.2

1/ Oregon State Department of Forestry letter of May 13, 1983.
2/ Estimated by multiplying the cubic foot volume by five, the traditional board foot/cubic foot conversion ratio.
3/ Cut and Sold Reports
4/ Estimated by dividing the board foot volume by five, the traditional board foot/cubic foot conversion ratio
5/ Estimated as follows. Sawtimber MMBF volume from FORPLAN plus nonsawtimber MMCF volume assumed to generate five board feet per cubic foot
6/ Timber Sale Programmed Quantity (TSPQ)
7/ The Timber Management Plan potential yield is 183 MMBF or 35.1 MMCF annually and does not include nonsawtimber components of the Timber Sale Program Quantity (TSPQ) The figures shown include estimates of the nonsawtimber volume with a board foot per cubic foot conversion ratio of five.

Designating the corridor as an existing utility corridor will serve to facilitate future rights-of-way authorization in what is a major transportation and power transmission route. Assuming 50 to 100 feet for powerline right-of-way width and 200 feet right-of-way width for power transmission lines, there is an additional capacity within the proposed corridor which varies from 1 to 1.8 miles in width. Most of the residual capacity lies south of the interstate highway.

Designation of the I-84 corridor would recognize the situation as it exists. Most tradeoffs of visual and other resources have already occurred as a result of the existing facilities and these tradeoffs are not considered objectionable By careful planning, the impact of additional facilities within this corridor is likely to be much less than if the facilities were to be located elsewhere on the Forest.

A consequence of all alternatives will be to make it clear where future transmission facilities will be excluded (to protect wilderness values), where they will be discouraged (to prevent recreational and scenic conflicts) and where they will be encouraged (designated existing corridors). These decisions will be useful to those wishing to use the Forest for power transmission purposes and will protect the public's interest Each new proposal will be subject to environmental analysis to verify the need for the proposal, review alternatives, and determine site-specific effects and mitigation measures Other than as discussed in the following two paragraphs, the management area which the corridors cross will not significantly affect the use of the corridors, regardless of alternative.

Management Area 6 is an avoidance area in each alternative and, as it varies by alternative, the avoidance area varies. It is unlikely that this will have a significant impact on future power transmission plans regardless of alternative

The only proposed exclusion areas are wilderness and wild and scenic rivers, where most facilities would not be in conformance with the provisions of the respective laws (The current powerline which crosses the Imnaha corridor is considered a nonconforming use. It was in place prior to classification of the river) Areas recommended for avoidance (Hells Canyon National Recreation Area, Management Area 6, research natural areas, recreation and administrative sites) will vary with each alternative. However, no new facilities are currently proposed to cross such areas in any of the alternatives Existing facilities would not have to be removed during this planning period unless it becomes convenient to do so The intent would be to not permit additional facilities in avoidance areas or exclusion areas. (See Comprehensive Management Plan for Hells Canyon NRA)

In summary, no significant conflicts between the Forest Plan and the objectives of Federal, Regional State, local, or tribal land use plans, policies, and controls for the areas concerned, except as discussed above, have been identified.

Cumulative Effects

Not applicable.

Mitigation Measures

Mitigation measures are discussed throughout the foregoing section

SOCIAL AND ECONOMIC CONSIDERATIONS

Up to this point, the chapter has dealt primarily with the effects on the physical and biological environment Council on Environmental Quality implementing regulations (40 CFR 1508.14) state that "when an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment". Human environment is defined as "the natural and physical environment and the relationship of people with that environment" In 40 CFR 1508.8 effects are defined as including social and economic considerations.

Comments received from reviewers of the draft Forest Plan documents show that economic considerations are a concern of many Effect on the local economy was a key issue identified early in the planning process The following discussion deals mainly with social

and economic considerations including the "costs" in terms of social or economic opportunities foregone as a result of providing for such things as old-growth tree stands or wildlife habitat Because "social" includes human enjoyment of the Forest, effects on recreation opportunity are included in this section.

Nearly all the social and economic considerations discussed in this section are indirect because they do not occur at the same time and place as the action which changes the physical or biological environment. (40 CFR 1508 8)

DEVELOPED RECREATION

Direct/Indirect Effects

At present the capacity of developed recreation sites (583,000 RVD's) exceeds the developed recreation use (366,700 RVD's) the Forest experiences during the normal recreation season Only on weekends, holidays, and during hunting season are the more popular sites filled A study of population projections and other factors which influence developed recreation use indicates this surplus of capacity will continue for many years. As described in Chapter III, there are some locational problems with current developments due to heavy use occurring where there are no developed sites. Therefore, some development will be necessary for site protection in the next 10 years

The RPA-developed recreation goal for the Forest for the period 1986-1990 is 407,000 recreation visitor days increasing to 430,000 by decade 5 While present use levels are less than the RPA target it is likely that use levels through the five-decade period will exceed RPA goals as well as existing capacity There are plans to construct new facilities in the Hells Canyon National Recreation Area which were authorized by Congress to develop the recreation potential of the river corridor. The extensive development proposed for Pittsburg Landing is the most prominent example

Table IV-20 summarizes and compares RPA targets, projected use and capacity for developed recreation. Alternative A would involve an investment of $87,000 per year, most of which would be used for reconstruction of existing sites It is projected that in decade 4 use would reach 90 percent of capacity. All other alternatives would involve an investment of $39,000 per year, mostly for reconstruction, plus $477,000 per year through 1995 for the Hells Canyon National Recreation Area, primarily for construction. This would result in a major increase in capacity, as authorized by Congress in the HCNRA Act. A number of other potential developed sites outside the HCNRA have also been identified which may be developed depending on demand and funding. (See Forest Plan, Appendix C)

The journey to or from recreation sites is often an important part of a recreation experience and the quality of this experience will vary by alternative All alternatives will offer a more "managed" appearing forest than now exists, with more evidence of timber harvest and associated activities. The change will be least noticeable in Alternative F and most noticeable in Alternative B-dep

There will be some differences in recreational alternative experiences associated with those sites that are surrounded by timber management areas For example, sites within unroaded areas will provide the user a different experience when the surrounding area has been logged

Table IV-20
PROJECTED DEVELOPED RECREATION CAPACITY AND USE
(Thousands of Recreation Visitor Days Per Year)

Year		Recent Levels	DECADE 1	2	3	4	5
Capacity	Alternatives A & NC	583	587	595	603	610	618
	all other Alts	583	661	661	661	661	661
Projected Recreation Use All Alternatives		367	399	464	523	571	621
RPA Target			407	410	410	410	430

Cumulative Effects

All effects are cumulative in that they occur over time. Similar effects are expected on adjacent National Forests.

Mitigation Measures -- All major sites, such as those at Anthony Lakes, Phillips Lake, or Mt Howard, have special provisions for protecting the scenic setting, regardless of alternative

DISPERSED RECREATION

Direct/Indirect Effects

Dispersed recreation use currently totals some 1.1 million recreation visitor days (RVD's) for the Forest. This is expected to increase to some 1.2 million RVD's during the first decade of the plan Considering that there is approximately one job for each 1,000 RVD's, the impact on the local economy is significant * It is estimated that some 1,300 local jobs (part-time and full-time) are associated with the dispersed recreation the Forest provides

The variation in use among the alternatives is largely the result of the variation in supply of unroaded recreation (Table IV-21). Between decades 2 and 3, capacity is less than demand for semiprimitive motorized and nonwilderness-primitive ROS Classes in some

* Wallowa-Whitman IMPLAN model. Includes direct, indirect and induced jobs.

Table IV-21
AREA OF RECREATION OPPORTUNITY SPECTRUM CLASS BY ALTERNATIVE IN DECADE 5 (Acres)

ROS Class	Recent Levels 1980 - 1993	ALTERNATIVE NC	A	B	B-dep	C Preferred	C-dep	D	E	F	G	H
Nonwilderness												
Primitive	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%	8,115 100%
Semiprimitive Nonmotorized	269,000 100%	171,700 64%	171,700 64%	126,800 47%	126,800 47%	167,678 62%	154,700 58%	154,700 58%	230,978 81%	205,340 76%	126,800 47%	154,700 58%
Semiprimitive Motorized	260,200 100%	148,600 57%	148,600 57%	128,600 49%	128,600 49%	153,448 59%	149,900 58%	149,900 58%	182,098 70%	171,060 66%	141,668 49%	149,900 58%
Roaded Natural	985,600 100%	262,300 27%	262,300 27%	222,000 23%	222,000 23%	237,100 24%	237,100 24%	234,700 24%	246,737 25%	220,327 22%	223,832 23%	237,100 24%
Roaded Modified	242,100 100%	1,174,300 485%	1,174,300 485%	1,279,500 529%	1,279,500 529%	1,198,674 502%	1,215,200 502%	1,217,600 503%	1,096,087 460%	1,159,173 478%	1,264,600 522%	1,215,200 502%
Rural	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%	1,500 100%
Subtotal	1,766,515	1,766,515	1,766,515	1,766,515	1,766,515	1,766,515	1,766,515	1,766,515	1,765,515	1,765,515	1,766,515	1,766,515
Wilderness												
Primitive (Trailed)	511,000	511,000	511,000	511,000	511,000	511,000	511,000	511,000	511,000	511,000	511,000	511,000
Semiprimitive	71,700	71,700	71,700	71,700	71,700	71,700	71,700	71,700	72,700	72,700	71,700	71,700
Subtotal	582,700	582,700	582,700	582,700	582,700	582,700	582,700	582,700	583,700	583,700	582,700	582,700
GRAND TOTAL	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215	2,349,215

NOTE Percentages display relationship to existing acreage (starting point) in each ROS class

alternatives By decade 5, capacity is less than demand for semiprimitive motorized and primitive (both wilderness and nonwilderness) ROS classes in all alternatives, and for the semiprimitive nonmotorized ROS class in some alternatives The total shortfall varies from 133,000 visitor days (5 percent of demand) in Alternative E to 313,000 visitor days (11 percent of demand) in Alternatives B and B-departure. This view of the future is based on the assumption that the mix of recreation demand will not change in the future. If the relative percentage of users seeking each kind of recreation setting changes, it would cause the future picture to be different

Due to the anticipated roading of the currently unroaded areas, semiprimitive motorized acreage and capacity will decrease in all alternatives, with the decrease varying from 31 percent to 51 percent This includes the roading of unroaded areas as well as the roading of areas that are not part of the roadless area inventory. In all alternatives except Alternative E, projected use will reach capacity by decade 3 of plan implementation. Especially in alternatives B, B-departure and G, there will be a shortage of off-road four-wheel drive and motorcycle opportunities in a semiprimitive setting It is possible that some of this demand will be met by providing such opportunities in a roaded-natural/modified setting, although the recreation experience will be substantially different and would conflict with other resource values such as big game habitat.

Roaded recreation capacity will increase in all alternatives and will greatly exceed demand throughout the planning period This excess capacity will generally not substitute for shortages in unroaded recreation Roaded-modified acreage and capacity increase substantially in all alternatives, with the largest increases occurring in Alternatives B, B-departure and NC In Alternatives C, C-departure, D, F and H, smaller increases are projected because greater acreages are retained in an undeveloped condition

Nonwilderness semiprimitive nonmotorized acreage and capacity decrease in all alternatives, with the decreases varying from 14 percent to 53 percent. Projected use is still less than capacity for decade 5 in Alternatives E and F In Alternative A projected use reaches capacity at around decade 4 In Alternatives C, C-departure, D, G, and H projected use reaches capacity by about decade 3 In Alternatives B, B-departure and G, projected use reaches capacity in decade 2

Because the recreation opportunity spectrum classes are broad, there are significant differences within classes Examples are with Alternatives C-departure and D which show the same amount of semiprimitive motorized area Yet, Alternative C-departure includes more Management Area 3 than does Alternative D In some Forest users' eyes, Management Area 3 would provide a significantly different recreation experience than would Management Area 1 which is more dominant in Alternative D. Table IV-22 illustrates the number of recreation visitor days that are estimated to be available, by ROS class, in decade 5, by alternative.

Of the four *National Recreation Trails* on the Forest, the Snake River and the Nee-Me-Poo Trails lie within the Hells Canyon National Recreation Area and will be unaffected by this planning effort The character of these two trails, and views therefrom, will not be noticeably altered by Forest management activities No significant changes in the view from the High Wallowa Trail are expected Neither will the Elkhorn Crest Trail be altered significantly within one-half mile of the trail but since all alternatives result in timber management activities within easy viewing distance of the trail, the cumulative effects of timber harvest will gradually change the vegetation pattern as seen from many portions of the trail In Alternatives B, B-departure, and NC these activities will be more noticeable because they provide for harvest within the large, currently-undisturbed North Powder River drainage

With other alternatives, the effects will be noticeable from the trail in direct proportion to the amount of harvest.

Probably more significant than the *visual* effects of timber management as seen from the Elkhorn Crest Trail will be the direct visual effects of the first harvest entries along the west side of the Elkhorn range. With Alternatives A, C, C-departure, and D, initial harvest units in drainages such as Wind Creek, Pole Creek and Wahoo Gulch, though similar to more distant presently existing disturbances, are likely to be highly visible in spite of efforts to blend the harvest units and roads into the landscape Visual effects of future harvests are likely to be less objectionable because of patterns established by the initial entries. Harvest entries within the frameworks of Alternatives E, F, and G will be least noticeable because they will occur at greater distances from the trail.

There are hundreds of undeveloped "*hunter camps*" throughout the Forest Some are plainly visible, having been used to park a recreation vehicle or pitch a tent each hunting season, and often by the same family, for years. Others are much less conspicuous and some are being "established" each year Many occur within management areas where grazing and timber harvest are emphasized. Consequently, conflicts occur when hunters, fishermen, or other recreationists return to "their" camp and find that the area has been altered by timber harvest or there is evidence that livestock have used the campsite

Wilderness ROS classes do not change over time, except for minor changes in Alternatives E and F Wilderness will be managed to preserve its primitive character. However, as road access to wilderness boundaries becomes more convenient, this will become more difficult. Also, as use nears capacity, special measures such as permit systems are likely to become necessary In all alternatives, wilderness reaches capacity at about decade 4.

Alternative NC does not provide the wilderness management direction required by 36 CFR 219 18 Consequently, it is unclear how this alternative would affect wilderness use, visitor distribution, or protection of adjacent areas. It is likely, however, that wilderness recreation opportunity would remain similar to what it is today.

Effects of *livestock grazing* on recreation vary as the effects are perceived by different people For example, while some view a band of sheep as an interesting sight, others are offended. Most livestock grazing is compatible with recreation use and problems are usually avoidable by excluding livestock from popular recreation sites or areas Other conflicts are less easily avoided Livestock excrement on trails or trampling of water sources are examples of livestock grazing effects that adversely affect recreation experience. Regardless of alternative, conflicts will continue to occur where livestock and the recreation public are mixed In those alternatives with higher grazing levels, there would be greater conflict than there would be in alternatives with lower grazing levels. However, it is unlikely the conflicts would be appreciably different since grazing will not occur in popular recreation areas regardless of alternative

Timber management activities have more effect on recreational activities than any other activity because they are responsible for greater changes in forest character As shown in Tables IV-21 and IV-22, the Recreation Opportunity Spectrum will be changed in each alternative primarily because of road development for timber management Opening areas to motor vehicle access increases recreation total opportunity because more recreational activities are associated with roaded land than with less accessible land and these activities accommodate a higher density of use Driving for pleasure, picking mushrooms or berries, fuelwood gathering, and rock hunting are just a few activities for which opportunity is increased with increased road mileage

The experience associated with elk and deer hunting, popular activities on the Forest, are different in areas where timber management occurs Because of increased access, animals may be harvested more rapidly than in undeveloped areas. Several of the roadless areas provide large blocks of security cover for elk which provides a recreational hunting challenge not usually found in roaded areas where timber stands are being managed for wood fiber production. These cover blocks will be broken up, the security cover value reduced, and the recreational value changed Road closures can reduce the harvest rate but will not totally offset the effects of development Roads make access less difficult, even when the roads are closed to motor vehicles Few will argue that the big-game hunting experience is not different in areas where timber is harvested and managed than where it is not. Whether the difference is desirable or undesirable varies with the individual hunter. See Wildlife and Wildlife Habitat within this chapter.

Recreation use would not be significantly altered by establishing any of the proposed *research natural areas.*

The *Forest-wide trail system* will be affected in varying degrees by the various alternatives Trails in areas designated for Management Areas 4 through 11, 13, 15, and 16 will generally be retained. Trails will be reconstructed or relocated where their existing standard or location does not serve the management direction for the area they access Additional trails will be constructed where needed See projections by alternative in Table IV-23. There are currently 1,750 miles of trail on the Wallowa-Whitman

Trails in areas designated for Management Areas 1, 2, 3, and 18 will experience the most change as these areas experience road development and timber harvesting. Determination of the future need for such trails will be a part of the detailed project planning for each area. As a result of detailed planning, trails may be retained in their present location, rerouted to a location that will better serve the long-term needs of the user, or be eliminated Trails are most likely to be retained in present or rerouted location in Management Areas 1, 2, 3, and 18 areas where·

- They will continue to provide a significant recreational experience or provide access to an area with significant recreational opportunity

- They do not closely parallel roads

These changes in trail mileage will result in.

- Reduced trail-related recreation opportunities.

- Shorter access to remaining unroaded areas and wilderness, with resultant increased pressure on such areas.

- Decreased cost for trail maintenance.

Table IV-22
PROJECTED RECREATION OPPORTUNITY SUPPLY BY RECREATION OPPORTUNITY SPECTRUM CLASS AND ALTERNATIVE FOR DECADE 5
(Recreation Visitor Days)

	ALTERNATIVE											
	Current Supply	NC	A	B,B-dep	C Preferred	C-dep	D	E	F	G	H	Demand at Decade 5
Nonwilderness												
Primitive	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	11,000
Semiprimitive Nonmotorized	322,800	206,000	206,000	155,000	200,000	187,000	187,000	261,000	245,000	174,000	187,000	216,000
Semiprimitive Motorized	573,700	327,000	327,000	281,000	339,000	333,000	333,000	402,000	379,000	310,000	333,000	474,000
Roaded Natural & Roaded Modified	6,134,800	7,178,000	7,178,000	7,484,000	6,932,000	6,932,000	7,178,000	6,871,000	3,435,000	7,423,000	6,932,000	1,568,000
Rural	172,700	172,700	172,700	172,700	172,700	172,700	172,700	172,700	172,700	172,700	172,700	187,000
Subtotal	7,211,000	7,890,700	7,890,700	8,099,700	7,650,700	7,631,700	7,877,700	7,713,700	4,238,700	8,086,700	7,631,700	2,456,000
Wilderness												
Semiprimitive	56,400	32,600	32,600	32,600	32,600	32,600	32,600	34,100	34,100	32,600	32,600	13,000
Primitive (trailed)	276,400	300,200	300,200	300,200	300,200	300,200	300,200	300,200	300,200	300,200	300,200	341,000
Subtotal	332,800	332,800	332,800	332,800	332,800	332,200	332,800	334,300	334,300	332,800	332,800	354,000
Total	7,543,800	8,223,500	8,223,500	8,432,500	7,983,500	7,964,500	8,210,500	8,048,000	4,573,000	8,419,500	7,964,500	2,810,000

Table IV-23

TRAIL SYSTEM MILEAGE AT YEAR 2000 BY ALTERNATIVE*

ALTERNATIVE	MILES WILDERNESS	MILES NONWILDERNESS	TOTAL
A	885	765	1650
B	885	758	1643
B-departure, NC	885	753	1638
C	885	765	1650
C-departure	885	765	1650
D	885	764	1649
E	885	794	1679
F	885	777	1662
G	885	762	1647
H	885	765	1650

* Does not include snowmobile or X-country ski trails.

With the exception of Alternative F, there will be less opportunity to experience *old-growth forest* environments in the future over the Forest as a whole. By reviewing the land allocation maps for each alternative, the reader can visualize the dispersion of old-growth for each alternative. (Also see old-growth discussion in Vegetation section of this chapter)

Cumulative Effects

Most of the foregoing indirect effects on recreational enjoyment are cumulative since they are the results of management activities over time and area. In addition, the activities will also be occurring over adjacent National Forests, to much the same degree Many roadless areas, for example, are likely to become roaded on each Forest

Mitigation Measures

The reduction in semiprimitive nonmotorized recreational opportunity will be mitigated to some degree by making the roaded landscape more acceptable to the previous users Seasonal and permanent road closures such as the popular green-dot system will be used. Some trails may be retained where they follow stream courses and will still provide a semiprimitive experience even though roads may be nearby. This is not to say, however, that roaded areas can be made to closely resemble, or provide true semiprimitive experiences, but for some people, such measures will be satisfactory

The management requirement for old-growth groves throughout the Forest, while intended to mitigate effects on wildlife, also provides conditions for human enjoyment of big trees, solitude and other old-growth features.

Much of the conflict between livestock grazing and recreational use is avoided when livestock are removed from the Forest prior to the primary hunting seasons in the fall months. Otherwise, measures to separate livestock from heavily used recreational areas or recreation sites is the primary means of mitigation. This can mean excluding the livestock through the use of fences or through herding. Watering or salting facilities can also be located to avoid conflicts with recreationists.

Another means of mitigating grazing conflict is through encouraging recreational user acceptance of grazing. Careful management of livestock (especially the avoidance of overgrazing along streams or other areas where people congregate) increases the likelihood of public acceptance.

Standards and guidelines in Chapter 4 of the Forest Plan provide for evaluating and considering alterations in timber sale layout to retain, or at least partially retain, the character of minimum development recreation sites, when they can be recognized Sometimes livestock control fences can be located to reduce livestock impacts on these sites, or in some instances, exclude livestock altogether.

Timber sales may provide funds for enhancing recreational opportunities as well as mitigating the charges that timber management brings. This may include improving access or providing funds for other facilities.

TIMBER MANAGEMENT PROGRAM

Direct/Indirect Effects on the Timber Management Program

Because timber harvested from the Wallowa-Whitman is such an important factor in local employment, many draft plan reviewers stressed the importance of clearly showing the effects of providing various other resources on the timber harvest levels. While activities associated with timber management are more noticeable, and often have greater environmental effect, negative and positive, than the management of any other resource, the production of timber also contributes more to payments to local governments than all other National Forest management activities combined. These contributions include jobs in timber harvesting, road construction, tree planting, tree thinning, slash disposal, lumber or pulpwood chip manufacturing as well as numerous other jobs in equipment sales and repair, restaurants, service stations, schools, etc. On the average, each one million board feet of timber harvested from the National Forest produces about six local jobs. Twenty-five percent of the timber receipts (along with other receipts) are remitted to local governments for schools and roads Table II-15, Chapter II, illustrates annual timber production levels for each alternative for five decades.

Following are timber production "tradeoffs" that result from providing for several resources Any tradeoff analysis is, of course, a two-way street, the same analysis can be made in terms of recreational or wildlife benefits foregone in order to provide various timber production levels. These costs are illustrated or implied elsewhere in this document. It is certainly true that there are economic benefits from retaining old growth, backcountry, landscapes, etc.

The adverse consequences of *old-growth forest* retention include the potential timber production that is foregone, and to a lesser degree, the loss of potential forage production. Annual timber production foregone, by alternative, as a result of old-growth objectives is displayed in Table IV-24 and includes the amount resulting from meeting management requirements (see Appendix M.) The old-growth forest stands provide a source of insects

and disease that can affect adjoining management areas They also provide excellent habitat for insectivorous birds which may help keep insect populations at endemic levels The loss of timber due to the indirect effects of insects and disease spreading from old-growth stands is not known and is not included in the figures shown in Table IV-24.

Table IV-24
TIMBER PRODUCTION FOREGONE AS A RESULT OF ACHIEVING
OLD-GROWTH OBJECTIVES
(MMBF Per Year)

NC	A	B	B-dep	C	C-dep	D	E	F	G	H
0 0	7.7	5 2	5 2	7 0	7.0	7 0	4 4	7 4	5.2	7.0

Management Areas 2, 3, and 18 are designed to mitigate the effects of timber management in wildlife. The implementation of harvest dispersion constraints in Management Area 2 would result in a reduction of timber yield of 10-12 percent from what the same lands could produce under Management Area 1 direction The implementation of Management Area 3 or 18 harvest dispersion constraints results in a reduction in timber yield of about 20 percent from Management Area 1. Table IV-25 displays timber production foregone as a result of Management Areas 2, 3, and 18.

Table IV-25
TIMBER PRODUCTION FOREGONE AS A RESULT OF MANAGEMENT AREAS 2, 3, AND 18
(MMBF Per Year)

NC	A	B	B-dep	C	C-dep	D	E	F	G	H
0 0	16.0	3.5	3.5	9.0	11.5	6.5	3.5	27.5	3 5	11 5

Management Area 6 is intended to maintain the "backcountry" atmosphere that many people enjoy. There is no programmed timber harvest from these areas.

Table IV-26
TIMBER PRODUCTION FOREGONE AS A RESULT OF MANAGEMENT AREA 6
(MMBF Per Year)

A, NC	B, B-dep	C	C-dep, H	D	E	F	G
5.5	0 0	5 9	5.1	2 9	12 5	7.2	1.7

Retaining visually pleasing *landscapes* with a variety of tree sizes and a natural appearance is accomplished only by reducing timber harvest to levels below potential The following table compares alternatives.

Table IV-27
ACRES OF VISUALLY SENSITIVE VIEWSHEDS RETAINING ESSENTIALLY NATURAL APPEARANCE AND TIMBER PRODUCTION FOREGONE DUE TO ACHIEVEMENT OF VISUAL QUALITY OBJECTIVES
(MMBF Per Year)

	ALTERNATIVE								
	A	B,B-dep, NC	C	C-dep	D	E	F	G	H
Thousands of Acres	575	149	530	576	575	178	577	149	577
Timber Production	7.4	2 1	6.4	7 0	7.0	1.9	6.8	1.8	7 0

Certain resource uses are usually foregone when research natural areas are established. Because most of the proposed areas on the Wallowa-Whitman lie within wilderness or are nontimbered, the potential values lost are relatively low, regardless of how many areas are selected. Of those proposed, only Government Draw is significantly timbered, containing approximately 1.5 MMBF of standing volume.

Cumulative Effects

While the foregoing effects on the timber program are perhaps some of the most obvious, there is a variety of other land allocation decisions and mitigation measures that cumulatively affect timber production. Examples are developed recreation sites, protection of riparian zones, dead tree maintenance. Table IV-28 compares the cumulative economic effects of alternatives in terms of personal income, jobs, and payments to local governments.

Table IV-28
FOREST-RELATED JOBS, PERSONAL INCOME, PAYMENTS TO LOCAL GOVERNMENTS

Effects	Recent Levels	ALTERNATIVE										
		NC No Change	A No Action	B RPA	B-Dep	C Preferred	C-Dep	D	E	F	G	H
Forest-Related Jobs Decade 1 - Jobs/Yr (Recent Levels)												
Sawtimber	982	1,123	838	946	1,048	894	1,063	893	850	616	731	742
Roundwood	218	232 1/	177	197	227	179	225	187	176	136	156	157
Livestock	93	93	93	104	102	93	93	96	82	72	104	93
Developed Recreation	404	439	439	439	439	439	439	439	439	439	439	439
Dispersed Recreation	1,258	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368
TOTAL	2,955	3,255	2,915	3,054	3,183	2,974	3,188	2,983	2,914	2,631	2,798	2,800
Forest-Related Personal Income - Decade 1-MM$/Yr (Recent Levels)												
Sawtimber	18 4	21 1	15 7	17 8	19.7	16 8	19 9	16 8	15 9	11 6	13 7	13 9
Roundwood	4 4	4 7 1/	3 6	4 0	4 6	3 6	4 6	3 8	3 6	2 8	3 2	3 2
Livestock	1 1	1 1	1 1	1 2	1 2	1.1	1 1	1 1	1.0	0 8	1 2	1 1
Developed Recreation	5 0	5 4	5 4	5 4	5 4	5 4	5 4	5 4	5 4	5 4	5 4	5 4
Dispersed Recreation	15 6	16 9	16 9	16 9	16 9	16 9	16 9	16 9	16 9	16.9	16 9	16 9
TOTAL	44 5	49 2	42 8	45 3	47 8	43 9	47.9	44 0	42 8	37.5	40 4	40 6
Forest-Related Payments to Local Governments - Decade 1-MM$/Yr (Recent Levels)												
Sawtimber 2/	3 7	4 0 3/	3 7	4 3	3 9	4 0	4 5	4 0	3 9	2 7	3 7	3 4
Roundwood 2/	2/	0 0 4/	0.0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Livestock	0.3	0 3	0 3	0 3	0.3	0 3	0 3	0.3	0.2	0 2	0 3	0 3
Developed Recreation	0 0	0 0	0 0	0.0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Dispersed Recreation	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
TOTAL	4 0	4 3	4 0	4 7	4 3	4 3	4 9	4 4	4 2	3 0	4 0	3 8

1/ Proportioned from Alternative B-Departure based on first decade roundwood offerings
2/ Figure for roundwood are included in sawtimber
3/ Inversely proportioned from Alternative B-Departure based on first decade sawtimber offerings
4/ Proportioned from Alternative B-Departure based on first decade roundwood offerings

Mitigation Measures

Just as there are many mitigation measures designed to reduce the effects of timber management activities on other resources, managers are continually looking for ways to provide higher timber production levels. Fertilization to increase tree growth, though currently prohibitively expensive on the Wallowa-Whitman, is a possibility Monitoring to determine whether the current mitigation constraints for wildlife or other resources are necessary (or adequate) are other possibilities.

LIVESTOCK GRAZING

Direct/Indirect Effects

Livestock grazing on the National Forest accounts for an average of 0.5 jobs and $5,900 of personal income per 1000 AUM's. Therefore, it is providing approximately 100 jobs at present, and would range from a high of 110 jobs with Alternative B to a low of 76 jobs with Alternative F.

Table IV-29
PERMITTED LIVESTOCK FORAGE ALLOCATION BY ALTERNATIVE
(Thousands of AUM's Per Year, First Decade)

	NC	A	B	B-dep	C	C-dep	D	E	F	G	H
Target	186	186	207	204	186	186	191	163	143	207	186

Through the construction of roads and skid trails associated with *timber harvesting,* livestock distribution is improved over the range But, while forage production and livestock distribution are improved, timber management at times disrupts livestock grazing This is due to the need for grazing deferment for one to three years to allow re-establishment of tree stands

Recreational users occasionally leave gates open, allowing livestock to move to areas where they are not permitted They may also harass livestock.

Elk and deer damage fences and use salt placed for livestock. *Predators* cause livestock losses, particularly on sheep grazing allotments.

The grazing potential of the proposed *research natural areas* totals approximately 1,000 AUM's annually In some cases the areas are not currently grazed In others, grazing could probably continue but at a reduced rate if the natural areas are established. The most significant grazing conflict is in the proposed Pleasant Valley area. Besides the decrease in grazing capacity, the location would create inconvenience in moving sheep throughout the remainder of the grazing allotment.

Cumulative Effects

See Table IV-28.

Mitigation Measures

The public has become more aware and more critical of livestock grazing on public lands during the past decade. Whatever public land managers and range permittees can do to ease public concerns will help to curtail efforts to reduce grazing levels This could take the form of careful management of livestock in riparian areas, strict adherence to herding plans, prompt removal of livestock from allotments when forage utilization standards are achieved, etc.

Predators can be effectively controlled by a variety of means directly available to landowners or through services provided by the Fish and Wildlife Service (federal trappers).

URBAN ENVIRONMENTS

Lying in rural northeast Oregon and western Idaho, more than 100 miles from the nearest urban area, implementing any of the alternatives will have no direct effects on urban environments That the Forest is there for urban dwellers' enjoyment may be considered an indirect effect Management of the Forest contributes forest products to the national economy which are used by urban dwellers

HUMAN RESOURCE PROGRAMS

Human resource programs include those designed to employ youths, senior citizens, and others for the benefit of the enrollees as well as society. These program activities on the Wallowa-Whitman are apt to fluctuate with the political/economic climate of the nation. They are unrelated to Forest Plan management alternatives and are not expected to vary by alternative.

After a period of relatively high participation in the late 1970's and early 1980's, the enrollment level has remained fairly constant, averaging 30 person years annually, with a high of 34 in 1986 and a low of 24 in 1988. The Regional Guide assigns only four enrollee years per year to the Wallowa-Whitman through year 2030. This indicates a relatively low emphasis

Human resource programs, all providing work and training, also benefit various Forest resources through such activities as campground construction, trail maintenance, slash disposal, and clerical work. They have been especially effective in assisting the wilderness management efforts.

COMPARISONS OF SOCIAL EFFECTS OF ALTERNATIVES

Alternative A (No Action, Baseline Alternative)

Effects would be similar for Baker, Union, and Wallowa Counties. During the next decade, the period covered by this social analysis section, the nature of the three-county area's

economy is expected to remain much as it is. (See "The Area Economy," Chapter VI, of A Social Appraisal of Oregon's Northeast Counties (Pekar 1981)) Timber, recreation, agriculture, minerals, and government employment are assumed to remain the principal sectors of the area's economy

Lifestyle and Job Dependence If current management direction continues, the volume of timber offered for sale during the next decade, on a board foot basis, would be below that offered during the 1979-1983 period. This analysis projects a 15 percent decline in timber-related employment and increases in employment related to recreation. Increases in recreation are the result of anticipated increases in the human population of the areas using the Forest. The Forest is not "trading off" logging for recreation Recreation is expected to increase in all the alternatives. The increases in recreation and tourism would not compensate for the losses incurred in the timber industry, however, either in numbers, level of income, or in payments to local government There will be increased activity in timber stand improvement work which will mitigate some of the reduced wood products-related employment, though at lower wage levels. Permitted domestic livestock AUM's would remain substantially unchanged

In the absence of other changes, the net change from continuing existing management direction (the "baseline" condition) indicates a reduced level of economic activity. Estimates of actual job numbers associated with the alternatives are shown in Table IV-28. The nature of employment would change and personal income would decrease as wood products-related jobs decreased and recreation-related employment increased

The other aspect of this alternative with significant effects on the lifestyle of residents of the three counties would be the construction of roads into areas which are not currently roaded. This would have the direct effect of increasing access to parts of the Forest for hunting and for wood gathering for as long as these roads are open. The number of people who use those areas would increase but others who enjoyed the characteristics of unroaded hunting might decide to do their hunting off the Forest altogether. The recreational experience for some would change as the opportunities for unroaded recreation decreased. The effects of these new roads would be most apparent in Baker and Union Counties. Many users of the Forest would regret the further reductions in nonroaded recreation opportunities this alternative entails.

No major changes in the visual character of the Forest would occur but more intensive management of young stands would be evident. Mature lodgepole and ponderosa pine stands would be harvested with resultant changes in their visual characteristics

Beliefs and Perceptions. The management practices associated with Alternative A (the current management direction) would not be significantly at odds with the beliefs and perceptions of most residents of the three-county area. The timber output levels, however, would be disruptive in that they are substantially below recent levels. The Forest is generally understood to be operating on a nondeclining flow basis -- harvesting at levels that can be sustained in perpetuity. The realization that changes have occurred in the timber inventory that make this impossible would definitely be cause for concern.

As noted above, the changed appearance of some parts of the Forest through the harvesting of mature trees would also cause concern, but leaving them unharvested would be of equal concern to others with different values The appearance of a more intensively managed, younger forest may be of concern to some, but older stands will be present elsewhere on the Forest. This alternative would maintain the numbers of permitted livestock. Big-game numbers are expected to stay relatively constant over the next decade, to the general satisfaction of the public.

Sense of Control/Sense of Self-Sufficiency The financial, social, and psychological insecurity associated with reduced economic activity would be evident in the current direction alternative. However, the reduction would be mitigated by the fact that there are other sources of timber supply including state, private, and other National Forest lands

Not only would there be fewer jobs, but they would be lower-paying jobs, resulting in less personal income for the area However, the local residents' ability to use the Forest without major restrictions would continue and, with new roads, would be enhanced in the eyes of many. Negative effects on employment and income are not expected to be reflected in decreased payments to local governments due to increased concern for efficiency in operations.

The roading of unroaded areas would detrimentally affect the sense of control and the sense of self-sufficiency of those who have used them for big-game hunting because of their unroaded condition

Out-of-Area Recreationists Those favoring roaded recreation would benefit, both in their recreational experience and in their satisfaction that their opinions have been reflected in Forest Service decisions. Those opposed to roads (particularly those who prefer to hunt big game in unroaded areas) would realize a loss in their recreational experience opportunities Some of these changes are more in the manner of adjustments, as when an already roaded area gets an additional road

American Indians Certain rights and privileges are afforded members of the Nez Perce Tribe and the Umatilla Confederated Indian Tribes by virtue of the treaties of 1855 These treaties resulted in cession by those American Indian tribes to the United States of a large territory which includes approximately two-thirds of the Wallowa-Whitman National Forest. The treaties provide that on the ceded lands the Indians will continue to have the rights of taking fish in streams running through them and at all other usual and accustomed stations in common with the citizens of the United States and of erecting suitable buildings for fish curing; the privilege of hunting, gathering roots and berries, and pasturing stock on unclaimed lands

The rights of American Indians to believe, express, and exercise their traditional religious practices (including having access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites) are also protected by law. Because much of their culture and the practice of their religion are related to sites often known only to certain families, site disturbance is of concern both to Forest managers and to tribal members. Disturbance of new areas will continue under the No Action alternative, thereby likely degrading the sites in the view of the Indians The Forest Service, the Columbia River Intertribal Fish Commission and the tribes they represent have recently agreed to a fish habitat policy that will help guide Forest management and help alleviate tribal concerns.

Racial and Cultural Minorities and Women Forest Service effects on these parties can be traced to its hiring and contracting procedures With reduced funding levels, new employment is at a reduced level and may so continue Forest hiring practices will continue to follow the National and Regional Affirmative Action Plan. However, since fewer people are being hired, opportunities for recruiting women and minorities will not increase. With reduced timber production levels, the Forest is not expected to appreciably increase its total number of contracts awarded Reduction in the amount of contracting and Forest hiring are not expected to result in a disproportionate reduction in the employment, contracting, or hiring by contractors of minorities and women, although total numbers may be less

Comparison of the Other Alternatives with Alternative A in the First Decade

Lifestyle Alternatives C, D, and E would be quite similar to Alternative A in that their overall levels of timber offerings would vary upwards from Alternative A by less than 8 percent The volume would benefit those whose livelihood is directly or indirectly linked to timber processing and would be the kind of increase that could be handled by minor shifts in scheduling or through the use of overtime. Because the Wallowa-Whitman provides only about half the timber processed locally (as shown in Chapter III), this level of change is even smaller when viewed in the context of the overall local marketplace.

Actual timber harvests on the Forest have historically been higher than those shown for Alternative A in the future Accordingly, these alternatives range downward from recent levels by as much as 14 percent and will be perceived as being undesirable on the part of those whose lifestyles depend on timber production.

These alternatives also would allow for some change in the numbers of domestic livestock permitted on the Forest The amount of change, ranging from -23 percent to +11 percent, would only take place after completion of allotment-respective plans and arrangement of both permittee and federal funding. These changes are more in the manner of routine adjustments Some permittees are highly dependent on Forest grazing on a seasonal basis, though, overall, the Forest provides only some 8 percent of the forage consumed by area livestock. Frequently, alternative forage resources are available, although at higher cost.

With increased emphasis on harvesting more lucrative timber, these alternatives are similar to Alternative A in generating payments to local governments and in providing jobs and personal income in the local area Alternatives C and D would continue, as would Alternative A, the roading of the Forest with the approval of those who value the Forest most in a roaded condition and to the disappointment of those who see the nonroaded recreational opportunities shrinking further. Alternative E precludes the roading of non-roaded areas, but manages the remaining, already-roaded areas more intensively for timber production, thus generating high levels of timber output.

To the extent individuals focus on timber processing, Alternatives B, B-departure, C-departure, and NC would benefit them. To the extent they focus on nonwilderness, unroaded recreation, or on stressing amenity considerations in general, these alternatives would be a setback Alternative B, with a significant increase in livestock numbers (an increase of 11 percent) might be appreciated by some permittees but it would require permittee investment which some permittees might resist. Were livestock numbers to increase, those recreationists who resent livestock would find their lifestyles adversely impacted.

All four of these alternatives would have positive impacts on the local economies compared to Alternative A

(Even though the discussion in this section is limited to first-decade effects, note that Alternative C-departure would provide these benefits for the first decade of the plan only, and that B-departure would do so for the first five decades only. In the decade immediately following those periods of departure, Alternatives B-departure and C-departure benefits would fall considerably; in the case of Alternative C-departure to levels far below those of Alternative A.)

Alternative F with its sharply reduced timber harvest levels would seriously harm those whose livelihoods depend directly or indirectly on timber harvesting Some hardship would

also occur for area livestock permittees, though not in the same overall proportions to the whole area's well-being. The reduction in sawtimber offerings could not reasonably be expected to be made up from other sources. The reduction in Forest permitted livestock grazing would translate into a 2 percent reduction in area forage supplies The 27 percent reduction in timber offered for sale is expressed relative to Alternative A It would translate into an overall falldown in volume available for the local market of some 13 percent. The falldown relative to the recent average level of timber sale offerings would certainly assure the closing of a large area mill. Even those who advocate a strong amenity emphasis and who would therefore be supportive of this alternative might be dismayed by the financial disadvantages of lessened governmental services, higher taxes, and reduced wholesale and retail trade opportunities

Alternatives G and H both strive, within the limits of their respective land allocations, to achieve higher degrees of efficiency Alternative G accomplishes this objective by excluding from harvest those lands which cannot be economically managed for timber production. These significantly lower sawtimber harvests, as much as 13 percent lower, would cause some reduction in lifestyle quality for those dependent on the timber industry. Others, more amenity-oriented, would appreciate the reduced harvest levels and the overall reduction in activity on Forest lands

Attitudes, Beliefs, Values Much of the following discussion revolves around the amount of timber harvesting in the individual alternatives. This is because over the next decade it will be the most important variable by alternative Recreation is very important to the local economy as well--so is livestock production But neither of those Forest-related activities is expected to vary by alternative so much over the coming decade, or even in subsequent decades, as to affect the local economy as will timber production.

The bone of contention in selecting the preferred alternative has been the timber harvest level. That reflects the importance people give this concern in their attitudes, beliefs, and values.

Those who feel the remaining nonwilderness portions of the Forest should be managed to maximize timber production on a continuing basis would have their value systems strengthened by Alternative B's selection, or even more so by selecting Alternative NC. Those who feel the nonwilderness portions of the Forest should be managed to balance emphasis for multiple uses would find this alternative distasteful. The alternative would create far more visible openings in the forest canopy than would Alternative A and more of these openings would be visible from area towns and cities.

Many people feel that the Forest should be managed to ensure that outputs do not decrease over time. They would be unhappy with Alternatives B-departure and C-departure because neither of them sustain their output levels Alternative B-departure would be especially unacceptable because it continues the departure for five decades These alternatives would also be upsetting to many who would see them as a capitulation to the timber interests and an abrogation of the rights of recreationists Alternative C-departure would create more openings in the forest canopy in the first decade than any other alternative with Alternative B-departure a close second Those who feel that the temporary increases of timber production are warranted for the well-being of the local economy--including area schools, roads, employment, money in circulation--would see their values reflected in these alternatives

Area residents who have come to accept existing Forest Service practices would most likely find Alternatives C and D to be acceptable on the whole, though not in every particular. Because many people recognize the importance of the timber industry to the

local economy, there would be concern about their respective timber harvest levels This might seem strange considering that both of these alternatives offer more timber for sale than does Alternative A. The problems arise because the timber harvest level in Alternative A has to decline in order to meet the management direction present in that alternative to not harvest timber at levels that cannot be sustained in perpetuity. Accordingly, Alternative A's harvest levels are reduced from recent average conditions and the increased harvest levels of Alternatives C and D (relative to Alternative A) are still below recent average conditions

Alternative E was tailored to meet the expressed desires of some local area inhabitants who felt the Forest should maintain existing roadless areas as roadless areas and pursue timber harvesting aggressively in already roaded areas. Therefore, this alternative would satisfy their aspirations. Those who feel roadless areas should remain unroaded will appreciate that aspect of this alternative Those who feel that these areas should be brought into management would disagree

Because Alternative F severely limits Forest timber offerings, it would serve to satisfy those who feel the Forest is being harvested too aggressively or that the Forest's highest value lies in its ability to offer amenities. Those who feel that any individual's livelihood or ability to support one's self and one's dependents is more important than the recreational pursuits of others would not share those feelings.

Because efficiency was highlighted in Alternative G, it should best satisfy those who call for increased Forest efficiency With its lower harvest levels, it would conflict with those who believe that a greater commodity emphasis is indicated. It would also antagonize those who feel that amenities have been undervalued in the analysis. Some would also be offended because Alternative G, along with Alternatives B and B-departure, has a land allocation which is more conducive to timber production than any other.

Alternative H, though operating with more land available for timber production than Alternative A, harvests less timber in the interest of economic efficiency. With its lower harvest levels, it would conflict with those who believe more commodity emphasis is indicated

Sense of Control/Sense of Self-Sufficiency. Alternatives B, B-departure, C-departure, and NC would heighten the sense of control or self-sufficiency for those for whom timber processing is of paramount concern Alternatives F, G, and H would disquiet them while C, D, and E could be accepted, albeit grudgingly Those who feel the Forest's harvest schedule is too aggressive would feel the opposite

Those who desire greater efficiency in Forest operations would feel their sense of control especially heightened in the selection of Alternatives G, B, H or E. For those concerned about excessive Forest roading, Alternatives F, G, and H would be especially attractive.

Self-sufficiency, as it relates to Wallowa-Whitman National Forest management, is concerned primarily with employment and personal fuelwood gathering Thus these considerations are of concern to local area inhabitants. Timber employment variation by alternative so overshadows other Forest-related employment variation by alternative as to make it the final arbiter in this category, especially considering that the other leading timber concern (personal-use fuelwood gathering) frequently goes hand-in-hand with timber production. That is, as more areas are roaded for timber harvesting, more areas become available for wood gatherers As timber is harvested, these wood gatherers also benefit from the dead or cull material left behind following timber sales. The alternatives would, therefore, be ranked in decreasing order of attractiveness to fuelwood gatherers as. NC, C-departure, B-departure, B, D, E, C, A, G, H, F.

Community Cohesion Alternatives B, B-departure, C-departure, and NC would serve to heighten the influence of the traditional, familiar bases of employment and economic activity in general This would further polarize commodity (timber production) versus amenity special interest groups. Alternatives C, D, and E, though more commodity-oriented in their land allocations than the current direction alternative, would better serve the interests of community cohesion in that they, like the current direction alternative, would be viewed as a compromise. In their significantly reduced timber harvest levels and intended increases in amenity emphasis, Alternatives F, G, and H would be just as destructive to any spirit of community cohesion as would Alternatives B, B-departure, C-departure, and NC.

Population Alternatives B, B-departure, C-departure, and NC would provide a stabilizing influence on the area's population. The area has normally had a surplus labor supply as evidenced in its persistently high rates of unemployment The increases in timber production could most likely be handled with overtime or through scheduling adjustments Such harvest levels have been accommodated in the past

Alternatives C, D, and E would be moderately destabilizing though not as severely so as *the no action alternative. The area has already experienced substantial unemployment* due to the protracted downturn in the timber industry earlier in the decade Alternatives G and H would cause significantly more out-migration than Alternative A; Alternative F even more out-migration

The local economy described here consists of Baker, Union, and Wallowa counties in northeastern Oregon. Effects are considered for the first decade of Forest Plan implementation.

The levels of jobs, personal income, and payments to local governments are the criteria used to gauge effects on the local economy They are displayed in Table IV-28 As can be seen in that table, the main differences among the alternatives derive from differences in timber harvest levels. This is because other Forest programs affecting the local economy vary little among the alternatives (as in the case of recreation) or because they are not highly important in the local supply picture (as in the case of forage available for livestock).

The primary determinant of Forest-related economic activity in the local area over the coming decade will be the level of timber harvesting.

In general, the level of jobs and personal income associated with Forest activities are tied quite closely to timber harvest Payments to local governments however, are associated primarily with the dollar value of timber logged from the Forest. Therefore, the volume of timber logged is but one of many factors that influence the level of payments. Other important factors are tree species, size, quality, and accessibility For instance, Alternative B generates a higher level of payments to local governments than does Alternative B-departure, even though B-departure offers a higher level of timber harvesting This is because Alternative B-departure logs more low-dollar-valued timber in order to meet its timber output level targets

Social effects can also be viewed in terms of their immediacy or causality This section of the document addresses those concerns IMPLAN, a large computer model, was used to help assess local effects. Its terminology uses the term "direct" to refer to the initial effects identified in the model.

In IMPLAN, the direct effect of a reduction in sawtimber sold, for instance, comes in the *form of losses of jobs and personal income to the people who work in the lumber mills*

This is because the lumber mill is the industry identified as the local economic sector which processes the material to the state it is in at the time it is consumed locally or exported from the study area The sawmill is the processing unit that loses the sale In normal conversation however, people might well identify a reduction in sawtimber sold with a direct effect on the logger as well In IMPLAN the effects on the logger would be identified as an indirect effect because the model sees the direct effect of a loss of sawmill sales translated into an indirect effect of a loss of sawmill purchases of raw material from the logging contractor

The term "induced effect" is used in IMPLAN to refer to those local economic effects associated with what happens locally when monies gained in (or lost to) the local economy are respent in (or relost to) the local economy.

The different alternatives would directly affect the socio-economic base of the Tri-Counties and the livelihood of its inhabitants Quantitative indicators reflecting these effects include changes in jobs, personal income, and payments to local economies. These quantitative indicators are shown in Table IV-28 The figures shown there are for the total impact and thus include direct, indirect, and induced effects

ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

Overview

This chapter has described numerous adverse effects, most of which cannot be avoided. The following summarizes these effects for Alternative C, the proposed action:

Soil and Water

During the construction of roads, harvesting timber and prescribed burning, soils are impacted through compaction, displacement or heating. This can adversely affect the productivity of the land, and the quality of water when actions take place near water courses. Through careful timber sale layout, properly prepared logging plans, effective sale administrative, careful logging, road maintenance, erosion control structures and vegetation restoration, these adverse effects can be minimized. There is no doubt that there will be some adverse effects that will tend to lower land productivity and reduce water quality

Livestock also cause soil compaction, particularly on meadowlands. Careful management can minimize but not prevent some degree of compaction damage Livestock will contaminate streams where they have free access to them. A certain amount of streamside trampling will occur, as will damage to riparian vegetation While this may not be considered unacceptable according to regulation or law, it is an unavoidable adverse effect. Elk, deer and other wildlife also contribute to adverse effects along water courses.

Fish

Short-term changes in water quality will result from such activities as bridge and culvert installation on streams. Existing fish habitat problems (sediment, high water temperatures) will continue until major sediment sources are corrected and shade-producing streamside vegetation returns on those streams where it has been lost or reduced Risks to fish from chemical spills will continue.

Wildlife

The proposed alternative shows a reduction in the amount of mature and old-growth trees Since some wildlife species rely on mature or old-growth tree stands for their habitat during part of the year, a reduction in the numbers of some wildlife species that depend on these conditions is unavoidable

Alteration of vegetation through timber harvest and stand improvement practices will cause temporary or permanent displacement of many wildlife species Cavity nesting habitat will be particularly reduced, thereby eventually reducing dependent species populations

Control of insects through the use of insecticides will reduce food supplies for insect-dependent birds This is due to the reduction of the target insect species as well as the reduction in insect species that are not targeted. Although effects on the food supply are usually short-term, they are effects that can seldom be avoided.

Recreation

As the character of the Forest changes, so do the recreational opportunities. Although the total recreational opportunity will meet projected needs, certain experiences will change. There will be fewer areas without roads and evidence of timber harvesting in which to hunt or hike and fewer mature and old-growth dependent wildlife species such as the pileated woodpecker to view. In some areas, trails will be replaced by roads. These effects are unavoidable and will be considered adverse by many people.

Landscapes

The most noticeable unavoidable effects of human activity are those caused by manipulation of vegetation. The effects of timber harvest and related activities are especially apparent because of the large areas involved Power transmission corridors also create highly noticeable changes in vegetation patterns. To a considerable extent, these adverse effects can be mitigated. Nonetheless, major changes in vegetation will at times be obvious from travel routes in all areas of the Forest except in those areas where significant alterations in vegetation are prohibited or restricted, such as in wilderness

Air Quality

Air quality will be temporarily degraded in local areas as a result of prescribed fire and wildfire for brief intervals during the year

Use of Herbicides, Insecticides, and Rodenticides

Herbicides, insecticides, and rodenticides are tools for controlling vegetation, insects, or rodents, respectively. They are employed when their use is more cost effective than other means of control, or constitute the only known methods for effective control Although used according to rigid specifications, circumstances will occasionally result in sprayed chemicals drifting to nontarget areas or streams and damaging flora or fauna that were not intended for spraying There is also the possibility of herbicide or insecticide spills due to accidents, and there is a possibility of nontarget animal species finding and consuming rodenticides directly or from ingesting target species that have consumed a chemical

To remove all risk would render the use of chemicals ineffective or impractical. Therefore, the possibility and likelihood that adverse effects will occur is unavoidable.

Native Americans

Native Americans may be adversely affected by any ground-disturbing activities because their cultural ties to the Forest are often site-specific; roading and logging an area can reduce or destroy its attraction. Though the tribes have not always provided exact site locations, the final effect of any alternative can be assumed to be negative in general proportion to its level of timber harvest. Livestock grazing also has an adverse impact on Native Americans in that livestock eat the identifying tops of plants which are sought by tribal members for food or ceremony

RELATIONSHIP BETWEEN SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The long-term productive capability of all resources depends on maintaining soil stability and soil fertility, including keeping the soil in a noncompacted condition that is conducive to plant growth. While we understand and can deal with soil stability, there is still much to be learned about soil, plant, and nutrient relationships in forest systems The effects of prescribed burning on the nutrient cycles are not fully known, nor are the effects of soil compaction which result from operating heavy machinery, grazing animals, or concentrated recreational activities. Construction of roads results in a long-term productivity loss from affected sites.

The long-term effects of whole-tree utilization on fertility are not fully understood Recent studies show that reductions in woody debris can have significant impacts on stream nutrients and aquatic life (Maser and Trappe 1984) It is evident that fallen trees provide habitat for a vast array of insects and other organisms We need to learn more about the contribution of fallen trees to forest ecosystems and to the quality of soil in particular.

At present, we can be certain that those areas dedicated to permanent roads, campgrounds, or other facilities reduce long-term land productivity to a significant extent

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposal provides for management activity in areas that are currently undeveloped, thus foregoing their being further considered for wilderness To the extent that the areas become altered before the next Forest Land and Resource Management Plan is written, those altered areas are irreversibly lost for potential wilderness consideration.

With all alternatives, several of the management areas offer varying degrees of irretrievable commitment of wood fiber production. Examples are Management Areas 6 and 15 Although conditions for producing high levels of wood fiber production can be realized by reallocating the lands, production lost in the interim cannot be retrieved. Similarly, certain wildlife populations are likely to be reduced due to loss of habitat such as old-growth forest and snags The habitat can be restored in the future but the interim loss is irretrievable

Because minerals are not renewable resources, the loss of mineral wealth removed from the Forest is irreversible and irretrievable.

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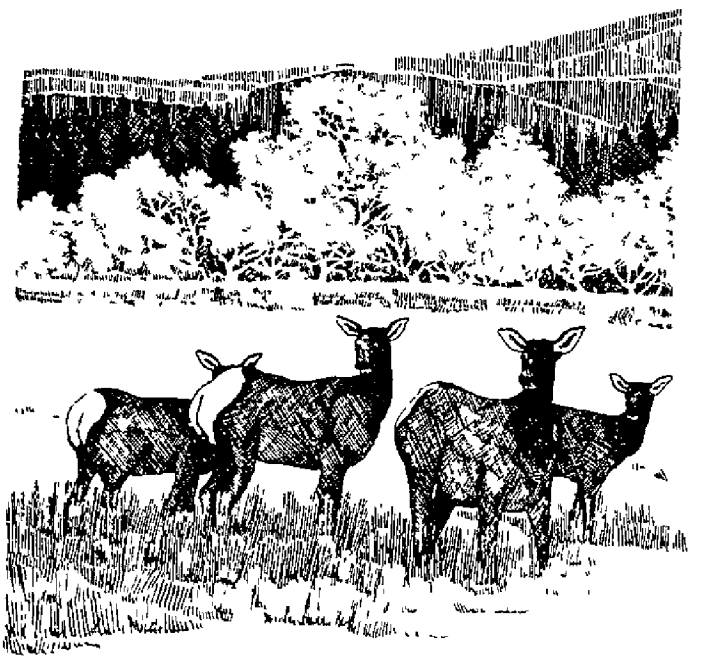

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TECHNICAL SUPPORT

Alexander, Janet·	Data Storage and Retrieval, 11 years experience.
Ames, Lloyd:	Old-Growth Forest Inventory, 9 years experience.
Anderson, David.	Fire Management Planning, 29 years
Anderson, Ralph·	Old-Growth Forest Inventory, Big-Game Winter Range, 29 Years experience
Aschenbrenner, Larry	Logging Systems, Logging Costs, 18 years experience
Austin, John.	Transportation Planning, 25 years experience
Avery, Daniel	Geology and Minerals, 18 years experience
Barney, Robert.	Range Capacities for Research Natural Areas, 13 years experience.
Barton, Douglas·	Utility Corridors, La Grande Municipal Watershed Planning, 25 years experience
Brockus, Gay	Public Involvement, Mailing List, 12 years experience.
Cates, Gordon·	Transportation Planning, 19 years experience.
Clemens, David:	Old-Growth Forest Inventory, Management Area Boundaries, 25 years experience
Crist, Carey	Old-Growth Forest Inventory, Management Area Boundaries, 13 years experience
Curtis, Dean·	Old-Growth Forest Inventory, 17 years experience
Ehmer, Lee	Suitability of Land for Timber Production, 25 years experience
Ernst, Charles:	Range Management Planning, Livestock Capacities, 18 years experience
Farr, Leonard:	Old-Growth Forest Inventory, Management Area Boundaries, 24 years experience
Fessel, William:	Recreation Planning, Recreation Opportunity Spectrum, 32 years experience.
Fine, Woody:	Wild and Scenic Rivers, 1 year experience.
Fletcher, Steven·	Land Suitability for Timber Production, Old- Growth Forest Inventory, Management Area Boundaries, 17 years experience.

Glassford, Thomas	Wilderness Planning, 16 years experience
Hauter, Kenwood·	Baker Municipal Watershed Planning, 20 years experience.
Hedgpeth, Glenn:	Land Suitability for Timber Production, Old- Growth Forest Inventory, Silvicultural Prescriptions, 22 years experience
Hermsen, Lucille:	Graphics, Visual Aids, Tables, Maps, 24 years experience.
High, Thomas	Land Suitability for Timber Production, 17 years experience
Hohman, Kenneth·	Floodplain Identification, 11 years experience
Holden, Arnold:	Social Analysis, 9 years experience
Holden, Judith	Graphic, Visual Aids, maps, 9 years experience
Johnson, Dr. Charles.	Research Natural Areas, Ecology, 18 years experience.
Kaufman, Bruce.	Timber Management Planning
Kaplan, Gerald	Management Area Boundaries, Old-Growth Forest Inventory, La Grande Municipal Watershed Planning, 27 years experience
Kuchenbecker, Lyle	Social Analysis, land suitability for timber production, 15 years experience.
Leonard, R. Michael	Old-Growth Forest Inventory, Riparian Habitat Inventory, Big-Game Winter Range Boundary, 14 years experience
Little, David.	Land Suitability for Timber Management, 24 years experience
Luce, Nicole:	Data Storage and Retrieval, 14 years experience
Marvin, Frances:	Multi-year Budgeting, 24 years experience
McEwan, Linda:	Old-Growth Forest Inventory, 11 years experience
McGinty, Pauline.	Land Adjustment Plan, 27 years experience.
Miller, Rod:	Fisheries, Riparian Habitat Inventory, Range Planning, Big-Game Forage Needs, 30 years experience
Mohr, Francis:	Fire Management and Air Quality, 21 years experience.
Olson, Frank.	Social Analysis, 30 years experience
Perrigan Steve.	Old-Growth Forest Inventories, 26 years experience.
Petersen, Gary.	Old-Growth Forest Inventories, Land Suitability for Timber Management, 17 years experience

Puddy, Susan.	Old-Growth Forest Inventory, 13 years experience.
Pyles, Bruce	Old-Growth Forest Inventory, Management Area Boundaries, 30 years experience
Quimby, Charles	Range Management, Threatened, Endangered, and Sensitive Species, 17 years experience.
Rasmussen, Frank	Old-Growth Forest Inventory, Management Area Boundaries, 31 years experience
Reagan, Michael·	Archaeology, Cultural Resources, 19 years experience
Schimke, Arthur	Old-Growth Forest Inventory, Management Area Boundaries, 30 years experience
Schrenk, Robert	Management Area Boundaries, 19 years experience
Sines, Roy·	Wilderness Planning, 35 years experience.
Smith, Susan.	Graphics, Data Management, 4 years experience.
Smith, Wanda:	Data Storage and Retrieval, 13 years experience
Spink, Louis·	Range Management Planning, Livestock Grazing Capacities, 26 years experience.
Stamy, Roger·	Land Adjustment Plan, Recreation Planning, 33 years experience,
Stephens, Joaquin·	Baker Municipal Watershed Planning, Grazing Capacities, 29 years experience
Stewart, Ralph	Research Natural Areas, Grazing Capacities, Management Area boundaries, 16 years experience.
Symons, Richard.	Land Suitability for Timber Production, Silvicultural Prescriptions, Old-Growth Forest Inventory, 16 years experience.
Szymoniak, Mary Ann	Data Storage and Retrieval, 9 years experience.
Taylor, Brandon	Logging System and Logging Costs, 18 years experience.
Thomas, Thomas	Old-Growth Forest and Riparian Habitat Inventories, Big-Game Winter Range Boundaries, 17 years experience
Titus, Ronald:	Old-Growth Forest Inventory, Management Area Boundaries, 28 years experience

Tobin, Richard:	Recreation, 14 years experience
Tyler, Gregory:	Data Storage and Retrieval, 10 years experience
Walker, Ralph:	Old-Growth Forest Inventory, Land Suitability for Timber Production, 17 years experience.
Wilkens, John:	Lodgepole Pine Utilization and Yield Projection, 22 years experience.
Wilson, Jerry:	Visual Management Inventory, Viewsheds, 23 years experience
Wyland, Dave:	Logging Systems and Costs, 20 years experience

The foregoing is, at best, a partial list in that it does not include the many Regional Office personnel who helped; nor does it include many people from the Forest who developed file data which was drawn upon in making the analysis and plan, neither does the list include many non-Forest Service people who made important contributions

LIST OF AGENCIES, ORGANIZATIONS, AND INDIVIDUALS TO WHOM COPIES WERE SENT

List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent

The agencies, Indian tribes and elected officials shown in Appendix N as having responded to the Draft Environmental Impact Statement have been sent copies of this Final EIS. Copies have also been sent to U.S Senator Mark O. Hatfield, U S. Senator Robert W Packwood, U S Representative Robert F. Smith, State Representatives Ray Baum and Michael Nelson. In addition, each person or organization who responded, and is shown in Appendix N, has either been sent copies of this statement or has been contacted to see if they prefer to receive a copy of the statement, the summary, or no document A copy of the statement or summary was sent to each as requested

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GLOSSARY

GLOSSARY

Many of the definitions in this glossary are referenced to the following sources The sources are identified by a number in parentheses following the definition. This number corresponds to the list below. Some other terms will be referenced to Forest Service Manuals (FSM), Forest Service Handbooks (FSH), or other sources which are too numerous to list Finally, many other definitions are not referenced, but are those in general use on the Forest.

SOURCE LIST

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(2) Regional Guide for the Pacific Northwest Region, 1984
(3) SAF Dictionary of Forestry Terms, 1971.
(4) The Random House College Dictionary, Revised Edition, 1975.
(5) Webster's New Collegiate Dictionary, 1977.
(6) *Wildland Planning Glossary*, 1976.
(7) Webster's Third New International Dictionary, 1981
(8) Wildlife Habitats in Managed Forests, The Blue Mountains of Oregon and Washington, 1979.
(9) A Glossary of Terms Used in Range Management
(10) Forest Service Manual or Forest Service Handbook
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A

access - Usually refers to a road or trail route over which a public agency claims a right-of-way for public use; a way of approach (4)

acquired lands - Lands added to the National Forest system by purchase, transfer, or donation under authority of the Weeks Law or related acts. Also, lands obtained by the Forest Service by exchange for other acquired lands.

acre equivalent - When applied to habitat improvement or improvement structures, this term reflects overall habitat benefits derived. It reflects the zone of influence of the habitat improvement for the target species For example, a single water development for upland game birds occupies very little space but has an acre equivalent of 160 because it serves 160 acres of bird habitat. A single water structure for big game has a value of 640 because it has a larger zone of influence for the more mobile big-game animals.

acre-foot - 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 (i e , 43,560 cubic feet or 325,851 gallons). (6)

activity - An action, measure or treatment undertaken that directly or indirectly produces, enhances, or maintains forest and rangeland outputs, or achieves administrative or environmental quality objectives (FSM 1309, Management Information Handbook). An activity can generate multiple outputs (2)

activity fuels - Fuels generated or altered by a management activity (10)

administrative unit - An area under the administration of one line officer, such as a District Ranger, Forest Supervisor, or Regional Forester. (6)

aerial logging - A timber yarding system employing aerial means, e.g , balloons or helicopters, to lift the log or logs. (3)

age class - An interval, usually 10 to 20 years, into which the age ranges of vegetation are divided for classification or use. (3)

age group distribution - Age class distribution; the location and/or proportionate representation of different age classes in a forest (3)

airshed - A geographic area that, because of topography, meteorology, and climate, shares the same air. (2)

allocated funds - Those funds transferred to the Forest from other agencies (including those from the Land and Water Conservation Fund, the Department of Labor, and the Soil Conservation Service) or provided from the K-V, Brush Disposal, Co-op Road Maintenance, or Purchaser Road Credits accounts.

allocation - See **land use allocation** or **resource allocation**

allotment - See **range allotment**

allowable sale quantity (ASQ) - The quantity of timber that may be sold, from the area of suitable land covered by the Forest Plan, for a time period specified by the Plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity". (6) (1)

all terrain vehicle (ATV) - A vehicle characterized by its ability to negotiate most kinds of terrain, by virtue of traction devices such as wide tracks, large, low-pressure rubber tires and/or four-wheel drive

alternative - One of several policies, plans, or projects proposed for decision making (2) (10)

amenity - An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses The terms "amenity values" or "amenity resources" are typically used in land management planning to describe those resources for which monetary values are not or cannot be established (such as clean air and water, or scenic quality).

anadromous fish - Those species of fish that mature in the sea and migrate into streams to spawn Salmon, steelhead, and sea-run cutthroat trout are examples

analysis area - A delineated area of land subject to analysis of: (1) responses to proposed management practices in the production, enhancement, or maintenance of forest and rangeland outputs and environmental quality objectives, and (2) economic and social impacts. (FSM 1905) Tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed in the FORPLAN model.

analysis of the management situation (AMS) - A determination of the ability of the planning area to supply goods and services in response to society's demand for those goods and services. (1)

animal unit - Considered to be one mature (1,000 lb.) cow or the equivalent based upon average daily forage consumption of 26 pounds dry matter per day (9)

animal unit month (AUM) - The amount of forage required by one mature (1,000 lb) cow or its equivalent for one month (based upon average forage consumption of 26 lbs dry matter per day). (6)

Animal Month is one month's use and occupancy of the range by one animal For grazing fee purposes, it is a month's use and occupancy of range by one weaned or adult cow with or without calf, bull, steer, heifer, horse, burro, or mule, or 5 sheep or goats. Forage consumption by other animals is converted to AUM's from animal months by the following factors:

mature cow	=	1.0 AUM	mature sheep	=	2 AUM
one horse	=	1.2 AUM's	cow/calf	=	1 32 AUM
ewe/lamb	=	.3 AUM			

annual sale quantity - The quantity of timber that may be sold annually from the area of suitable land covered by the Forest Plan.

anomalies - A deviation from the common rule, type, or form. An incongruity or inconsistency. (4)

appropriated funds - Monies authorized by an act of Congress which permit Federal agencies to incur obligations and to make payments out of the U S Treasury for specified purposes.

appropriate suppression response - The planned strategy for suppression action (in terms of kind, amount, and timing) on a wildfire which most efficiently meets fire management direction under current and expected burning conditions The response may range from a strategy of prompt control to one of containment or confinement (10)

aquatic ecosystems - Stream channels, lakes, marshes or ponds, and the plant and animal communities they support

aquifer - A geological formation or structure that contains water in sufficient quantity to supply needs for water development (6)

artifact - An object made or modified by humans. (4)

assigned values - Monetary values given to nonmarket resources, based on estimates from comparable market transactions. For example, the benefits of dispersed recreation are given assigned monetary values for their production.

available forage - The amount of forage which may be removed without adversely affecting the vigor of the forage plants. (Normally considered to be about 50 percent of a grass plant.)

available forest land - Land which has not been legislatively withdrawn by Congress or administratively withdrawn by the Secretary of Agriculture or Forest Service Chief from timber production.

average daily traffic (ADT) - The average 24-hour volume of traffic, being the total volume of traffic during a stated period divided by the number of days in that period. (6)

B

background - In visual management terminology, refers to the visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the total fabric of the stand Also a portion of a view beyond three to five miles from the observer, and as far as the eye can detect objects. (6)

bald eagle management areas (BEMA's) - Areas managed for the protection of the threatened and endangered bald eagle. BEMA's provide nesting and roosting habitat for the bird on each plot.

basal area - The area of the cross-section of a tree stem near the base, generally at breast height and inclusive of bark (3)

base flow - That portion of the water flowing in a stream which is due to ground water seepage into the channel (6)

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 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.) (1)

basic resource - One of the principal resources; a resource upon which the production of other resources is dependent, e g , the production of vegetation is dependent upon basic resources such as soils and water.

batholith - A great mass of intruded igneous rock that for the most part stopped its rise a considerable distance below the surface (10)

below-cost timber sale - A sale in which the dollar costs of the sale, including all costs resulting from the sale, are greater than the dollar benefits.

benchmark - Reference points that define the bounds within which feasible management alternatives can be developed. Benchmarks may be defined by resource output or economic measures.

benefit (value) - Inclusive terms used to quantify the results of a proposed activity, project or program expressed in monetary of nonmonetary terms. (10) Also:

> **direct benefit** - A primary benefit that responds to specified objectives of the policy, program, project, or expenditure (10)
>
> **induced benefit** - A primary benefit that is incidental to the objectives of the policy, program, project, or expenditure. (10)
>
> **primary benefit** - A benefit accruing to resource owners from a primary output and that may be direct or induced or may be a residual asset. Primary benefits are components of net public benefits (10)
>
> **secondary benefit** - A benefit accruing to parties other than the resource owners, including effects on local, Regional, and national economies and on consumers of outputs Secondary benefits are not necessarily included in net public benefits. (10)

benefit/cost ratio - A measure of economic efficiency computed by dividing total discounted primary benefits by total discounted economic costs. (10)

best management practices - A practice or combination of practices that is determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation, to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (Federal Register, Volume 40, No. 230 dated 11/28/75).

big game - Large mammals hunted for sport On the National Forest these include animals such as deer, elk, antelope, and bear. (8)

big-game summer range - See **summer range.**

big-game winter range - See **winter range**

biological control - A method to control insect populations or tree diseases through the use of applied technology Also used in noxious plant control. (3)

biological growth potential - The average net growth attainable in a fully stocked natural forest stand. (1)

biological needs - The combination of habitat factors necessary to sustain an organism through *normal life processes*

biological potential - The maximum production of a selected organism that can be attained under optimum management (8)

biomass - The total quantity (at a given time) of living organisms of one or more species per unit of space (species biomass), or of all the species in a biotic community (community biomass).

biscuit scabland - Also termed biscuit-swales, mounded topography, and patterned ground. For the purpose of this document, biscuit scabland means natural mounds surrounded by or interspersed with either shallow-soiled swales or scabland. The mounds, typically composed of medium-textured soils, are normally capable of supporting a dense cover of grasses, forbs, and occasionally shrubs The swales, typically rocky with somewhat coarser textured soils, are normally sparsely vegetated with grasses, forbs, and moss. The scablands are either devoid of vegetative cover or are vegetated by grasses and moss

board foot (BF) - The amount of wood equivalent to a piece of wood one foot by one foot by one inch thick. (3)

board foot/cubic foot conversion ratio - Both board foot and cubic foot volumes can be determined for timber stands. The number of board feet per cubic foot of volume varies with diameter, height, and form factors A specific factor by species is applied to the cubic foot FORPLAN outputs to give board foot estimates.

British thermal unit (BTU) - The quantity of heat required to raise the temperature of one pound of water one degree fahrenheit at or near 39.2 degrees F.

broadcast burn - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard or as a silvicultural treatment, or both.

browse - Twigs, leaves, and young shoots of trees and shrubs on which animals feed, in particular, those shrubs which are used by big game animals for food (6)

brush - A growth of shrubs or small trees usually of a type undesirable to livestock or timber management.

Bureau of Land Management (BLM) - An agency within the Department of the Interior, with land management responsibility for the Public Domain lands.

buyback and defaulted timber sales - In 1984, the Federal Timber Payment Modification Act was enacted by Congress. It allowed private companies to return timber sales not economical to harvest after payment of a fee to the government. The sales returned under the conditions of this Act are known as "buyback" sales. A timber sale is considered "defaulted" if it is not in compliance with the terms of the contract by the contract termination date. Defaulted sales are also returned to the government.

C

cable logging - Refers to methods used to skid or pull logs to a central landing or collection area by a cable connected to a remote power source. (6)

canopy - The more-or-less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth. (3)

canopy closure - The progressive reduction in space between tree crowns as they spread laterally (Ford-Robertson 1971), a measure of the percent of potential open space occupied by the collective tree crowns in a stand (8)

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 given levels 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. (1)

capability area - Geographic delineations used to describe characteristics of the land and resources in integrated forest planning. Capability areas may be synonymous with ecological land units, ecosystems, or land response units. (10)

capital formation - As used in IMPLAN is defined as the value of purchases from sectors both inside and outside the Region used by individuals, governments, and industries in the area as investment (land, plant, and equipment used in production processes). (10)

capital investment - An input that increases the stock of natural or manmade resources (assets) needed to maintain or increase the flow of outputs in the future. Benefits resulting from capital investments are normally recouped in excess of 1 year (10)

capital investment - Activities that create or improve capital assets to obtain benefits occurring during several planning periods (10)

carrying capacity - 1) The number of organisms of a given species and quality that can survive in, without causing deterioration of, a given ecosystem through the least favorable environmental conditions that occur within a stated interval of time. 2) In recreation, refers to the number of people that can occupy an area for a given social and experience goal 3) In range, refers to the maximum stocking rate possible on a given range without causing deterioration to vegetation or related resources. (3)

cave - Any natural void, cavity, recess, or system of interconnected passages which occurs beneath the surface of the earth or within a cliff or ledge (including any cave resource therein, but not including any vug, or any mine, tunnel, aqueduct, or other man-made excavation), and which is large enough to permit an individual to enter, whether or not the entrance is naturally formed or manmade Such term shall include any natural pit, sinkhole, or other feature which is an extension of the cave entrance

cavity - The hollow excavated in trees by birds or other natural phenomena; used for roosting and reproduction by many birds and mammals. (2)

channel or stream scour - *Erosion of the channel bottom caused by high flows of water, loss of* channel stability, or debris torrents.

characteristic landscape - *In reference to the USDA Forest Service visual management system; the* overall impression created by a landscape's unique combination of visual features (land, vegetation, water, structures), as seen in terms of form, line, color and texture, synonymous with "visual landscape character." (6)

chargeable volume - All timber 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. (10)

clearcutting - The cutting method that describes the silvicultural system in which the old crop is cleared over a considerable area at one time. Regeneration then occurs from (a) natural seeding from adjacent stands, (b) seed contained in the slash or logging debris, (c) advance growth, or (d) planting or direct seeding. An even-aged forest usually results (3)

climatic regimes - A generalized climatic classification which applies to a specific land area; generally that area can be expected to experience that kind of climate in any given year

climax - The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition (6)

climax species - Those species that dominate a climax stand in either numbers per unit area or biomass.

closure - An administrative order restricting either location, timing, or type of use in a specific area.

Code of Federal Regulations (CFR) - A codification of the general and permanent rules published *in the Federal Register by the Executive departments and agencies of the Federal Government.* (1)

coho smolt - Young coho salmon which are ready to migrate to the sea

commercial forest land - Land that is producing, or is capable of producing, crops of industrial wood and (1) has not been withdrawn by Congress, the Secretary of Agriculture, or the Chief of the Forest Service; (2) land where existing technology and knowledge is available to ensure timber production without irreversible damage to soil productivity or watershed conditions; and (3) land where existing

technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be obtained within 5 years after final harvesting

commercial thinning - Any type of tree thinning that produces merchantable material

commodity - A transportable resource with commercial value; all resource products that are articles of commerce. (6)

common minerals - See **mineral materials.**

common varieties - See **mineral materials.**

community cohesion - The degree of unity and cooperation within a community in working toward shared goals and solutions to problems

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 (10)

community types - A generalized category comprising a number of similar stands of vegetation and including animal life. (8)

compaction - The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density

composite - In reference to planning for special areas under the Land and Water Conservation Act of 1965, an area identified as having unique recreation and/or fish and wildlife values

composite plan - A documented analysis which, at one time was required to justify the use of Land and Water Conservation Funds for acquisition of private lands within a designated composite

condition class - 1) Timber: a grouping of timber strata into size-age-stocking classes for Forest planning. 2) Range: one of a series of arbitrary categories used to classify range conditions, usually expressed as excellent, good, fair, or poor. (9)

confine - To limit fire spread within a predetermined area principally by use of natural or preconstructed barriers or environmental conditions. Suppression action may be minimal and limited to surveillance under appropriate conditions. (10)

congressionally classified and designated areas - Areas that require congressional enactment for their establishment, such as National Wildernesses, National Wild and Scenic Rivers, and National Recreation Areas.

constant dollars - See **real dollars**

constraint - In FORPLAN, a limit (either ceiling or floor) which may be placed on the level of inputs to or outputs from a forest

consumptive use - A use of resources that permanently reduces the supply, such as mining (See also **nonconsumptive use**) (6)

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. (6184 definition) (10)

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. (10)

conversion period - The duration of a change from one silvicultural system to another or from one tree species to another. (3)

corridor - A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries (1)

corridor avoidance area - Area with high resource values which are in conflict with power transmission facilities. Used for power facility corridors only when other reasonable choices are not available.

corridor exclusion area - Area from which power transmission facilities will be excluded. Classified wilderness is the most common example

full corridor - Approximately 600 feet wide (or wider where existing corridor is wider)

utility corridor - 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 or more), oil, gas, and coal slurry pipelines 10 inches in diameter and larger, and telecommunication cable and electronic sites for interstate use

existing utility corridor - A strip of land containing one or more existing linear utility rights-of-way which, in the current Forest planning effort, are being included within the designation of a full 600-foot utility corridor in order to facilitate future authorization of additional utility rights-of-way

new utility corridor - A strip of land containing no existing linear utility right-of-way, but warranting designation as a full corridor.

critical window - A control point or area (such as a mountain pass) not to be designated within an existing utility corridor, but needed to retain future new utility corridor options.

transportation corridor - A strip of land of variable width designated to accommodate the clearing and access control and visual resource limits of a highway or road facility, which may also be designated to accommodate one or more linear utilities.

costs -

direct cost - A cost that directly contributes to the production of the primary outputs of an activity, project, or program (10)

economic cost - Total fixed and variable costs for inputs, including costs incurred by other public parties and, if appropriate, opportunity costs and cost savings. (10)

fixed cost - A cost that is committed for the time horizon of planning or the decision being considered. Fixed costs include fixed ownership requirements, fixed protection, short-term maintenance, and long-term planning and inventory costs (10)

investment cost - A cost of creating or enhancing capital assets, including costs of administrative or common-use transport facilities and resource management investments (10)

joint cost - A cost contributing to the production of more than one type of output. (10)

non-Forest Service cost - A cost of investment and operating activities paid by cooperators or other non-Forest Service agencies which are part of Forest Service management programs, or which contribute to the outputs included in the analysis. (10)

opportunity cost - The value of a resource's foregone net benefits in its most economically efficient alternative use. (10)

unit cost or cost per unit - Total cost of production divided by the number of units produced. (10)

variable cost - A cost that varies with the level of controlled outputs in the time horizon covered by the planning period or decisions being considered. (10)

cost, capital investment - The cost of manmade structures, facilities, or improvements in natural resources used as inputs in production processes to produce outputs over one or more planning periods. (FSM 1905)

cost effective - Achieving specified outputs or objectives under given conditions for the least cost (6)

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 costly manner Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and internal rate-of-return may be appropriate (1)

cost sensitivity analysis - A type of analysis done to estimate how a particular problem's solution would change if the costs were increased or decreased

Council on Environmental Quality (CEQ) - An advisory council to the President established by the National Environmental Policy Act of 1969 It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters. (Abstracted from the National Environmental Policy Act of 1969, as Amended)

cover/forage ratio - The mixture of cover and forage areas on a unit of land, expressed as a ratio.

created opening - An opening in the Forest created by the silvicultural practices of: final removal harvest of shelterwood; clearcutting; seed tree cutting; or group selection cutting (2)

critical habitat - That habitat designated by the Secretary, USDI, as critical to the continued survival of threatened or endangered species.

critical window - See **corridor**

crop tree - Any tree forming, or selected to form, part of the final crop; generally a tree selected in a young stand for that purpose

crown closure - See **canopy closure.**

crown fire - A fire that runs through the tops of trees, scrub or brushwood

crown height - In a standing tree, the vertical distance from ground level to the base of the crown, measured either to the lowest live branch whorl, or to the lowest live branch (excluding shoots arising spontaneously from buds on the stem of a woody plant), or to a point halfway between. (3)

cubic foot (CF) - The amount of timber equivalent to a piece of wood one foot by one foot by one foot. (3)

culmination of mean annual increment (CMAI) - The age at which average annual growth is greatest for a stand of trees. Mean annual increment is expressed in cubic feet measure, and is based upon expected growth according to the management intensities and utilization standards assumed in accordance with 36 CFR 219 16(a)(2)(i) and (ii). Culmination of mean annual increment includes regeneration harvest yields and any additional yields from planned intermediate harvests. (10)

cultural resource - The remains of sites, structures, or objects used by humans in the past--historic or prehistoric. (2)

cumulative effects or impacts - Cumulative effect or impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7 - these regulations use effects and impacts synonymously.)

cunit - One hundred cubic feet of wood chips

current direction - The existing direction in approved management plans; continuation of existing policies, standards and guidelines; current budget updated for changing costs over time; and, to the extent possible, production of current levels and mixes of resource outputs.

cutting cycle - The planned lapse of time between successive cuttings in a stand. (6)

D

data - Any recorded measurements, facts, evidence, or observations reduced to written, graphical, tabular, or computer form The term implies reliability, and therefore provides an explanation of source, type, precision and accuracy. (6)

debris slide - A shallow landslide of soil, rock, and organic material that occurs on steep slopes

debris torrent - A large debris slide that is charged with water and confined to a steep stream channel Debris torrents may travel several thousand feet.

decadent (stands) - Decaying, deteriorating. (4)

deer winter range - See **big-game winter range.**

de facto outputs - Resource outputs produced from lands not necessarily being managed or allocated for the specific production of these outputs De facto resource outputs are most commonly recreation and wildlife opportunities For example, an area may not be allocated to emphasize recreation management and, in fact, may be scheduled for timber harvest in a later decade. However, the area can usually continue to provide recreation opportunities until it is entered for harvesting

de facto supply - In dispersed recreation, those acres that are available for timber harvests but not entered.

deferred rotation - A type of grazing management where the grazed area is divided into two or more pastures One or more of the pastures are grazed for only part of the grazing season. The following season the period of use is rotated. (10)

DEIS - See **draft environmental impact statement**

demand - The amount of an output that users are willing to take at a specified price, time period, and condition of sale. (10)

demand analysis - A study of the factors affecting the schedule of demand for an output, including the price-quantity relationship, if applicable (10)

Department of Energy (DOE) - A department of the Executive branch of the Federal Government which oversees national matters involving the development and use of energy.

departure - A schedule which deviates from the principle of nondeclining flow by exhibiting a planned decrease in the timber sale and harvest schedule at any time in the future (10)

dependent communities - Communities whose social, economic, or political life would change in important respects if market or nonmarket outputs from the National Forests were substantially decreased

designated area (air quality) - Those areas delineated in the Oregon and Idaho Smoke Management Plans as principal population centers of air quality concern

design standard - Approved design and construction specifications used mainly for recreation facilities and roads--includes specified materials, colors, dimensions, etc.

desirable residual vegetation - The remaining vegetation after application of harvest cutting methods that meets management area objectives The vegetation may be trees, shrubs, grass, or a combination

developed recreation - Recreation that requires facilities that, in turn, result in concentrated use of an area Examples of developed recreation areas are campgrounds and ski areas, facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings. (2)

developed recreation site - Relatively small, distinctly defined areas where facilities are provided for concentrated public use; e.g., campgrounds, picnic areas, swimming areas, and downhill ski areas (6) (As used in this Plan, includes any recreation site where a capital investment has been made)

diameter at breast height (d.b.h.) - The diameter of a tree measured 4 feet 6 inches above the ground (6)

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. (6) (10)

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 (6) FSM 1905

dispersed recreation - A general term referring to recreation use outside developed recreation sites; this includes activities such as scenic driving, hiking, backpacking, hunting, fishing, snowmobiling, horseback riding, cross-country skiing, and recreation in primitive environments. (2)

distance zone - One of three categories used in the Visual Management System to divide a view into near and far components. The three categories are: (1) foreground, (2) middleground, and (3) background

diversity - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan. (2) (1)

draft environmental impact statement (DEIS) - The draft statement of environmental effects which is required for major federal actions under Section 102 of the National Environmental Policy Act, and released to the public and other agencies for comment and review. (6) (In this document, usually refers to the DEIS for the Forest Plan.)

drop camp - A camp where an outfitter furnishes transportation only. Clients provide all their own gear Everything is packed in at the start of the trip and everything is packed out at the end of the trip.

dry ravel - The slow to very rapid gravity driven movement of dry soil. Dry ravel usually occurs when the organic materials in the surface few inches of the soil are severely altered by fire. Dry ravel is most likely where soils are medium to coarse textured and slopes are over 60% gradient.

duff - Organic matter in various stages of decomposition on the floor of the forest. (4)

dwarf mistletoe - Any of a number of relatively host specific plant parasites of the genus *Arceuthobium*. In Northeastern Oregon, ponderosa pine, lodgepole pine, western larch, and Douglas-fir are affected Spread is via seeds ejected from capsules on the female plant in the late summer to early fall. Impact includes growth reduction, and reduced quality and quantity of seed. Severely infected trees may be killed outright or rendered susceptible to attack by other pests

E

early forest succession - The early stage or condition of a plant community that occurs during its development from bare ground to climax (6)

ecoclass - A classification system for identification and mapping of basic vegetative resources and their characteristics

economic efficiency - The usefulness of inputs (costs) to produce outputs (benefits) and effects when all costs and benefits that can be identified and valued are included in the computations. Economic efficiency is usually measured using present net value, though use of benefit-cost ratios and rates-of-return may sometimes be appropriate. (10)

economic growth - Increased economic output in real terms over time. (6)

economic impacts -

> **direct economic impact** - Effects caused directly by forest product harvest or processing or by forest uses. (10)
>
> **indirect economic impact** - Effects that occur when supporting industries sell goods or services to directly affected industries. (10)
>
> **induced economic impact** - Effects that occur when employees or owners of directly or indirectly affected industries spend their income within the economy. (10)

ecosystem - An interacting system of organisms considered together with their environment; for example, marsh, watershed, and lake ecosystems. (2)

edge - An area where plant communities meet or where successional stages or vegetation conditions within the plant communities come together. (2)

effects - Environmental changes resulting from an 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 and water and other natural systems, including ecosystems.

Effects and impacts as used in this FEIS 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 healthy effects, 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 (40 CFR 1508 8, 2)

electronic sites - Areas designated for the operation of equipment which transmits and receives radio signals (excluding television aerials and antennas) for individual pickup of programming, and passive reflectors.

empirical yield table - A table showing, for one or more given species on a given site, the progressive development of a timber stand at periodic intervals covering the greater part of its useful life. This table is prepared on the basis of actual average stand conditions

employment - Labor input into a production process, measured in the number of person-years or jobs. A person-year is 2,000 working hours by one person working year long or by several persons working seasonally (10)

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 by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act. (6)

ending inventory constraint - The standing volume left in the inventory at the end of the planning horizon. The constraint insures that there is enough standing inventory at the end of the planning horizon to perpetuate long-term sustained yield capacity harvest levels on a nondeclining flow basis

environment - The aggregate of physical, biological, economic, and social factors affecting all organisms in an area

environmental analysis - A comprehensive evaluation of alternative actions and their predictable short- and long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions. (2)

environmental assessment - The concise public document required by the regulations for implementing the procedural requirements of the National Environmental Policy Act (40 CFR 1508.9, 2)

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. (6)

Environmental Protection Agency (EPA) - An agency of the Executive Branch of the Federal Government which has the responsibility for environmental matters of national concern

ephemeral draw - A drainage way which conveys surface water for short periods of time in direct response to snowmelt or rainfall runoff. Form in slight depressions in the natural contour of the ground surface but do not normally develop sufficient flow to wash or scour their channels. Can usually be identified by the presence of needles or other litter in the depressions

erosion - (1) The wearing away of the land surface by running water, wind, ice, or other geologic agents, including such processes as gravitational creep; or (2) detachment and movement of soil or rock fragments by water, wind, ice, or gravity. The following terms are used to describe different types of erosion:

> **accelerated erosion** - Erosion which is much more rapid than natural erosion, with the increase in erosion rate resulting primarily from the influence of human activities, or, in some cases, of other events that expose mineral soil surfaces, such as wildfire.
>
> **gully erosion** - The erosion process whereby water accumulates in narrow channels, and over short periods, removes the soil from this narrow area to considerable depths, ranging from 4 inches to as much as 75 to 100 feet

rill erosion - An erosion process in which numerous small channels less than 4 inches deep and 6 inches wide are formed.

sheet erosion - The removal of a fairly uniform layer of soil from the land surface by runoff water

eutrophic - Of habitats, particularly soils and water, that are rich or adequate in nutrients (3)

even-aged management - The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes) throughout the forest area The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands (1)

even-aged stands - Stands in which all trees are of about the same age (A spread of 10 to 20 years is generally considered one age class.) Cutting methods producing even-aged stands are clearcut, shelterwood, or seed tree systems.

exchange reserved - Lands which have been added to the National Forest System by exchange under the General Exchange Act for reserved/proclaimed National Forest System Lands

existing visual condition (EVC) - An inventory of existing visual impacts as seen from sensitive travel corridors or use areas, measures visual changes to the landscape caused by natural or human activities

exports - As used in IMPLAN are defined as outputs or products produced but not consumed or used in production of other outputs in the impact area. Includes both exports to other areas of the U.S. and international exports (10)

extensive forest management - A low investment level of management on regulated timberlands that requires initial harvest, regeneration, and final harvest. Some precommercial thinning may be done to prevent stagnation and disease buildup.

F

fault - A ground surface fracture or fracture zone along which there has been a displacement of one side with respect to the other (6)

fault scarp - An abrupt change in surface elevation resulting from earthquake activity Fault scarps may vary from as little as a few inches to two or three thousand feet.

fawn rearing habitat - Areas used regularly by female deer for fawn raising; optimum fawning habitat includes low shrubs or small trees under an overstory of about 50% closure, usually located on slopes of less than 15 percent where vegetation is succulent and plentiful in June, and water is available within 183 meters (8)

feral - Non-native species, or their progeny, which were once domesticated but have since escaped from captivity and are now living free (6)

FIL - See **fire intensity level.**

final cut - See **final removal harvest**

final environmental impact statement - The final version of the statement of environmental effects required for major federal actions under section 102 of the National Environmental Policy Act. It is a revision of the draft environmental impact statement to include public and agency responses to the draft (6)

final removal harvest - The removal of the last seed bearers or shelter trees after regeneration is established under a shelterwood system. (6)

fire intensity level - Fire intensity level; a measure of heat released over time by the flaming front of a fire; indicated by flame length (i e., FIL 1 = 0-2 ft; FIL 2 = 2-4 ft)

fire management - All activities required for protection of resources from fire and for the use of fire to meet land management goals and objectives. (6)

fire risk - Potential for a fire start, natural or human-caused.

fisheries habitats - Streams, lakes, and reservoirs that support fish populations

flood plain - The lowland and relatively flat area adjoining inland waters, including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year. (2)

forage - All browse and nonwoody plants that are available to livestock or game animals and used for grazing or harvested for feeding. (6)

forb - Any herb other than grass, sedges, or rushes (7)

foreground - A term used in visual management to describe the portions of a view between the observer and up to 1/4 to 1/2 mile distant. (6)

Forest and Rangeland Renewable Resources Planning Act of 1974 - An Act of Congress requiring the preparation of a program for the management of the National Forests' renewable resources, and the preparation of land and resource management plans for units of the National Forest System. It also requires a continuing inventory of all National Forest System lands and renewable resources (6)

forest land - Land at least 10 percent occupied by forest trees 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 clearings and powerline clearings of any width. (1) (10)

forest program - The summary or aggregation of project or activity information that makes up an integrated (multifunctional) course of action for a given level of funding on a National forest that is consistent with the Forest Plan

forest-range environmental study (FRES) levels - Various range management intensities developed to reflect the degree of range utilization. FRES levels measure the amount of native forage available to livestock for consumption under these different intensities Developed in a Forest Service

report entitled "The Nation's Range Resources -- A Forest-Range Environmental Study," Forest Resources Report No 19.

Forest Service Handbook (FSH) - For Forest Service use, directives that provide detailed instructions on how to proceed with a specialized phase of a program or activity (10)

Forest Service Manual (FSM) - A system of manuals which provides direction for Forest Service activities.

forest system roads - Roads that are part of the Forest development transportation system, which includes all existing and planned roads as well as other special and terminal facilities designated as Forest development transportation facilities (See **roads.**)

forest type - A classification of forest land based upon the tree species presently forming a plurality of basal area stocking in live trees.

formally dedicated area - An area of the Forest set aside for a specific use by virtue of a formal ceremony or congressional designation

FORPLAN - A linear programming system used for developing and analyzing forest planning activities. (10)

free-to-grow - A term used by silviculturists to indicate that trees are free of growth restraints, the most common of which is competing over-topping vegetation.

fuel break - A zone in which fuel quantity has been reduced or altered to provide a position for suppression forces to make a stand against wildfire Fuel breaks are designated or constructed before the outbreak of a fire Fuel breaks may consist of one or a combination of the following. natural barriers, constructed fuel breaks, constructed barriers (6)

fuel hazard - A supply of fuel that forms a special threat of ignition or suppression difficulty.

fuel management - The practice of planning and executing the treatment or control of living or dead vegetative material in accordance with fire management direction (10)

fuel treatment - The rearrangement or disposal of natural or activity fuels (generated by management activity, such as slash left from logging) to reduce fire hazard. Fuels are defined as both living and dead vegetative materials consumable by fire

fuels - Combustible wildland vegetative materials While usually applied to above ground living and dead surface vegetation, this definition also includes roots and organic soils such as peat. (10)

full-service management - Management of developed recreation sites to furnish the full range of amenities and maintenance for the public enjoyment Management objectives are based on site capacity, site protection needs, seasonal demands for public use, and desired levels of service to enhance visitor's experience and convenience and provide optimum maintenance

furbearing species - See **game species**

G

game species - Any species of wildlife or fish for which seasons and bag limits have been prescribed and which are normally harvested by hunters, trappers, and fishermen under state or federal laws, codes, and regulations. (6)

genetic seedlings - Tree seedlings from a genetically superior seed source The seeds are collected from trees displaying exceptional form and raised in nurseries before outplanting The seedlings usually have faster growth rates than naturally regenerated seedlings.

geomorphology - The science that deals with land and submarine relief features of the earth's surface and seeks a genetic interpretation of them, using the principles of physiography in its descriptive aspects and dynamic and structural geology in its explanatory phases. (6)

geothermal - Of or pertaining to the internal heat of the earth. (4)

goal - A concise statement that describes a desired condition to be achieved sometime in the future It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed. (2) (1)

goods -

> **nonmarket good** - An output that is not normally exchanged for money in a market. Usually no market has evolved because ownership of the good is not clear, exclusive use is not possible under current laws, or it is not possible to consistently define good. (10)
>
> **public good** - An output for which it is impractical to impose a charge, either because it must be supplied to all if it is supplied to one or because the costs of collection and control exceed likely revenue. (10)

goods and services - The various outputs, including on-site uses, produced from forest and rangeland resources. (2,1)

grass/forb - An early forest successional stage where grasses and forbs are the dominant vegetation.

group selection cutting - See **uneven-aged silvicultural systems**.

growing season - That part of the year when temperature and moisture are favorable for vegetation growth.

guideline - An indication or outline of policy or conduct; i.e., any issuance that assists in determining the course of direction to be taken in any planned action to accomplish a specific objective. (2)

guzzler - A device for collecting and storing precipitation for use by wildlife or livestock Consists of an impenetrable water collection area, a storage facility, and a trough from which animals may drink. (9)

H

habitat - The place where a plant or animal naturally or normally lives or grows. (2)

habitat capability - The estimated ability of an area, given existing or predicted habitat conditions, to support a wildlife, fish or plant population It is measured in terms of potential population numbers.

habitat diversity - The distribution and abundance of different plant and animal communities and species within a specific area

hardwood - A broad-leaved flowering tree.

harvest cutting method - A combination of interrelated actions whereby forests are tended, harvested, and replaced. The combination of management practices used to manipulate the vegetation results in forests of distinctive form and character. Harvest cutting methods are classified as even-aged and uneven-aged.

harvest dispersion (factor) - The dispersion of cutting units over the land base in order to meet clearcut size limitations, or other resource constraints. An example of a harvest dispersion constraint is: no more than 25 percent of an analysis area may be harvested in one decade.

HCNRA - Hells Canyon National Recreation Area

headwaters - The upper tributaries of a river. (4)

herbaceous - An adjective describing seed-producing plants that do not develop persistent woody tissue, but die down to ground level at the end of the growing season

herbicide - A chemical substance used for killing plants. (8)

high-site timbered lands - A relative measure of resource productivity.

historic site - Site associated with the history, tradition, or cultural heritage of national, state, or local interest, and of enough significance to merit preservation or restoration. (6)

hydrology - The scientific study of the properties distribution and effects of water in the atmosphere, on the earth's surface, and in soil and rocks.

I

ID team - See **interdisciplinary team**

impacts - See **effects**

impact analysis area - The delineated area subject to significant economic and social impacts from Forest Service activities included in an economic or social impact analysis

impact analysis subarea - A specific area within an analysis area that is subject to localized economic or social impacts from Forest Service activities.

Impact, economic, direct - Impacts, caused directly by forest product harvest or processing, or forest uses.

Impact, economic, indirect - Impacts that arise from supporting industries selling goods or services to directly-affected industries.

Impact, economic, induced - Impacts resulting from employees or owners of directly or indirectly-affected industries spending their income within the economy

IMPLAN - A computer-based system used by the Forest Service for constructing nonsurvey input/output models to measure economic input The system includes a data base for all countries in the U.S and a set of computer programs to retrieve data and perform the computational tasks for input/output analysis (10)

Imports - As used in IMPLAN are defined as purchases of products for use in production of other products and for final consumption from outside the impact area Includes both imports from other areas of the U.S. and international imports. Competitive imports are the same as local domestic products which are not produced in quantities sufficient to meet local demands or which obtain a share of the local market formerly supplied by local producers. Noncompetitive imports are products not produced locally. (10)

Improved genetic stock - Group of plants (trees) that have been improved genetically (4)

Income - Employee compensation, profits, rents, and other payments to households. (10)

Indicator species - See **management indicator species.**

Indirect outputs - Outputs caused by an action, but which are later in time or farther removed in distance, although still reasonably foreseeable. (See **effects.**)

Individual (single) tree selection - See **uneven-aged silvicultural systems**

Induced outputs - Outputs in the private sector induced by the direct outputs produced on the Forest (6)

Influence zone - See **zone of influence**

Input/output analysis - A quantitative study of the interdependence of a group of activities, based on the relationship between inputs and outputs of the activities The basic tool of analysis is an input-output model for a given period that shows simultaneously for each economic sector the value of inputs and outputs, as well as the value of transactions within each economic sector. It has especially been applied to estimate the effects of changes in Forest output levels on local economic activity. (3)

Instream flows - A prescribed level (or levels) of streamflow, usually expressed as a stipulation in a permit authorizing a dam or water diversion, for the purpose of meeting National Forest System management objectives.

INTEGER - A computer model used to integrate Forest social and economic data.

Integrated pest management - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated population on various resource values, alternative regulation tactics and strategies, and benefit/cost estimates of those alternative strategies.

Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system, and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides A basic principle in the choice of strategy is that it be ecologically compatible or acceptable (2) (1)

integrated resource management - A management strategy which emphasizes no resource element to the exclusion or violation of the minimum legal standards of others (FSM 1905)

intensive grazing management - Grazing management that controls distribution of cattle and duration of use on the range, usually by fences, so parts of the range are rested during the growing season. (See also **quality extensive management; quality intensive management**)

intensive management (intensive forest management) - A high investment level of timber management that includes use of precommercial thinnings, commercial thinnings, genetically improved stock, and control of competing vegetation (2)

interdisciplinary team (ID team) - A group of individuals with different training assembled to solve a problem or perform a task The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem (6)

intermediate cutting - Any removal of trees from a stand between the time of its formation and the regeneration cut Most commonly applied intermediate cuttings are release, thinning, improvement, and salvage (6)

intermingled ownerships - Lands within the National Forest boundaries or surrounded by National Forest lands that are owned by private interests or other government agencies.

intermittent stream - A stream that runs water in most months, but does not run water during the dry season during most years.

interpretive services - Visitor information services designed to present educational and recreational values to Forest visitors to enhance their understanding, appreciation, and enjoyment of the Forest

intrusive - (rock) having been forced while in a plastic state into cavities or between layers (of other rock). (6)

inventory data and information collection - The process of obtaining, storing, and using current inventory data appropriate for planning and managing the Forest. (6)

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. (10)

irreversible - Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options. (10)

issue - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process. (See also **public issue**) (2)

K

Knutson-Vandenberg Act (K-V) - An act of Congress which among other things authorizes the Forest Service to use funds collected from timber sales for tree planting, timber stand improvement, and other forest uses.

L

Land and Water Conservation Fund (L&WCF) - Funds collected from sales of surplus Government real property, motorboat fuels taxes, recreation use fees, etc. which are available to purchase and develop certain qualifying lands for recreational purposes.

land class - The topographic relief of a unit of land Land classes are separated by slope, which coincides with the timber inventory process The three land classes used in the Fremont National Forest Plan are defined by the following slope ranges: 0 to 40 percent; 40 to 60 percent; and greater than 60 percent.

land exchange - The conveyance of nonfederal land and/or interests in exchange for National Forest System land or interests in land

landform - An area of that is defined by its particular combination of bedrock and soils, erosion processes and climatic influences.

landing - Any place where round timber is assembled for further transport, commonly with a change of method. (3)

land management - The intentional process of planning, organizing, programming, coordinating, directing, and controlling land use actions. (6)

land management planning - The process of organizing the development and use of lands and their resources in a manner that will best meet the needs of people over time, while maintaining flexibility for a combination of resources for the future

landownership pattern - The National Forest System resource land base, in relation to other land ownerships within given boundaries. (2)

landscape management - The art and science of planning and administering the use of Forest lands in such ways that the visual effects maintain or upgrade human psychological welfare. The planning and design of the visual aspects of multiple-use land management.

lands not appropriate for timber production - Includes lands that: 1) are proposed for resource uses that preclude timber production, such as Wilderness, 2) have other management objectives that limit timber production to the point where management requirements set forth in CFR 219 27 cannot be met, or 3) are not cost efficient over the planning horizon in meeting forest objectives including timber production. (1)

lands not suited (unsuitable) for timber production - Includes lands that: 1) are not forest land as defined in CFR 219 3; 2) are likely, given current technology, to suffer irreversible resource damage to soils productivity, or watershed conditions; 3) cannot be adequately restocked as provided in 36

CFR 219 27(c)(3); or, 4) have been withdrawn from timber production by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service In addition, Forest lands other than those that have been identified as not suited for timber production shall be reviewed and assessed prior to formulation of alternatives to determine the costs and benefits of a range of management intensities for timber production. (1)

lands suitable for timber production - Includes all lands not classified as either Not Suited or Not Appropriate for Timber Production

landtype - A portion of the Forest mapped in the Siuslaw National Forest Soil Resource Inventory that has a defined arrangement of specific landforms that reacts to management activities in generally predictable ways. Landtypes range from 60 to 600 acres in size.

landtype association - A group of landtypes that make up a large portion of the Forest The landtypes are sufficiently homogeneous to be considered as a whole for modeling the future outputs and effects of planned management activities. Landtype Associations do not usually follow watershed boundaries and are defined on the basis of general similarities in geology, climate, landform and vegetation. Landtype Associations on the Forest range in size from 14,000 to 93,000 acres.

land use allocation - The commitment of a given area of land or a resource to one or more specific uses--for example, to campgrounds or wilderness. (6)

leasable minerals - Coal, gas, oil, phosphate, sodium, potassium, oil shale, sulphur, geothermal steam. Also includes other minerals on acquired National Forest Lands (6)

least-cost analysis - Determination of the least cost means of attaining specified results. (10)

Level IV Law Enforcement Officer - A Forest Service employee who has graduated from the Federal Law Enforcement Academy and holds a law enforcement commission signed by the Regional Forester. District Level IV officers generally perform other duties as well as law enforcement

lifestyle - The characteristic way people live, indicated by consumption patterns, work, leisure, and other activities. (10)

linear programming - A mathematical method used to determine the cost-effective allocation of limited resources between competing demands when both the objective (e.g., profit or cost) and the restrictions on its attainment are expressible as a system of linear equalities or inequalities. (6)

locatable minerals - Those hardrock minerals which can be obtained by filing a claim on Public Domain or National Forest System lands reserved from the Public Domain In general, the locatable minerals are those hardrock minerals which are mined and processed for the recovery of metals, but may also include certain nonmetallic minerals and uncommon varieties of mineral materials. (6)

lode mining - The mining of a valuable mineral which occurs as a tabular deposit between definite, contrasting mineral or rock boundaries. (6)

logging residues - See **slash.**

long-span cable system - In timber harvesting, any cable logging system capable of yarding logs at distances greater than 2,000 feet.

long-term - Greater than ten years

long-term sustained yield timber capacity (LTSY) - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity, consistent with multiple-use objectives. (1)

low income - Household income below the poverty level as defined by the U. S. Department of Health and Human Services. (10)

M

management area - An area with similar management objectives and a common management prescription (1) (10)

management concern - An issue, problem, or condition which influences the range of management practices identified by the Forest Service in the planning process. (1)

management direction - A statement of multiple use and other goals and objectives, and the associated management prescriptions, and standards and guidelines for attaining them. (1)

management emphasis - That portion of a management scheme which receives the most stress or is of the greatest significance or importance. It may be the resources being produced, or it may be the way in which they are produced

management indicator species - A species selected because its welfare is presumed to be an indicator of the welfare of other species using the same habitat. A species whose condition can be used to assess the impacts of management actions on a particular area (8)

Management Information Handbook (MIH) codes - An accounting system that labels each Forest activity or budget item with a code to identify that activity in a consistent manner Normally used for budgeting purposes.

management intensity - The management practices or combination of management practices and associated costs to obtain different levels of goods and services (1). In FORPLAN management prescriptions, a set of activities designed to accomplish a particular management emphasis. (See also **management prescriptions).**

management practice - A specific activity, measure, course of action, or treatment (1)

management prescription - The management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives (1) In FORPLAN, the combination of a management emphasis and associated management intensities with a *variety of timing choices for implementation.* (2)

management requirement (MR) - Minimum standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, soil and water diversity, to be met in accomplishing National Forest System goals and objectives. (1)

marginal cover - A stand of coniferous trees 10 or more feet (3 or more meters) tall, with an average canopy closure equal to or more than 40 percent. (11)

market - The processes of exchanging a good or service for money or other goods or services according to a customary procedure. A market may occur in a specific place or throughout an area by individual transactions (10)

market area - The area from which a market draws or to which it distributes its goods or services and for which the same general price structure and price influences prevail. (10)

market assessment - A market study describing sources of supply and demands for goods or service, pricing processes, and influences on value (10)

market value - The unit price of an output normally exchanged in a market after at least one stage of production Market value is expressed in terms of prices as evidenced by market transactions. (10)

mass movement - A general term for any of the variety of processes by which large masses of earth material are moved downslope by gravitational forces - either slowly or quickly (6)

mature timber - Trees that have attained full development, particularly height, and are in full seed production (3)

maximum modification - See **visual quality objective**

MBF - Thousand board feet.

MCF - Thousand cubic feet.

mean annual increment of growth - The total volume of a tree or stand of trees up to a given age divided by that age. (2)

mesotrophic - Habitats, particularly soil and water, of moderate nutrient capacity. (3)

middleground - A term used in visual management to describe the portions of a view extending from the foreground zone out to 3 to 5 miles from the observer (6)

MIH - Management Information Handbook.

mineral entry - The filing of a mining claim upon public domain or related land to obtain the right to any minerals it may contain. (6)

mineral entry withdrawal - The exclusion of mining locations and mineral development work on areas required for administrative sites by the Forest Service and other areas highly valued by the public. (6)

mineral materials - Deposits such as sand, stone, gravel, and clay (6)

mineral soil - Weathered rock materials usually containing less than 20 percent organic matter. (6)

minimum level management - FORPLAN term designating lands that will not be actively managed for timber or forage production. Often, these are lands that have high costs and low benefits associated with their management

minimum streamflows - A specified level of flow through a channel that must be maintained by the users of streams for biological, physical, or other purposes.

mining claim - A portion of the public lands which a miner, for mining purposes, takes and holds in accordance with mining laws. (6)

minority - Persons as specified in Directive 15, Office of Federal Statistical Policy and Standards, U. S Department of Commerce, Statistical Policy Handbook (1978). Generally identified as one of the following four categories: Alaskan native or American Indian, Asian or Pacific Islander, Black, Hispanic (10)

mitigation - Mitigation includes. (a) avoiding the impact altogether by not taking a certain action or parts of an action, (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation, (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or elimination the impact over time by preservation and maintenance operations during the life of the action; and, (e) compensating for the impact by replacing or providing substitute resources or environments. (40 CFR Part 1508.20)

mitigation measures - Actions to avoid, minimize, reduce, eliminate, or rectify adverse impacts of management practices

MMBF - Million board feet

MMCF - Million cubic feet.

MMRVD - Million recreation visitor day.

MRVD - Thousand recreation visitor day.

model - A representation of reality used to describe, analyze, or understand a particular concept A "model" may be a relatively simple qualitative description of a system or organization, or a highly abstract set of mathematical equations (6)

modification - See **visual quality objective**

monitoring and evaluation - The periodic evaluation of Forest Plan management practices on a sample basis to determine how well objectives have been met.

mortality - In wildlife management, the loss in a population from any cause, including hunter kill, poaching, predation, accident, and disease In forestry, trees in a stand that die of natural causes. (8)

mountain pine beetle - A tiny black insect, ranging in size from 1/8 to 3/4 inch, that bores its way into a tree's cambium and cuts off its supply of nutrients, thus killing the tree.

multiple use - The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people, making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions, that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land and with consideration being given to the relative values of the various resources; and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output. (1)

multiplier - A ratio of a measure of total change in income or employment to the direct income or employment change The measure to total change may be direct plus indirect change (Type I

Multipliers); or direct, indirect, and induced change (Type II Multipliers); or direct, indirect, and interactive increased induced demands based on population increase (Type III Multipliers) (10)

municipal watershed - A watershed which provides water for human consumption, where Forest Service management could have a significant effect on the quality of water at the intake point, and that provides water utilized by a community or any other water system that regularly serves: 1) at least 25 people on at least 60 days in a year, or 2) at least 15 service connections In addition to cities, this includes campgrounds, residential developments, and restaurants (10)

N

National direction - Statements of missions, goals, and objectives that guide Forest Service planning. (FSM 1905)

National Environmental Policy Act (NEPA) of 1969 - An Act to declare a National policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish a Council on Environmental Quality. (The Principal Laws Relating to Forest Service Activities, Agriculture Handbook No. 453, USDA, Forest Service, 359 pp.)

National Forest Land and Resource Management Plan - A Plan which ". . . shall provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long-term net public benefits in an environmentally sound manner." (1)

National Forest Management Act (NFMA) - A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development

National Forest System (NFS) - All National Forest lands reserved or withdrawn from the public domain of the United States, all National Forest lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat 525, 7 U S.C. 1010-1012), and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system (16 U S.C 1608)

National recreation trails (NRT) - Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the National system of trails authorized by the National Trails System Act National Recreation Trails provide a variety of outdoor recreation uses (6)

National Register of Historic Places - A listing (maintained by the U.S. National Park Service) of areas which have been designated as being of historical significance The Register includes places of local and state significance as well as those of value to the Nation (6)

National Wilderness Preservation System - All lands covered by the Wilderness Act and subsequent Wilderness designations, regardless of the governmental department having jurisdiction

natural barrier - A natural feature that restricts livestock or wildlife movements, such as a dense stand of trees or a cliff.

natural regeneration - Reforestation of a site by natural seeding from the surrounding trees. Natural regeneration may or may not be preceded by site preparation

net cash flow - The difference between the annual receipts of an alternative and costs required to implement that alternative.

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 principles of multiple use and sustained yield. (1)

net receipts - Receipts minus costs

net returns to the treasury, net cash flow - The difference between the total dollar receipts projected for an alternative and the total budget required to implement the alternative.

nitrogen-fixing (nitrogen fixation) - Conversion of free nitrogen by plants such as red alder into combined forms useful in nutrient cycles and other functions in the biosphere.

nominal value - A monetary value relative to time that does not account for the effects of inflation.

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. (FSH 2409 13)

noncommodity outputs - Resource outputs that are not normally bought and sold, or cannot be bought and sold, such as air quality or scenic beauty

nonconsumptive use - That use of a resource that does not reduce the supply. For example, nonconsumptive use of water includes hydroelectric power generation, boating, swimming, and fishing (2)

nondeclining flow - Where the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade, and this planned sale and harvest for any decade is not greater than the long-term sustained yield capacity (1)

nonforest land - Lands that never have had or that are incapable of having 10 percent or more of the area occupied by forest trees, or lands previously having such cover and currently developed for nonforest use (6)

nongame species - Animal species which are not hunted, fished, or trapped.

nonmarket value - The unit price of a nonmarket output normally not exchanged in a market at any stage before consumption, it is thus necessary to impute nonmarket value from other economic information. (10)

nonmarket valued outputs - Assessed value of a goods or service which is not traded in the market place and has no market value Because it is not bought and sold, some measure other than price must be used in establishing the value. (6)

nonpoint source pollution - Pollution whose source is general rather than specific in location It is widely used in reference to agricultural and related pollutants-- for example, production of sediments by logging operations, agricultural pesticide applications, or automobile exhaust pollution. (6)

nonpriced outputs - Nonpriced outputs are those for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value. Subjective nondollar values are given to nonpriced outputs

no surface occupancy - A clause used in mineral leases to prevent activities in sensitive areas. Sometimes results in closure of an area and sometimes has little impact if directional drilling can tap resources underlying restricted area

noxious weeds - Undesirable plant species that are unwholesome to the range or to animals. (6)

O

objective - A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals (1)

off-road vehicle (ORV) - Vehicles such as motorcycles, all-terrain vehicles, four-wheel drive vehicles, and snowmobiles. (2)

old-growth deficit - A forest without the excess volume of mature/overmature old-growth trees that could be used to offset reductions in programmed harvest volume resulting from allocation changes.

old-growth habitat - Habitat for certain wildlife that is characterized by overmature coniferous forest stands with large snags and decaying logs

old-growth stand (old growth) - Any stand of trees 10 acres or greater generally containing the following characteristics 1) contain mature and overmature trees in the overstory and are well into the mature growth stage; 2) will usually contain a multilayered canopy and trees of several age classes; 3) standing dead trees and down material are present, and 4) evidences of man's activities may be present, but do not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand. (2) (In this Forest Plan, old-growth stands less than 30 acres in size were generally not tracked.)

oligotrophic - Lakes characterized by a low accumulation of dissolved nutrient salts, supporting only sparse plant and animal life, and having a high oxygen content, owing to the low organic content (4)

open roads - Any roads which are not blocked or closed to all standard vehicle use (excluding ATV or over-the-snow vehicles) for a full year Seasonal closures do not constitute a "closed" road

open to entry - With respect to minerals management, lands available to occupy under the mining laws

operational costs - Those costs associated with administering and maintaining National Forest facilities and resource programs.

operational plan - A document approved by the Forest Supervisor which specifies at the project level, implementation of the management direction established in the Forest Plan. (6)

opportunity - A proposal that is considered in developing alternative activities, projects or programs where an option exists to invest profitably to improve or maintain a present condition

opportunity cost - The dollar-quantifiable net loss resulting from selecting a less efficient course of action.

output - A good, service, or on-site use that is produced from forest and rangeland resources. See FSH 1309 11 for forest and rangeland outputs codes and units measure. Examples: X06-Softwood Sawtimber Production MBF; X80-Increased Water Yield - Acre Feet, W01-Primitive Recreation Use RVD's. (FSM 1905)

output, controlled - The amount of an output which management has the legal and practical ability to control with management activities. (10)

output, market - A good, service, or on-site use that can be purchased at a price. (FSM 1905)

output, noncontrolled - The amount of an output which will occur regardless of management activity. (10)

output, nonmarket - A good, service, or on-site use not normally exchanged in a market (FSM 1905)

overbid - To bid more than the appraised value (4)

overgrazing - Continued overuse (year after year) creating a deteriorated range

overgrazed range - A range that has deteriorated and may still be deteriorating from its productive potential due to overgrazing

overmature timber - The stage at which a tree declines in vigor and soundness, for example, past the period of rapid height growth. (2)

overstory - That portion of the trees, in a Forest or in a stand of more than one story, forming the upper or uppermost canopy. (3)

overuse (overutilization) - Utilizing an excessive amount of the current year's growth which, if continued, will result in overgrazing and range deterioration

overwood removal - A harvest method that removes the overstory of a two-story stand and leaves the smaller understory for further treatment (thinning or harvesting).

P

P & M - Fund appropriated by Congress for protection and management of the Forest.

partial cut - Covers a variety of silvicultural practices where a portion of the stand is removed and a portion is left.

partial retention - See **visual quality objective.**

particulates - See **total suspended particulates**

payment in lieu of taxes (PILOT) - Payments to local or State governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing. Specifically, they

include payments made under the payments in Lieu of Taxes Act of 1976 by U. S. Department of the Interior (10)

payments to counties - See **payment in lieu of taxes.**

perennial stream - A stream that flows year round

permittee - Any person or business formally allowed to graze livestock on the land of another person or business (e g ; on state or federal land) (3)

personal use - Normally used to describe the type of permit issued for removal of wood products (firewood, post, poles, and Christmas trees) from National Forest 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 (2)

pests - Any animal or plant that, during some portion of its life cycle, inhibits the establishment or growth of some other species of plant or animal favored by man

phenology - The science dealing with the influence of climate on the recurrence of such annual phenomena of animal and plant life as bird migrations, budding, etc. (4)

physiographic province - A Region having a particular pattern of relief features or land forms that differs significantly from that of adjacent Regions. (6)

pioneer species - A plant capable of invading bare sites (e g , a newly exposed soil surface) and persisting there, i.e., "colonizing" them, until supplanted. (3)

placer mining - The extraction of valuable heavy minerals from a mass of sand, grave, or other similar alluvial material by concentration in running water (6)

planned ignition - A fire started deliberately, and controlled to accomplish a resource management objective

planning area - The area of the National Forest System covered by a Regional guide or forest plan. (1)

planning criteria - Criteria prepared to guide the planning process. Criteria applied to collection and use of inventory data and information, analysis of the management situation, and the design, formulation, and evaluation of alternatives (1)

planning horizon - The overall time period considered in the planning process It spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions (1) In this FEIS and Forest Plan, the planning horizon is considered to be 15 decades

planning period - One decade The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits. (1)

planning records - The body of information documenting the decisions and activities which result from the process of developing a Forest Plan, revision, or significant amendment

plan of operations - A document required from any person proposing to conduct mineral-related activities which utilize earth moving equipment and which will cause disturbance to surface resources or involve the cutting of trees. (36 CFR 228 4)

pole/sapling - A Forest successional stage in which trees between five and nine inches in diameter are the dominant vegetation. (See also **size class.**)

pole timber - Trees of at least five inches in diameter at breast height, but smaller than the minimum utilization standard for sawtimber (See also **size class**)

policy - A guiding principle upon which is based a specific decision or set of decisions. (FSM 1905)

potential yield - (*This term is in reference to the 1962 Timber Management Plan only.*) Optimum sustained yield of timber harvest volume attainable with intensive forestry on available commercial forest land (forest lands able to produce 20 cubic feet of timber per acre per year or more)

practices - Those management activities that are proposed or expected to occur

preattack planning - In fire management, a system for collecting, evaluating, and recording fire intelligence data for a given planning unit. The planning phase is usually followed by a construction and development program integrated with other management functions.

precommercial thinning - The practice of removing some of the trees less than marketable size from a stand so that the remaining trees will grow faster. (2)

prehistoric site - An area which contains important evidence and remains of the life and activities of early societies which did not record their history

preparatory cut - *The removal of trees near the end of a rotation, which permanently opens the* canopy and enables the crowns of seed bearers to enlarge, to improve conditions for seed production and natural regeneration. Typically done in the shelterwood system (3)

prescribed fire - A wildland fire burning under specified conditions which will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions. Proposals for use of unplanned ignitions for this purpose must be approved by the Regional Forester (2)

prescription - A written direction for harvest activities and regeneration methods.

present net value (PNV) - 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. (1)

preservation - A visual quality objective that allows only for ecological changes (2)

price - The unit value of an output expressed in dollars. (10)

price elasticity - A measure of the sensitivity of the quantity of a good or service exchanged to changes in price. (10)

priced outputs - Priced outputs are those that are or can be exchanged in the market place. The dollar values for these outputs fall into two categories. market or nonmarket (assigned values).

price-quantity relationship - A schedule of prices that would prevail in a market for various quantities of the output exchanged (10)

price trend analysis - An analysis done to estimate how a particular FORPLAN solution would change if predicted price trends were increased or decreased.

primitive recreation - Those types of recreational activities associated with unroaded land -- e g , hiking, backpacking, cross-country travel. (6)

proclaimed land - Lands reserved from the Public Domain for National Forest purposes by presidential proclamation. (See also **reserved land**)

program - Sets of activities or projects with specific objectives, defined in terms of specific results and responsibilities for accomplishments (10)

program budget - A plan that allocates annual funds, work force ceilings, and targets among agencies. (10)

program budget level - A single, comprehensive integrated program responsive to the Chief's direction that specifies a level of production attainable from a given investment of dollars and other resources Each budget level represents a complete, full, and independent package within the criteria and constraints identified (10)

Programmatic Memorandum of Agreement - An agreement between the USDA Forest Service, Pacific Northwest Region, the Oregon State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation on the management of two types of cultural resource sites found on the Forest Depression-era administrative structures and prehistoric lithic scatters

programmed harvest - The amount of timber on the Forest that is scheduled for harvesting. The programmed harvest is based on current demand, funding, and multiple-use considerations

project - An organized effort to achieve an objective identified by location, timing, activities, outputs, effects, and time period and responsibilities for executions (10)

project design - The process of developing specific information necessary to describe the location, timing, activities, outputs, effects, accountability, and control of a project

public involvement - A Forest Service process designed to broaden the information base upon which agency decisions are made by (1) informing the public about Forest Service activities, plan, and decisions, and (2) encouraging public understanding about and participation in the planning processes which lead to final decision making. (10)

public issue - A subject or question of widespread public interest relating to management of the National Forest System. (1)

public participation - Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning. (2)

public participation activities - Meetings, conferences, seminars, workshops, tours, written comments, survey questionnaires, and similar activities designed or held to obtain comments from the general public and specific publics

purchaser road credits - Credit earned by the purchaser of a National Forest timber sale by construction of contract-specific roads. earned purchaser credit may be used by the purchaser as payment for National Forest timber removed (2)

pyroclastic - Formed by or involving fragmentation as a result of volcanic or igneous action. (5)

Q

quality extensive management (QE) - Range management based on low operating and investment costs per acre. (3)

quality intensive management (QI) - Range management to obtain a high production of livestock through the best techniques of range management. (3)

R

range - Land producing native forage for animal consumption, and lands that are revegetated naturally or artificially to provide forage that is managed like native vegetation. (6)

range allotment - An area designated for use of a prescribed number and kind of livestock under one management plan. (6)

range allotment management plan - An approved plan for managing a range allotment resulting in resolution of resource conflicts including riparian areas. Resource damages may still be occurring, however, the action items identified in the AMP are expected to stop resource damage or resolve resource conflicts over time

range condition - The current productivity of a range relative to what that range is naturally capable of producing. (Also see **satisfactory range condition.**) (9)

range environmental assessment (REA) - An environmental assessment to determine the condition of the range with regard to suitability for grazing, vegetative cover types, potential vegetative communities, condition of vegetation, soil stability, and forage production and utilization.

rangeland - Land on which the climax vegetation (potential natural plant community) is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing and browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundra, and certain forb and shrub communities. It also includes areas seeded to native or adapted introduced species that are managed like native vegetation.

range management - The art and science of planning and directing range utilization so as to secure sustained maximum production of livestock, milk, and/or cut forage, consistent with other uses and conserving natural resources (3)

raptors - Predatory birds, such as falcons, hawks, eagles, or owls

RARE II - An acronym for a second generation "Roadless Area Review and Evaluation" instituted in June 1977, to identify roadless and undeveloped land areas in the National Forest system Its purpose was to determine which of the inventoried areas should be recommended to Congress for inclusion in the National Wilderness Preservation System, which areas should be managed for

nonwilderness uses, and which areas required further planning before a reasonable decision on them could be made.

rate of return - The financial yield per unit cost determined as the rate of interest at which total discounted benefits equal total discounted costs (Internal rate of return is a similar measure appropriate to the benefits and costs that affect private firms or individuals) (10)

real dollar - A monetary value that compensates for the effects of inflation. (1)

receipts - Those priced benefits for which money will actually be paid to the Forest Service: recreation fees, timber harvest, mineral leases and special use fees

receipt shares - 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 (1)

Record of Decision - A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not (40 CFR 1505 2)

recreation capacity - The number of people that can take advantage of the recreation opportunity at any one time without substantially diminishing the quality of the experience or the biophysical resources (2)

Recreation Information Management (RIM) - A computer-oriented system for the organization and management of information concerning recreation use, occupancy, and management of National Forest lands.

recreation opportunity - The availability of choices for users to participate in the recreational activities they prefer within the settings they prefer.

Recreation Opportunity Spectrum (ROS) - A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences have been arranged along a continuum or spectrum divided into seven classes. Primitive, Semiprimitive Nonmotorized, Semiprimitive Motorized, Roaded Modified, Roaded Natural, Rural, Urban.

> **primitive** - Area is characterized by an essentially unmodified natural environment of fairly large size Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.
>
> **semiprimitive nonmotorized** - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.
>
> **semiprimitive motorized** - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site

controls and restrictions use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted

roaded natural - Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities

roaded modified - Timber harvest and other management activities may be dominant, but carried out within NFMA requirements Interaction between users may be moderate to high with evidence of other users present. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.

rural - Area is characterized by substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities is designed for use by a large number of people Facilities are often provided for special activities Moderate densities are provided far away from developed sites Facilities for intensified motorized use and parking are available.

urban - Area is characterized by a substantially urbanized environment, although the background may have natural appearing elements. Renewable resource modification and utilization practices are to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans, on-site, are predominant. Large numbers of users can be expected, both on site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

recreation visitor day (RVD) - A measure of recreation use, in which one RVD equals twelve visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons. (2)

recreational river - See **wild and scenic river**

redd - Nest in gravel of stream bottom where fish deposit eggs In this document, refers to salmon spawning redds.

reduced service management - Management of developed recreation facilities below optimum maintenance standards.

reforestation - The natural or artificial restocking of an area with forest trees. (2)

regeneration - The renewal of a tree crop, whether by natural or artificial means. Also, the young crop itself, which is commonly referred to as reproduction. (2)

Region - An area covered by a Regional guide See FSM 1221.3 for organizational definitions. (10)

Regional Forester - The Forest Service official responsible for administering a single Region.

Regional Guide - The guide developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended It guides all natural resource management

activities, and establishes management standards and guidelines for the National Forest System lands within a given Region. It also disaggregates the assigned Regional RPA objectives to the Forests within that Region.

regulated - Stands which contribute to the calculated base timber sale schedule or departure. Herein includes green volume projections of FORPLAN.

regulations - Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers management of the Forest Service. (2)

rehabilitation - Action taken to restore, protect, or enhance site productivity, water quality, or other resource values over a period of time

release - Freeing trees from competition for light, water, and nutrients by removing or reducing the vegetation growth that is overtopping or closely surrounding them.

removal cut (final cut) - The removal of the last seed bearers or shelter trees after regeneration is established under a shelterwood method. (6)

renewable resources - Resources that are possible to use indefinitely, when the use rate does not exceed the ability to renew the supply

renewable resources assessment - An appraisal of the Nation's renewable resources that recognizes their vital importance and the necessity for long-term planning and associated program development. The Assessment meets the requirements of Section 3 of the Resources Planning Act and includes analyses of present and anticipated uses, demands, and supplies of the renewable resources, a description of Forest Service programs and responsibilities, and a discussion of policy considerations, laws, and regulations.

research natural area (RNA) - An area set aside by a public or private agency specifically to preserve a representative sample of an ecological community, primarily for scientific and educational purposes. In U.S.D.A Forest Service usage, Research Natural Areas are areas designated to ensure representative samples of as many of the major naturally-occurring plant communities as possible (6)

reserved lands - Lands reserved from the public domain for National Forest purposes, and lands which are added to the National Forest System by exchange for reserved National Forest lands (See **proclaimed land)**

residual stand - The trees remaining standing after some activity such as selection cutting (2)

resource - Anything which is beneficial or useful - be it animal, vegetable, mineral, a location, a labor force, a view, an experience, etc Resources, in the context of land use planning, thus vary from such commodities as timber and minerals to such amenities as scenery, scenic view points, or recreation opportunities (6)

resource allocation - The action of apportioning the supply of a resource to specific uses or to particular persons or organizations (6)

resource management plan - A Plan developed prior to the Forest Plan that outlined the activities and projects for a particular resource element independently of considerations for other resources. Such Plans will be superseded by the Forest Plan.

Resource Planning Act (RPA) - The Forest and Rangeland Renewable Resources Planning Act of 1974. Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of the act. (2)

responsible line officer - The Forest Service employee who has the authority to select and/or carry out a specific planning action. (1)

rest rotation - An intensive system of range management whereby grazing is deferred on various parts of the range during succeeding years, allowing the deferred part complete rest for one year. (6)

retention - See **visual quality objective**

returns to counties - 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

right-of-way (R/W) - An accurately located strip of land with defined width, point of beginning, and point of ending, the area within which 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. (6)

riparian - Pertaining to areas of land directly influenced by water. Riparian areas usually have visible vegetative or physical characteristics reflecting this water influence Stream sides, lake borders, or marshes are typical riparian areas (3)

riparian area - Geographically delineated areas, with distinctive resource values and characteristics, that are comprised of aquatic and riparian ecosystems

riparian ecosystem - A transition between the aquatic ecosystem, and the adjacent upland terrestrial ecosystem. Identified by soil characteristics and distinctive vegetation communities that require free or unbound water.

road - A general term denoting a way for purposes of travel by vehicles greater than 40 inches in width

> **forest arterial road** - Provides services to large land areas and usually connects with public highways or other forest arterial roads to form an integrated network of primary travel routes The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service. It is usually developed and operated for long-term land and resource management purposes and constant service. (10)
>
> **forest collector road** - Serves smaller land areas than a forest arterial road and is usually connected to a forest arterial or public highway. Collects traffic from forest local roads and/or terminal facilities. The location and standard are influenced by both long-term multiresource service needs as well as travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility. (10)
>
> **forest local road** - Connects terminal facilities with forest collector or forest arterial roads or public highways The location and standard are usually controlled by specific resource activity requirements rather than travel efficiency needs (10)
>
> **road (temporary)** - Any short-lived road not intended to be a part of the forest development transportation system and not necessary for future resource management. (10)

Roadless Area Review and Evaluation II (RARE II) - The national inventory of roadless and undeveloped areas within the National Forest and Grasslands. This refers to the second such assessment, which was documented in the Final Environmental Impact Statement of the Roadless Area Review and Evaluation, January 1979. (2)

rotation - Planned number of years between the formation of a generation of trees and its final harvest at a specified stage of maturity. Appropriate for even-aged management only. (6)

roundwood products - All timber products other than sawtimber and personal use fuelwood.

S

sale preparation costs - Costs associated with preparing a timber harvest on Forest Service lands for sale to the public, usually include all administrative costs for developing sale layout, writing an Environmental Assessment and selling the timber sale.

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. (1) For planning purposes, the sale schedule and the allowable sale quantity are synonymous for all periods or decades over the planning horizon. (1)

salvage cuttings - Intermediate cuttings made to remove trees that are dead or in imminent danger of being killed by injurious agents. (10)

sanitation cuttings - Intermediate cuttings made to remove dead, damaged, or susceptible trees to prevent the spread of pests or pathogens. (10)

sanitation-salvage treatment - See **salvage cutting; sanitation cutting.**

satisfactory cover - a stand of coniferous trees 40 or more feet (12 or more meters) tall, with an average canopy closure equal to or more than 70 percent. (11)

satisfactory range condition - On suitable range, forage condition is at least fair, with stable trend, and allotment is not classified PC (basic resource damage) or PD (other resource damage).

PC (basic resource damage)

Allotments will be classified as PC when analysis or evaluation indicates that one ore more of the following conditions exist and livestock use on the allotment is or has been a major factor contributing to this condition

a Maximum summer water temperatures are elevated above State Standards or other approved criteria on SMU class I·or II streams and this is largely due to the loss of shade-producing vegetation in the allotment.

b Management-induced instability exceeds 20 percent of the total miles of stream (SMU classes I-IV) in an allotment.

c Gully development of sufficient size to lower the seasonally saturated zone and change the plant community type is occurring

d. Soil condition rating on 25 percent or more of Key Areas is rated poor or very poor.

PD (other resource damage)

These allotments may or may not have approved allotment management plans (AMP's), but adverse impacts on resources other than the basic soil and water resources are occurring These impacts are the result of resource management objectives not being met An allotment will be classified as PD when 10 percent or more of its area meets this criteria. Damage to vegetation is based on use in excess of that planned.

scablands - Shallow-soiled lands typically dominated by such species as low and stiff sagebrush

scarified - Land in which the topsoil has been broken up or loosened in preparation for regenerating by direct seeding or natural seedfall. Also refers to ripping or loosening road surfaces to a specified depth for obliteration or "putting a road to bed" (3)

scenic areas - Places of outstanding or matchless beauty which require special management to preserve these qualities. They may be established under 36 CFR 294.1 whenever lands possessing outstanding or unique natural beauty warrant this classification (6)

scenic river areas - See **wild and scenic river.**

scheduled timber harvests - Volumes and acres programmed for harvest which are within the allowable sale quantity. This does not include salvage and sanitation harvesting

scoping process - A part of the National Environmental Policy Act (NEPA) process; early and open activities used to determine the scope and significance of the issues, and the range of actions, alternatives, and impacts to be considered in an Environmental Impact Statement (40 CFR 1501.7)

second growth - Forest growth that has become established following some interference, such as cutting, serious fire, or insect attack, with the previous Forest crop. (6)

sediment - Earth material transported, suspended, or deposited by water (6)

seed tree cutting - Removal in one cut of the mature timber from an area, except for a small number of seed bearers left singly or in small groups. (3)

seedlings and saplings - Live trees less than five inches in diameter at breast height. (See also **size class.**) (3)

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 establish a new crop of irregular constitution. (3)

sensitive species - Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Those species that have appeared in the Federal Register as proposed for classification or are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent placement on Federal or State lists. (2)

sensitivity analysis - A determination of the effects of varying the level of one or more factors, while holding the other factors constant. (6) (10)

sensitivity level - A measure of people's concern for the scenic quality of the National Forests. 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 (2)

sequential upper and lower bounds - A FORPLAN term referring to the constraint that sets upper and lower limits by which harvest levels can increase or decrease from decade to decade. This constraint constitutes a departure from nondeclining flow and allows the harvest to rise or fall by decade according to the bounds that are set (See **constraint**)

seral - A biotic community which is a developmental, transitory stage in an ecologic succession (6)

shelterwood - The cutting method that describes the silvicultural system in which, in order to provide a source of seed and/or protection for regeneration, the old crop (the shelterwood) is removed in two or more successive shelterwood cuttings. The first cutting is ordinarily the seed cutting, though it may be preceded by a preparatory cutting, and the last is the final cutting Any intervening cutting is termed removal cutting An even-aged stand results. (3)

short-span cable system - In timber harvesting, any cable logging system capable of yarding logs only from distances of up to 2,000 feet.

short-term - Ten years or less

silvicultural examination - The process used to gather the detailed in-place field data needed to determine management opportunities and direction for the timber resource within a small subdivision of a Forest area, such as a stand.

silvicultural system - A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced (3) (1)

silviculture - The art and science of controlling the establishment, composition, and growth of forests. (2)

single-tree selection - See **individual (single) tree selection.**

site index - A numerical evaluation of the quality of land for plant productivity, (6) . .based on the height of dominant trees in a stand at an arbitrarily chosen age. (3)

site preparation - 1) An activity (such as prescribed burning, disking, and tilling) performed on a reforestation area, before introduction of reforestation, to ensure adequate survival and growth of the future crop, **or** 2) manipulation of the vegetation or soil of an area prior to planting or seeding The manipulation follows harvest, wildfire, or construction in order to encourage the growth of favored species. Site preparation may include the application of herbicides; burning, or cutting of living vegetation that competes with the favored species; tilling the soil; or burning of organic debris (usually logging slash) that makes planting or seeding difficult.

site productivity - Production capability of specific areas of land

size class - For the purposes of Forest planning, size class refers to the intervals of tree stem diameter used for classification of timber in the Forest Plan data base.

seedling/sapling = less than five-inch diameter
pole/sapling or pole timber = five-inch to nine-inch diameter
sawtimber = greater than nine-inch diameter (7 inches in future stands)

skidding - A general term for hauling loads by sliding, not on wheels, as developed originally from stump to roadside, deck, skidway, or other landing. (3)

skyline logging - A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable.

slash - The residue left on the ground after tree felling and tending, and/or accumulating there as a result of storm, fire, girdling or poisoning It includes unutilized logs, uprooted stumps, broken or uprooted stems, the heavier branchwood, etc. (3)

small game - Birds and small mammals normally hunted or trapped (2)

smolt - Young salmon or steelhead which migrate to the ocean

smolt habitat capability index - An indicator of the quality of rearing habitat for young salmon or steelhead (smolt). It assumes that spawning gravels are adequate to provide sufficient spawning areas to fully seed the existing rearing habitat and that sufficient numbers of adults will escape past fishermen, hydroelectric dams, or natural mortality to return and fully seed the spawning gravels. It is expressed as the number of smolt which could be produced, estimating potential rather than actual production.

snag - A standing dead tree.

socioeconomic - Pertaining to, or signifying the combination or interaction of social and economic factors. (2)

softwoods - Coniferous trees, usually evergreen, having needles or scalelike leaves.

soil - The portion of the earth's surface consisting of disintegrated rock and humus (7)

soil damage (detrimental compaction or displacement) - For volcanic ash soils, an increase in bulk density of 20 percent over pre-harvest levels is considered detrimental compaction. For all other soils, an increase of 15 percent in bulk density or more is considered detrimental compaction. Detrimental displacement is the removal and horizontal movement of more than 50 percent of the topsoil or humus enriched A1 and/or AC horizons from an area of 100 square feet or more which is at least 5 feet in width.

soil productivity - The capacity of a soil to produce a specific crop such as fiber or forage under defined levels of management. Productivity is generally dependent on available soil moisture and nutrients, and length of growing season.

soil resource inventory - See **soil surveys.**

soil surveys - Systematic examinations of soils in the field and in laboratories, their description and classification; the mapping of kinds of soil, the interpretation according to their adaptability for various

crops, grasses, and trees, their behavior under use or treatment for plant production or for other purposes, and their productivity under different management systems (6)

soil texture - The relative proportions of the various soil separates in a soil, described by the classes of soil texture. Twelve basic soil texture classes are recognized, such as "loam." The textural classes may be modified by the addition of suitable adjectives when coarse fragments are present in substantial amounts, for example, "stony loam "

special interest areas - Areas managed to make recreation opportunities available for the understanding of the earth and its geological, historical, archaeological, botanical, and memorial features. (6)

special management areas (SMA) - Areas of unusual public interest or other significance, e g ; wilderness, primitive areas, scenic areas, or archeological areas. SMA's do not require formal designation, however, Special Interest Areas do. (10)

special places - Special places on the Wallowa-Whitman National Forest, i e , dispersed recreation sites, water features, rock or unique landform features, areas of unique vegetation, historic sites or other places which are special to Forest users will be protected, commensurate with other Forest management objectives.

special use permit - A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest land for some special purpose

spike camp - A hunting camp that is set up in advance of the client's arrival. This camp may be left up for the duration of the hunting season The camp may or may not be used by the outfitter The specific location is described in the permit Also refers to an isolated fire camp, away from the primary fire camp

stand (tree stand, timber stand) - An aggregation of trees or other vegetation occupying a specific area and sufficiently uniform in species composition, age arrangement, and condition as to be distinguishable from the forest or other vegetation or land cover on adjoining areas (2)

stand diversity - Any attribute that makes one timber stand biologically or physically different from other stands. This difference can be measured by, but not limited to· different age classes; species, densities; or non-tree floristic composition

stand examination surveys - Procedures to collect data on Forest stands.

standard - A statement which describes a condition when a job is done properly Standards show how well something should be done, rather than what should be done (6)

standards and guidelines (S&G) - Principles specifying conditions or levels of environmental quality to be achieved

standard motor vehicles - Those which are normally used on highways and roads, such as passenger cars, pickups, four-wheel-drive pickups and station wagons, vans, trucks, and other types of vehicles that are not privarily designed for off-road use

statistical high bid (stat high bid) - The successful bid for Forest stumpage.

stocking - The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard, that is, the basal area or number of trees required to fully use the growth potential of the land

stream blockage - Accumulation of soil, rock, and organic material deposited in a stream channel by landslides that prevent fish from moving upstream.

stream buffer - Vegetation left along a stream channel to protect the channel or water from the effects of logging, road building, or other management activity (See **vegetation leave area**)

stream class - Classification of streams based on the present and foreseeable uses made of the water, and the potential effects of on-site changes on downstream uses. Four classes are defined:

> Class I - Perennial or intermittent streams that: provide a source of water for domestic use, are used by large numbers of fish for spawning, rearing or migration; and/or are major tributaries to other Class I streams.
>
> Class II - Perennial or intermittent streams that: are used by moderate though significant numbers of fish for spawning, rearing or migration, and/or may be tributaries to Class I streams or other Class II streams
>
> Class III - All other perennial streams not meeting higher class criteria
>
> Class IV - All other intermittent streams not meeting higher class criteria. (10)

streamflow - The flow of water, generally with its suspended load, down a well-defined water course. (6)

streamside management unit (SMU) - An area of varying width adjacent to a stream where practices that might affect water quality, fish, and other aquatic resources are modified to meet water quality goals, for each class of stream The width of this area will vary with the management goals for each class of stream, characteristics of the stream and surrounding terrain, and the type and extent of the planned activity

stream structure - The arrangement of logs, boulders, and meanders which modify the flow of water, thereby causing the formation of pools and gravel bars in streams Generally, there is a direct relationship between complexity of structure and fish habitat. Complex structure is also an indication of watershed stability.

stumpage (stumpage value) - The value of timber as it stands uncut, in terms of an amount per unit of volume. (6)

substantive comment - A comment that provides factual information, professional opinion, or informed judgment germane to the action being proposed (10)

successional stage - A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax; for example, coniferous forests in the Blue Mountains progress through six recognized stages· grass-forb; shrub-seedling; pole-sapling timber; young timber, mature timber; old-growth timber (2)

suitability - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices. (1) (2) (FSM 1905)

suitable forest land - Land to be managed for timber production on a regulated basis.

summer range - A range, usually at higher elevation, used by deer and elk during the summer. Summer ranges are usually much more extensive than winter ranges. (8)
supply - The amount of an output that producers are willing to provide at the specified price, time period, and condition of sale.

supply schedule (curve) - A schedule of amounts of an output that producers are willing to provide at a range of prices, at a given point in time and condition of sale. (See **price-quantity relationship**)

suppression - The process of extinguishing or confining fire. (2)

sustained-yield of products and services - The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land. (1) (6)

T

targets - Pacific Northwest Regional RPA output and activity levels which are assigned to the 19 Forests in the Region

technology change - A change in the relationship between inputs and outputs in a production process resulting from the implementation of new technology, or a new application of existing technology (10)

tentatively suitable 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; (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that it is possible to restock adequately within five years after final harvest, and (d) adequate information is available to project responses to timber management activities

thinning - A felling made in an immature stand primarily to maintain or accelerate diameter increment and also to improve the average form of the remaining trees without permanently breaking the canopy. An intermediate cutting. (3)

threatened and endangered (T&E) species - See **threatened;** see **endangered**

threatened species - Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future (See also **endangered species**) (2)

tiering - Refers to the coverage of general matters in broader environmental impact statements (such as National program or policy statements) with subsequent narrower statements or environmental analyses (such as Regional or Basin-wide program statements, or ultimately, site-specific statements) incorporating, by reference, the general discussions and concentrating solely on the issues specific to the statement subsequently prepared. (40 CFR 1508 28)

timber classification - Forest land is classified under each of the land management alternatives according to how it relates to the management of the timber resource The following are definitions of timber classifications used for this purpose.

> **nonforest** - Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses
>
> **forest** - Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use
>
> **suitable** - Commercial forest land identified as appropriate for timber production in the forest planning process
>
> **unsuitable** - Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness) or identified as not appropriate for timber production in the forest planning process

timber harvest schedule - See **sale schedule.**

timber production - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use For purposes of Forest planning, the term "timber production" does not include production of fuelwood or harvest of unsuitable lands. (1) (2)

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 (ASQ) (chargeable volume) and any additional material (nonchargeable volume) planned for sale. Expressed as the 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 the growing condition of the remaining trees. (2)

topography - The configuration of a surface including its relief, elevation, and the position of its natural and human-created features (6)

Total Resource Information system - See **TRI**

total suspended particulates (TSP) - Any finely divided material (solid or liquid) that is airborne with an aerodynamic diameter smaller than a few hundred micrometers.

tractor logging - Any logging method which uses a tractor or other mobile surface units as the motive power for transporting logs from the stumps to a collecting point--whether by dragging or carrying the logs (3)

tradeoff - The combination of benefits and costs which are gained and lost in switching between alternative courses of action Trade-offs include only those portions of benefits and costs which are not common to all alternative courses of action under consideration (6)

transitory range - Land that is suitable for grazing use of a nonenduring nature over a period of time; often found in the openings created by timber harvesting activities For example, on particularly disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage (6)

TRI - A natural resource data base used on National Forests in the Pacific Northwest (Washington and Oregon) to provide storage and retrieval for in-place resource data. TRI system is a multimedia information system using maps, aerial photographs, paper forms, microfilm, and computer storage to handle large volumes of data

TRI compartment - An orthophoto map area for indexing and storing data locations The scale is 4" = 1 mile, and covers approximately 6,500 to 8,000 acres, with boundaries on photo-identifiable features Each compartment has a unique name and number used for information storage on the orthophoto maps and in the USDA Fort Collins Computer Center.

TRI-counties - Baker, Union, and Wallowa Counties of Oregon -- the primary impact area of the Wallowa-Whitman National Forest

turbidity - The degree of opaqueness, or cloudiness, produced in water by suspended particulate matter, either organic or inorganic Measured by light filtration or transmission and expressed in Jackson Turbidity Units (JTU's).

U

understory - The trees and other woody species growing under a more-or-less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth. (6)

undeveloped area - Portion of the National Forest that is essentially unroaded

uneven-aged management - The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection. (1)

uneven-aged silviculture systems - The combination of actions that result in the creation of forests or stands of trees, in which trees of several or many ages grow together Cutting methods that develop and maintain uneven-aged stands are individual tree and group selecting cutting methods:

> individual tree selection cutting - The removal of selected trees of all size classes on an individual basis
>
> group selection cutting - The removal of all trees in groups for regeneration purposes. The size of the group will be small enough in area that all subsequent regeneration will be influenced by the surrounding uncut stand. Cuts are generally .25 - 2 0 acres in size

ungulate - A mammal with hooves. (8)

unplanned ignition - A fire started at random by either natural or human causes, or a deliberate incendiary fire

unregulated - Timber which was not considered (because of land allocations or condition of trees) in calculating a base sale schedule or departure. Unregulated timber includes salvage of epidemic mortality, volumes of cull material, or green volumes from unsuited lands.

unsatisfactory range condition - Allotment does not meet criteria for satisfactory condition. (See **satisfactory range condition.**)

utility corridor - A strip of land, up to approximately 600 feet in width, designated for the transportation of people, energy, commodities, and communications by: railroad, state highway, electrical power transmission (66 KV and above), and/or oil, gas, and coal slurry pipelines 10 inches in diameter and larger; and telecommunication cable and electronic sites for interstate use. (See also **corridor.**) (1)

utilization standards - Standards guiding the projection of timber yields and the use and removal of timber. The standards are described in terms of minimum diameter at breast height, minimum length, and percent soundness of the wood, as appropriate. (1)

V

variety classes - Variety Classes are obtained by classifying the landscape into different degrees of variety. This determines those landscapes which are most important and those which are of lesser value from the standpoint of scenic quality

The classification is based on the premise that all landscapes have some value, but those with the most variety or diversity have the greatest potential for high scenic value

There are three variety classes which identify the scenic quality of the natural landscape:

Class A - Distinctive
Class B - Common
Class C - Minimal

vegetative management - Activities designed primarily to promote the health of the crop forest cover for multiple-use purposes

vertical relief - A contour variation of the land surface perpendicular in relation to the surrounding land. (3) (4)

viable population - A population which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population on the planning area. (FSM 1905)

viewshed - Portion of the Forest that is seen from a major travel route, or high use location.

visual absorption capacity (VAC) - The physical capability of the land to support management activities without significantly affecting its visual character. Rated as high, moderate, and low.

HIGH (H) - High visual capability to absorb change.
MODERATE (M) - Moderate visual capability to absorb change.
LOW (L) - Low visual capability to absorb change

visual quality objective (VQO) - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape

preservation (P) - Ecological changes only.

retention (R) - Management activities should not be evident to the casual Forest visitor.

partial retention (PR) - Management activities remain visually subordinate to the characteristic landscape

modification (M) - Management activities may dominate the characteristic landscape but must, at the same time, follow naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

maximum modification (MM) - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background

enhancement - A short-term management alternative which is done with the express purpose of increasing positive visual variety where little variety now exists (2)

visual resource - The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors (2)

W

water rights - Rights to divert and use water or to use it in place.

water yield - The measured output of the Forest's streams. (6)

watershed - The entire land area that contributes water to a drainage system or stream (6)

wetlands - Areas that are inundated by surface or ground water often enough to support, and usually do support, primarily plants and animals that require saturated or seasonally saturated soil conditions for growth and reproduction. (E O. 11990)

wild and scenic river - Those rivers or sections of rivers designated as such by congressional action under the 1968 Wild and Scenic Rivers Act, as supplemented and amended Wild and scenic rivers may be classified and administered under one or more of the following categories

wild river areas - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted

scenic river areas - Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

recreational river areas - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past (2) (6)

Other terms pertaining to wild, scenic, and recreational river designation include.

potential rivers - Rivers on the National Rivers Inventory, as well as those identified by the Forest Service as having "potential" for designation as Wild and Scenic Rivers, which flow partly or wholly through the Forest. These may or may not include rivers formally designated as "potential" by the Secretaries of Agriculture and the Interior under Section 5(d) of the W&SRA.

eligible rivers - Those rivers found to be eligible for Wild and Scenic status according to resource considerations and in accordance with the Final Revised Guidelines for Eligibility, *Federal Register*, Vol. 47, no. 173, September 7, 1982. NRI rivers are not automatically eligible

suitable rivers - Those eligible rivers found to be suitable for recommendation to Congress as a component of the National Wild and Scenic River System Such a determination would be conducted *only* on rivers that are eligible. While there are no nationally recognized guidelines for a suitability determination, the following should be considered. the amount of private land and its use, state and local government as well as public interest, and cost involved In other words, the eligibility study considers the resources, and the suitability study includes political, economic, and public interest considerations.

study rivers - Those rivers formally designated by Congress to be studied under Sections 5(a) and 5(b) of the W&SRA. Only one stream in the Pacific Northwest, the North Umpqua, is currently in this category.

recommended rivers - Those rivers which are found to be eligible and suitable, and which are recommended to Congress to become components of the National Wild and Scenic River System. In the past, such a recommendation has usually been made only after Congress first directed that a study by made under provisions of Sections 5(a) and 5(b) of the W&SRA However, this does not preclude agency-initiated studies.

wilderness - Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation. Wildernesses are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or a primitive and unconfined type of recreation, are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition, and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest (2)

Wilderness Recreation Spectrum (WRS) - A further refinement of the **primitive** portion of the ROS The following terms deal only with officially designated wilderness:

primitive trailed - The sights, sounds, and smells relating to human activities outside the wilderness are essentially non-existent. The same factors relating to human activities within the

wilderness are minimized. An **extremely high opportunity** exists for exploring and experiencing considerable isolation, tranquility, and self-reliance

primitive trailless - The most remote, generally the core area which is least accessible Terrain, vegetation, trail density, and reasonable travel methods provide an area generally large enough to allow at least two days of cross-country travel without crossing a constructed trail. A ***most outstanding*** *opportunity exists for isolation and solitude free from evidence of past* human activity.

semiprimitive trailed - The least remote; generally those areas nearest trailheads and major access points or the wilderness periphery where the sights, smells, and sounds of human activities both within and outside the wilderness are affecting the wilderness visitor Opportunities for a wilderness-related experience are only **moderate.**

wildlife and fish user day (WFUD) - Twelve visitor hours which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

wildfire - Any wildland fire that is not a prescribed fire (See also **prescribed fire**) (2)

winter range - A range usually at lower elevation, used by migratory deer and elk during the winter *months, usually smaller and better-defined than summer ranges. The criterion for mapping big-game* winter range was: These ranges represent the area occupied by approximately 90 percent of the elk population from December 1 to April 1, two out of three winters

withdrawal - A legislative or administrative order removing specific land areas from availability for certain uses.

wolf plant - *A plant species generally considered to be palatable, but which is not grazed* Absence of grazing allows the plant to evolve into a relatively large, coarse form intermixed with dead previous year's growth Extensive root development allows the plant to successfully exclude competition from younger plants The resulting coarse growth is less palatable and produces less forage growth than identical species exposed to periodic grazing

wood fiber production - The growing, tending, harvesting, and regeneration of harvestable trees.

woody material - Organic materials necessary for stream channel stability and maintenance of watershed condition. It includes large logs and root wads.

working circle (WC) - A geographic division of the Forest created for administrative or marketing purposes. (3)

working group - *A grouping of community types or forest types indicative of timber productivity.*

X, Y, Z

xeric - A dry soil moisture regime. Some moisture is present but does not occur at optimum levels for plant growth. Irrigation or summer fallow is often necessary for crop production (3)

yarding - Hauling timber from the stump to a collection point. (2)

yield tables - Tables that estimate the level of outputs that would result from implementing a particular activity. Usually referred to in conjunction with FORPLAN input or output. Yield tables can be developed for timber volumes, range production, soil and water outputs, and other resources

zone of influence - The geographic area whose social, economic and/or environmental condition is significantly affected by changes in Forest resource production or management.

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